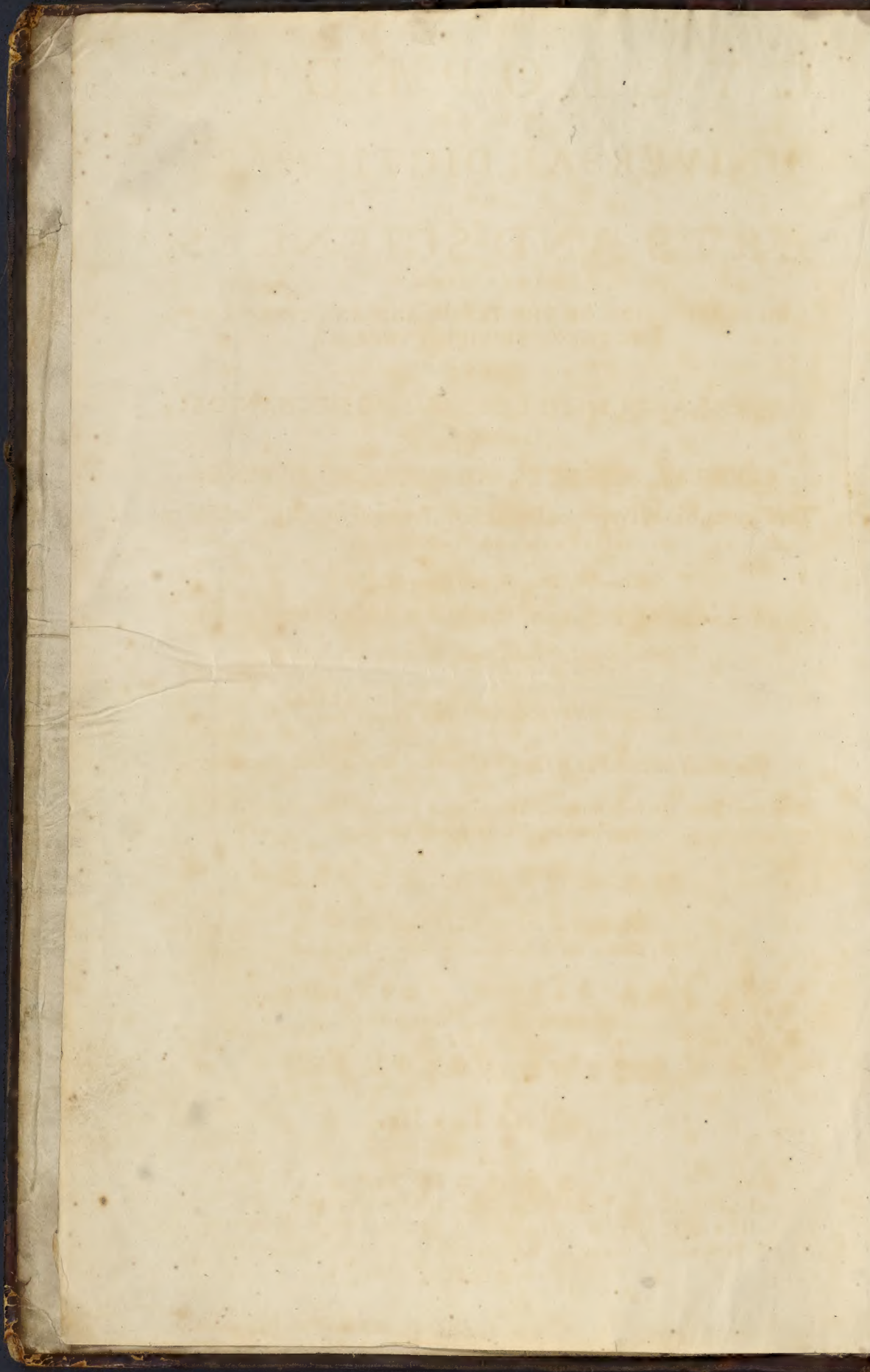


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CYCLOPÆDIA:
OR, AN
UNIVERSAL DICTIONARY
OF
ARTS AND SCIENCES;

CONTAINING

AN EXPLICATION OF THE TERMS, AND AN ACCOUNT OF
THE THINGS SIGNIFIED THEREBY,

IN THE

SEVERAL ARTS, BOTH LIBERAL AND MECHANICAL;

AND THE

SEVERAL SCIENCES, HUMAN AND DIVINE:

The Figures, Kinds, Properties, Productions, Preparations, and Uses of Things
NATURAL AND ARTIFICIAL:

The Rise, Progress, and State of Things

ECCLESIASTICAL, CIVIL, MILITARY, AND COMMERCIAL:

With the several Systems, Sects, Opinions, &c. among

PHILOSOPHERS,
DIVINES,
MATHEMATICIANS,

|| PHYSICIANS,
ANTIQUARIES,
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Ephemerides, &c. in several Languages.

By E. CHAMBERS, F.R.S.

*Floriferis ut apes in saltibus omnia libant,
Omnia nos* ———— LUCRET.

THE SIXTH EDITION,
CORRECTED and AMENDED.

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CYCLOPÆDIA: OR, AN UNIVERSAL DICTIONARY OF ARTS AND SCIENCES.

LAB

L, *EL*, a semi-vowel, or liquid; making the eleventh letter of the alphabet.
The *l* has a sweet sound, and is pronounced by applying the tongue to the palate.

Passerat observes, that *l* was frequently used among the ancients for *b*; as in *cillibæ* for *cibillæ*: for *d*; as, *alipe*, for *adipe*: for *c*; as *mutila* for *mutica*: for *n*; as, *arvilla* for *arvina*, *belle* for *bene*, *colligo* for *colligo*: for *r*; as, *frateius* or *frater*, *balatrones* for *baratrones*: for *s*; as *ancille*, of *am* and *caesium*, *equis* for *equisio*: for *t*; as *equifelis* for *equisetis*, *The-lis* for *Theitis*. See *B*, *T*, &c.

The double *ll* is a modern contrivance, and was never used among ancient Roman authors: they wrote *alium* not *allium*, *macelum* not *macellum*, *polucere* not *pollucere*.

The double *ll* of the Greeks was sometimes changed by the Romans into *li*, as in *ἀλλομαι*, *salio*; *ἄλλος*, *alius*: *ὄλλος*, *folium*: *r* has also been turned into two *ll*; as, *hira*, *illa*; *sarare*, *satullare*, &c. and *l* into *x* or *xill*; as *ala*, *axilla*; *mal-la*, *maxilla*; *velum*, *oxellum*; *d* was also used for *l*; *n* for two *ll*, and *r* for one *l*. See *R*, &c.

L is also frequently used instead of *d*, as in *Ulysses*, from the Greek *Ὀδυσσεύς*, in the Æolic dialect *Ὀδυσσεύς*. Thus also for *dentia*, we say *laudia*; for *daerume*, *lacryme*, &c. See *D*.

There are several people, for instance, the Chinese in Asia, the Ilinois in America, &c. who cannot pronounce the *r*, but always change it into *l*. Thus, when any of them have been baptized by the name of *Petrus*, *Franciscus*, &c. they always pronounce it *Petlus*, *Flanciscus*, &c. See *R*.

The Spaniards and Welsh usually double the *l* at the beginning of a word, which follows nearly the same with our *hl* or *fl*.

The figure of our *l* we borrowed from the Latins, they from the Greeks, and they again from the Hebrews, whose *lamed* is much like our *l*, excepting that the angle is somewhat more acute.

L was also a numeral letter among the ancients, and is still so in the Roman cyphering, signifying *fifty*; according to the verse,

Quinquies L denos numero designat habendos.

When a dash was added at top *L*, it stood for *fifty thousand*. *L* was used for *fifty*, as being half a *C*, which signified a hundred, and was formerly written thus *L*, which, according to Pasquier, makes two *LL*, the one upright, the other inverted.

The French *louis d'ors* have a cross on them consisting of eight *L*'s interwoven, and disposed in form of a cross. See *LOUIS*.

The epocha's on Greek medals are usually written with the ancient *lamda*, *L*; which, according to the tradition of the antiquaries, stands for *Λαοκράτης*, a poetical word, unknown in common speech, signifying *anno*, and which, it is probable, was more used in Egypt than Greece.

LABARUM, the banner, or standard born before the Roman emperors in the wars.

VOL. II.

LAB

The *labarum* consisted of a long lance, with a staff atop, crossing it at right angles; from which hung a rich streamer, of a purple colour, adorned with precious stones.

Till the time of Constantine it had an eagle painted on it, but that emperor, in lieu thereof, added a cross with a cypher expressing the name of Jesus.

Constantine chose *five* of the bravest men in his guards to bear it on their shoulders, each in his turn. — Eusebius tells us, that in the battle against Maxentius, the person who bore it being fatigued, gave it to another, and that he had no sooner parted with it, but he was killed; all the strokes he received while the *labarum* was in his charge, not being able to wound him. — The author adds, he had this miracle from the emperor's mouth.

This standard the Romans took from the Germans, Dacæ, Sarmatæ, Pannonians, &c. whom they had overcome.

The name *labarum* was not known before the time of Constantine; but the standard itself, in the form we have described it, abating the symbols of Christianity, was used by all the preceding emperors.

* Some derive the word from *labor*, as if this signified their labours; some from *λαβών*, reverence, piety; others from *λαβόντων*, to take; and others from *λαβύρα*, iggils.

The *labarum*, has afforded very ample matter for criticism, and has been discoursed of by Fuller, Alciatus, Cujas, Gyrardus, Liplius, Meursius, Vossius, Hoffman, Valois, Du Cange, &c.

LABEL, a long, thin brass ruler, with a small sight at one end, and a centre hole at the other; commonly used with a tangent line on the edge of a circumferentor, to take altitudes, &c.

LABEL, in law, is a narrow slip of paper, or parchment, affixed to a deed or writing, in order to hold the appending seal. — Any paper annexed by way of addition, or explication, to any will or testament, is also called a *label*, or *codicil*. See **CODICIL**.

LABEL, in heraldry, a kind of addition to the arms of a younger brother, especially a second, to distinguish him from the first or eldest.

The *label* is esteemed the most honourable of all differences; and is formed by a fillet usually placed in the middle, and along the chief of the coat, without touching its extremities. Its breadth ought to be a ninth part of the chief. It is adorned with pendants somewhat like the drops under the triglyphs in the Doric freeze. — When there are above three pendants, the number must be specified in blazoning. — There are sometimes six.

LABIA, in anatomy. See the article **LIPS**.
Depressor LABIORUM. } See the article { **DEPRESSOR**.
Elevator LABIORUM. } { **ELEVATOR**.

LABIAL, a term in the French law, used in the same sense with *oral*. See **ORAL**.

LABIAL Letters, among grammarians, are those whose pronunciation is chiefly effected by the motion of the lips. See **LETTER**.

By which they stand contradistinguished from *palatal*, *dental*, *guttural*, &c. letters. See **PALATAL**, **GUTTURAL**, &c.

LABIAL *Officers*, are such as are only made by word of mouth, or even by writing, where there is no valuable consideration: In courts of equity these are not regarded.

LABIATE *Flowers*, from the word *labium*, a lip, is a term applied by herbalists to such flowers as have one or two lips, some of which represent a kind of helmet or monks hood. See **FLOWER**.

LABORATORY, or **ELABORATORY**, the chymists workshop; or the place where they perform their operations; where their furnaces are built, their vessels kept, &c.

In general, the term *laboratory* is applied to any place, where physical experiments, and operations in pharmacy, chymistry, pyrotechnia, &c. are performed.

LABORATORY of an hospital, is a place where the chymical, &c. remedies are made up.

LABORATORY, in a camp, is the tent where the fireworkers and bombardiers prepare their works, drive their fuses, fix their shells, and carcasses, make quick match, &c.

LABYRINTH, **ΛΑΒΥΡΙΝΘΟΣ**, among the antients, was a large and intricate edifice cut out into various isles, and meanders, running into each other, so as to render it difficult to get out of it.

There is mention made of four celebrated *labyrinths* among the antients, ranked by Pliny in the number of the wonders of the world; viz. the *Cretan*, *Egyptian*, *Lemnian*, and *Italian*.

That of *Crete* is the most famed; it was built by *Dædalus*; and it was hence that *Theseus* made his escape by means of *Ariadne's* clue.

That of *Egypt*, according to Pliny, was the oldest of all, and was subsisting in his time, after having stood 3600 years. He says it was built by king *Petefucus*, or *Tithoes*, but *Herodotus* makes it the work of several kings: It stood on the banks of the lake *Myris*, and consisted of twelve palaces, and 1500 apartments: *Mela* says, *ter mille domos*.

That of *Lemnos* was supported by columns of wonderful beauty, there were some remains of it at the time when Pliny wrote.—That of *Italy*, was built by *Porcenna* king of *Hetruria*, for his tomb.

LABYRINTH, in anatomy, denotes the second cavity of the internal ear, which is formed or excavated out of the os petrosum; and is thus called, as having several windings in it.

This cavity is divided into three parts; the first called the *vestibulum of the labyrinth*, because it leads into the other two. The second comprehends three canals bent semicircularly, and thence called *semicircular canals*, placed on one side of the vestibulum, towards the back of the head. The third called the *cochlea*, is situate on the other side.

Dr. Vieussens observes that the bone out of which the *labyrinth* is dug, is white, hard, and very compact; that the ethereal matter of sounds laden with impressions striking against its side, may lose little or nothing of its motion, but communicate it entire to the nerves of the ear. See **HEARING**, **SOUND**, &c.

LAC Laurus. See the article **MINERAL AGARIC**.

LACCA, or gum **LAC**, a sort of gum, or resin, hard, red, brittle, clear and transparent, brought from Malabar, Bengal, and Pegu, and used in dying scarlet, and in painting, making sealing wax, &c.

Authors differ as to the production of this curious drug. *F. Tachard*, who was on the spot, tells us, that a kind of little ants fixing themselves on the branches of several trees, leave behind them a reddish moisture, which lying exposed to the air and sun, hardens in five or six days time, and becomes *lacca*.—Some imagine that it is not the production of the ants, but a juice which they draw out of the tree, by making little incisions in it; and others say that the trees where the *lacca* is found, do yield a gum; but that it is of a very different nature from the *lacca*.

The ants they tell us, act here in quality of bees, and the *lacca* is their wax. They work at it eight months in the year, and the rest of the time lie by because of the rains.

Lemery having examined the gum *lacca* chymically, judges it to be a mean mixture between a gum and a resin, and more abundant in salt than oil.

To prepare the *lacca* for use in dying, they first separate it from the branches to which it adheres, pound it in a mortar, and throw it into boiling water; and when the water is well dyed, they pour on fresh, till such time as it will tinge no more. Part of the water thus tinged is evaporated in the sun; after which the thickened tincture is strained through a linnen cloth.

M. Geoffroy, examining the gum *lacca*, found it to be a kind of comb, such as the bees, and some other insects, are accustomed to make. Upon breaking it into pieces, it appeared divided into a great number of alveoli, or little cells of an uniform figure, and which he thinks plainly shew that it never oozed from trees. These cells are not mere excrements, as some imagine, but are intended for something to be deposited in them. And accordingly are found to contain

little bodies, which the first observers took for the wings or other parts of the insects that produced the *lacca*.—These little bodies are of a beautiful red colour; and when broke, make a powder as fine as cochineel. It is most probable, these cells are defined to lodge the young brood, as those of the bees, and that these little carcasses are the embryo's of insects, or perhaps their skins.

There are several sorts of *lacca*; that mentioned in the last paragraph is the natural; when it is prepared, as in the former, those kinds of dry cells are not seen.—*M. Geoffroy* reckons six or seven different kinds; besides which, there are several pastes used by the painters, that go by this name, or by that of *laque*. This gum boiled in water with acids, makes a beautiful red dye.

Artificial LACCA, or **LAQUE**, is also a name given to a coloured substance, drawn from several flowers; as the yellow from the flower of the juniper, the red from the poppy, and the blue from the iris or violet.

The tinctures of these flowers are extracted by digesting them several times in aqua vite, or by boiling them over a stove-fire in a lixivium of pot-ashes and alum.

An *Artificial lacca* is also made of *Brazil* wood boiled in a lixivium of the branches of the vine, adding a little cochineel, turmeric, calcined alum, and arsenic incorporated with the bones of the cuttle-fish pulverized, and made up into little cakes, and dried.

If it be to be very red, they add the juice of citron to it; to make it brown, they add oil of tartar.

Dove-coloured or columbine *lacca*, is made with *brazil* of *Fernambuc* steeped in distilled vinegar for the space of a month, and mixed with alum incorporated in cuttle-fish bone.

LACERNA, a thick coarse sort of military garment worn by the antients.

The *lacerna* was a kind of cloak of woollen, only used by the men; who wore it over the toga, and when that was not on, over the tunica.—It was at first very short, but growing popular in the Roman army, it was soon lengthened.

The *lacerna* was scarce known in Rome till the time of the civil wars and the triumvirate; then indeed it came into fashion, for the soldiers being then frequently in the city, or at the city-gates, the sight became familiar to the citizens, and they fell into the use of it; insomuch that it became the common dress of the knights and senators, till the time of *Valentinian* and *Theodosius*, when the senators were prohibited the wearing of it in the city.

The *lacerna* appears to have been much the same with the *chlamys* and *birrus*.

Martial mentions *lacernæ* of ten thousand sesterces price.

LACHRYMAL, or **LACRYMAL Gland**, in anatomy, a small oblong gland situate above the eye, near the little canthus, whence proceed two or three small ducts, which opening on the inward surface of the eye-lid, filtrate a serosity serving to moisten the ball of the eye, and facilitate its motion.

Near the larger angle is also a little eminence, in form of a caruncle, which some have taken for another *glandula lachrymalis*, but by mistake; this being no more than the duplicature of the inner membrane of the eye-lids.

On the same side, near the lesser angle, are two little perforations, called *puncta lachrymalia*.

On the same side is also a small bone, one of those of the upper jaw, sometimes called *os lachrymale*, but more usually *os unguis*.

Fistula LACHRYMALIS, is a fistula in the larger angle of the eye.

It usually happens after an abscess formed in the sacculus lachrymalis, by means of the serosity lodged there; which being retained too long, becomes acrimonious, and occasions an ulcer, which frequently degenerates into a fistula.

Sacculus LACHRYMALIS. See **SACculus**, and **LACHRYMALIA**.

LACHRYMALIA, or **LACRYMALIA Puncta**, in anatomy, two little apertures in the great angle of each eye, into which an aqueo-saline pellucid humour, secreted from the blood by the *glandula lachrymalis*, is conveyed, and thence carried off by the lachrymal canals into a little bag called *sacculus lachrymalis*, in the canal of the nose; whence, by a pipe always open it is carried into the cavity of the nose immediately under the lower os spongiosum.

Hence appears the reason why people, in crying, run at the nose.

This humour separated by the *glandula lachrymalis*, serves to moisten and lubricate the ball of the eye, and prevent any hurtful attrition: when it is secreted in any great quantity, so as to overflow the eye-lids, it is called *tears*. See **TEARS**.

LACHRYMATORIES, or **LACRYMATORIES**, were antiently small glass or earthen vessels, wherein the tears of the weeping friends that survived were deposited, and buried with the ashes and urns of the dead.

Some of these are still seen in the cabinets of the curious.

LACONIC Style. } See the article **STYLE**.

LACONICA Syntala. } See the article **SCYTALA**.

LACONISM, ΛΑΚΩΝΙΣΜΟΣ, a short, pithy, sententious speech, in the manner of the Lacedæmonians, who were remarkable for the closeness and conciseness of their way of delivering themselves.

LACRYMAL See the article **LACHRYMAL**.

LACTATION, the act of giving suck.

The word is also applied to the time during which the mother doth that office to her young.

LACTEALS, or **LACTEAL Veins**, a kind of long slender tubes, for the conveyance of the chyle from the intestines to the common reservoir.

They appear to have been known to Hippocrates, Erasistratus, and Galen; but were first duly described and published by Aëlius, an Italian physician in 1622, and called *lacteals*, from the liquor they contain, which resembles milk. Vid. *Dougl. Bibl. Anat.* p. 236. Ed. 1734. Their coats are so thin as to be invisible, except when distended with chyle, or lymph.—They arise from all the parts of the small guts, and as they run from the sides of the guts to the glands in the mesentery, unite and form larger branches, called *venæ lacteæ primi generis*.—The mouths of these *lacteals*, which are open into the cavity of the guts, from whence they receive the chyle, are so small, as not to be seen by the best microscope. It was necessary they should be smaller than the finest arteries in the body, that nothing might enter to stop the circulation of the blood.

The same extremity of the *lacteals* has likewise a communication with the capillary arteries of the guts, by which they receive a lymph that dilutes, and propels the chyle forwards, and washes the *lacteals* and glands, that they might not sur, and be obstructed by the chyle's staying in them upon fasting.

The other extremity of the *lacteals* discharges the chyle into the vascular cells of the glands dispersed up and down the mesentery: And from thence arise other *lacteals*, of a larger size, which carry the chyle immediately into the receptaculum chyli, and these are called *lacteæ secundi generis*.

The *lacteal veins* have valves at proper distances, which hinder the chyle from returning back into the intestines.

It is still doubted, whether or no the intestina crassa have any *lacteals* or not. The impossibility of human dissection proper for such an enquiry, gives no room either to affirm or deny. But the contents of the thick intestines seem not likely to afford much chyle, and therefore if there be any *lacteals*, it is probable they are very few.

In brutes, if dissected at a reasonable time after feeding, as two or three hours, the *lacteals* appear very tumid and white; and if wounded, the chyle flows plentifully from them. But if inspected when the stomach of the animal has lain some time empty, they appear like lymphatics, visible indeed, but filled with a transparent liquor.

That the *lacteals* have a communication with the cavities of the intestines, is evidently demonstrated by their contents, the chyle; but how their pores are disposed to receive it, has not yet been discovered; nor is there any way known whereby to fill the *lacteals* from the cavities of the guts after death. It is probable then, their entrance into the gut is oblique, since neither wind nor liquors can pass from thence. As it is found these pores can only receive any thing in their living state, we may be allowed to imagine, that it is the peristaltic motion of the guts which disposes them in that state to receive the chyle. And this may be done by means of the circular and longitudinal fibres of the intestines still applying the internal coats of the guts to their contents, by which means its pores absorb the chyle from the excrementitious part.

LACTARY Column. See the article **COLUMN**.

LACTEA Via, the milky way. See the article **GALAXY**.

LACTIFER Tubuli. See the article **TUBULI**.

LACUNÆ, among anatomists, certain excretory canals in the genital parts of women.—See *Tab. Anat. (Splanchn) fig. 11. litt. II.*

Between the fleshy fibres of the ureters, and the membrane of the vagina, is found a whitish glandulous body, about a finger thick, running round the neck of the bladder, having a great number of excretory ducts, which de Graaf calls *lacinae*, and which terminate in the lower part of the orifice of the womb; conveying thither a slimy matter, that mixes with the seed of the male.

LACUNAR, in architecture, an arched roof, or ceiling; more especially the planking, or flooring over portico's, or piazza's.

LADANUM, or **LABDANUM**, in pharmacy, a gummos, or a resinous matter, oozing out of the leaves of a shrub called *cistus ladanifera* which is very common in the hot countries of the Levant, and whereof there are various kinds.

Dioscorides says, they gather the *ladanum* by means of goats, which browsing on the leaves of this shrub, return to the stable with their beards loaded with a fat substance, which

the peasants rake off, with a kind of combs made for that purpose. This matter they thus collect into lumps, and, as it is mixed with the goats hair, and other impurities, call it *ladanum in the beard*, or *natural ladanum*.—Others are said to draw cords over the leaves, and other parts of the shrub; and scraping off what had stuck to the cords, they make up the *ladanum* into little balls.

Tournefort assures us, that the common way of gathering the *ladanum* at this time is, by brushing it off the leaves with a sort of whip, composed of many lashes, or straps: after it is scraped off the straps, they make it into cakes of different sizes.

Ladanum is used in physic, to soften, digest, deterge, attenuate, and resolve. That which is brittle, of an ash colour, sweet scented, &c. is the best.

Pietro della Valle tells us, he was informed by the Indians, that *ladanum* is formed like dew, and falls from heaven like manna; that it is gathered on the leaves of a plant a palm and a half high; that, after gathering, they boil it, by which means it becomes soft, like wax.

Liquid LADANUM, more properly called *clear*, or *purified ladanum*, is a preparation of the natural *ladanum*, by melting and purifying it from the hairs, &c.

This harden is sometimes sold for a sort of black amber grease.

LADING. See the article **BILL of Lading**.

LADY of the Thistle. } See **THISTLE**.

Presentation of our LADY. } See **PRESENTATION**.

LAGAN*, or **LAGON**, in our ancient sea laws, shipwrecked goods, left by the sea, lying on the sand, either ashore, or out at sea.

* The word seems formed from the Saxon *legan*, or *legan*, *jacere*, to lie.—Though others deduce it from the Latin *ligare*, to bind; and suppose it to denote goods tied together with a buoy, or the like, to hinder their sinking to the bottom, that they may be found again.

Lagan, is usually joined with *jetson*, and *flotson*. See **JETSON**, and **FLOTSON**.

LAGOPHTHALMIA*, ΛΑΓΟΦΘΑΛΜΙΑ, a disease of the eye-lids, when the upper lid is so contracted, that the eye cannot be quite shut, but remains open even in the time of sleep.

* The word comes from the Greek *λαγος*, hare, and *οφθαλμος*, eye; this being the property of the eyes of hares.

LAICA Vi remouenda. See the article **VI**.

LAID under Metal. See the article **METAL**.

LAIR, or **LAYER**, in gardening. See the article **LAYER**.

LAIR, **LAYR**, or **LAYER**, among sportsmen, denotes a place where deer harbour by day.

LAIR, or **LAYR of a Deer**, is the impression which the beast has made on the grass, and ground, where he has lain down, or reposed.

LAIR, among husbandmen, also denotes a place, where cattle usually rest, under some shelter; the ground being enriched by their dung.

LAKE, a collection of standing water, inclosed in the cavity of some inland place, of a considerable extent, and depth.

According to some authors, those only are properly called *lakes*, which receive and emit rivers.

Lakes, however, may be divided into four kinds; 1°. Such as neither emit nor receive rivers. 2°. Such as emit rivers, without receiving any. 3°. Such as receive, without emitting any. 4°. Such as both receive, and emit rivers.

Of the first kind, some are perennial, others temporary: the temporary owe their origin, most of them, to rain, and to the cavity, or depression of the place where they are lodged. In the Indies they make artificial *lakes*, which they wall about, to catch the rain in wet seasons, and preserve it for their use in the dry ones.—There are several of this kind of *lakes*, formed also by the inundations of the sea and rivers, particularly the Nile and Niger; which, when they retire within their banks, leave floods of water, which the inhabitants take care to inclose, to serve as a magazine for the ensuing months.

The generation of perennial *lakes* may be also referred to rain, where the cavity is so deep as to receive a quantity in winter, more than the heat of the sun will be able to exhale in summer; though it is probable many of these *lakes* have their springs at bottom, by which they are also continually supplied.—To this class may be referred the turloughs, i. e. *terreus lacus*, or land-lakes, in Ireland, which are *lakes* one part of the year, and the rest smooth fields: At the bottom of these turloughs are found holes, through which the water springs in winter, and sinks towards summer.

The second species of *lakes*, which emit, without receiving rivers, is very numerous; they owe their origin to springs, the cavities where the spring is found not being able to contain all the waters it yields. See **SPRING**.

The third kind, viz. those which receive rivers without emitting any, apparently owe their origin to those rivers which in their progress from their source falling into some ample cavity, are collected together, and form a *lake* of such dimensions, as may lose as much by exhalation as it continually

tinually receives from its springs; or to a river's flowing on a soft spongy soil, which imbibes the water, and transmits it to the neighbouring grounds.—The number of these is but small.

Of the fourth species, which both receive and emit rivers, we reckon three kinds; as the quantity of water they emit is greater, equal, or less than they receive. If the quantity they emit be greater, it is plain they must have a spring at the bottom; if less, there must be some subterraneous ducts, or canals, or else the earth must be spongy; if it be equal, we gather, that they have neither any hidden springs, nor canals.—Of these lakes we have a great number, and those very considerable ones.

The generality of lakes consist of fresh waters, as most of those which are supplied either from some spring, far from the sea, or a river, or from the rain: some few of salt water, as those produced by the inundation of the sea, or by its immission through some duct of the earth, or that have salt springs at bottom.

Dr. Halley is of opinion, that all great perennial lakes are saline, either in a greater or less degree; and that this saltness increases with time; and on this foundation, he proposes a method for determining the age of the world.

The large lakes, wherewith the northern regions abound, serve for very good purposes, inasmuch as the warm vapours arising from them, serve for a defensive against the pinching cold of those climates.—To this it is owing, that Ireland, Scotland, &c. are less affected with frosts than much warmer countries.

LAKE, among painters, &c. See the article LACCA.

LAMA, or LAMAS, the title of an order of priests among the western Tartars, on the frontiers of China; who are held in great veneration.

They have a grand lama, who is their high-priest, and who is the second person in the kingdom, being the next in authority to the king. He receives homage, and adoration, not only from the people, but from the neighbouring kings; none of whom are ever intronized, without sending ambassadors to him to obtain his benediction.

The lama's are extremely superstitious, and are remarkably addicted to magic.

LAMB. See the article PASCAL Lamb.

LAMBATIVES, or rather LAMBITIVES, a form of medicine to be licked off the end of a liquorice-stick.

Lambatives amount to the same with *linctus*, *lobochs*, and *elegmas*.

LAMBDOIDES, ΛΑΜΒΔΟΕΙΔΗΣ, in anatomy, an epithet applied to the third proper tunic of the cranium, in regard it resembles the form of a Greek λ, lambda. See SUTURE.

For the same reason it is sometimes called *ypsiloides*, as bearing some resemblance to a Greek γ, *ypsilon*. See YPSILOIDES.

LAMELLÆ*, little, thin plates, or laminae, whereof the scales, and shells of fishes, &c. are composed.

* The word is a derivative of *lamina*; and signifies as much as *little laminae*.

LAMIÆ, ΛΑΜΙΑΙ, among the ancients, a kind of demons, or evil spirits, who, under the form of beautiful women, are said to have devoured children.

Horace makes mention of them in his *Art of Poetry*.—Some authors call them *lamie*, *a lamiano*.—Philostratus says, they are also called *larvæ*, or *lennæ*, as if they were all the same thing.—Bochart will have the word to be Phœnician, and derives it from 𐤋𐤍𐤏 to devour; alledging, that the fable of the *lamie* came from Libya.

LAMINÆ, in physiology, thin plates, or tables, whereof any thing consists: particularly the human skull, which are two, the one laid over the other.

LAMMAS-DAY, the first of August; so called, as some will have it, because lambs then grow out of season, as being too big. Others derive it from a Saxon word, signifying *loaf-mass*, because on that day our fore-fathers made an offering of bread made with new wheat.

On this day, the tenants who formerly held lands of the cathedral church in York, were bound by their tenure to bring a lamb alive into the church at high mass.

LAMP, ΛΑΜΠΑΔ, a sort of luminary, consisting of oil disposed with a wick in a proper vessel for burning.

The use of lighted lamps in churches, and places of devotion, is very ancient.—In the city of Fez is a mosque, wherein are nine hundred brazen lamps burning every night.

—In Turkey, all the illuminations are made only with lamps.—Polydore Vergil ascribes the first invention of lamps to the Egyptians; and Herodotus describes a feast of lamps held annually in Egypt.

Kircher shews the manner of preparing lamps, which shall diffuse a light so disposed, as to make the faces of those present appear black, blue, red, or of any other colour.

There has been a great dispute among the learned, about the sepulchral lamps of the ancients: some maintain, they had the secret of making lamps that were inextinguishable, alledging

several that had been found burning, at the opening of tombs, fifteen or sixteen hundred years old. But others treat these relations as fables; and others think that the lamps which before were extinguished, took light afresh upon the admission of fresh air.

Dr. Plott, however, is of opinion, such perpetual lamps are things practicable, and has himself made some proposals of this kind. The linum asbestinum, he thinks, may do pretty well for the wick, and that the naptha, or liquid bitumen, constantly springing into some of the coal mines, would answer for the oil.

If the asbestos will not make a perpetual wick, he thinks there is no matter in the world that will; and argues, that the tradition of such lamps must be fabulous, or else that they made them without wicks.

Such a lamp he thinks it possible to make of the bitumen springing into the coal mines at Pitchford in Shropshire; which, he says, like other liquid bitumens, will burn without a wick.

Those lamps that kindle on the immision of fresh air, the same author thinks might be imitated by inclosing some of the liquid phosphorus in the recipient of an air-pump; which, under those circumstances, will not shine at all; but on letting in the air into the recipient, there will possibly, says he, appear as good a perpetual lamp, as some that have been found in the sepulchres of the ancients.

Cardan's LAMP, is a contrivance of an author of that name, which furnishes itself with its own oil.

It consists of a little column of brass, tin, or the like, well closed every where, excepting a small aperture at bottom, in the middle of a little gullet, or canal, where the wick is placed.

Here the oil cannot get out, but in proportion as it spends, and so opens the passage of that little aperture.

This kind of lamp was in much use some years ago; but it has several inconveniences; such as that the air gets into it by starts and gluts; and that when the air in the cavity comes to be much rarified by heat, it drives out too much oil, so as sometimes to extinguish the lamp.

Dr. Hook, and Mr. Boyle, have invented other lamps, that have all the conveniences of Cardan's without the inconveniences.—See some improvements in the doctrine of lamps, under MIRROR.

LAMP Black.

Cul de LAMP.

Enamelling by LAMP.

Fire of a LAMP.

LAMPADARY, LAMPADARIUS, an officer in the ancient church of Constantinople; whose business was to see the church well lighted, and to bear a taper before the emperor, the empress, and the patriarch, when they went to church, or in procession.

The taper born by the lampadary before the emperor, was accompanied with diverse circles of gold, in manner of crowns; those held before the empress, and patriarch, had but one.—It seems they were of emblematical use, and were intended to keep those great persons in mind, that their light was to illumine those underneath them.

There were also lampadaries in the emperor's palaces; and others in the houses of the grantees: at first, the privilege of having a lampadary, or torch-bearer, was only granted to the principal officers of the crown, and the chief magistrates; but afterwards the emperor allowed it to other inferior officers, as questors, treasurers, &c.

Together with the taper, they bore before the magistrates the emperor's image, &c. And it is very probable, it was on account of this image, that they were first permitted to have a lampadary.

LAMPAS, a kind of fiery meteor, resembling a burning lamp, hence also denominated *fax ardens*. See METEOR.

LAMPAS, or LAMPERS, a kind of swelling in the palate of a horse; so called, because it is cured by burning with a lamp, or an hot iron.

The lampas is an inflammation, or tumor, in the roof of a horse's mouth, behind the nippers of the upper jaw.—It arises from abundance of blood resorting to the first furrow of the mouth, near the fore teeth, which causes that furrow to swell as high as his gatherers: It hinders the beast's feeding, and makes him let his meat fall, half chewed, out of his mouth again.

The lampas is a natural infirmity, which every horse has, first or last, and which every smith can cure.

LAMPETIAN S, LAMPETIANI, a sect of ancient heretics, who fell in with some of the opinions of the Arians.

Their founder, Lampetius, is said to have been one of the chiefs of the Marcionites. They condemned all kind of vows, particularly that of obedience, as inconsistent with the liberty of the sons of God.

LAMPORPHORUS, an appellation anciently given to the Neophytes, during the seven days that succeeded their baptism.

In the ceremony of baptism, the new Christian was clothed with

with a white robe, which he wore for the week following; and was thence called *lamprophorus*, which signifies a *person wearing a shining garment*; from *lampro*, shining, and *phoros*. I carry.

The Greeks also gave this name to the day of the resurrection, in regard their houses were adorned and illuminated on that day with an infinite number of torches, as a symbol of the light which that mystery diffused in the world.

LANÆ *Petra*. See the article *PETRA*.

LANCE, *LANCEA*, a spear; an offensive weapon, bore by the ancient cavaliers, in form of a half pike.

The lance consisted of three parts, the shaft, or handle, the wings, and the dart.—Pliny attributes the invention of lances to the Aetolians. But Varro, and Aulus Gellius say, the word *lance* is Spanish; whence others conclude the use of this weapon was borrowed by the people of Italy from the Spaniards.—Diodorus Siculus derives it from the Gaulish, and Festus from the Greek, *λανχην*, which signifies the same.

LANCETTI, a name given by the ancient laws of England to a kind of vassals, who were obliged to work for the lord one day in a week, from Michaelmas to Autumn, either with fork, spade, or flail, at the option of the lord.

LANCETTITE, a fine, small, chirurgion's knife; straight-pointed, and two edged; used in opening veins, &c. See *PHLEBOTOMY*.

LAND, in a general sense. See the articles *SOIL*, *EARTH*, &c.

Fardel of LAND.

Oxgang of LAND.

Plow-LAND.

Yard-LAND.

Yolk of LAND.

Arable LAND.

Champion LANDS.

Up-LAND.

If *ood*-LANDS.

Catch-LAND.

Charter-LAND.

Court-LANDS.

Fabric-LANDS.

Folk-LAND.

Forest-LAND.

Glebe-LAND.

Tenementary-LANDS.

Thane-LANDS.

Fore-LAND.

Head-LAND.

In-LAND.

Lay the LAND.

Burning of LAND.

Holding LAND in *Peage*.

LAND *Army*.

LAND *Roads*.

LAND *Telescope*.

LANDAN, in physiology. See the article *SAGO*.

LAND-CHEAP, an ancient customary fine, paid either in cattle, or money, upon the alienating or selling of *land* in certain manors, or within the liberty of certain boroughs.

At Malden in Essex, a payment is still made of 13d. in every mark of the purchase-money, for lands and houses sold in that town; which is called *land-cheep*.

LAND-FALL, is a sea term, signifying to fall in with the land.

Good LAND-FALL, is when a ship makes, or sees the *land* as she expected, according to her reckoning.—The contrary is called a *bad land-fall*.

LAND-GABLE, an antient term for a tax, or rent issuing out of a *land*; answering to what we now call *ground-rent*.

LAND-LOCKED, a ship is said to ride *land-locked*, when she is surrounded with land; that is, is at anchor in a place where there is no point open to the sea, so that she is safe from the violence of winds, and tides.

LANDSKIP, or LANDSCAPE, the view, or prospect of a country, extended as far as the eye will carry.

LANDSKIPS, in painting, are pieces representing some campaign, or rural subject, as hills, vales, rivers, and country houses, where human figures are only introduced as accidents, or circumstances.

Landskip painting is esteemed one of the lowest branches of painting. See *PAINTING*.

LANGREL SHOT, is a sort of shot sometimes used at sea, made of two bars of iron, with a joint, or shackle, in the middle; by which means it can be shortened, and so put the better into the gun; and at each end there is a half bullet, either of lead, or iron.

This shot, when discharged, flies out expanded, and so does more execution among the enemies' rigging, &c.

LANGUAGE, a set of words which any people have agreed upon, whereby to communicate their thoughts to each other.

The first principles of all languages, F. Buffier observes, may be reduced to expressions, signifying, first, The subject spoke of. Secondly, The thing affirmed of it. Thirdly, The

circumstances of the one and the other. But as each language has its particular ways of denoting each of these, a language is only to be looked on as an artificiality of expression, which chance or caprice has established among a certain people, just as we look on the mode of dressing, &c.—It is usage and custom is the rule of a language, and these held their empire independent of reason, or any other cause: nor has reason any thing to do in language, unless to study or teach it, such as it is: Here then commences grammar; a just plan of which, supposes a language already introduced by use; and without pretending to alter or amend a title, only furnishes reflections, called *rules*, to which the manners of speaking used in that language may be reduced; which assemblage of reflections, is what we call the *grammar of that language*.—This remark may obviate an abuse introduced among grammarians, who are ever crying out, * Usage is, in this point, opposite to grammar; or the language here frees itself from the rules of grammar, &c.

It is chance then to which we owe usage, and usage that makes the rules and measures of a language. Usage, indeed, is somewhat dubious, and may be divided into *good* and *bad*: If it be asked, Wherein the difference between these lies? it is in this; that the one is better established, or authorized, than the other: and if it be asked, Wherein that difference of authority consists? it is answered, That in dead languages, that which makes the good usage is the writings of the best authors in that language: and if it be further questioned, Which are the best? those are allowed such, who wrote when that state was in its greatest glory. Thus the age of Augustus, being the most distinguished by great men, who then flourished, we call that *good Latin* which is conformable to the manners of speaking used by authors who wrote within fifty years before, and fifty after the reign of that emperor.—As to living languages, the good usage, or mode, is that which obtains among the most eminent persons, whether as to quality, and authority, or as to learning, and the reputation of writing well.

With this view it is that M. Vaugelas defines usage of a language, the manner of speaking used by the soundest or best part of the court, conformably to the manner of writing among the best part of the authors of the time.—But this definition, how judicious soever, may occasion infinite doubt; for which is to be deemed the best part of the court, and of the writers? Each party, doubtless, thinks itself the best.—F. Buffier, therefore, very justly, instead of the best part, substitutes the greatest part, which brings the matter nearer to a certainty, the most numerous part being something fixed, and palpable, whereas the most useful part may be sensible, or arbitrary. There is found a constant resemblance between the genius or natural complexion of each people, and the language they speak.—Thus the Greeks, a polite, but voluptuous nation, had a language perfectly suitable, full of delicacy and sweetness.—The Romans, who seemed only born to command, had a language noble, nervous, and august; and their descendants, the Italians, are sunk into softness, and effeminacy, which is as visible in their language, as in their manners.—The language of the Spaniards is full of that gravity, and haughtiness of air, which make the distinguishing character of that people.—The French, who have a world of vivacity, have a language that runs extremely brisk and lively.—And the English, who are naturally blunt, thoughtful, and of few words, have a language exceedingly short, concise, and sententious.

The diversity of LANGUAGES is generally allowed to have taken its rise from the confusion at the building the tower of Babel, both by Jews, Christians, and Mahometans: but the manner in which this diversity was effected, is still in dispute among the learned.—The question is, Whether God only expunged the remembrance of the signification of terms in those who built the tower? or, Whether he immediately inspired them with new words? Scaliger holds, that they only forgot the meaning of the words, and named one thing instead of another; though all indifferently spoke the Hebrew tongue.—Nor does Casaubon allow, that they immediately spoke different languages: the confusion of tongues he thinks, might be very well effected, without introducing a multiplicity of languages. See *Ziegra de confusione Linguarum Babylonica ad Genes. XI.*

As to the point of antiquity and priority among languages, that too has been extremely controverted.—Herodotus tells us, that in the dispute between the Egyptians and Phrygians about the antiquity of their languages, Piameitichus, king of Egypt, ordered two children to be brought up, with express prohibition not to have one word pronounced before them, but to leave nature to speak of herself; and the first word they spoke happened to be *lexor*, which, in the Phrygian language, signifies *bread*. The Egyptians, however, were not convinced with this proof.—The Arabs dispute the point of antiquity with the Hebrews: but the Jews, jealous, even to excess, of the honour of their nation, positively insist on it, that the Hebrew tongue, such as it is found in the holy scriptures, is the primitive language, and that spoken by the first man.

Others maintain, that the language spoken by Adam is lost, and that the Hebrew, Chaldean, and Arabic, are only dialects of that original tongue. So far are they from giving the priority to the Hebrew, that they maintain Abraham spoke Chaldean before he passed into the land of Canaan: so that this was not a special language consecrated to the people of God, but was originally the language of the Canaanites.

M. le Clerc is of opinion, the Hebrew is far inferior to the Greek both in copiousness, elegance, and perspicuity; it is dry and destitute of ornaments, inasmuch that wanting expressions to vary the phrase, the same periods are perpetually returning.—The Rabbins say, it is so pure and chaste, that it has no proper names for the parts of generation, nor for those by which the excrements are discharged. See HEBREW.

The Arabic is held the most copious of all languages; being said to have 300 different words to express a lion, and no less than 1200 for a sword.

LANGUAGES are in general divided into—original or mother tongues; as the Hebrew, and Arabic, in the East, the Teutonic, and Slavonian in the West.

Secondary, or derivative LANGUAGES, which are those formed out of a mixture of several others, as Latin, French, &c.

Kircher will have the Coptic a mother tongue, independent of all others.

Du Jon maintains the Gothic a primitive language, and the mother of all the Teutonic tongues; that is, of all those spoke in the North.

Some add the Basque, or Biscayan, and Bas Briton, to the number of mother tongues, imagining them to have been those of the ancient Celts, or Gauls.

Learned, or dead LANGUAGES, are those which only subsist in books, and which must be learned by the rules of grammar; as the Greek, Hebrew, Syriac, and Chaldean. See the articles HEBREW, GREEK, &c.

Raimond Lully foliowed the establishment of the study of the learned languages a long time, in the thirteenth and fourteenth Centuries. At length, in the year 1312, pope Clement, and the council of Vienne, appointed, that in the court of Rome, and in the universities of Paris, Oxford, Bologna, and Salamanca, there should be instituted professors of each, who should have salaries from the respective courts.—The monks, however, vigorously opposed the spreading of these studies; and with so much success, that Erasmus tells us, in his time *Greece nosse scriptum, Hebraice prope veritatem*.

Living LANGUAGES, are those still spoke in some country, or other; and which may be learned by conversation.—The most popular among these are the French, Italian, Spanish, and English, which see under their respective names, ENGLISH, FRENCH, ITALIAN, &c.

The Spaniards seem to place the nobleness and gravity of their language, in the number of syllables, and the swelling of words; and speak less to be understood, than to be admitted. Their terms are big, and sonorous, their expressions haughty, and boisterous, and pomp and ostentation run through all they say: their language cannot paint a thought to the life; it always magnifies it, frequently distorts it; and does nothing, if it do not exceed nature.

The Italian tongue does not swell up things to that degree, but it adorns, and embellishes them more; yet these ornaments, and embellishments, are not real beauties.—The Italian expressions, thus rich and brilliant, are like those faces covered with patch and paint, which make a fine show; but the finery is all deceit.

The French language (as some of their authors express themselves) is simple, without lowness; bold, without indecency; elegant, and florid, without affectation; harmonious without swelling; majestic, without pride; delicate, without softness; and strong, without roughness.—Though, as to the points of strength, and majesty, the French must give way to the English; which, in these, as well as in copiousness, exceeds most of the living languages; as far as it comes behind some of them in smoothness, and delicacy.

Of all the modern languages, the French is generally allowed to be the most clear and fit for philosophical and critical subjects; the chastest and most reserved in its diction; the most judicious and severe in its ornaments.—Of all others, the English is said to be the most honest, open, and undesigning; it will not bear double meanings, nor can it palliate, or hide nonsense: bad sense, and good English, being things inconsistent. With all its sublimity, it is gay and pleasant on occasion; but its gaiety is still moderated, and restrained by good sense; it hates excessive ornaments; and, for the greater simplicity, would almost chafe, as some say of the French, to go naked: it never dresses more than decorum and necessity require.

The Spanish resembles those rivers whose waters are always swelling, and always muddy, and turbulent; that never keep long within their channel, but are ever overflowing, and their overflowings over noisy, and precipitate.—The Italian is like those pleasing rivulets that curl agreeably among the stones, and glide in meanders through meads full of flowers.—The French resembles one of those beautiful streams that

always run briskly; but, at the same time, smoothly, and equally; without much noise, or much depth.—The English, like the Nile, preserves a majesty even in its abundance; its waters roll rapidly notwithstanding their depth; it never roars, but when its banks are too narrow; nor overflows, without enriching the soil.

The Latin is the common mother of the three former; but the daughters have very different genius, and inclinations.—The Spanish, a haughty dame, that piques herself on her quality, and loves excess, and extravagance in every thing. The Italian, a coquette, full of fine airs, always appearing dressed, and taking all occasions of showing her finery: to be admired being all she aims at. The French, an easy prude, that has her share of modesty, and discretion; but, on occasion, can lay them both aside.—The English is of a more masculine temperament: it is not only of a different family from the others, but appears of a different sex too. its virtues are those of a man: indeed, it is the product of a colder climate, and a rougher people; and its features may be somewhat coarser than those of its neighbours, but its faculties are more extensive; its conduct more ingenuous, and its views more noble.

Ennius, and Cæcrops, are celebrated for their knowledge of many languages. Mithridates, king of Pontus, it is said understood twenty two tongues, which was the number of different people over whom he commanded; and those languages he knew so well, that he was able to converse with each of his people in their own tongue. It was a saying of Charles the fifth, 'That so many languages as a man understands, so many times he is man.' Saitan Solomon's interpreter spoke perfectly well seventeen different languages. But among the philosophers, none have been more remarkable in this way, than Postellus, who, besides a perfect knowledge of all the dead languages, was so well acquainted with the living, that it is said he could have made the tour of the globe, without the use of an interpreter.

Bibliauer has written of the analogy, and proportion of languages and letters, *De ratione communi linguarum*, in 1518. Gesner, of the difference of languages, in 1572. Lazius published an *Introduction to the learning of the polite languages, in a common method*, in 1548. Megasthenes, a scheme of forty different languages, and different dialects, specimens of each whereof he gives in the Lord's prayer, in 1593. De Recoles, in his addition to the *world of Davitt*, has published the Pater-noster in all the languages spoken among Christians; and Mr. Chamberlayne has lately proposed to do the same in 100 languages, a specimen of which has been already published. Albericus Gentilis wrote of the mixture of languages, in 1602. And farther Reaumur's discourse on etymologies, is a work of the same kind. In 1613, Duret published a treasure of the history of all the languages in the universe: Guichenon has a treatise of the etymological harmony of languages, published in 1610. Brerewood has given us curious enquiries into the diversities of languages, and religions, published in 1635.

LANGUAGE, is also used in the order of Malta, for nation.

The knights of Malta are divided into eight languages; three whereof are for France, viz. the language of Provence, of Auvergne, and of France; two for Spain, those of Castile, and Arragon; the other three are the languages of Italy, England, and Germany.

Each of these languages has its chief, who presides in assemblies of the language to which he belongs. See MALTA.

Frank Language. } See the article FRANK.
Hellenistic Language. } Hellenistic.

LANGUED, LANGUE, in heraldry, is applied to such animals whose tongues appear out of their mouths; being of a colour different from that of the body of the animal.

LANGUOR, in medicine, signifies a faintness, or relaxation of the members arising either from a want, or decay of spirits, through indigestion, or too much exercise; or from an additional weight of fluids, caused by a diminution of the excretion by the common discharges.

LANIGEROUS, any thing that bears wool. See WOOL.

—Hence, LANIGEROUS, or LANUGINOUS Trees, among herbalists, are those trees that bear a woolly, downy substance; as, the black, white, and trembling poplars, osters, and willows of all sorts.

LANTERN*, or LANTHORN, a cover for a luminary, made of some transparent matter; serving to transmit the light, and, at the same time, to screen it from the wind, and rain.

* The word is derived from the French *lanterne*, and that from the Latin *late-na*, of *lateo*, I am hidden; so *quod latere subter interioris clausum*, in regard the light is hidden within, say Hidore, and Lambin. But according to Pezzen, *lucerna* comes from the Celtic *latern*; and according to balm, *latern* comes from *late*, of *fero*, in regard it bears a lamp, or a light.

Epietetus's lantern is said to have been sold for 3000 diachms. That of Diogenes was held in great veneration among

among the ancients; and that of Judas is still preserved in the treasury of S. Denys, as a very curious piece of antiquity. *Lanterns* are made of glass, horn, paper, &c. formerly, they were made of the horn of a wild bull, called *urus*; which when cut into thin laminae, Pliny tells us, was very transparent.

DARK LANTERN, is a *lantern* with only one opening, or light, which, too, may be closed up, when the light is to be entirely hid; and may be presented to the person one would see, without being perceived one's self.

The ancients had their dark *lanterns*, but they differed from ours; they were covered with four skins, one on each side, or light, three whereof were black, and only the fourth transparent.—Cassaubon, who gives us the description, took it from a manuscript of Julius Frontinus.

These were principally used in their armies, when they were to march privately off from their enemies in the night-time.

Feast of LANTERN, in China, is a celebrated feast held on the fifteenth day of the first month; and is so called from the infinite number of *lanterns* hung out of the houses, and in the streets; which, it is said, is not less than two hundred millions: inasmuch, that it rather appears a fit of madness, than of feasting. On this day are exposed *lanterns* of all prices, whereof some are said to cost 2000 crowns.—Some of their grandes retrench somewhat every day, out of their table, out of their dress, equipage, &c. to appear the more magnificent in *lanterns*. They are adorned with gilding, sculpture, paintings, jappanning, &c. and as to their size, it is extravagant; some are from 25 to 30 foot diameter: they represent halls, and chambers, and two or three such machines together would make handsome houses; so that in China they are able to eat, lodge, receive visits, have balls, and act plays in a *lantern*.

To illuminate them, they should have bonfires; but as that would be inconvenient, they content themselves with lighting up in them an infinite number of torches, or lamps; which, at a distance, have a beautiful effect.—In these they exhibit various kinds of shews to divert the people.

Besides these enormous *lanterns*, there is a multitude of other smaller: these usually consist of six faces or lights, each about four feet high, and one and a half broad, framed in wood finely gilt and adorned; over these they stretch a fine transparent silk curiously painted with flowers, trees, and sometimes human figures: the painting is very extraordinary, and the colours extremely bright; and when the torches are lighted, they appear highly beautiful, and surprising.

LANTERN, in architecture, denotes a kind of little dome raised over a large one, or over the roof of a building, to give light, and to serve for an acroter to finish the building. See **CUPOLA**.

LANTERN is also used for a square cage of timber, with glass in it, placed over the ridge of a corridor, or a gallery between two rows of shops to illuminate them; as that in the Royal Exchange, London.

Magic LANTERN, in optics, the name of a machine, which in the dark represents various images, and spectres on a wall, or other white surface, so odd and surprising, that those who are not in the secret, think them the effect of magic. See **MAGIC**.

LANUGINOUS. See the article **LANIGEROUS**.

LANUGO, in botany, *draws*; that soft, hairy, or woolly covering, which grows on the leaves, stalks, or fruit of divers plants.

Such is that found on the leaves of the rose campion, and on the fruit of the peach-tree.

LAPIDARY, LAPIDARIUS, an artificer, who cuts precious stones.

The art of cutting precious stones is very ancient; but, like other arts, its original was very imperfect: the French have succeeded in it the best; and the *lapidaries* of Paris, who have been a corporation since the year 1290, have carried it, especially the cutting of diamonds called *brilliant*s, to its last perfection.

There are various machines used in the cutting of precious stones, according to the quality of the matter to be cut: the diamond, which is extremely hard is cut and formed on a wheel of soft steel, turned by a kind of mill, with diamond dust tempered in oil of olives; and this serves to polish them, as well as to cut them.

Oriental rubies, sapphires, and topazes, are cut and formed on a copper wheel, with oil of olives, and diamond dust: they are afterwards polished on another copper wheel with tripoly and water.

Emeralds, hyacinths, amethysts, garnets, agats, and other stones less hard, are cut on a leaden wheel, with emery and water, and polished on a pewter wheel with tripoly.

Turquois, of the old and new rock, lapis, girafol, and opal, are cut and polished on a wooden wheel with tripoly.

LAPIDARY is also used for a virtuoso skilled in the nature, kinds, &c. of precious stones; or a merchant who deals in them.

In which sense, the present great mogul is said to be one of the greatest *lapidaries* in the world.

LAPIDARY Style, denotes the style proper for monumental or other inscriptions.

This is a kind of medium between prose and verse; the jejune and the brilliant are here equally to be avoided. Cicero has prescribed the rules of it; *Acedit quæret oratio varia ornament, plena spiritus. Omnium sententiarum gravitates, annuum verborum ponderibus est utenda.*

The *lapidary style*, which was lost with the ancient monuments, has been retrieved, at the beginning of this age, by count Emanuel Tesoro: It is now used various ways at the beginning of books; and even epistles dedicatory are composed in it, whereof we have no example among the ancients.

LAPIDESCENT, any thing which has the faculty of petrifying, or turning bodies to a stony nature.

Naturalists speak of a *lapidescent* principle, a *lapidescent spirit*, *lapidescent* juices, &c.

LAPIDESCENT Waters or Springs, are such as having stony particles dissolved, and swimming in them, do deposit the same on wood, leaves, and other bodies immersed therein; which being incruited herewith, are commonly mistaken for petrifications.

LAPIDIFICATION, in chemistry, an operation whereby any substance is converted into a sort of stone.

This is done by dissolving a metal, for instance in a corrosive spirit or menstruum, and afterwards reducing that dissolution into the consistence of a stone.

Lapidification is practised in metals, fixed salts, and salts of plants.

The term is also used for the making of artificial stones.

LAPIS, in the general sense. See the article **STONE**.

LAPIS Asbestos.

LAPIS Calaminaris.

LAPIS Dentalis.

LAPIS Infernalis, a caustic stone prepared various ways; sometimes of strong soap-les evaporated to a drinels, and the remainder kept in a glass well stopp'd from the air.

Sometimes it is made of calcined vitriol, tartar, and sal armoniac, and boiled in quick-lime water to a strong lixivium; then strained and evaporated till dry.

LAPIS Judaicus. See the article **JUDAICUS**.

LAPIS Lazuli. See the article **LAZULI**.

LAPIS Medicamentosus, or the medicinal stone; is a composition of rock alum, litharge, coelethar of vitriol, Armenian bole, and vinegar; boiled to the consistence of a hard stone.—It is used to fasten the teeth, preserve the gums, heal and dry up ulcers and wounds, and is used in injections, and in compositions for sore eyes.

LAPIS Specularis. See the article **SPECULARIS**.

LAPSARII. See **INFRA LAPSARII, SUB LAPSARII, and SUPRA LAPSARII**.

LAPSE, a slip, or omission of a patron to present a clerk to a benefice within six months of its being void; in which case the benefice is said to be in *lapse*, or *lapsed*, and the right of presentation devolved to the ordinary.

LAQUEARIUS*, a kind of athleta among the ancients, who in one hand held a *laqueus*, i. e. a sort of snare, wherewith to embarrass and intangle his antagonist, and in the other a poinard to stab him.

* The word comes from the Latin *laqueus*, a snare, or noose.

LAQUEUS, in surgery, a *noose* or *snare*; or a kind of ligature so contrived, that when stretched by any weight, or the like, it draws up close.

Its use is to extend broken or disjointed bones to keep them in their places, when they are set, and to bind the parts close together.

LAR-BOARD, the left-hand side of a ship when you stand with your face toward the head.

LARCENY*, in law, is a theft of personal goods, or chattels in the owner's absence. See **THEFT**.

* The word comes from the French *larcin*, and that from the Latin *latrocinium*, theft.

In respect of the things stolen, *larceny* is either *great*, or *small*.

Great LARCENY, is when the things stolen, though severally, exceed the value of 12d.

Petty LARCENY, is when the goods stolen, exceed not the value of 12d.

Civilians define *larceny*, a fraudulent subtraction of another man's property, with design to appropriate it without the owner's leave.

When it is done by force, it is called a *robbery*.

By the Roman law, the penalty of *simple* and *secret larceny* was the returning it twofold; and of *manifest larceny*, fourfold: *manifest larceny*, was where the criminal was taken in the fact; *simple*, where he was not. The Lacedæmonians never punished *larceny*, provided the person was not caught in the fact; but, on the contrary, it was applauded as a mark of dexterity and address.—The Circassians are said to honour it at this day; inasmuch that at their public feasts their

death are not suffered to drink, if they have not performed something remarkable in that way.—Solinus tells us, that in Sardinia there was a fountain that had the virtue of discovering a person that had committed *larceny*.

LARENTINALIA, in antiquity, a feast held among the Romans on the 23d day of September; by some supposed to have been in honour of the Lares, but by others, with more probability, in honour of Acca Laurentia; and to have been the same with *laurentalia*.

LARES, among the ancients, a kind of domestic genii, or divinities, worshipped in houses, and esteemed the guardians and protectors of families; supposed to reside more immediately in the chimney-corner.

Plutarch distinguishes good and evil *lares*, as he had before done good and evil genii.

There were also *lares* public, others private *lares*.

Apuleius tells us the domestic *lares* were no more than the souls of departed persons, who had lived well, and discharged the duties of their station; whereas those who had done otherwise, were vagabonds, wandering about and frightening people, called *larvae* and *lemures*. See **LEMURES**.

The *lares* were also called *penates*, and were worshipped under the figures of little marmoulets, or images of wax, silver, or earthen ware.

The public *lares* were also called *compitales*, from *compitum*, a cross-way; and *viales*, from *via*, a way, or public road; as being placed at the meetings of roads, and in the high-ways, and esteemed the patrons and protectors of travellers.

Their private *lares* took care of particular houses and families: these they also called *præfites*, from *præfite*;

Quod præfiant oculis omnia tuta suis. Ovid. Fast.

They gave the name *urbani*, i. e. *lares* of cities, to those who had cities under their care; and *hustili*, to those who were to keep their enemies off.—There were also *lares* of the country, called *rurales*, as appears by several antique inscriptions.

The *lares* were also genial gods, and were supposed to take care of children from their birth. It is for this reason, that when Macrobius tells us the Egyptians had four gods who presided over the births of children, viz. the *genius*, *fortune*, *love*, and *necessity*, called *præfites*, some interpret him as if he had said the Egyptians had *lares*; but there was a world of difference between the *lares* of the Romans, and the *præfites* of the Egyptians.

The ancients differ extremely about the origin of the *lares*. Varro and Macrobius say that they were the children of *Mama*; Ovid makes them the issue of *Mercius*, and the naiad *Lara*, whom Lactantius and Ausonius call *Larunda*; Apuleius assures us they were the posterity of the *Lemures*; Nigidius, according to Arnobius, made them sometimes the guardians and protectors of houses, and sometimes the same with the *Curetes* of Samothracia, which the Greeks call *Idæi dætyli*. Nor was Varro more consistent in his opinion of these gods; sometimes making them the manes of heroes, and sometimes gods of the air.

T. Tatius, king of the Sabines, was the first who built a temple to the *lares*. The chimney and fire-place in the house were particularly consecrated to them.

Tertullian tells us, the custom of worshipping the *lares* arose from this, that they anciently interred their dead in their houses; whence the credulous people took occasion to imagine their souls continued there also, and proceeded to pay them divine honours.—To this it may be added, that the custom being afterwards introduced of burying in the high-ways, they might hence take occasion to regard them as gods of the highways.

The victim offered to the *lares*, in the public sacrifices, was a hog: In private, they offered them wine, incense, a crown of wool, and a little of what was left at the table.—They also crowned them with flowers, particularly the violet, myrtle, and rosemary. Their symbol was a dog, which was usually represented by their side, on account of its fidelity, and the service it does to man, in watching his house. They were sometimes also represented as clothed in a dog's skin.

See further on the *lares*, in Arnobius, Lactantius, Augustin *De Civit.* Natalis Comes, Lambin on *Plaut. Aulul.* and on *Hor.* Cafaubon on *Sueton.* &c.

The pantheons, or images representing several gods at once, were also called *lares*.—Harpocrates was one of these.

LARGE, a *la-ter-n*. See the article **VEERING**.

LARGE Minion. See the article **MINION**.

LARMIER, in architecture, a flat, square, massive member of the cornice, between the cymatium and the ovolo; so called from its use, which is to disperse the water, and cause it to fall at a distance from the wall, drop by drop, or, as it were, by tears: *larmie*, in French, signifying a tear.—See *Tab. Architect.* fig. 9. fig. 24. lit. d. fig. 28. lit. f.

The *larmier* is also called *corona*; and in English, the drip.

LARYNGOTOMIA*, an incision into the trachea, or wind-pipe between two of its annuli, or rings in order to give passage for the breath, when there is danger of suffocation, from a spasm, &c., or the like.

* The word is Greek *Λαρυγγοτομία* (termed of *λαρυγξ*, and *τομή*, from *τέμνω*, I cut).

Laryngotomy is the same with what is otherwise called *bronchotomy*.

Dr. Mufgrave observes, that in all medicine there is not one method that works so great a change, for the better, in so short a time. However, it is seldom practised, in regard that gap which appears on the cutting a trachea, (the divided parts being then drawn towards their more fixed ends) together with the great efflux of blood, when the jugulars and carotid arteries are also wounded, create in most men a dread of the operation, and make many believe all wounds of the trachea mortal. The same author makes no scruple, however, to say, that it ought to be practised in quinzies, and other dangers of suffocation from caufs of a like nature with them; from an extraordinary cure which he himself had wrought in this way.

LARYNX, ΛΑΡΥΞ, in anatomy, the upper part, or head of the trachea, lying below the root of the tongue, and before the pharynx.

The *larynx* is one of the organs of respiration, and the principal instrument of voice.

Its body is almost wholly cartilaginous, and it is to be constantly open to give room for the air to pass and repass. Its figure is circular, though it jets out a little before, and is a little flattened behind, lest it should incommode the œsophagus, whereon it is placed.

The *larynx* is of different diameters, according to the different ages; in young people it is narrow, whence their voice comes to be acute; in those more advanced in years, it is more ample, which occasions their voice to be stronger and deeper. In men it is bigger than in women, for which reason mens voice is more grave than that of women.

It appears the less in women, in regard the glands situate at the bottom of the *larynx*, are bigger in women than in men.

The *larynx* moves at the time of deglutition: when the œsophagus is lowered for the reception of the food, the *larynx* raises itself to compress it, and facilitate its descent.

There are five kinds of parts belonging to the *larynx*, viz. cartilages, muscles, membranes, nerves, and glands.—Its cartilages are the thyroides, cricoides, arytenoides, glottis, and epiglottis, by means of which it can easily dilate and contract, shut and open itself. These form the whole body of the *larynx*, and grow dry and harden, in proportion as the person grows old, when the *larynx* sometimes appears as if it were bony.

The biggest of these is the *thyroides* or *scutiformis*, this guards the forepart, and has its name from some supposed resemblance that it bears to a shield. It is of a concavo-convex square figure, the hollow part being inward, and the gibbous outward, having a little prominence in the middle called *papum Adami*, as if some of the forbidden fruit had stuck in Adam's throat, and occasioned that swelling.

The second is called *cricoides*, or *annularis*, from its resemblance to a ring which the Turks put on their thumb for the drawing of their bows. The fore part of this is very narrow, coming under the other cartilage, but behind it is broad, thick, and strong, being, as it were, the basis of all the others.

The third and fourth are called *arytenoides*, or *gutturales*, from the figure of an ewer, which these two together somewhat resemble. At the juncture of these there is a little cleft, or chink, in form of a little tongue, and for that reason called *glottis*, or *lingula*. Through this chink the air descends into the lungs, and the pituitous matter ejected by coughing, in catarrhs, is let out. It serves also for modulating the voice, and is imitated in flutes and the pipes of organs.

Over the glottis lies a fifth cartilage called the *epiglottis*, which is very thin and soft, and in non-adults almost membranous, concave on the under side, and convex on the upper: It defends the entrance of the *larynx*, and hinders the liquids, which in drinking slip over it into the œsophagus, from falling into the trachea.

The *larynx* has seven pair of muscles, which serve to move its several cartilages, and to contract or dilate them at pleasure; two pair of them are common, the other five proper: the proper are those which have both their origination and insertion in the *larynx*; the common have only their insertion there.

Of the former kind are the cricothyroides which moves the scutiform cartilage; the crico-arytenoides posticus, which serves, by its contraction, to draw the arytenoides cartilage, and to open the rima. The third is the arytenoides; which serves to bring the two cartilages of that name together, and to shut the rima. The fourth is the crico-arytenoides laterale, and the fifth the thyro-arytenoides, which shuts the *larynx*.

The common muscles are the sternothyroides, which serve to draw down the thyroide cartilage, and the hyothyroides, which lift up that cartilage.

The *larynx* has but two membranes, the one *external*, which is a continuation of that which covers the trachea; the other *internal*, which is the fame that lines the whole mouth.

It receives two branches of nerves from the recurrents, and is moistened by four large glands, two situate above, called *tonsils*; and two underneath, called *thyroidea*. See TONSIL, &c.

The *larynx* is of very considerable use, not only in forming and modulating the voice, by the different apertures of its rima, or chink, but also in compressing the lungs to a greater or less degree, by the air: for if the internal diameter of the *larynx* had been equal to that of the trachea, the lungs could then have undergone little or no compression at all; nor, consequently, without the *larynx* could we have reaped any advantage from breathing, in regard the air would not have resisted that force wherewith it is driven out in expiration, nor consequently, could the compression have been made in the lungs, which is found necessary for the comminution of the globules of the blood, and the mixing of the two fluids, air and blood, together.

For the action of the *larynx* in sound, see GLOTTIS, and SOUND; see also EPIGLOTTIS, TRACHEA, &c.

LASH, or **LACE**, in the sea language, signifies to bind, or make fast.

Lashing is chiefly used for binding up to the ship's side, muffs, butts of water or beer, or pieces of timber to make spare top-masts.

LASHERS, are properly those ropes only which bind fast the tackles, and the breeches of the ordnance, when they are haled, or made fast within board.

LASKING, a sea term, for going large, or veering. See VEERING.

LASSITUDE, among physicians, expresses that weariness, or heaviness of members, that proceeds from a disordered state of body, and not from exercise; either from an increase of bulk, a diminution of proper evacuation, or too great a consumption of that fluid which is necessary to maintain the force and spring of the solids, as in fevers and convulsions; or from a vitiated secretion of that juice, whereby the fibres are not supplied either in due quantity or quality.

The remedy, in the first case, is evacuation: in the latter a proper diet, or such alterative medicines as influence such a secretion.

LAST, or **LEST**, in general, signifies the burden or load of a ship.

LAST, is also used for a certain weight and measure, which is various in various countries; though in the general, the *last* is estimated at four thousand pounds weight. See WEIGHT. A *last* of cod-fish, white herrings, meal, and ashes for soap, is twelve barrels: Of corn, or rape-seed, ten quarters: Of gunpowder, twenty four barrels, or 2400 pounds weight: Of red herrings, twenty cades: Of hides twelve dozen: Of leather, twenty dockers. Of pitch, or tar, fourteen barrels: Of wool, twelve facks: Of stock-fish, a thousand: Of flax, or feathers, 1700 pounds weight.

LAST HEIR, is he to whom lands come by escheat, for want of lawful heirs; which, in many cases, is the lord whereof they are held, but in others the king.

LAST WILL. } See the article { WILL.
PORT-LAST. } { PORT-LAST.

LASTAGE, or **LESTAGE**, according to Rassafl, is a duty exacted in some fairs and markets, for carrying things bought where one will.

LASTAGE, according to another author, is properly that custom which is paid for wares sold by the *last*.

In a law of Ric. II. lastage is taken for the ballast or for lading of a ship. See BALLAST, &c.

LASTAGE, is sometimes also used for garbage, rubbish, or such filth.

LATE FLOWERS. See the article FLOWERS.

LATENT ACIDS. See the article ACID.

LATERAL. See COLLATERAL, MULTILATERAL, and QUADRILATERAL.

LATERAL EQUATION, in algebra, denotes a simple equation; or an equation whose root is only of one dimension. See EQUATION.

LATERAL PALSY. } See the article { PALSY.

LATERAL OPERATION. } { LITHOTOMY.

LATERALIS RECTUS CAPITIS. See the article RECTUS.

LATERAN, was originally the proper name of a man, whence it descended to an ancient palace in Rome, and to the buildings since erected in its place; particularly a church called S. John of Lateran, which is the principal see of the pope-don.

Councils of the LATERAN, are those held in the basilica of the Lateran: Of these there have been five, held in 1123, 1139, 1179, 1215, and 1513.

Canons Regular of the Congregation of the LATERAN, is a congregation of regular canons, whereof that church is the principal place, or seat.

It is pretended, there has been an uninterrupted succession of clerks, living in community from the time of the apostles; and that a number of these were established in the *Lateran* in the time of Constantine. But the canons were not introduced till the time of Leo I. and these held the church 800 years, till the reign of Boniface, who took it from them, and placed secular canons in their room: 150 years after, the regulars were reestablished.

LATERE, a Latin term, used to denote the qualification of cardinals whom the pope sends as legate into foreign courts; who are called cardinals *à latere*, as being his holiness's counsellors in ordinary, and assistants.

The guards of princes were heretofore called *laterones*, because always attending at their sides *à latere*.

Du Cange, in his *Glossary*, says, there were antiently counts *à latere*, and monitors *à latere*.

LATH, in building, a long, thin, narrow slip of wood, nailed on the rafters of a roof, in order to sustain the covering.

* These are what Festus calls *ambriaci*; in other Latin writers they are denominated *templa*; and by Gregory of Tours, *ligatura*.

Laths are divided into three kinds, with regard to the different woods they are made of, viz. *heart of oak laths*, *sap laths*, and *deal laths*: The two last are used only for cieling and partitioning, and the first only for tyling.—*Laths* are also distinguished, with regard to their length, into *five foot*, *four foot*, and *three foot laths*: though the statute allows but of two lengths, viz. those of five foot and of three, each of which are to be an inch and half in breadth, and half an inch in thickness.

LATHE, or **LEATHE**, a very useful engine for the turning of wood, ivory, metals, and other materials.

The invention of the *lathe* is very antient: Diodorus Siculus says, the first who used it was a grandson of Dædalus, named Talus. Pliny ascribes it to Theodore of Samos, and mentions one Thericles, who rendered himself very famous by his dexterity in managing the *lathe*.

With this instrument the antients turned all kinds of vases, many whereof they enriched with elegant figures and ornaments in basso relievo. Thus Virgil.

Lenta quibus torno facili superaddita vitis.

The Greek and Latin authors make frequent mention of the *lathe*; and Cicero calls the workmen who used it, *cafularii*. It was a proverb among the antients, to say a thing was formed in the *lathe*, to express its delicacy and justness.

The *lathe* is composed of two wooden cheeks, or sides, parallel to the horizon, having a groove or opening between; perpendicular to these, are two other pieces, called *puppets*, made to slide between the cheeks, and to be fixed down at any point at pleasure.

These have two points, between which the piece to be turned is sustained; the piece is turned round, backwards and forwards, by means of a string put round it, and fastened above to the end of a pliable pole, and underneath to a trestle or board moved with the foot. There is also a rest which bears up the tool, and keeps it steady.

As it is the use and application of this instrument that makes the greatest part of the art of turning, we refer the particular description thereof, as well as the manner of applying it in various works, to that head. See TURNING.

LATHE, in law. See the article LETH.

LATIAR, a feast or ceremony instituted by Tarquinius Superbus, in honour of Jupiter Latiaris, or Latialis.

Tarquinius, having made a treaty of alliance with the Latins, proposed, in order for perpetuating it, to erect a common temple, where all the allies, the Romans, Latins, Hernici, Volsci, &c. should assemble themselves every year, hold a kind of fair, exchange merchandizes, feast, sacrifice, and make merry together.—Such was the institution of the *latiar*.

The founder only appointed one day for this feast; the first consuls added another to it, upon concluding the peace with the Latins; and a third was added, after the people who had retired to the Mons Sacer were returned to Rome, and a fourth after appeasing the sedition raised on occasion of the consulship, in which the people would needs have a share.

These four days were called the *Latin ferias*, and every thing done during the course of these ferias, as feasts, sacrifices, offerings, &c. were called *latinæ*.

LATICLAVIUM, or **LATUS CLAVUS**, a garment of distinction and dignity among the Romans; contradistinguished from the *angusticlavium*.

The *laticlavium* was a kind of tunic, or long coat, faced with one, or two slips of purple, applied lengthwise to the two sides of the tunic.

In the *latus clavus* these slips were pretty broad, and in the *angustus clavus* narrower; though there is nothing about which the learned differ more, than the difference between those two habits.

There were buttons set on the *latus clavus*, which appeared like the heads of large nails; whence some think it took its name.

The senators, prætors, and the chief magistrates of colonies and municipal cities, had a right to wear it. The robe called *prætexta*, was worn over the *latus clavus*. When the prætor

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prætor pronounced sentence of death, he put off the prætexta, but retained the *latus-clavus*.

LATIN, a dead language, first spoken in Latium, and afterwards at Rome; and still used in the Romish church, and among men of letters.

Some authors rank the *Latin* among the number of original languages, but by mistake: it is formed principally from the Greek, and particularly from the *Æolic* dialect of that tongue; though it has a great number of words which it borrowed from the languages of the *Eufaci*, *Olici*, and other antient people of Italy; and foreign commerce and wars, in course of time, added a great many more.

The *Latin* is a strong, robust language, perfectly suitable to the character of the people who spoke it. We have, still, works of every kind, admirably well written in *Latin*, though there are an infinite number lost. The *Latin* is more figurative than the English, less pliant than the French, less copious than the Greek, less pompous than the Spanish, less delicate than the Italian, but closer and more nervous than any of them.

For a while, the *Latin* tongue was confined almost wholly within the walls of Rome; nor would the Romans allow the common use of it to their neighbours, or to the nations they subdued.—Cicero observed, that, even in his time, Greek was used almost among every people, but the *Latin* only confined to a very narrow compass; *Græca leguntur in omnibus fere gentibus, Latina suis finibus exiguis sane continentur*. By degrees they were brought to grant the use of it as a favour; and in time became sensible of the necessity there was of its being generally understood, for the convenience of commerce; and accordingly used their utmost endeavours, that all the nations subject to their empire, should be united by one common language; so that at length they imposed that as a law, which they had before granted as a favour.

After the translation of the seat of the empire from Rome to Constantinople, the emperors of the east, being always desirous of retaining the title of Roman emperors, appointed the *Latin* to be still retained in use, both in their rescripts and edicts, as appears by the constitutions of the eastern emperors, collected in the Theodosian Code: But at length the emperors neglecting the empire of the west, abandoned all care of the *Latin* tongue, and allowed their judges to pass sentence in Greek; and accordingly, we find the emperor Justinian's *Novels* are composed in Greek.

Charlemagne coming to the empire of the west, appointed the law proceedings in sovereign courts to be made in *Latin*; and the notaries were to draw their acts and instruments in the same tongue: This practice continued a long time through a great part of Europe, but at length it gave way, and the French took place of the *Latin*, not only in France, but in some measure in England too; and the reason given for it was, that abundance of difficulties arose about the understanding of *Latin* terms.

The *Latin*, however, was prodigiously degenerated and corrupted, ere it came to be laid aside. The incursions of the Goths and Vandals into Italy, brought an inundation of foreign words and phrases into it; inasmuch that Valla and Naude call Boethius the last *Latin* author. But that was not all; when it once got into the courts of justice, it was still worse handled; till at last being introduced amongst the monks, and become the common language of missals and breviaries, it was debauched to that degree, that it was almost become scandalous to use it.

In this condition it was found at the time of the Reformation; when *Vives*, *Erasmus*, &c. began to open the way for its recovery; since which time, monkish latinity has been declining, and all endeavours have been used to retrieve the pure language of the Augustan age.

It was said of cardinal Bembo, that he would never read the Breviary, for fear of corrupting his fine *Latin*.

LATIN Church, is a term used for the Romish or western church, by way of opposition to the Greek church. See **CHURCH**, and **GREEK**.

LATIN Bible. } See the article } **BIBLE**.
LATIN Character. } **CHARACTER**.

LATISSIMUS Dorsi, in anatomy, a muscle so called from its shape covering almost the whole back.

It has a thin, broad, tendinous beginning, which comes from the posterior part of the spine of the ilium, from the superior spines of the os sacrum, from all the spines of the vertebrae of the loins, and from the seven lower of the thorax; it passes by the inferior angle of the scapula, from which some of its fleshy fibres sometimes arise, and is inserted with the *teres major*, by a strong and broad tendon, with which it pulls the arm downwards.

It is also called *ani scalptor*, because it carries the arm to the anus.—See *Tab. Anat. (Myol.) fig. 6. n. 28*.

LATITAT*, a writ, whereby all men in personal actions are called originally to the King's Bench.

* It has this name, as supposing the defendant lurks, lies hid, and cannot be found in the county of Middlesex, to be taken by bill; but is gone to some other county, to the sheriff wherof this writ is directed.

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LATITUDE, *LATITUDO*, in geography, the distance of a place from the equator; or an arch of the meridian intercepted between the zenith of the place and the equator.—Hence, *latitude* is either northern or southern, according as the place whose *latitude* is spoke of, is on this, or that side, of the equator.—Thus London is said to be in 51 degrees, 32 minutes, northern *latitude*.

Circles parallel to the equator are called *parallels of latitude*, because they shew the *latitudes* of places by their intersection with the meridian.

If through the poles of the world we conceive innumerable great circles drawn, these are called *secondaries* of the equator; and by their help, the position of every point, either on earth, or in the heavens, with regard to the equinoctial (that is, the *latitude* of any point) is determined. See **SECONDARY**.

One of these secondaries passing through any place on the earth's surface, is called the *meridian* of that place, and on it the *latitude* of that place is measured. See **MERIDIAN**.

The *latitude* of a place, and the elevation of the pole of that place above the horizon, are terms used indifferently for each other, in regard the *latitude* and the elevation of the pole are always equal.

This will appear from *Tab. Geography, fig. 5*—where the circle HZQ represents the meridian, HO the horizon, AECQ the equator, Z the zenith, and P the pole.

Here, the *latitude* of the place, or its distance from the equator, is the arch ZAE, and the elevation of the pole, or its distance from the horizon, the arch PO.—Now the arch P/E between the pole and the equator, is a quadrant of a circle, and the arch ZO, from the zenith to the horizon, is likewise a quadrant. Therefore the two arches, P/E and ZO, must be equal; and taking away the arch ZP, which is common to both, there will remain the arch Z/E, equal to the arch PO; that is, the *latitude* of the place equal to the pole above the horizon.

Hence we have a method of measuring the circumference of the earth, or of determining the quantity of a degree on its surface: for by going directly northward or southward, till the pole be elevated one degree more or less, and then measuring that interval accurately, we shall have the number of miles in a degree of a great circle of the earth's globe.

The knowledge of the *latitude* of the place is of the utmost consequence, both in geography, navigation and astronomy: The methods of determining it, both at sea and land, are as follow.

The altitude of the pole, it has been already shewn, is always equal to the *latitude*; for which reason the *latitude* might be best found by observing the pole's height: But in regard that the pole is only a mathematical point, and no ways to be observed by our senses, its height cannot be determined in the same manner as that of the sun and stars, &c. for which reason, another manner has been contrived.

In order to this, a meridian line is first drawn; the method of doing which, see under the word **MERIDIAN**.

Place a quadrant on this line, so as its plane may be in the plane of the meridian; then take some star near the pole, *v. gr.* the pole star, which never sets, and observe both its greatest and least altitude.

Let the greatest, *v. gr.* be SO, (*Tab. Geography, fig. 5*.) and the least $\angle O$; the half of which P S or P \angle deducted from the greatest altitude SO, or added to the least $\angle O$, will give P O, the altitude of the pole above the horizon, which is equal to the *latitude* of the place.

The *latitude* may also be found, by having the sun's, or a star's declination, and meridian altitude, taken with a quadrant or astrolabe.—The method is this:

Observe the meridian distance of the sun from the vertex or zenith, which is always the complement of his meridian altitude; and add to this the sun's declination, when the sun and the place are on the same side the equator, or subtract the declination when they are on different sides: the sum, in the former case, and the difference in the latter, will be the *latitude* required. But when the declination of the sun is greater than the *latitude* of the place, which is known from the sun's being nearer to the elevated pole than the vertex of the place is, as it frequently happens in the torrid zone; then the difference between the sun's declination, and his zenith distance, is the *latitude* of the place.

If the sun, or star, have no declination, but move in the equinoctial that day, then the elevation of the equator will be equal to his meridian altitude, and consequently his meridian altitude is the complement of the *latitude* to go.

This latter method is best accommodated to the uses of navigation, as being practicable at sea; but the former method preferable at land.

LATITUDE, in astronomy, is the distance of a star or planet from the ecliptic.

Or, it is an arch of a great circle, TS (*Tab. Astron. fig. 14. n. 2.*) intercepted between the centre of the star S, and the ecliptic EL; and perpendicular thereto.

Through

L A T

Through the poles of the ecliptic are supposed to pass an indefinite number of great circles, cutting the ecliptic at right angles, called *circles of latitude*, or *secondaries of the ecliptic*: By means of which, every star and point of the heavens is reduced to the ecliptic, and has its place in regard thereto determined; the *latitude* of a star being an arch of one of these secondaries, intercepted between that star and the point where it intersects the ecliptic.

In which the *latitude* differs from the *declination*, which is the distance of a star from the equator towards one of the poles of the world.

So that the geographical *latitude* is the same thing with the astronomical *declination*, and the astronomical *latitude* a quite different thing.

The *latitude* of a planet is an angle, as PTR, (Tab. *Astronomy*, fig. 26.) under which a planet's distance from the ecliptic PR is seen on the earth.

The sun never has any *latitude*, but the planets have: for which reason, in the common sphere the zodiac has some breadth.—The ancients only allowed six degrees on each side the ecliptic, but the moderns have extended it to nine.

According to the observation of some of the modern astronomers, the greatest *latitude* of the planets is not always the same; but Venus never exceeds 9 degrees northern *latitude*; Mercury 5 degrees; the Moon in her quadrant with the Sun 5 degrees; Saturn 2 degrees, 50 minutes; Jupiter one degree, 50 minutes; Mars 7 degrees, 31 minutes.

When they have no *latitude*, they are said to be in the *nodes* of the ecliptic, or in the intersection of their orbit with that of the sun; and in this situation it is that they eclipse, or are eclipsed by the sun.

Circle of LATITUDE, is a great circle, MST *m*, passing through the poles of the ecliptic. See *CIRCLE*.

North ascending LATITUDE of the moon, is when she proceeds from the ascending node towards her northern limit, or greatest elongation.

North descending LATITUDE, is when the moon returns from her northern limit to the ascending node.

South descending LATITUDE, is when she proceeds from the descending node to her southern limit.

South ascending LATITUDE, is when she returns from her southern limit to her ascending node.

And the same holds good of the other planets. See *ASCENDING*, and *DESCENDING*.

Heliocentric LATITUDE of a planet, is its distance from the ecliptic, such as it is seen from the sun.

This, when the planet comes to the same point of its orbit, is always the same, and unchangeable.

Geocentric LATITUDE of a planet, is the distance of the planet from the ecliptic, as it is seen from the earth.

This, though the planet be in the same point of its orbit, yet is not constantly the same, but alters according to the position of the earth, in respect to the planet. See *HELIOCENTRIC*, and *GEOCENTRIC*.

Dr. Halley has some considerations in the *Philosophical Transactions*, which make it probable, the *latitudes* of some of the principal fixed stars, particularly *Pollux*, *Sirius*, and *Arcturus*, alter in time; whence it may be argued, the rest likewise alter, though the variation may be less conspicuous in these, by reason they are supposed at a greater distance from us.

Parallax of LATITUDE. { See the article { *PARALLAX*.
Refraction of LATITUDE. { *REFRACTION*.

LATITUDINARIAN, among divines, signifies a moderate person, not over-closely tied to any particular religious opinions, but who thinks there is a breadth, or latitude, in the road to heaven; which may admit people of different persuasions.

*LATOMIA**, *AATOMIA*, properly signifies a quarry, or place whence stones are dug. See *QUARRY*.

* The word comes from the Greek *latō*, stone, and *atomia*, I cut. These were anciently used as goals for criminals.—Dionysius had a place of this kind dug in a rock near Syracuse, where an infinite number of people were shut up. Cicero reproaches Verres with imprisoning Roman citizens in *latomia*; so that *latomia* became a general name for a prison, and the prisoners inclosed in them were called *latomarii*.

LATRIA, *ΛΑΤΡΕΙΑ*, in theology, a religious worship due only to God.

The Romanists say, 'They honour God with the worship of *latria*; and the saints with the worship of *dulia*?' but the terms, however distinct, are usually confounded.

The worship of *latria*, besides its inner characters, has its external marks to distinguish it; the principal whereof is sacrifice, which cannot be offered to any other but God himself, as being a solemn acknowledgment, or recognition of the sovereignty of God, and our dependence on him.

M. Daille seems to own, that some of the fathers of the fourth century allowed the distinction between *latria* and *dulia*.

L A U

LATUS rectum in conics, the same with *parameter*. See *PARAMETER*.

LATUS transversum of the hyperbola, is a right line intercepted between the vertices of the two opposite sections; or that part of the common axis, which is between the vertices of the upper and lower cone.

Such is the line ED, (Tab. *Conics*, fig. 1.) where also DD, and EE, may be the parameters, or *latus rectum* belonging to the two opposite sections, DLRO, and OEOR.

To this *latus transversum* answers the longest diameter in the ellipsis; which Apollonius calls the *transverse axis*, or *diameter*.

LATUS primarium, is a right line belonging to a conic section, drawn through the vertex of the section of the cone, and within it; as the line EE, or DD, in the figure above referred to.

LAVATORY, or *LAVADERO*, a name given to certain places in Chili, and Peru, where gold is got out of earth by washing.

M. Frezier gives us the following description of the *lavatories* of Chili: they dig deep into the earth, in such places as they have reason to expect gold in; and in order to facilitate this digging, they turn a stream of water upon the spot, loosening the earth as much as possible all the time, that the current may have the greater effect, and tear up the earth more strongly. When they are got to the earth they want, they turn off the stream, and dig dry.

The earth that they now get, is carried on mules, and discharged into a basin, made somewhat in the manner of a smith's bellows; into which a little rivulet of water runs with a great deal of rapidity, dissolving the parts of the earth, and carrying every thing away with it, excepting the particles of gold, which, by their great weight, precipitate to the bottom of the basin, and mix with a fine black sand, where they are almost as much hidden, as they were before in the earth.

Sometimes, they find very considerable pieces in *lavatories*, particularly some pieces of twenty four ounces each.—There are several *lavatories*, where they find these pebbles, or pieces of virgin gold, of a prodigious size. Among others, they tell of one that weighed 512 ounces, bought by the count de la Moncloa, viceroy of Peru.

Nine or ten leagues to the east of Coquimbo, are the *lavatories* of Andacoll, the gold whereof is twenty three carats fine.—Their work, here, always turns to great profit, excepting when the water fails them.—The natives maintain, that the earth is creative, (*creatrix*) that is, it produces gold continually; because, after having been washed sixty or eighty years, they find it impregnated afresh, and draw almost as much out of it as at first.

LAUDANUM, a name given by the chymists to certain preparations, chiefly extracts, of opium; by reason of their excellent qualities: as who should say, *laudandum*, from *laudare*, to praise.

We have divers kinds of *laudanum*; as Sydenham's *liquid laudanum*, *tartarized liquid laudanum*, &c.

LAUDS, *LAUDES*, the second part of the ordinary office of the Breviary, said after matins; though heretofore it ended the office of the night.

The *laudes* consist principally of psalms, hymns, &c. whence they took their name: from *laus*, *laude*, praise.

LAUGHTER, an action, or passion peculiar to man.

Authors attribute *laughter* to the fifth pair of nerves, which sending branches to the eye, ear, lips, tongue, palate, and muscles of the cheek, parts of the mouth, præcordia, &c. there hence arises a sympathy, or consent, between all these parts; so that when one of them is acted upon, the others are proportionably affected.

Hence, a savoury thing seen, or smelt, affects the glands, and parts of the mouth; a thing seen, or heard, that is shameful, affects the cheeks with blushes: on the contrary, if it pleases and tickle the fancy, it affects the præcordia, and muscles of the mouth and face with *laughter*; if it cause sadness and melancholy, it likewise affects the præcordia, and demonstrates itself by causing the glands of the eyes to emit tears.

Dr. Willis accounts for the pleasure of kissing from the same cause, the branches of this fifth pair being spread to the lips, the præcordia, and the genital parts; whence arises a sympathy between those parts.

LAUNCH, in the sea phrase, is to put out: thus they say, *launch the ship*; that is, put her out of the dock, or out of the key, &c.

*LAURA**, a name given to the residences of the ancient monks. See *MONK*.

* The word is originally Greek *λαύρα*, where it primarily signifies *village*, *street*, or *hamlet*.

Authors cannot agree about the difference between a *laura* and a monastery: some pretend, that a *laura* was a monastery wherein there lived, at least a thousand monks; but this is in no wise credible. The more natural opinion is, that the ancient monasteries were the same with the modern, consist-

ing of large buildings, divided into halls, chapels, and cells possessed by the monks, each of whom had his apartment; but the *lauræ* were a kind of villages, whereof, each several house was inhabited by one or two several monks at the most: so that the houses of the chartreux seem, in some measure, to represent the ancient *lauræ*, and those of the other monks, proper monasteries.

The term *laura* was only understood of the religious places in Egypt, and the East, where their houses stood apart from each other, and were not joined by any common cloister, the monks that inhabited them only meeting in public once a week.

LAUREATION, a term in the Scottish universities used for the act of taking up the degree of a master of arts, to which the students are admitted after four years study in the university.

LAURENCE—*Canons of S. Laurence*, an order of regular canons, so called from the monastery of S. Laurence d'Oulx in Dauphine.

This congregation is said to have been founded by S. Benedict. It was destroyed by the Vandals, and continued uninhabited till the middle of the eleventh century. In 1057, Odo, count of Savoy, gave it to one Gerard, and his canons. This donation was confirmed in 1065, by Cunibert, bishop of Turin, who added to it above forty other churches. By which means a very considerable congregation was formed, to whom the succeeding popes, and counts of Savoy, granted a great many privileges.

It had thirty priories; the chief, who is the prior of the congregation, bears the title of provost, and exercises a spiritual jurisdiction throughout his provostship.

LAURENTIALIA*, or **LAURENTALIA**, called also *laurentinalis*, *laurentales*, and *laurentales*; feasts celebrated among the Romans on the tenth of the calends of January, or twenty third of December, in memory of Acca Laurentia, wife of the shepherd Faustulus, and nurse of Romulus and Remus.

* Acca Laurentia, from whom the solemnity took its name, is represented as no less remarkable for the beauty of her person, than her later conduct: on account of which, she was nick named by her neighbours, *lupa*, the wolf; which is said to have given rise to the tradition of Romulus and Remus being suckled by a wolf.—She afterwards married a very rich man, who brought her great wealth; which, at her death, she left to the Roman people; in consideration whereof they performed her these honours: though others represent the feast is held in honour of Jupiter Latiaris.

LAW*, a command, or precept, coming from some superior authority, which an inferior is obliged to obey; or, more properly, law is a command, or mandate of some person, or power, whose precept carries with it the reason of obedience.

* The word is formed from the Saxon *lah*, *lagu*, which signifies the same.

Thus, the command is of God, with respect to men, of a city, with respect to the citizens, and universally of all powerful beings, in respect to those who cannot resist, are called their *laws*.

The nature of a *law* will be most clearly discovered, by shewing wherein it differs from *covenant*, *counsel*, and *right* or *equity*; with all which it is frequently confounded. The difference between a counsel and a *law*, will be best determined from the difference between counsel and command. A counsel is a precept, wherein the reason of obedience is taken from the thing itself prescribed; a command is a precept, wherein the reason of obedience depends on the will of the prescriber; for we cannot properly say, *scilicet* *volens*, *scilicet* *jubes*, unless *scilicet* *pro ratione voluntas*. But since in *laws* we do not obey for the sake of the thing itself, but for the sake of the person who prescribes it, a *law* is not properly a counsel, but a command. A *law* comes from a person who has a power over those whom he commands; a counsel, from him who has no such power. To do what is enjoined by a *law*, is an act of duty; what by a counsel, an act of choice, or free-will. A counsel is directed to his advantage who receives it, a *law* to his who gives it. A counsel only takes effect over those who are willing; a *law*, over those that are unwilling. Lastly, the authority of the counsellor is taken away at the discretion of him to whom the counsel is given; but the authority of the legislator is not taken away at the discretion of him on whom the *law* is imposed.

Law is always confounded with *covenant*, by those who take *laws* to be nothing else but *synthetice*, or forms of living determined by the consent of mankind: among whom is Aristotle, who defines a *law*, 'A declaration determined by the common consent of a city, shewing in what manner things are to be done'; which is not so much the definition of a *law*, as of a *civil law*: nor yet properly of a *civil law*; for this common consent is no more than a mutual covenant, which does not oblige any person, and consequently is not any *law*, till some supreme power be constituted with a power to compel, and to make it penal to transgress it. Here then the covenant is confounded with the *law*, which leads into absurdities; for a covenant is a promise; a *law*, a command.

In a covenant it is said, *I will do*; in a *law* *do*. By a covenant we are obliged, (that is, we must perform according to our promise) by a *law* we are preferred under that obligation, (that is, we are forced to perform, for fear of the punishment awarded by it;) a covenant obliges by itself, a *law* preserves the obligation by force. In a covenant, therefore, we consider what is to be done ere we be obliged to do it; in a *law* we are obliged to do, in the first place, and what is to be done is determined afterwards.

Law is confounded with right or equity, by those who persist in doing what is permitted by the *divine laws*, though prohibited by the *laws* of the country. What is prohibited by the *divine law*, cannot be permitted by the *civil law*; nor what is commanded by the *divine law*, be prohibited by the *civil law*; but what is permitted by the *divine law*, may, notwithstanding, be prohibited by the *civil law*: for the inferior *laws* have a power of restraining the liberty left the superior *laws*, though they cannot enlarge it. Now right or equity is a natural liberty, not constituted by *laws*, but free of them; for take away *laws*, and liberty is complete. This liberty is first restrained by the *natural* and the *divine law*, the rest restrained by the *civil laws*; and what remains unrestrained by the *civil law*, may be again restrained by the constitutions of particular cities, and societies. There is a great difference, therefore, between *law* and right, *lex* & *ius*; for *law* is a chain, but right, a liberty; and they differ as two contraries.

Law may be divided, with respect to its different authors, 'into *divine*, and *human*.'

Divine Law may be considered as twofold, with respect to the two different manners in which God notifies his will to man, *viz.* *natural*, (or *moral*) and *positive*.

Natural Law, is that which he has made known to all mankind, by that innate light, called *natural reason*.

Positive Law, is that which he has revealed by his prophets; as those *laws* delivered to the Jews, relating to the divine worship, and polity, which may be called *divine-civil laws*, as being peculiarly directed to that people.—Again,

Natural law may be divided into that *natural law* of men, which, in a peculiar sense, is called the *Law of nature*; and the *natural law* of countries, commonly called the *Law of nations*.—The precepts are the same in both these: but because, when societies are once instituted, certain personal properties become vested in men; that *law*, which, when we speak of the duties of men severally, we call the *natural law*, when transferred to cities, or countries, we call the *law of nations*.

M. Regis says, that the *laws* of nature are the dictates of right reason, which teach every man how he is to live his natural right; and the *laws* of nations, the dictates, in like manner, of right reason, which teach every state how to act and behave themselves towards others.

Human Laws are all civil. See the article *CIVIL*.

For, according to Hobbes, the state of man, out of society, is a state of war; wherein, no one being subject to another, there can be no other *law* besides the dictates of natural reason, which is the *divine law*.

Civil Laws may be divided, with regard to the difference of their subject matter, into *sacred*, and *secular*.

Sacred Laws, are those that relate to religion; that is, to the ceremonies and worship of the Deity, and which are not prescribed by any positive divine law.

Secular Laws, are those that relate to property, &c. commonly called by the name *civil*.—Further,

Civil Laws, considered with regard to the two offices of the legislator, *viz.* to judge, and to compel, may be divided into two branches; the one *distributive*, the other *vindictive*, and *penal*.

Distributive Law, is that by which every man has his right; or, it is that which constitutes the rules and measures of things, whereby we know what belongs to us, and what to others; so as we may not disturb or interrupt others in the enjoyment of their own, nor be interrupted by them; and what each man may lawfully do, or not do.

Vindictive Law, is that branch by which the punishments to be inflicted on those who violate the *laws*, are determined.

The distributive, and vindictive, are not two species of *laws*, but two parts of the same *law*. For if a *law* say no more than 'Whatever you catch in your net, in the sea, shall be yours,' it is in vain; for though another take from you what you have caught, it is still yours; in regard, in the state of nature, where all things are common, yours and another's are the same thing. So that what the *law* defines to be yours, was yours before that *law*, and will be yours after it, though possessed by another.—A *law*, therefore, is but an empty sound, unless it determine the thing to be yours in such a sense, as to forbid every body else from disturbing you in the possession of it. But such prohibition will be vain, unless there be a penalty annexed to it.—A *law*, therefore, must contain both these parts, that which prohibits, and that which punishes. The first whereof, which is called *distributive*, is prohibitory, and speaks to all: the latter, called *vindictive*, or *penal*, is mandatory, and speaks only to the public officers.

officers. Whence it follows, that to all *civil laws* there is annexed a penalty, either implicitly, or explicitly: and where that punishment is not ascertained, either by writing, or by example, it is supposed to be arbitrary, and to depend on the pleasure of the legislator; for that is no *law* which may be violated impune.

Civil laws, considered with regard to the different manners of promulgating them, are of two kinds; *scriptæ* and *non-scriptæ*, or *written*, and *unwritten*.

Written Laws, are those which require either the voice, or some other sign of the legislator's will, to become *laws*.

Unwritten Laws, are such as need no other promulgation besides the voice of nature, or natural reason; of which kind are all natural *laws*.

Hence it appears, that though the natural *laws* be described in the writings of the philosophers, they are not therefore to be called *written laws*. Nor are the writings of lawyers, *laws*, for want of the supreme authority: nor the *responsa prudentum*, or opinions of judges, *laws*, excepting so far as they are allowed by the supreme power to pass into use; and then they are called *leges scriptæ*, written *laws*; not because of their use, but because of the will of the supreme power, which is argued from their passing into use.

The first principle, or *law* of nature, according to Hobbes, is self-preservation.—Thomasius will have it to be our own happiness, which falls in at last with the sentiment of Hobbes. Puffendorff maintains it to be sociality.—Valentine Alberti, the belief that we are the image of God.—Henry and Samuel Cocceius, the will of God.—Grotius, right reason.—Veltremius, the intrinsic decency, or turpitude of actions.—Strimius and Janus, that we are to love God, ourselves, and our neighbour.

LAW is also applied to the several policies of states and people, or the maxims and rules they have agreed upon, or received from their magistrates, whereby to live in peace and mutual society.

The *laws* of the twelve tables, were the antient *laws* of the Romans, for which the Decemviri were sent into Greece, and which served them for the ground-work of all their jurisprudence.

The celebrated *laws* of the more modern days, are those of the Angli, the Werini, or Thuringi; of the Boii, or Bavarians; those of the Burgundi, Germans, Danes, and Norwegians; of the Franks, the Frisians, the Lombards, the Gothic *laws*, the Marthian, or Merician *law*; the *laws* of the Saxons, Scots, Sicilians, Visigoths; the *laws* of Oleron, the Molmutin *law*, and the Salic *law*.

LAW, *Lex*, among the first Romans, properly signified an ordinance of the people, made at the request of a magistrate, particularly a consul.

These ordinances differed from the plebiscita, and senatus-consulta, and even from other ordinances made at the request of any other magistrate beside a consul, though those too bore the name of *laws*.

Thus, though Aquilius and Falcidius were only tribunes when they made their request, yet we still say, the *Aquilian law*, the *Falcidian law*, &c.

The several *laws* of the Romans are distinguished, 1^o. By the name of him at whose request they were passed; as the *Cornelian law*, the *Julian law*, &c.—2^o. By the matter or subject of the *law*; and hence came the terms *Testamentary law*, *Judiciary law*, *Agrarian law*, &c.

3^o. Sometimes, by the crimes against which they were made; for instance, the *laws* touching *poisoning*, *parricides*, &c. the *laws* of *concession*, *peculate*, &c.

The *Codex* and *Authentica*, are the *laws*, and constitutions of the Roman emperors: and the *Digest* is a compilation, made by the emperor Justinian's order, of the several opinions, and judgments of the most learned in the Roman *law*; to which he gave the sanction of *laws*, as appears by the epistle prefixed to the work: and it is this that properly constitutes the Roman *law*.

The *lex talionis*, or *law* of *like for like*, is the most antient, and equitable *law* in the world. It was observed by the Hebrews.

LAW of *England*, consists of three parts: 1^o. The common *law*, which is the most antient, and general *law* of the realm. See *COMMON*.

2^o. Statutes, or acts of parliament.—3^o. Particular customs. See *STATUTE*, *CUSTOM*, &c.

The common *law* of *England*, is derived from the English, Saxons, and Danes, and was antiently divided into three parts, viz. the *Merician law*, the *West-Saxon law*, and the *Danish law*.

Those called *Merician laws*, are commonly said to have been composed by Martia, queen of the Britons, from whom there was a province called *provincia Mericorum*.—Many *laws* were also published by Etheldred, king of Kent, and by king Ina and Offa: but Alfred, who subdued the whole kingdom, having revised all the *laws* of his predecessors, retained those which he thought proper, and abolished the rest; whence

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he is called *Anglicarum legum conditor*; and these *laws* were called *Westsexenelaga*.

But the kingdom being afterwards subdued by the Danes, they introduced another *law*, called *Danilaga*, by which their people were governed: And they being afterwards destroyed, Edward the confessor, out of the former *laws*, composed that which we now call the *common law*; for which reason he is called by our historians, *Anglicarum legum restitutor*.

These *laws* were only general customs observed through the nation, and for that reason they were called *common*; and perhaps, also, because *leges omnibus in commune reddidit*, to be observed by all, with such amendments as were afterwards to be made.

William the conqueror did not enact many new *laws*, but he confirmed the old, viz. S. Edward's *laws*; and abrogated none that any way concerned compositions, or mulcts of delinquents.

The *common law* is also called *lex non scripta* (not but that we have most of them written in the old Norman dialect; but because it cannot be made by charter, or parliament; for those are always matters of record, whereas customs are only matters of fact, and are no where but in the memory of the people, and of all *laws* must be the best for the English: for the written *laws*, made by king and parliament, are imposed upon the subjects before any probation, or trial whether they are beneficial to the nation, or agreeable to the nature of the people, except where they are first made temporary, and for their experienced usefulness afterwards made perpetual; but customs bind not till they have been tried and approved time out of mind.

Besides the *common law* of *England* in general, there are in several parts of it certain customs and common usages, which have the force of *common law* among those people to whose property they belong; as, *herough English*, a custom so called as not being in use out of *England*; where the youngest son, or, for want of sons, the youngest brother, is to inherit; the eldest being supposed to have learnt the father's trade, and the youngest to be the least able to shift for himself.

Where the *common law* is silent, there we have *statute laws*, made by the several kings of *England*, with the advice and consent of both houses of parliament.

Besides these, we make use of the *civil* and *canon laws* in ecclesiastical courts.

We have also *military* or *martial law*, in use among the soldiery in time of war; and *forest law*, for the regulation of forests. See *MARTIAL*, and *FOREST*.

LAW has also a more special signification, wherein it is taken for that which is lawful with us, and not elsewhere; as, 'Tenant by the courtesy of *England*.'

Thus we also say, to *wage law* (*vadare legem*) and to *make* or *do law* (*facere legem*). See *WAGE*, and *MAKE*.

When an action of debt is brought against one upon some secret agreement or contract, the defendant may wage his *law* if he pleases; that is, he may swear, and certain persons with him, that he owes the plaintiff nothing: but this is only allowed in case of the plaintiff's want of evidence, and when he cannot prove his surmise by any deed, or open act.

When one wages his *law*, he shall bring with him so many of his neighbours as the court shall assign, (Sir Edward Coke says, eleven) to swear with him, that they believe, in their consciences, he hath sworn truly; and these, in our *law*, are called *compurgators*; by the feudists, *sacramentales*.

The officer, to make oath, is called the *wager of law*; and when it is accomplished, it is called the *making* or *doing* of *law*. This custom is said to have obtained, formerly, among the Egyptians.

Assigment by LAW.	} See	ASSIGNEE.
Covenant of LAW.		COVENANT.
Frank LAW.		FRANK.
Intendment of LAW.		INTENDMENT.
Poining's LAW.		POYNING.
Release in LAW.		RELEASE.
Salic LAW.		SALIC.
Suit in LAW.		SUIT.
Sumptuary LAW.		SUMPTUARY.
Surrender in LAW.		SURRENDER.
By-LAWS.		BY-LAW.
Cock-pit LAWS.		COCKPIT.
LAWS of the Stage.		STAGE.

LAW of *Arms*, is that *law* which gives precepts how rightly to proclaim war, to make and observe leagues, to attack the enemy, and to punish offenders in the camp.

LAW of *Marque*, a *law* by which those who are driven to make use of it, take the goods, or shipping of the party that has done them wrong, and of whom they cannot get ordinary justice, whenever they can take them within their own bounds, or precincts.

LAWS of Molmutius. } See the article { MOLMUTIN LAWS,
LAWS of Oleron. } OLERON.

L A W

LAW of the Staple, the same with **LAW Merchant**.

LAW Merchant, a summary sort of *law*, originally differing from the *common law*, though now adopted and become a part of the laws of the kingdom; one point of it consists in this, that if there be two joint merchants of wares, and one of them dies, his executor shall have the moiety: which is not allowed in the case of others, nor merchants.

LAW Spiritual, is the ecclesiastical or canon *law*, allowed and authorized in this realm; so far as it is not against the *common law*, nor against the statutes and customs of the kingdom. And according to such ecclesiastical *laws*, the ordinary and other ecclesiastical judges do proceed in cases within their cognizance.

LAW is also used figuratively, in speaking of the rules, or order wherein any thing is performed.

Thus we say, the *laws* of motion, the *laws* of mechanics, the *laws* of fluids, the *law* of chance, of a game, &c.—*Laws* of friction, of resistance, of descent of bodies, &c. *Laws* of elasticity, rarefaction, reflection, refraction, &c. all which fee under their proper heads.

LAWFUL. See the article **UNLAWFUL**.

LAWFUL Naam. See the article **NAAM**.

LAWING of Dogs, a phrase used in our antient law-writers.

Thus, mastiffs must be *lawed* every three years; *Crompton Jurisd.* fol. 163. that is, three claws of the fore foot shall be cut off by the skin, or the ball of the fore foot cut out.

LAWLESS Court, a court held on Kings-hill, at Rochford in Essex, every Wednesday morning next after Michaelmas-day, at cock-crowing; at which court they whisper, and have no candle, nor any pen and ink, but a coal: he that owes suit or service there, forfeits double his rent every hour he is missing.

This court is called *lawless*, because held at an unlawful hour, or, perhaps, *quia dicta sine lege*, because opened without any form. It is mentioned by Camden, who says, this servile attendance was imposed on the tenants, for conspiring at the like unseasonable time to raise a commotion.

LAWLESS Man, *Exlex*. See the article **OUTLAW**.

LAXATIVE, in medicine, is used to signify a loose state, or disposition of the body; so as to go frequently to stool.

LAXATIVES, or **LAXATIVE Medicines**, are such as promote this disposition, which they do by some smooth, softening quality, taking away the tensity of the fibres, and facilitating the passage of the contents of the intestinal tube, through it; for which reason all oily substances come under this class.

LAXIOR Toga. See the article **TOGA**.

LAY, the name of a kind of antient poetry, or poem among the French; consisting of very short verses.

There were two sorts of *lays*, the *great*, and the *little*.

Greater LAY, was a poem consisting of twelve couplets of verses, of different measures.

Little LAY, was a poem consisting of sixteen or twenty verses, divided into four couplets.

These *lays* were the lyric poetry of the old French poets, who were imitated by some among the English. They were principally used on melancholly subjects, and are said to have been formed on the model of the trochaic verses of the Greek and Latin tragedies.

Father Mourgues gives us an extraordinary instance of one of these antient *lays*, in his treatise of French poetry:

*Sur l'appuis du monde
Que fait il qu'on fonde
D'espoir?
Celle mer profonde,
En debris seconde
Fait voir
Calme au matin, l'onde
Et l'orage y gronde
Le soir.*

LAY the land, a sea phrase, used for failing in sight of land.

In such cases they say, *they have laid the land*: and if another point of land exclude the sight of the former, they say, *they have sbut the first land in*.

LAY-Land, in husbandry, denotes fallow ground, which lies untilld. See **FALLOW**, and **PLOUGHING**.

LAY-Brother, among the Romanists, a pious, but illiterate person, who devotes himself, in some convent, to the service of the religious.

The *lay-brother* wears a habit different from that of the religious, nor ever enters into the choir, or the chapter. He is not in any orders, nor does he make any vow, excepting of constancy and obedience.

LAY-Brother, is also used for an illiterate religious, who takes care of some of the temporal concerns of the convent, as the kitchen, the gate, &c.

These *lay-brothers* make the three vows of religion.

In the nunneries are also *lay-sisters*, who never enter the choir, &c. and who are only retained for the service of the convent.

L A Z

The institution of *lay-brothers* began in the eleventh century. The persons on whom this title was conferred, were such as were too ignorant to become clerks, and who therefore applied themselves wholly to bodily labour. It seems to have taken its rise from hence, that the laity in those days had not, for the generality, the least tincture of learning; whence also those came to be called *clerks*, by way of distinction, who had studied a little, and were able to read.

LAY-Canons.
LAY-Communities.
LAY-Corporation.
LAY-Patronage.

CANON.
COMMUNITY.
CORPORATION.
PATRONAGE.

LAYS-side.
Vaunt-LAY.

Side-lays.
Vaunt-lay.

LAYER, in husbandry, and gardening, a young tender shoot or twig of a plant, not far from the ground, which is bent down, and several joints or knots of it buried three or four inches under ground: the other part fill remaining united with the parent tree: till having struck root below, it is cut and separated from the rest, and produces a new plant.

LAYMAN, a person not engaged in any order of ecclesiastical ties.

LAYMAN, among painters, a little statue or model, either of wax or wood, whose joints are so made, that it may be put into any attitude, or posture: its chief use is for the casting, and adjusting draperies, for the clothing of figures.

Some call it, after the French, *manequin*, *q. d.* a little man.

LAZARETTO, or **LAZAR-HOUSE**, a public building in manner of an hospital, for the reception of poor sick.

LAZARETTO, in some countries, is an edifice appointed for persons coming from places suspected of the plague, to perform quarantain in.

This is usually a large building, at a distance from any city, whose apartments stand detached from each other, &c. where ships are unladen, and their crew is laid up for forty days, more or less, according to the time and place of their departure.

S. LAZARUS, or **LAZARO**, a military order, instituted at Jerusalem by the Christians of the West, when they became masters of the holy land, whose business was to receive pilgrims under their care, guard them on the roads, and defend them from the insults of the Mahometans.

Some say, this order was instituted in 1119. Pope Alexander IV. confirmed it by a bull in 1255, giving it the rule of S. Augustin.

The knights of this order being driven out of the holy land, part of them retired into France, and were established there under Louis III. who bestowed on them the country of Boigny near Orleans. Innocent VIII. suppressed the order of S. *Lazaro* in Italy in 1490, or rather he united it to that of Malta. Leo X. re-established it in Italy in the beginning of the sixteenth century. In 1572, Gregory XIII. united it in Savoy to that of S. Maurice, just instituted by duke Emanuel Philibert.

In France, this order was united to that of N. D. of Mount Carmel in 1608, and had some new advantages conferred on it by the late king Louis XIV. The knights of S. *Lazarus* are allowed to marry, and yet have pensions upon benefices.

Fathers of S. LAZARUS, called also **LAZARITES**, a name given to certain regular clerks of a congregation instituted in France, in the seventeenth century, by M. Vincent.

They take the denomination from a house in the Fauxbourg of Paris. They have a seminary in Paris, called, *The seminary des bons enfans*. The vows they make are simple, and on occasion may be dispensed withal.

LAZULI.—**Lapis LAZULI**, a sort of precious stone, of a blue colour, veined and spotted with white, and yellow.

This is the same with what is otherwise called *azure* stone, by the antients *cyaneus*, and *caeruleum*: by Mesue, the *starry* stone; and by Pliny, and many of the antients, *sapphirus*. Of the *lapis lazuli* is prepared the fine pigment called *ultra marine*.

To be good, it should be able to resist fire and smoke; and come out of them with new lustre.—It is found in mines of gold, silver, and copper, as also in quarries of marble; which last is that that generally in use.

Naturalists distinguish three kinds of *lapis lazuli*: The first called of the *old rock*, which is pure, smooth, a fine blue, with beautiful yellow streaks like veins of gold, which yet are frequently no more than veins of pyrites.—The second, called that of the *new rock*, is debased by a mixture of common stones: its colour is weaker, and its price lower: these two kinds are brought from Persia and Siam.—The third kind is brought from the mountains of Auvergne. This is mixed with the common rock whence it is dug: it is of a pale blue, and is sprinkled with greenish spots, with veins of pyrites. This when sufficiently charged with spots of green, is often sold for the Armenian stone.

The *lapis lazuli* is of some use, in medicine; they prepare it by calcining

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cining and washing it several times; which done, it makes an ingredient in the famous confection of alchemies. Sometimes, in spite of all its lotions, it continues to be purgative, by reason of the vitriolic matter it contains. See Supplement: article LAZULI LAPIS.

LE Roy, *le vent*.

LE Roy's *adjuvera*. } See the article LE ROY.

LEAD, a coarse, heavy, impure metal, of all others the softest and most fusible, when purified; called by the chymists *saturn*.

Those who have made an analysis of *lead*, find it to contain a little mercury, some sulphur, and a great deal of bituminous earth.

Lead is found in various countries, but it abounds particularly in England. It is found, too, in several kinds of soils, and stones, some whereof, besides, contain gold, some silver, others tin, &c.

It is melted in a furnace provided for that purpose, with a strong coal-fire upon it; as it melts, it runs through a canal on one side; leaving the earth, stone, and scoria, with the ashes of the coals.

It is purified by skimming it ere cold, and throwing fuel and other fat bodies into it.

Lead is found of a lighter, or deeper colour, according as it is more or less purified; though some make a difference in the colour of the ore, always esteeming that most which is the whitest.

Some very able naturalists observe, that the weight of *lead* increases on long keeping, either in the open air, or underground.—Mr. Boyle observes this particularly of the lead of churches, which, he says, frequently grows both in bulk and weight, so as to become too ponderous for the timber that before sustained it; which some account for from the impurity, heterogeneity, and loose texture of its parts, by means whereof the particles of the air getting admission within its pores, are attracted, and easily assimilated to it. But others, who rely wholly on experience, absolutely deny the fact, as also that it is reproduced in mines before exhausted, by letting them lie long open to the air; which others assert.

Lead is a metal of much use; it easily melts, and mixes with gold, silver, and copper, and communicates, as they talk, its humidity to them; but not being able to endure the violence of the fire which they undergo, it retires, and carries with it all that was heterogeneous in them; so as neither gold nor silver are refined without *lead*. See REFINING.

To which it may be added, that the coarser kind of precious stones, heated in *lead*, are said to be thereby rendered much more brilliant.

Lead is much used in building, particularly for covering, gutters, pipes, and in glass-windows. For which uses, it is either cast into sheets in a mold, or milled; which last, some have pretended, is the least serviceable, not only on account of its thinness, but also because it is so exceedingly stretched in milling; that when it comes to lie in the hot sun, it is apt to shrink and crack, and consequently will not keep out the water: But this appears to be a suggestion without grounds. *Vid. Bayl. Build. Dict. Suppl. in voc.*

The *lead* used by glaziers is first cast into slender rods, twelve or fourteen inches long, called *canes*; and these being afterwards drawn through their vice, come to have a groove on either side for the panes of glass; and this they call *turned lead*.

The method of paleing or folding *lead* for fitting on of imbossed figures, &c. is by placing the part whereon the figure is to be paled, horizontal, and strewn on it some pulverised rosin; under this they place a chaffing-dish of coals, till such time as the rosin becomes reddish, and rises in pimples; then apply the figure, and rub some soft solder into the joining: when this is done, the figure will be paled on, and as firm as if it had been cast on it.

Borrichius asserts, that *lead* reverberated into minium, converted into glass, reduced into ceruss, or burnt into litharge, immediately resumes its original figure, upon the dexterous application of a lixivial salt.

LEAD-works.—Mr. Glanville observes, that the smoke of the *lead-works* at Mendip in Somersetshire is a prodigious annoyance, and subjects both the workmen, and the cattle that graze about them, to a mortal disease. The trees that grow near them have their tops burnt, and their leaves and outsidings discoloured and scorched.

When the *lead* ore is dug out, they beat it small, then wash it clean in a running stream, and sift it in iron rudders. Their hearth or furnace is made of the clay or fire-stone; which they set in the ground, and on it build their fire, which they light with charcoal, or continuing it with young oaken gads, blown with bellows, work'd by mens treading on them. After the fire is lighted, and the fire-place hot, they throw their *lead* ore on the wood, which melts down into the furnace, and then with an iron ladle they take it out, and upon sand cast it into what form they please.

The mine-men sometimes find the vein run up into the roots of trees, and yet do not observe any difference between those and other trees. When the mine is new, the surfaces

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the grafts is sometimes found yellow. They make no account of the virgula divinatoria; yet say, that when a mine is open, they may guess by it how far the vein will lead: The ore runs sometimes in a vein, sometimes dispersed in banks; it lies many times between rocks; some of it is harder, others milder; sometimes they have branched ore in the spar; about the ore is spar and caulk; and another substance, which they call *crotes*. See Supplement: article PLUMBUM.

For the manufacture of LEAD, see the article PLUMBERY.

There are various preparations of *lead*, serving for various purposes:

LEAD Duff, is a preparation used by the potters; made by throwing charcoal dust into melted *lead*, and stirring them a long time together; to separate the coal again, they only wash it in water, and dry it afresh.—Its use is to give a varnish and gloss to their works.

Burnt LEAD, *plumbum ustum*, is a chymical preparation used in medicine, made of plates of *lead* melted in a pot with sulphur, and reduced by fire into a brown powder.

White LEAD, used by painters, is only thin plates of *lead* dissolved with vinegar.

Litharge of gold or silver, is only the burnt *lead* used in purifying other metals.

Red LEAD, a preparation or mineral lead calcined, and rubified; used by painters, potters, and surgeons. See MINUM. By help of chymistry, there are also drawn from *lead*, salts, balsams, oils, vinegar, a magistery, &c. disguised under the name of *saturn*, to amuse the ignorant.

Salt, or Sugar of LEAD, *Saccharum saturni*, is an essential salt of vinegar, incorporated with the proper substance of *lead* or ceruss dissolved in spirit of vinegar.

Balsam of LEAD, or *Saturn*, is an oil drawn from the salt of *lead* by distillation, after having dissolved it in spirit of turpentine.

Magistery of LEAD, is the calx of *lead* purified and sublimized. It is made of *lead* dissolved in aqua fortis, pouring a filtrated salt water into it; whence results a magistery extremely white, which when softened by several lotions, is mixed with pomatums for the face and complexion.

Black LEAD, is a kind of mineral of a black colour, but soft and shining, found chiefly in England, and appearing to be nothing else but a peculiar talky earth. It is much used for pencils, or crayons for designing.—It is not to be melted like the common *lead*.

Essay of LEAD.

Refining of LEAD.

Casting of LEAD on Cloth.

LEAD Nails. See the article NAILS.

LEADEN Bullet moulds. See the article MOULDS.

LEAF, a part of a plant, ordinarily very thin and flat, growing in the spring, and usually falling off in autumn. See PLANT. There are some plants without leaves, as truffles and mushrooms.

As to the structure of leaves, Dr. Grew observes, that their fibres never stand on the stalk in an even line, but always in an angular or circular posture, and their vascular fibres or threads are 3, 5, or 7. The reason of which position is for their more erect growth, and the greater strength of the leaf. Another observable in the fibres of leaves, is their orderly position; so as in some to take in an eighth part of a circle, as in mallows; in some a tenth, but in most a twelfth.

The same author observes six several parts intended by nature for the preservation of gems; viz. leaves, furcils, interfoils, stalks of leaves, hoods, and mantlings that cover them.

The skin or coat of the leaves is no more than that of the branches extended, as gold, by beating, is reduced into leaves.—In the gem, the leaves are folded, sometimes in two, and sometimes in several plaits, somewhat after the manner of a fan. If the leaves be too thick to plait commodiously in two, and to be ranged against each other; or if they be in too small a number, and their fibres too delicate, instead of being plaited, they are rolled up, and form either a single roll, as the leaves of the mountain cowslip, which are thick; or two rolls, which begin at each extremity of the leaf, and meet in the middle.—There are also some plants whose leaves form three rolls, as fern; several leaves are covered with hair of several figures, those of lavender and the olive-tree have hairs resembling stars. See LANUGO.

Botanists consider the leaves of plants, with regard to their structure, surface, figure, consistence, edges, situation and size.—With regard to their structure, leaves are either single, as those of the apple-tree, pear-tree, &c. or double, as those of angelica, parsley, &c.

With regard to their surface, leaves are either flat, as the nummularia, asarum, origany, androsæmum, bronia canadensis, &c. or hollow, as those of the onion and asphodel; or thick and solid as several kinds of kali, and house-leeks.

With regard to their consistence, leaves are either thin and fine, as those of S. John's-wort, and dog's grass; or thick and gross, as those of portulaca; or fleshy, as those of several kinds of house-leeks; or woolly, as those of the mullein.

With

With regard to their verge, or edges, *leaves* are either cut slightly, as some species of gum, and cannabis; or deep, as trefoil, &c.

With regard to their situation, *leaves* are either alternate, that is, ranged alternately, as the hound's tongue; or opposite to each other, as the phillyria, or flattened as in the rubia.

With regard to their size, *leaves* are either very big, as those of the colocasia, and sphondylium; moderate, as those of the fig-tree; small, as those of the apple-tree, pear-tree, peach-tree; or very small, as those of mille-pertuis, or S. John's wort.

Annual LEAVES.	} See the article {	ANNUAL.
Crenated LEAVES.		CRENATED.
Dissimilar LEAVES.		DISSIMILAR.
Procumbent LEAVES.		PROCUMBENT.
Segment LEAVES.		SEGMENT.
Seminal LEAVES.	}	SEMINAL.
Vernal LEAVES.		VERNAL.

LEAF, is also applied to the finest and most beautiful parts of flowers, more properly called petals.

It is true, all flowers have not leaves or petals, and it is sometimes difficult to determine which is to be called the *leaves*, and which the calyx of the same flower.

To prevent confounding the *leaves* of the flower with those of the rest of the plant; the former are called by botanists *petala*, the latter *folia*.

LEAVES, in architecture, are an ornament of the Corinthian capital, and thence borrowed into the Composite; consisting in the representation of a double row of *leaves* covering the vase, tympanum, or neck of the column.

These *leaves* are usually formed in imitation of those of the acanthus; sometimes of those of olive, and sometimes of laurel.

The *leaves* are divided; each making three ranges of lesser, and are bent, atop, one third of their height.—See *Tab. Archit. fig. 30. lit. CC.*

LEAF-SILVER. See the article SILVER.

LEAGUE,* an extent of ground, considered lengthwise; serving to measure the distances of one place from another; and containing more or less geometrical paces, according to the different usages and customs of countries.

* The word comes from *leuca*, or *leuga*, an ancient Gaulish word, for an itinerary measure, and adopted in that sense by the Romans.—Some derive the word *leuca* from λευκοι, white; in regard the Gauls, in imitation of the Romans, marked the spaces and distances of their roads with white stones.

A sea league is usually reckoned 3000 geometrical paces, or three English miles: the large leagues of France, are usually 3000, and in some places 3500 paces; the mean or common league is 2400 paces, and the little league 2000. Chorier observes, that the ancient Gaulish leagues were but 1500 paces.

The Spanish leagues are larger than the French, 17 Spanish leagues make a degree, or 20 French leagues or 60 $\frac{1}{2}$ English statute miles. The leagues of Germany and Holland contain four geographical miles each.

The Persian leagues are nearly the same with the Spanish; that is, each is equivalent to four Italian miles; which comes pretty near to what Herodotus mentions of the parafanga, an ancient measure among the Persians, containing thirty stadia; eight whereof, according to Strabo, make a mile.

The Persians mark their leagues by trees, as the ancient Romans did by stones, lapides; for which reason they are also called *agaga*, a Turkish word signifying tree.—In Japan, the league consists of 1800 fathoms.—These are all distinguished by little hillocks, raised on purpose by the road side. See the leagues of most countries, reduced to the Roman foot, under the word MILE.

LEAGUE* also denotes an alliance, or confederacy between princes, and states, for their mutual aid, either in attacking some common enemy, or in defending themselves.

* The word comes from *liga*; which, in the corrupt Latin, was used for a confederacy: Quia qui cum alio ligatur.

There have been several holy leagues entered into by the Christians, against the Saracens and infidels; called also *crusades*, or *croisades*.

The LEAGUE, by way of eminence, denotes that famous one on foot in France, from the year 1576, to 1593. Its intent was to prevent the succession of Henry IV. who was of the Reformed religion, to the crown; and it ended with his abjuration of that faith.

The leagues, or confederates, were of three kinds: the zealous leagues aimed at the utter destruction, not only of the Huguenots, but also of the ministry. The Spanish leagues had principally in view the transferring the crown of France to the king of Spain, or the infant his daughter. The moderate leagues aimed only at the extirpation of Calvinism, without any alteration of the government.

LEAKAGE, the state of a vessel that leaks; that is, lets water, or other liquid ooze in or out.

LEAKAGE also denotes an allowance of 12 per cent, to merchants importing wine, out of the customs thereof; and of 2 barrels in 22 of ale to brewers, &c. out of the excise.

LEAP, and STEP. See the article STEP.

LEAP-YEAR*, the same with bissextile. See BISSEXTILE.

* It is thus called, by reason, in the common year, any fixed day of the month changes successively one day of the week; but, in the leap year, it skips or leaps over one day.

The common year hath 365 days in it, but the leap-year 366 days; and in this case February hath 29 days; which, in the common year, hath but 28.

To find the leap-year, the rule is,
Divide by 4, what's left shall be,

For leap-year 0, for past, 1, 2, or 3.
For example; Is the year 1720 a leap year, or a common year?

4) 1720 (430
There is 0 remainder, so that it is leap-year.

LEASE, in law, a demise, or letting of lands, tenements, or hereditaments unto another for life, term of years, or at will, for a rent reserved.

A lease is either written, called an indenture, deed poll, or lease in writing; or by word of mouth, called lease parol. See PAROL.

The party who lets a lease, is called the lessor; and the party to whom it is let, the lessee.

LEASH, or LEASHE among sportsmen, denotes three creatures of any kind; but chiefly greyhounds, foxes, bucks, and hares.

We say, a leash of greyhounds, a couple and a half of hounds.

LEATHER-MILLS. } See the article { MILL.
LEATHER-MONEY } COIN, and MONEY.

LEAVE and TAKE. See the article TAKE.

LEAVEN*, any thing that will make a body swell, and ferment.

* The word is formed from the French *levain*, which signifies the same, of the verb *lever*, or Latin, *levare*, to rise.

Beer, ale, wine, and cyder only work by means of the leaven in them.—Sour paste, barm, rennet, &c. are leavens used in baking bread, brewing beer, making cheese, &c.

LEAVER. See the article LEVER.

LECTICARIUS, an officer in the Greek church, whose business it was to bear off the bodies of those who died, and to bury them.—These were otherwise denominated *decani* and *copiata*.

The Romans had two kinds of *lecticarii*, different from those of the Greeks, and who answered nearly to the office of our chairmen.

LECTISTERNIUM, a religious ceremony among the ancient Romans; being a festival prepared, and solemnly served up in a temple.

And because, according to the customs of those times, they placed beds around the tables, and set the statues of the gods on those beds, in the same manner as men sat at meals; they called the solemnity *lectisterium*, from *lectus*, bed, and *sternere*, of *sterno*, to spread, prepare.

In this ceremony the Epulones presided. See EPULO.
Casaubon has observed from a passage in the scholiast of Pindar, that the Greeks had also a sort of *lectisterium* in use.

Livy observes, that the first *lectisterium* seen in Rome, was that which held for eight days successively, in honour of Apollo, Latona, Diana, Hercules, Mercury, and Neptune; on occasion of a contagious disease which killed almost all their cattle, in the year of Rome 354; though Valerius Maximus mentions one before that.

LECTURES. See the article BOYLE'S Lectures.

LEDGER. See the article BOOK.

LEE, a term variously used at sea; though its general use be to signify the part towards, or opposite to the wind.—Thus the

LEE-Shore, is that on which the wind blows; so that to be under the lee of the shore, is to be close under the weather-shore, or under wind.

A LEE the Helm, signifies, put the helm to the lee-ward side of the ship.

Take care of the LEE Hatch, is a word of command to the man at the helm, to take care that the ship do not go to the lee-ward of her course.

LEE-ward Ship, is one that is not fast by the wind, or which doth not fall so near the wind, nor make so good way as she should.

To lay a Ship by the LEE, or to come up by the LEE, is to bring her so, that all her sails may lie flat, against her masts and throats, and that the wind may come right upon her broad-side.

LEE-way, or LEE-ward-way of a Ship, is the angle made by the line on which the ship should run according to her course; or the point of the compass steered upon, and the real line of the ship's way.

All ships are apt to make some lee-way; so that in casting up

the log-board, something must be allowed for *lee-way*. The ordinary rule is this:

1°. In the ship before a wind, allow one point for *lee-way*.
2°. If the wind blow hard, so that you are forced to take in one top-sail, allow two points for *lee-way*.
3°. If it blow so hard, that both top-sails must be taken in, and the sea runs high, allow three points for *lee-way*.
4°. If her fore-sail being furled, the try under a main-sail, or mizzen, she will make her way four points before the beam.
5°. If the try with a main-sail only, she will make her way near three points before the beam.
6°. If under a mizzen only, she will make her way about two points before the beam.
7°. If she lie a hull, with all her sails furled, she will make her way one point before the beam.

LEER *Fishkill*. See the article FURNACE.

LEES, the grossiest and thickest parts of wine, oil, and other liquors; or the sediment found at the bottom of the vessel.

* The word comes from the French, *lie*, and that either from *lieux*, m. d., or from *Levis*, one of the surnames of B. cohen; or according to Du Cange, from *lia*, a corrupt Latin word, signifying the same.

A kind of Pot-ash called *cineres clavellati* is made with the *lees* of wine burnt, and prepared, used by dyers, &c. which ought to be remembered by people troubled with the stone, &c.

The vinegar-makers make a great trade of the *lees* of wine dried, and made into cakes, after having squeezed out the remains of the liquor in presses. See Supplement: article LEES.

LEET, LETA, a court held by the lord of a manor; though, in reality, it is the king's court, in whose manor *fover* it is held; by reason the authority thereof belongs originally to the crown, and is derived thence to other persons.

A *court leet*, is a court of record, and inquires of all offences under his jurisdiction; though it cannot punish many, but must certify them to the justice of assize.

LEFT *Hand*. See the article HAND.

LEG, *Cruel*. See the article LEGS.

LEGACY, LEGATUM, in the civil law, a donation by testament; answering to what in common law is called a *bequest*.

Legacy is usually defined some particular thing given by a last will, and testament; for that if a man thus dispose, or transfer his whole estate on another, it is called *hereditas*; and he to whom it is given, is called *heres*.—Though, in common law, the distinction is this; that he to whom all a man's lands, and hereditaments descend by right of blood, is *heres natus*; the other, to whom it is bequeathed, is called *heres factus*.

LEGACY, in an ecclesiastical sense, was a *fool-fest*, a bequest to the church, or accustomed mortuary: which was to hold good, even though the testament itself were declared null, and invalid.

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LEGATIS *Tenementis*. See the article TENEMENTIS.

LEGATORY, or LEGATARY, a term used in speaking of the government of the ancient Romans: Augustus divided the provinces of the empire into consular, *legatory*, and *prefectal*.

LEGATORY *Provinces* were those whereof the emperor himself was governor, but where he did not reside, but administered affairs by his lieutenant, or *legatus*.

LEGATUS, among the Romans, a military officer, who commanded as deputy of the chief general.

Of these there were divers kinds, viz. a *legatus* in the army under the emperor, or general, answering to our lieutenant-general; and a *legatus* in the provinces, under the proconsul, or governor.

When any considerable person, among the Roman citizens, had occasion to pass through any of the provinces, the senate gave him the title of *legatus*; that is, of envoy from the senate, to the end he might be received with the greater respect; and that the cities and towns, through which he travelled, might defray his expences.—This they called a *free legation*, *libera legatio*; in regard the person was not incumbered with any trust, and might lay it aside as soon as he pleased.

LEGEND, LEGENDA, was originally a book used in the old Romish churches, containing the lessons that were to be read in divine service.

Hence also the lives of saints, and martyrs came to be called *legends*; because chapters were read out of them at matins, and in the refectories of the religious houses.

Golden LEGEND, is a collection of the lives of the saints, compiled by James de Varase, better known by his Latin name of *J. de Voragine*, vicar-general of the Dominicans, and afterwards archbishop of Genoa, who died in 1298.

It was received into the church with a world of applause, which it maintained for 200 years; but, in effect, it is so full of ridiculous and romantic accounts, that the Romanists themselves are now generally ashamed of it.—The word *legend* itself is, on that account, come into disrepute.

LEGEND is also used by authors to signify the words, or letters engraven about the margins, &c. of coins.

Thus the legend of a French crown is, *Sit nomen domini benedictum*; that of a moidore, *In hoc signo vinces*; on those of the last emperors of Constantinople, we find *Jesus Christus Vofileus Vofileon*, IHS XPS NIK A, *Jesus Christus vincit*.

LEGEND is also applied to the inscription of medall, which serve to explain the figures, or devices thereof.

In strictness, the *legend* differs from the *inscription*; the latter properly signifying words placed on the reverse of a medal, in lieu of figures.

It seems as if the antients had intended their medals should serve both as images, and as emblems; the one for the common people, and the other for persons of taste and parts: the images to represent the faces of princes; and emblems to represent their virtues, and great actions; so that the *legend* is to be looked on as the soul of the medal, and the figures as the body.

Every medal has properly two legends; that on the front, and that on the reverse. The first, for the generality, serves only to distinguish the person by his name, titles, *ages*, &c. the latter is intended to express his noble and virtuous sentiments, his good deeds, and the advantages the public has reaped by him.—This, however, does not hold universally; for sometimes we find the titles shared between both sides, and sometimes also the *legend*.

In the medals of cities, and provinces, as the head is usually the genius of the place, or, at least some deity adored there; the *legend* is the name of the city, province, or deity, or of both together; and the reverse, is some symbol of the city, &c. frequently without a *legend*; sometimes, with that of one of its magistrates.

The ordinary subjects of legends, are the virtues of princes, the honours they have received, consecrations, signal events, public monuments, deities, public vows, privileges, &c.

Legends, and inscriptions of medals, are either in Latin, or Greek.—The Greek character, consisting of majuscule, or capital letters, appears uniform on all the medals; no change, or alteration being found in confronting the several characters; though, it is certain, there was in the ordinary use, and pronunciation.—All we observe on medals, is sometimes a mixture of Greek and Latin letters.—The character was preserved in all its beauty, till the time of Gallienus.

From the time of Constantine, and for the space of 500 years, the Latin tongue was alone used in the *monetary* medals, even in those struck at Constantinople.—Michael began the first, whose *legenda* was in Greek; and from his time the language, as well as the characters, began to alter for the worse.

LEGION, a kind of regiment, or body of forces, of a number whereof the Roman armies were chiefly composed.

* The word comes from the Latin, *legere*, to choose;—hence, when the *legions* were raised, they made choice of such of their youth, as were the most proper to bear arms.

LEG

The number of soldiers, and officers, whereof the *legion* consisted, was different at different times: but it is impossible to determine the precise time, and manner of their alteration.—In the time of Romulus, each *legion* contained 3000 foot, and 300 equites, or horse: these were divided into three bodies, which made as many orders of battle.—Each body consisted of ten companies, or maniples, ranged at some distance from each other, though in the same front.—Each body had two general officers, to command it, called *tribunes*; and each manipule, two *centurions*.

Under the consuls, the *legion* consisted of 4000 men, who made four bodies, commanded by a consul, or one of his lieutenants; and each legion had its share of cavalry, which was from two to three hundred horse.

Afterwards, in the time of Marius, these four divisions of the *legion* were united into one, and augmented; and cohorts were appointed from five to six hundred men, each under the command of a tribune.—Each cohort consisted of three companies or maniples, each manipule of two centuries, and the *legion* was divided into ten cohorts, who made as many distinct battalions, disposed in three lines; so that the *legion*, then, consisted of five or six thousand men.

Livore tells us, that the *legion* consisted of six thousand men, and was divided into sixty centuries, thirty maniples, twelve cohorts, and two hundred troops.—According to the French academy, the *legion* consisted of six thousand foot, and seven hundred twenty five horse.

The *legions* were, by far, the most considerable part of the Roman army; their number, in the time of Augustus, was thirty three; they were composed wholly of Roman citizens.—The allies formed a body of auxiliary forces.

The standard bore by the *legions* was various: at first, a wolf, in honour of that which suckled Romulus; afterwards a hog, by reason, says Festus, war is only undertaken with a view to peace, which was concluded by sacrificing a hog. Sometimes, they bore the minotaur, to remind their general that their designs were to be kept secret, and inaccessible as the minotaur in the labyrinth.—They also bore a horse, a bear, &c.—Pliny tells us, that Marius was the first who changed all these standards into eagles.

Square LEGION, *Legio quadrata*, was a legion consisting of 4000 men.

Domestick LEGIONUM. } See { DOMESTICUS.

Thundering LEGION. } See { THUNDERING.

LEGISLATOR, *Law-giver*; he who frames the laws of a kingdom, or state founded by him.

The principal antient legislators are—Moses, legislator of the Hebrews; Mercurius Trismegistus, and Bochyrus, of the Egyptians; Italus, of the Oenotrians; Theseus, Draco, and Solon, of the Athenians; Zoroaster of the Bactrians; Charondas, of the Cappadocians; and Charondas, or Phaleas, of the Carthaginians; Andromadas, of the Chalcidians; Eudoxus of the Cnidians; Phido, of the Corinthians; Minos, of the Cretans; Pythagoras, of the Crotoniates, and most of the cities of Græcia Major; Parmenides, and Zeno, of Elca in Lucania; Zanolxis, of the Getæ; Phoroneus, of the Greeks; Bacchus, of the Indians; Saturn of Italy; Macarius, of the ile of Lesbos; Zaleucus, of the Locrians; Nicodorus Athleta, of the city of Mutina; Hippodamia, of Miletus; Charondas, of Rheggio; Lycurgus, of the Lacedæmonians; Archytas, of Tarentum; Philolaus of the Thebans.

At Rome, the people were in a great measure their own legislators; though Solon may be said, in some sense, to have been their legislator, in regard the Decemviri, who were created for the making of laws, borrowed a great number from those of Solon.

LEGITIMATE Delivery. } See { DELIVERY.

LEGITIMATE Tertian. } See { FEVER.

LEGITIMATION, an act by which natural, or illegitimate children are rendered legitimate. See **BASTARD**, &c.

By the French law, the father and mother, by marrying, render their children, begotten before marriage, legitimate; and this is called *legitimatío per subsequens matrimonium*.

The right of legitimatión, was a thing unknown to princes till the time of Constantine; but, since his time, has been exercised by most of them. The Greek emperors invented several kinds of legitimatión.

Anastasius put it in the power of the father to legitimate his natural children, by a bare adoption, provided he had no legitimate children.—But Justin by his constitution, and Justinian, by his *Novel 74*, abolished this legitimatión, as fearing the too easy access to legitimatión should encourage concubinage.

In lieu of this, he established a way of legitimatión by the emperor's letters.—This rendered bastards capable of attaining to honours, and even of succeeding to inheritances, provided the persons were legitimated with the consent of their father and mother; which is agreeable to the canon law.

LEGS, the lower extremes of the bodies of most animals, serving them for support and motion. See **ANIMAL**, and **EXTREME**.

LEM

Some anatomists divide the foot of man into three parts, viz. the thigh, the *leg*, and the lesser foot. See **FOOT**.

In the *legs*, there are two considerable bones; the one called the *great femur*, or *tibia*; the other the *little femur*, or *fibula*.

The *legs* and feet of the several animals, Mr. Derham observes, are exactly conformable to the posture, make, ray, to the motion and exercises of those animals. In some they are made for strength only, in others for agility and swiftness; in some for walking and running, in others for swimming, in others for digging, and in others for flying. In some more lax, and weak, for traversing the plain land; in others stiff, and rigid, for ice and precipices. In some, shod with tough and hard hoofs, some whole, some cleft. In some the feet are composed of toes, some short, for only going, others long, to supply the place of hands; some are armed with talons, to catch and tear their prey; and some with short nails, to confirm their steps in running and walking.

In birds, the *legs* are curved, for their easy perching, roofing, and rest, as also to help them on the wing in taking their flight, and to be therein commodiously tucked up to the body, so as not to obstruct their flight. In some, they are long, for wading, &c.

Legs of a Triangle.—when one side of a triangle is taken as a base, the other two are called *legs*. See **TRIANGLE**.

Arched LEGS.

Hyperbolic LEGS.

Compasses of three LEGS.

LEGUMEN, **LEGUME**, is applied, by botanists, to beans, peas, vetches, &c. otherwise called *pulse*.

Some will have them thus called, in regard they are gathered with the hand; by which they are distinguished from corn, &c. which are mowed, or reaped: *eo quod manu legatur, & non secatur*.

Yet the antient writers on husbandry consider corn, and even turnips, and all grains, and roots for family use, are *legumina*.

LEGUMINOUS, an appellation given to those plants which yield legumes, or pulse.

Of this kind are most plants which grow in pods, as beans, peas, &c.

Ray ranks all plants as *leguminous*, which have a papilionaceous or butter-fly-like flower.

LEGUMINOUS Flowers. See the article **FLOWER**.

LEMMA, *ahmma*, in mathematics, denotes a previous proposition, laid down in order to clear the way for some following demonstration; and prefixed either to theorems, in order to render their demonstration less perplexed, and intricate; or to problems, to make their resolution more easy, and short. Thus, to prove a pyramid one third of a prism, or parallelepiped of the same base and height with it; the demonstration whereof in the ordinary way, is difficult, and troublesome; this lemma may be premised, which is proved in the rules of progression; that the sum of the series of the squares, in numbers in arithmetical progression, beginning from 0, and going on 1, 4, 9, 16, 25, 36, &c. is always subtriple of the sum of as many terms equal to the greatest; or is always one third of the greatest term multiplied by the number of terms. Thus, to find the inflection of a curve line, this lemma is first premised; that a tangent may be drawn to the given curve, in a given point.

So, in physics, to the demonstration of most propositions, such *lemmata* as these are necessary first to be allowed; that there is no penetration of dimensions; that all matter is divisible; and the like.—As also in the theory of medicine, that where the blood circulates, there is life, &c.

LEMNIAN Earth, *Terra LEMNIA*, a medicinal, astringent sort of earth, of a fatty consistence, and reddish, white, or yellowish colour; used in the same cases as bole.

It has its name from the island of *Lemnos*, whence it is chiefly brought.

They form it into round cakes, and impress a seal upon it; whence it is also called, *terra sigillata*. See **SUPPLEMENT**: article **LEMNIA TERRA**.

LEMONADE, a drink prepared of water, sugar, and citron, or lemon juice.

This facitious liquor is so popular in Paris, that it has given its name to a new established company, called *lemonadiers*.

LEMURES, in antiquity, *spirites* or *bebabbins*; restless ghosts of departed persons, who return to terrify and torment the living.

These are the same with *larvæ*, which the ancients imagined to wander round the world, to frighten good people, and plague the bad.—For which reason, at Rome they had *lemuria*, or feasts instituted to appease the manes of the deceased.

Apuleius explains the antient notion of manes thus: The souls of men released from the bands of the body, and freed from performing their bodily functions, become a kind of demons, or genii, formerly called *lemures*.—Of these *lemures*, those that were kind to their families, were called *lares familiares*; but those who, for their crimes, were condemned to wander continually, without meeting with any place

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place of rest, and terrified good men, and hurt the bad, are vulgarly called *larvæ*.

An ancient commentator on Horace mentions, that the Romans wrote *lemures* for *remures*; which last word was formed from Remus, who was killed by his brother Romulus, and who returned to earth to torment him.

But Apuleius observes, that in the ancient Latin tongue *lemures* signifies the soul of a man separated from the body by death.

LEMURIA, or **LEMURALIA**, a feast solemnized at Rome on the ninth of May, to pacify the manes of the dead, or in honour of the *lemures*.

The institution of this feast is ascribed to Romulus, who, to rid himself of the phantom of his brother Remus (whom he had ordered to be murdered) appearing always before him, ordained a feast called after his name *remuria*, or *lemuria*.

In the *lemuria* they offered sacrifices for three nights together; during which time all the temples of the gods were shut up, nor were any marriages permitted.—There were a world of ceremonies in this feast, chiefly intended to exorcise the *lemures*, and prevent their appearing, or giving any disturbance to the living.

LENIS Spiritus, in profody. See the article **SPIRIT**.

LENITIVE, in phisic, sometimes denotes a softening, resolutive remedy, that moistens the parts diseased, and dissipates any sharp humour collected there.

LENITIVE, is more frequently used for *laxative*. See **LAXATIVE**.

LENITIVE Electuary, is more peculiarly used for a gentle purging of electuary, composed of fena, polypody, coriander seeds, &c. so called, in regard it purges easily, and by resolving.

LENS, in dioptrics, properly signifies a small, roundish glass, of the figure of a *lentil*; but is extended to any optic glass, not very thick, which either collects the rays of light into a point, in their passage through it, or disperses them farther apart, according to the laws of refraction.

Lens's have various figures; that is, are terminated by various surfaces, from which they acquire various names. Some are plane on one side, and convex on the other; others convex on both sides; both which are ordinarily called *convex lens*'s; though, when we speak accurately, the former are called *plano-convex*.—Again, some are plane on one side, and concave on the other; and others are concave on both sides, which are both usually ranked among the concave *lens*'s; though, when distinguished, the former is called a *plano-concave*.—Others, again, are concave on one side, and convex on the other; which are called *convexo-concave*, or *concavo-convex lens*'s, according as the one or the other surface is more curve, or a portion of a less sphere.

It is to be here observed, that in every *lens* terminated in any of the forementioned manners, a right line perpendicular to the two surfaces is called the *axis* of the *lens*.—Which axis, when both surfaces are spherical, passes through both their centres; but if one of them be plane, it falls perpendicularly upon that, and goes through the centre of the other. See **AXIS**.

A *lens*, one of whose surfaces is convex, and the other concave, is called a *meniscus*; the properties of which, see under **MENISCUS**.

See also the *Theory of LENS's demonstrated under REFRACTION*; and the application thereof, under **MICROSCOPE**, **TELESCOPE**, **BURNING-GLASS**, and **FOCUS**.

Some confine *lens*'s within the diameter of five or six lines, and will have such as exceed that diameter called *lenticular glasses*.

Lens's are distinguished, with regard to the manner of their preparation, into *ground*, and *blown*.

Blown LENS's, are little globules of glass, melted in the flame of a lamp, or taper.

But the figure of these is seldom exact; besides, that the smoke of the lamp cleaves to the surface in melting; on both which accounts, they come short of the clearness of those that are ground, or turned and polished in the lathe, in little copper basons, or dishes.—The secret is now found of making these exquisitely small, so as some of them do not exceed, in diameter, the sixth part of a line, which are found to magnify objects several millions of times.

Manner of grinding LENS's.—A little piece of copper is cemented to the end of the arbor of a lathe, and turned, till it form a dish, or bason of the diameter of the *lens* required.—Then a piece of clear glass is cemented on one of its flat sides, to the end of a little maundrel, with black Spanish wax; and thus ground, on the side not cemented, on a grindstone, with water, till it have nearly acquired a convex figure.—It is finished in the lathe, by turning it in the bason, with fine wet sand, or grit-stone. The grit must be often repeated fresh, till the *lens* appear very round; when it is come to that point, they cease to take any fresh stone, but continue to turn it in the bason, till the remains of the sand be become so fine as to have polished it.—This they perceive, when, upon wiping it, the image of the window of the

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place is seen painted on its surface; if it does not, it is wetted in water without any sand, and turned till it have got a polish.—The bason is then covered, within side, with two or three folds of linen, and the polish finished with putty, or tripoly of Venice steeped in water.—It is known to be perfectly polished, when, viewing it with a magnifier, there appear no scratches of the sand.—The cement is then broke off, and the side polished cemented, to work and grind the other, as before, till the edges of the *lens* be become sharp, and it be perfectly polished on either side.—When finished, it is washed in spirit of wine, to take off all remains of the wax.

For *convex LENS's*, the laws of their refraction, and their effects depending thereon, are as follow.—1°. A ray of light, E G, near the axis, (*Tab. Optics, fig. 1.*) and parallel thereto, striking on the plane surface of a *plano-convex lens*, directly opposite to the luminous body, after refraction concurs with the axis in the point F: and if C be the centre of the convexity, C F will be to F L, that is, the distance of the centre from the point of concurrence, or focus, will be to the distance of the centre in the convex surface, in the ratio of the refraction.

For the plane surface being directly opposed to the luminous body, the ray E G is perpendicular to A B, and therefore will pass unrefracted to H: thus it strikes on A H B, still parallel to the axis; and therefore coming out of a denser medium into a rarer, it will meet with the axis of the *lens* in F; and so, as that C F will be to F L in the ratio of the sine of the refracted angle to the sine of the angle of inclination: as will be demonstrated under the head **REFRACTION**.

If then the refraction be out of a glass *lens* into air C F: E L :: 3 : 2, and therefore F L = 2 C L. That is, parallel rays, near the axis, will concur with it at the distance of the diameter.—Again, if the refraction were out of a water *lens*, i. e. out of a *plano-convex lens* filled with water, C F: E L :: 4 : 3, and therefore F L = 3 C L; i. e. parallel rays, near the axis, will concur with it at the distance of half the diameter. So that if a lighted candle be placed in the focus of a *plano-convex lens*, that is, in the point F, distant from the surface of the *lens* A L B, by the length of the diameter; and from the surface of the water *lens*, by half the diameter, its rays, after refraction, will become parallel.

2°. If the ray K I, (*Tab. Optics, fig. 2.*) near the axis of a *plano-convex lens*, and parallel thereto, strike on its convex surface A H B, after a double refraction, it will meet the axis in F; so as that H G will be to G C, and G F to F H, in the ratio of the refraction.

For the ray K I, parallel to the axis E G, by virtue of the first refraction in I, will tend to the point G, so as G H will be to G C in the ratio of the sine of the angle of inclination to the sine of the refracted angle: therefore, by virtue of the second refraction in H, it will concur with the axis in F; so as G D will be to F D in the ratio of the sine of the refracted angle, to the sine of the angle of inclination. See **REFRACTION**.

So that the femidiameter, and thickness of the *plano-convex lens*, with the ratio of refraction being given, hence arises a method of determining the focus of parallel rays striking on the convex surface. For,

Hence, if the *lens* be glass, F D = 2 C H = $\frac{2}{3}$ HD. So that if two thirds of the thickness of the *lens* be inconsiderable (as in practice it usually happens) parallel rays meet with the axis at the distance of the diameter from the *lens*, even when they strike on the convex surface.

So that as to the place of the focus, it is the same thing whether the plane surface, or the convex one, be turned to a luminary of parallel rays; though it appears, both from experience, and trigonometrical calculations, that there are more rays united in a less space, if the convex surface, than if the plane one be turned towards the sun.

If the *lens* were full of water, F D = 3 C H = $\frac{3}{4}$ HD. Wherefore if $\frac{1}{4}$ H D be inconsiderable, F D = 3 C H, or if $\frac{3}{4}$ H D be inconsiderable, F H = 3 C H. Parallel, and near rays, therefore, are united at the distance of half the diameter, if the refraction be in water, even when the convex surface is opposed to the luminous body. Hence, also, arises a method of determining the focus of parallel rays striking on a *lens* convex on both sides, the two femidiameters, and the thickness of the *lens*, being given.

On these principles is founded the structure of refracting burning-glasses, the sun's light, and heat, being exceedingly augmented in the focus of a *lens*, whether convex or *plano-convex*; since the rays falling parallel to the axis of the *lens*, are reduced into a much narrower compass; so that it is no wonder they burn some bodies, melt others, and produce other extraordinary phenomena. See **BURNING-GLASS**.

3°. If a luminous body be placed in a focus behind a *lens*, whether *plano-convex*, or convex on both sides; or whether equally, or unequally, the rays, after refraction, become parallel.

Hence,

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Hence, by means of a convex *lens*, or a little glass bubble full of water, a very intense light may be projected to a vast distance.

And this furnishes us with the structure of a lamp, or lantern, to project an intense light to an immense distance: for a *lens*, convex on both sides, being placed opposite to a concave mirror, if in the common focus of both be placed a lighted candle, or wick, the rays reflected back from the mirror to the *lens* will be parallel to each other; and after refraction will converge, till they concur to the distance of the semidiameter, after which they will again diverge.—But the candle being likewise in the focus of the *lens*, the rays it throws on the *lens* will be parallel: and therefore a very intense light meeting with another equally intense, at the distance of the diameter from the *lens*, the light will be surprizing: and though it afterwards decrease, yet the parallel and diverging rays going a long way together, it will be very great at a very great distance. Lanterns of this kind are of considerable service in the night-time to discover remote objects, and are used, with success, by fowlers and fishermen, to gather their prey together, in order to take them.

If it be required to have the light, at the same time, transmitted to several places, as through several streets, &c. the number of *lens*s and mirrors is to be increased.

If the luminous body, placed in the focus, be of a larger extent, the rays flowing from points sensibly distant from each other, cannot be parallel; but they will constitute several trains, or parcels of rays, parallel to each other.

3°. The images of objects, opposed in any manner to a convex *lens*, are exhibited, invertedly, in its focus.

Hence, if a paper be applied to a convex *lens*, (especially in a dark room) at the distance of its focus, the images of objects shining upon it, will be represented distinctly, and in their natural colours, thereon: nor is the focus of the sun's rays any thing else, in effect, but the image of the sun.—Hence, in solar eclipses, the sun's image, eclipsed as it is, may be burnt by a large *lens* on a board, &c. a very entertaining phenomenon!

Hence also, if a convex *lens*, of any kind, be exposed both to nearer and remoter objects, and a paper at the same time be applied, so as to receive the images of objects distinctly, the distance of the focus from the *lens*, and thence the diameter of the convexity, may be determined.

4°. If a concave mirror be so placed, as that an inverted image, formed by refraction through a *lens*, be found between the centre and the focus, or even beyond the centre, it will again be inverted by reflection, and so appear erect in the first case beyond the centre, and in the latter, between the centre and the focus. Of this principle is built the camera obscura. See *CAMERA obscura*.

5°. The diameter of the image of an object delineated beyond a convex *lens*, is to the diameter itself in the ratio of the distance of the image to that of the object.

Since then the image of a remoter object is less distant from the *lens* than that of the nearer, the image of the more remote will be less than that of the nearer. And because the distance of the image from the *lens* is greater, if the *lens* be a segment of a greater sphere than of a less; hence the image will be greater in the former case than in the latter. The image therefore will be of such a magnitude, as it would be of, were the object to shine into a dark room through a little hole upon a wall, at the same distance from the hole, at which the focus is from the *lens*.—When an object is less distant from a *lens* than the focus of parallel rays, the distance of the image is greater than that of the object; otherwise, the distance of the image is less than that of the object; in the former case, therefore, the image is greater than the object; in the latter, less.

If the images be made greater than the objects, they will not appear distinctly; because in that case there are fewer rays which meet after refraction in the same point; whence it happens, that rays proceeding from different points of an object, terminate in the same point of an image, which is the cause of confusion.—Hence it appears, that the same aperture of a *lens* may not be admitted in every case, if we would keep off the rays which produce confusion. However, though the image is then more distinct, when no rays are admitted but those near the axis, yet for want of rays the image is apt to be dim.

6°. If the eye be placed in the focus of a convex *lens*, an object viewed through it appears erect, and enlarged in the ratio of the distance of the object from the eye, to that of the eye from the *lens*, if it be near; but infinitely, if remote.

For concave *lens*s, their laws are as follow.—1°. If parallel rays strike on a plano-concave *lens* K L, and F C be to F B in the ratio of refraction, the rays will diverge from the axis, and the point of divergence, or dispersion, called the *virtual focus*, will be F. See *Tab. Optics*, fig. 3.

For the ray H I, parallel to the axis, is perpendicular to K L, and will therefore pass unrefracted to E. Wherefore, F C being to F B in the ratio of refraction, F will be the virtual focus.

LEN

If then the *lens* be glass, F B = 2 B C; i. e. the virtual focus F will be distant from the *lens* K L, by the space of the diameter 2 B C.

If the refraction be in water, F B = 3 B C; i. e. the virtual focus F will be distant from the *lens* K L a diameter and a half 3 B C.

2°. If the ray A E, parallel to the axis F P, strike on a *lens* concave on both sides; and both F C be to F B, and I P to P H in the ratio of refraction; and F P : P H :: F B : B G; G will be the point of dispersion, or the virtual focus. See *Tab. Optics*, fig. 4.

If therefore the refraction be in a glass *lens*, the foci of the semi diameters C B and H I, will be to the diameter of the concavity of either, 2 H I, as the semidiameter of the other C B, to the distance of the virtual focus from the *lens* B G.

Hence, the sun's rays striking on a concave *lens*, their light, after refraction, will be considerably weakened; so that the effect of concave *lens*s is opposite to that of the convex ones.

3°. An object viewed through a concave *lens*, appears erect, and diminished in a ratio compounded of the ratio's of the space in the axis, between the point of incidence, and the point to which an oblique ray would pass without refraction, to the space in the axis between the eye and the middle of the object; and the space in the same axis between the eye and the point of incidence, to the space between the middle of the object and the point the oblique ray would pass to without refraction.

Though the properties of *lens*s have been here considered principally with regard to rays falling near the axis, and parallel thereto; yet the reasoning will be easily transferred to rays remoter from the axis, and falling in any direction.—Thus we may say universally, that in a convex *lens*, all parallel rays become converging, and concur in a focus; that diverging rays either become less diverging, or run parallel, or converge; and that converging rays converge the more: All which alterations are more sensible in oblique rays, than in perpendicular ones, by reason the angles of incidence in that case are greater.

In concave *lens*s all parallel rays become diverging, and all diverging rays diverge more; converging rays either converge less, or become parallel, or go out diverging, all which things hold of oblique as well as direct rays, but more sensibly in the first.

LENS, or **LENTICULA**, was also the name of a kind of weight among the Romans; being the hundred and eighth part of a drachm; equal to a grain and a half.

LENT, *Quadragesima*, a time of mortification, during the space of forty days, wherein Christians are enjoined to fast, in commemoration of our Saviour's abstinence during 40 days in the desert, and by way of preparation for the feast of Easter.

In the ancient Latin church, *Lent* only consisted of thirty-six days. In the ninth century, to come somewhat nearer to the miracle, several took upon them to add four days more; which in time became a general practice; though the church of Milan is said still to take up with the ancient thirty-six.

According to S. Jerom, S. Leo, S. Augustine, and others, *Lent* must have been instituted by the apostles.—The way of reasoning is thus: Whatever is generally received throughout the whole church, and whose institution we do not find in any council, must be esteemed to have been established by the apostles.—Now such, they say, is the fast of *Lent*. Its institution is not spoke of in any council; but many of the ancient councils, particularly that of Nice, that of Laodicea, &c. and some of the chief fathers, particularly Tertullian, speak of it as a thing of some standing.

The Reformed, generally, hold *Lent* to be a superstitious institution, set on foot by some vain enthusiasts, who durst undertake to ape the miracles of Jesus Christ; as, in effect, it appears to have been from a passage of Irenaeus, quoted by Eusebius.

Some will have it to have been first instituted by pope Telesphorus, in the second century; others, who own that there was a kind of abstinence observed in the ancient church before Easter, yet contend that it was entirely voluntary, and was never enjoined by any law, till the third century.

There was some difference between the practice of the Greek and Latin churches as to the length of *Lent*; the Greeks beginning it a week sooner, but at the same time allowing more days of intermission than the Latins: those who held it seven weeks, did not fast on Saturdays, as those who observed it but six did.

The ancient Latin monks had three *Lents*; the grand *Lent* before Easter; another before Christmas, called the *Lent* of S. Martin; and a third after Whitunday, called the *Lent* of S. John Baptist: each of which consisted of many days.

The Greeks, besides that before Easter, observed four others; that of the *Apostles*, of the *Assumption*, of *Christmas*, and of the *Transfiguration*: but they reduced each of them to the space of seven days.—The Jacobites added a fifth, which they call the *repentance* of Nineveh; and the Maronites a sixth, called the *evaluation* of the holy cross.

LEO

LEP

By the ninth canon of the eighth council of Toledo it is ordained, 'That if any persons, without evident necessity, eat flesh in *Lent*, they shall be deprived the use of it all the rest of the year.

The forty days in *Lent*, say some, are observed in remembrance of the forty days wherein the world was drowned; or, as others say, of the forty years wherein the Jews wandered in the desert; others, of the forty days allowed Nineveh for repentance; others, of the forty stripes by which malefactors were to be corrected; or, the forty days fasted by Moses at the receiving of the law; or, the forty days fasted by Elias; or finally, the forty days fasted by our Saviour.

LENTIGO, a cutaneous disorder, popularly called *freckles*. See **FRECKLES**.

LENTIGO, is also used by Dr. Quincy for a brown, scaly, or scurfy eruption upon the skin; such, especially, as is common to women in the time of child-bearing.

LENTISCUS, the wood of an evergreen tree of the same name, of some use in physics; it is astringent and fortifying, and is much used for tooth-picks.

It contains a kind of gum, or resin, which is mastic; the same with the incense of Persia, so highly commended by Strabo.

The *lentiscus* has nearly the same properties with the *launders*; but it has more of the turpentine in it, and sometimes passes by urine.

LEO, *Lion*, the fifth of the twelve signs of the zodiac.

The stars in the constellation *Leo* in Ptolemy's catalogue are 32, in Tycho's 37, in the Britannic catalogue 94; the names, places, longitudes, latitudes, and magnitudes whereof, are as follow.

Names and Situations of the Stars.	Longit.	Latit.	Magnit.
That in the nostrils	10 57 28	10 23 51	N 4
In the foremost toe of the south. foref.	17 12 57	5 35 27	S 6
	17 29 46	6 24 22	S 6
In the aperture of the month	13 52 13	7 51 27	N 4
In third toe of the northern forefoot	17 19 44	5 11 22	S 4
5			
Northern and following in the claw	17 50 1	4 41 12	S 6
	17 14 26	0 1 52	N 6
	14 21 5	9 55 48	N 6
	20 0 3	6 59 47	S 5
	14 24 14	10 41 9	N 7 8
10			
Following in fourth forefoot	14 45 14	11 23 26	N 7
	19 59 8	3 46 50	S 3 4
	13 42 32	15 21 3	N 6
In the preceding knee.	19 10 4	0 19 3	N 6
South. of three in the head	16 22 16	9 41 4	N 3
15			
	20 30 28	1 33 23	S 6
	20 49 20	1 42 11	S 7
	18 7 32	7 32 58	N 6
	21 31 2	1 9 33	S 7
Middle one of the head	17 27 35	10 45 1	N 6
20			
North, in the head	17 6 26	12 19 26	N 3 4
	23 49 32	3 25 36	S 7
	22 3 5	2 37 58	N 7
Just before the heart	03 05 2	0 1 25	N 4 5
	24 24 12	3 51 43	S 7 9
25			
In the following knee	24 49 4	3 56 18	S 4
South. of three in the neck	33 34 24	4 50 26	N 3 4
In the breast below the heart	26 5 36	1 26 15	S 5
The lion's heart, called also <i>Regulus</i>	25 31 20	0 26 38	N 5
	24 44 0	4 8 45	N 7
30			
	25 45 10	2 1 10	N 6
North, in the neck	23 11 12	11 55 37	N 6
	21 13 41	11 50 13	N 3
	26 46 1	2 48 7	N 6
	23 30 52	11 37 12	N 6
35			
Middle and subseq. in the neck	25 22 25	8 26 51	N 6
	25 15 5	8 47 27	N 2
	27 29 23	4 24 54	N 6
	0 47 10	3 20 14	S 6
	0 30 39	1 2 27	S 5 6
40			
Preceding and lesser	0 42 45	0 5 8	N 6
Preceding of three in the belly	0 7 58	4 53 27	N 6
In the axilla	2 3 40	0 7 48	N 4
	3 24 5	1 52 27	S 6
	2 49 25	0 16 10	S 7
45			
Informis 40th of Ursa Maj. Tych.	24 30 58	21 37 1	N 3
	0 53 30	7 0 25	N 6 7
Foremost of two over the back	27 49 14	16 49 4	N 6 5
	29 9 15	13 56 46	N 5
In the middle of the back.	1 30 14	10 14 52	N 6
50			
North. of three in the belly	3 19 21	5 54 45	N 6
South and subseq. in the belly	5 21 19	2 47 46	N 6
Subseq. over the back.	1 10 21	16 28 46	N 4 5
	10 34 32	5 39 57	N 5 5
	8 33 35	0 35 42	N 4 7

Names and Situations of the Stars.	Longit.	Latit.	Magnit.
South. of three under the belly	10 48 37	5 54 3	S 7
Middle under the belly	10 55 34	2 31 51	S 5
Preceding in the loins	9 40 33	0 13 10	S 5
	4 31 8	12 53 37	N 5
	13 13 40	3 3 1	S 5
60			
North. of three under the belly	13 42 11	5 34 35	S 6
	10 12 9	1 20 21	N 4 5
	4 23 30	16 16 29	N 6
	12 43 44	3 26 1	S 6
	14 8 50	6 24 8	S 6
65			
A bright one following in the loins	4 4 57	17 35 54	N 6
	6 57 21	14 19 4	N 2 3
South in the hip	15 4 79	4 38 53	S 6
North. in the hip.	9 5 31	9 39 50	N 3
	8 20 34	11 35 5	N 6
70			
That over the bright one in the loins	6 8 13	16 45 2	N 5
North. of two in the thigh	10 18 7	7 51 41	N 6
That before the hindmost claw.	17 10 19	7 39 5	S 4
	15 3 3	2 22 53	S 6
	15 35 19	2 33 21	S 7
75			
In the ham	14 22 25	1 40 53	N 5
South. in the thigh	13 12 58	6 5 10	N 4 5
	10 51 53	2 16 55	S 6
	15 57 5	0 3 35	N 6
	11 14 1	11 41 39	N 7
80			
	16 27 27	0 18 5	N 7 8
	6 53 27	0 32 7	S 8
More south. as in the leg	7 11 2	0 34 4	S 4
	12 54 10	11 8 9	N 6
	11 31 13	13 5 16	N 6
85			
South. in the nail of the hind-foot	20 3 13	5 42 22	S 5
	13 29 27	10 23 53	N 6
	18 35 11	0 10 9	N 6
	13 6 41	12 53 3	N 6
North. in the nail of the hind foot	20 42 52	3 3 35	S 4
90			
That over the tail	12 32 21	17 38 0	N 6
In the extremity of the tail	14 38 50	17 18 9	N 4
That following the tail	17 19 14	12 16 51	N 2
	18 19 27	13 53 21	N 6

Cor LEONIS, *Lion's Heart*, a fixed star of the first magnitude in the sign *Leo*: called also *Regulus*, *Basiliscus*, &c.

LEONINE, in poetry, is applied to a kind of verses which rime at every hemistich, the middle always chiming to the end.

In this kind of verse we find several antient hymns, epigrams, prophecies, &c.—For instance, Muretus speaking of the poetry of Lorenzo Gambara of Brescia, says,

Brixia, vestra's merdosa volumina vatis.
Non sunt nistrates tergere digna rates.

The following one is from the school of Salernum:

Ut vites pomam de potibus incipe conam.

The origin of the word is somewhat obscure; Paquier derives it from one Leoninus, or Leonius, who excelled in this way, and dedicated several pieces to pope Alexander III. Others derive it from pope Leo; and others from the beast called *lion*, by reason it is the loftiest of all verses.

M. Fauchet makes the *leminie* rime the same with what the French call the *rich*, and we the *double rime*, i. e. where two syllables have the same orthography, accentuation, and pronunciation with two others.

LEONTICA, feasts or sacrifices celebrated among the antients, in honour of the sun.

They were called *leontica*, and the priests who officiated at them *leontes*, in regard they represented the sun under the figure of a lion radiant, bearing a tiara, and gripping in his two fore paws the horns of a bull, who struggled with him in vain to disengage himself.

The critics are extremely divided about this feast; some will have it anniversary, and to have made its return not in a solar, but a lunar year; but others hold its return more frequent, and give instances where the period was not above two hundred and twenty days.

The ceremony was sometimes also called *Mithriaca*, *Mithras* being the name of the sun among the antient Persians.

There was always a man sacrificed at these feasts till the time of Hadrian, who prohibited it by a law. Commodus introduced the custom afresh, after whole time it was again exploded.

LEPIDOIDES*, or **LEPIDOIDEIS**, in anatomy, a name of the squamous or scaly future of the cranium.

* The word is Greek, λεπιδοειδης; formed of λεπας, scale, and ειδος, form, figure.

LEPROSY*, **LEPRA**, a foul, cutaneous disease, appearing in dry, white, thin, scurfy scabs, either over the whole body,

or only some part of it; and usually attended with a vehement itching, and other pains.

* The word is derived from the Greek λεπτα, which signifies the fame; and that from λεπτα, squama, scale.

The leprosy seems to arise from a great obstruction of perspiration; whereby the thin, saline humours, are thrown off from the blood, and detained by the density and closeness of the cuticula.

This distemper has been much more frequent in former times than it is at present, and much more in the hot countries of the east, particularly among the Jews, than among us; perhaps by reason the salts which, by the appointment of nature, are to be eliminated through the pores of the skin, along with the recementitious serum their proper vehicle, are, in hot countries, conveyed in greater plenty to the surface of the body, than in these northern regions they ordinarily are; and flicking in their passage in the thin dry membrane of the cuticle, the aqueous parts, which are their vehicle, slip away from them by insensible evaporation, and leave them there to corrode and fret it, till at length, through the quantity so gathered, the membrane becomes dry, brittle, and white, which is the cause of that desquamation, or falling away in white scales: that whiteness, as well as the brittleness, proceeding merely from the quantity of these salts, which are themselves white; and when the moisture is drawn from them, being accumulated, and having insinuated themselves into the pores of the cuticle, dissolve the continuity of it by their points and edges, which thus mortified and broken, is apt on the least friction, to fall off, as abovementioned.

The antients distinguished two kinds of leprosy, viz. the *lepra Græcorum*, and *lepra Arabum*: though the two seem only to have differed in degree; the symptoms of the Grecian being further heightened and aggravated in the Arabian.

LEPRA Arabum, is the same with what is otherwise called *elephantiasis*, by reason in this the patient's skin is rough and wrinkled like an elephant's hide.

In the *lepra Arabum*, the skin is beset with a dry scabby crust. As in the former case the salts, being left destitute of their humidity, are not so active, and therefore affect only the cuticle; in the latter case these salts, with their vehicle, crowding faster than they can be evaporated through the pores of the skin (being still in *fluor*, and so more caustic) corrode deeper, and eat not only the cuticle, but the excretory vessels, and surface of the skin itself, which thereby spews out a liquor somewhat thicker than usual; which when the thinnest and most aqueous parts are evaporated, are condensed into that crust or scab, which is the distinguishing character of this disease.

Galen defines the *lepra*, an effusion of thick disorderly blood, that corrupts the whole habit of the body. Avicenna calls it an *universal cancer*.

The *lepra* always begins within-side, a long time before it appears without-side: It was frequent in Europe in the Xth and XIth centuries, but seems at present almost extinct; unless we allow the venereal disease to be the same with the *lepra*, as was the opinion, among many others, of the learned Pitcairn, and as has been lately endeavoured to be proved by Mr. Becquet, in a discourse expressly on the subject in the *Philosophical Transactions*.

The symptoms of the antient *lepra*, as laid down by Galen, Aretæus, Pontanus, *Egineta*, Cardan, Varanda, Gordon, Pharæus, and others, are as follow: The patient's voice is hoarse, and comes rather through the nose than the mouth; the blood is full of little white shining bodies, like grains of millet, which upon filtration separate themselves from it; the serum is scabious, and destitute of its natural humidity, inso-much that salt applied to it does not dissolve; it is so dry, that vinegar poured on it boils; and is so strongly bound together by little imperceptible threads, that calcined lead thrown into it swims. The face resembles a coal half extinct, unctuous, shining, and bloated, with frequent hard knobs, green at bottom, and white at top. The hair is short, stiff, and brinded, and not to be torn off without bringing away some of the rotten flesh to which it adheres; if it grows again, either on the head or chin, it is always white. Athwart the forehead run large wrinkles, or furrows, from one temple to the other; the eyes are red and inflamed, and shine like those of a cat; the ears swollen and red, eaten with ulcers towards the bottom, and encompassed with little glands; the nose sunk, because of the rotting of the cartilage; the tongue dry and black, swollen, ulcerated, divided with furrows, and spotted with grains of white: the skin covered with ulcers, that die and revive on each other, or with white spots or scales like a fish; it is rough and insensible, and when cut, instead of blood, yields a sanious liquor. It arrives in time to such a degree of insensibility, that the wrist, feet, or even the large tendon, may be pierced with a needle, without the patient's feeling any pain. At last the nose, fingers, toes, and even privy members fall off entire, and by a death peculiar to each of them, anticipate that of the patient. It is added, that the body is so hot, that a fresh apple held in the hand for an hour, will be dried and wrinkled, as if exposed to the sun for a week.

Matthew Prior says, that in Christendom there were fifteen thousand hospitals for *lepers*; but the disease having been dis-

continued for two hundred years, the revenues of those hospitals were abused, and persons feigned themselves *lepers*, to be entitled to the provision; which occasioned their regulation in some countries, and their entire suppression in others.

In France, they were united to the order of the religious of S. Lazarus and mount Carmel in 1664, and the administration of them given to the knights of that order. See *LAZARUS*. In England they have been converted to other purposes.

Formerly the causes of *lepers* were committed to the ecclesiastical tribunals; and it was prohibited to prosecute a *leper* before a lay-judge, in regard they were under the protection of the church, which separated them from the rest of the people by a ceremony still to be seen in the antient rituals.

As to the cure, that which proved effectual in those southern countries, is found to fail among us, where the strongest medicaments, and the most powerful mercurials, are necessary. Bathing is judged to be of good use in the *lepra*. Dogs and hares are said to be subject to this disease. Among the Indians a white man is despised, this passing with them for the mark of a *leper*.

LEPUS, the *Hare*, a constellation of the southern hemisphere; whose stars in Ptolemy's catalogue are 12, in that of Tycho 13, in the Britannic catalogue 19; the names, places, longitudes, latitudes, and magnitudes whereof are as follow.

Names and Situations of the Stars.	Sta. in the Sign.	Longitude South	Latitude South	Magni- tude
In the preceding anterior foot	II	0 44 2	45 20 17	6
North. in the preceding ear		7 45 6	45 0 18	4
South of the fame ear		11 27 27	34 45 39	5
Against the knee		11 35 1	15 50 25	5
South. of the following ear		11 43 3	3 5 28	4 5
North. of the following ear		13 27 47	36 13 59	4 5
That under the belly		13 40 32	35 23 10	5 6
In the middle of the body		14 34 52	37 3 42	6
Preced. and south. in the poster. foot		15 21 25	3 57 24	3
In the loins		16 18 14	44 6 50	6
North. and subseq. in posterior foot		17 4 47	41 6 28	3
Preceding in the tail		19 15 0	45 46 6	6
Subsequent in the tail.		20 36 20	45 49 58	4 3
		21 39 52	38 15 30	4
		22 51 9	44 17 19	4 3
		24 35 48	37 39 27	4
		27 15 13	39 57 35	6
		27 37 34	38 24 26	4
	II	28 9 50	142 38 23	4

LE ROY *le roy*, a form of words by which the royal assent is signified by the clerk of the parliament to public bills: to private bills this assent is expressed by *soit fait comme il est desire*. See *ROYAL*.

LE ROY s'avilera.—By these words to a bill, presented to the king by his parliament, are understood his absolute denial of that bill in a more civil way; and the bill thereby becomes wholly null and void. See *PARLIAMENT*.

LESBIAN Cymatium. See the article *CYMATIUM*.

LESSER Barons. }
LESSER Bear. }
LESSER Centaury. }
LESSER Circle of a Sphere. } See
LESSER euharmonical Diecis. }
LESSER Excommunication. }
LESSER Hexachord. }
LESSOR, and **LESSEE**. See the article *LEASE*.

LETHARGY*, *ληθαργία*, in medicine, a disease consisting of a profound drowsiness or sleepiness, wherein the patient can scarce be awaked; or, if awaked, he remains stupid, without sense or memory, and presently sinks again into his former sleep.

* The word comes from the Greek ληθω, oblivion, and αἴσια, numbness, laziness.

The *lethargy* is usually accompanied with a fever and delirium. Boerhaave makes the *lethargy* a gentle apoplexy arising from the same causes, and to be known and cured in the same manner.

Some authors distinguish the *lethargy* from the *carus*, in that this latter is without a fever, or at most is preceded with a violent one; whereas the *lethargy* is attended with a slow one.

Celsus ranges the *lethargy* in the number of acute diseases, the patient usually dying on the seventh day. A *lethargy* frequently succeeds a frenzy.

LETHE, *LETH*, or *LATHE*, a measure or portion of lands, making one of the antient divisions of England.

King Ælfred divided England into counties, as it stands at present; those counties he subdivided into hundreds or tithings. The hundred was a division, wherein were an hundred officers to secure the peace; the *lethe* or *lathe* comprehended three or four of these hundreds.

LETHE was also the jurisdiction of a viscount; or a kind of assize, held once a year in each village, about Michaelmas.—Whether this was instituted by Ælfred, or no, is a question?

LETTER, *Littera*, a character either in print or writing, by which any people have agreed to express one of the sounds, used

Aug. 9. 1840

By WILLIAM CASLON, Letter-Founder, in Chifwell-Street, LONDON.

DOUBLE PICA ROMAN.

Double Pica Italic.

Quouique tandem abutere, Catilina, patientia nostra? quamdiu nos etiam furor iste tuus eludet? quem ad finem sese effrenata iactabit ABCDEFGHIJKLMNOP?

Quoque tandem abutere, Catilina, patientia nostra? quantum nos etiam furor iste tuus eludet? quem ad finem sese effrenata iac-
ABCDEFGHIKLMNO

And he it further enacted by the Autpouing
alopocia, That all and eury of the said de-
cienner Jellies to be made forth by virtue of
this Act, or so many of them as shall from
this Act, be so many of them as shall from

Brevier Black

GREAT PRIMER ROMAN

Great Primer Italic.

And be it further enacted by the Authority aforesaid, That all and every of the said Deceptive Bills to be made forth by virtue of this Act, or for many of them as shall from time to time remain undischarged and uncanceled, until the Discharging and cancelling the same pursuant to this Act.

Quoniamque tandem abutere, Catilina, patientia nostra? quamdiu nos etiam fu-

Quousque tandem abutere, Catilina, patientia nostra? quandiu nos etiam fu-

Pica Gothick

effrenata iactabit audacia? nihiline te

*ror iste tuus eludet? quem ad finem sese
effrenata iactabit audacia? nihili te*

ATTANSAK þu in humanum veihna
 namq þein umi þindalssns þeins
 valkþa vinga þeins sýe in humanu

nocuum prædium palatii, nihil ur-
bis vigilæ, nihil timor populi, nihil con-

nocturnum praefidium palatii, nihil ur-
bis vicilivae, nihil timor botuli, nihil con-

Pica Coptick.

A B C D E F G H I J K L M N O P Q R S
 ENGLISH ROMAN.

ABCDEF GHI JKLMNOP QR

the ordinary

French Cannon.

Quousque tan-

Pica Armenian.

dem abuteire,

PICA ROMANA.

Pica Italic.

English Syriack.

Catilina, pati-

Melium, novis rebus studentem, manu sua occidit. Fuit, fuit illa quondam in hac republ. virtus, ut virtutes acrioribus suppliciis civem perniciosum, quam acerbissimum hostem coercent. Habemus enim &

*Melium, novis rebus fudentem, manu sua occidit.
Fuit, fuit illa quondam in hac repub. virus, ut viri
fortes acerbioris supplicis vicem perniciosum, quam a-*

[illegible]

LET

used in conveying their thoughts to each other in speech. Letter is by some defined, a simple uncompounded found of the voice, that cannot be subdivided into any more simple, and generally marked with a particular character.

But it must be owned, that strictly speaking a letter is not the found itself, but rather the sign of a found; for γράμμα, *litera*, is derived from γράφω, of γράφω, to write, and *litera* is formed from *litus*, the participle of *linere*, to smear, or mark: whence *oblitterare* signifies to blot out.

Where a sign or character does not express a found entirely simple, but one resolvable into several, it is not so properly a letter as an abbreviation, containing in itself as many letters as its power does simple founds. This is evident in the Latin *ſ*, *x*, and the Greek *ξ*, *ψ*, *τ*, &c. which are composed of *e*, *t*, *k*, *s*, *κ*, *ω*, *σ*, *τ*, &c.

On the contrary, a simple found, though expressed by several characters, is yet to be esteemed one letter; for *th*, *ph*, are single letters, as much as *φ*, *θ*, and *f*.

The letters F, G, H, K, Q, X, Y, Z, were unknown to the ancient Romans, as is proved by Daufiquin in his *Orthography*, where he traces the origin of the several letters. See F, G, H, &c.

Grammarians distinguish letters into vowels and consonants;

LET

into mutes, diphthongs, liquids, and characteristicks.

The Hebrews divide their letters into guttural, as *a*, *b*, *ch*, *gh*, aleph, he, chaph, hain; dental, as *x*, *t*, *r*, zain, thade, reh; labial, as *b*, *m*, *u*, *p*, beth, mem, vau, phe; lingual, or those chiefly formed by the tongue, as *d*, *t*, *l*, *n*, dalet, tau, lamed, nun; and palatal, as *g*, *i*, *e*, *k*, ghimel, jod, caph, koph.

Printers distinguish their letters into capital, majuscule, initial, or upper case letters, which serve for the titles of books, proper names, &c. And minuscule, small, or under case letters: which are again divided, according to their size, into *pearl*, *nonpareil*, *pica*, *great canon*, &c.—They have also their flourished letters, engraven on wood or metal, which take place of the illumined letters of the ancient manuscripts.

There are letters of various sizes, or bodies; each of which, again, are sometimes cast with the Roman, sometimes an Italic, and sometimes an English, or Black letter face. There are also bodies with Greek, Hebrew, Arabic, the music face, &c.

The most usual sizes, or bodies, with their proportions, are shewn and exemplified in the following table; where it is to be observed, that the verse answering to each is composed in the respective size or letter.

Pearl.
Nonpareil.
Brevier.
Long Primer.
Small Pica.
Pica.

Which when he bore, and felt our fleebie breath,
Embost with bale, and bitter biting grief,
Which love had launched with his deadly darts;
With wounding words, and terms of foul reproof,
He pluck'd from us all hope of due relief,
That erst us held in love of ling'ring life.

English.

The hopeless, heartless 'gan the cunning thief

Great Primer.

Perfuate to die to flint all further strife:

Double Pica.

To me he lent this rope, to him a rusty knife:

Twolined
English.

With which sad instrument of hasty death,

Great
Canon.

That woful lover lothing
longer life.

The above sizes were all cast in the foundry of M. W. Caſlon: a person who, though not bred to the art of letter-founding, has by dint of genius arrived, at an excellency in it unknown before in England, and which even surpasses any the kind done in Holland, or elsewhere.

A set or found of any of these sizes, includes current letters, capitals, numeral figures, points, spaces, &c. See FOUNT. Letters make the first part or elements of grammar; an assemblage of these compose syllables, of those words; and of these sentences.

The alphabet of every language consists of a certain number of these letters, which ought each to have a different found, figure, and signification.

As the difference of articulate founds was intended to express the different ideas of the mind, so one letter was originally intended to signify only one found, and not, as at present, to express sometimes one found, and sometimes another; which practice has brought a great deal of confusion into the languages, and rendered the learning of the modern tongues infinitely more difficult than it would otherwise have been. This consideration, together with the poverty of all the known alphabets, and their want of some letters to express certain founds by, has occasioned several attempts towards an universal alphabet, to contain an enumeration of all such single founds or letters as are used in any language. A thing of very considerable use; a specimen of which is given us by Mr. Lodwick, in the *Philosophical Transactions*.

According to Crinitus, Moses invented the Hebrew letters, Abraham the Syriac and Chaldee; the Phœnicians those of Attica, brought into Greece by Cadmus, and thence by the Pelasgians into Italy; Nicostira the Latin; Isis the Egyptian; and Uulsilas those of the Goths.

Yet as to the first letters, what they were, who first invented them, and among what people they were first in use, there is still room to doubt; however, setting aside conjectures, and prejudice, the business of antiquity seems to lie between the Egyptians and Chinese.—Poli attributes the first invention of letters to Abraham; Josephus, S. Irenæus, and others, to Enoch; Bishlander, to Adam; Eusebius, Clement Alexandrinus, Corn. Arrippa, &c. to Moses; Pomponius Mela,

Herodian, Rufus Fustus, Pliny, Lucan, &c. to the Phœnicians; S. Cyprian, to Saturn; Tacitus, to the Egyptians; and some to the Ethiopians.

The Egyptian mummies, and obelisks, prove a great antiquity on the side of the hieroglyphics; but if the Chinese chronology may be credited, their characters are vastly more ancient than those of the Egyptians.—The Chinese make Fohi, the first of their kings, the inventor of their letters, and compute him to have lived 2950 years before Christ. During all which time, they pretend to have certain and written accounts in their books.—If this holds true, their character must be older than Moses by 1400 years, and even prior to Menes, the first king of Egypt, by 500 years: so that the Chinese letters appear to be the most ancient of that kind; and the book *Yekim*, said to be written by Fohi, the most ancient book.

But as China is so remote, and had so little communication with these parts of the world, we may reasonably make another enquiry into the original of letters in the hither parts of Asia, Egypt, and Europe.—Here, indeed, the Egyptians seem to have the best title.—It is more than probable, from the obelisks, &c. that their hieroglyphics were the first manner of writing, and the original characters in these parts, as being prior to Moses; and were made, at least in great measure, while the Israelites were slaves among them, and consequently not well qualified for inventions so very curious, and judicious.

Whether Cadmus, and the Phœnicians learnt letters from the Egyptians, or from their nearer neighbours of Judæa, and Samaria, is a question; since some of the books of the Old Testament, being written in letters, is more likely to have given them the hint, than the hieroglyphics of Egypt.—But when, or whereforever the Phœnicians learnt this art, it is generally agreed, that Cadmus, the son of Agenor, first brought letters to Greece; whence, in the following ages, they spread over the rest of Europe.

Rudbees, who in his *Atlantica* claims the glory of all inventions, from all other nations, for the Swedes, maintains, that the Ionians had letters before Cadmus; that at the time of the siege of Troy, the Greeks had but 16 letters, whereas the

the Phœnicians had 22: whence he concludes, that it was not either Cadmus, or the Phœnicians, who taught this art to the Greeks.—But, in regard the ancient northern nations had just 16 letters, like the Greeks, he concludes the Greeks must either have taught them to the people of the North, or have learnt them of them.—But because the form and make of the Runic letters is more artless, and coarser, than that of the Greek letters, he concludes that these last must be derived from the former; taking it as a principle, that those who derive any thing from another, polish and improve it.—He even asserts, that by the golden apples which Hercules was obliged to steal, must be understood the letters in use among the Hyperboreans.

There are few things on which there has been so much written, as on the original Hebrew letters; Origen, Eusebius Cæsariensis, S. Jerom, &c. have made it the subject of their enquiry. If they do not always go back to the beginning of the world, and the origin of letters, it is at least enquired, what were the characters made use of by Moses to transmit the law to posterity, or those used by the other historians, and prophets of the Old Testament, or even those used by the Hebrews before the Babylonian captivity?—With regard to which, there are three principal opinions: some imagine the ancient Hebrew letter the same with that now in use; of this opinion are several doctors of the talmud, Pottellus, Buxtorf, &c.—The second opinion is, of those who believe the Samaritan letter the more ancient; which is now the more common opinion, as without doubt it is the elder: several Michmic and Gemaric doctors, many of the rabbins, and fathers, Origen, Jerom, Eusebius, Beda, Genebrard, Ramban, Bellarmine, Scaliger, Drusus, Capella, Bibliander, Bicerwood, Montanus, Walton, the two Vossius's, Bochart, and Bernard, are all of this opinion.—The third is, that from the beginning there were two Hebrew characters; the one sacred, and the other profane; which is the opinion of Azarias, R. de Bartenora, Pottell, Buxtorf, Conringius, &c.—But this distinction of two kinds of characters seems a mere chimera.—See P. Soucier on the Samaritan medals, where he proves, that the letters in the inscriptions of those medals, are the genuine, original Hebrew characters.—See also the articles SAMARITAN, and HEBREW.

The art of joining letters to form words, and of combining the one and the other an infinite number of different ways, is a secret unknown to the Chinese. Instead of the alphabetical letters, they at first, like the Egyptians, used hieroglyphics: they painted rather than wrote; striving, by the natural image of things drawn on paper, to express and communicate their ideas to one another. To write a bird, they were obliged to paint its figure; and to signify a forest, they drew a great number of trees. A circle served for the sun, and a crescent for the moon.—But this manner of writing was not only very inconvenient, but also very imperfect. For, besides that they could but express their thoughts by halves, even that little they could express, was but very imperfectly delivered; and it was scarce possible not to be frequently deceived in it.—Further, they were under a necessity of writing large volumes to say very little matters, in regard their pictures took up a great deal of room.—To remedy these inconveniences, they changed, by little and little, their manner of writing, making it more simple, though less natural. They even invented several characters, to express things that did not come within the reach of painting to represent; as voice, smell, thoughts, passions, and a thousand other objects that have no body, or figure.—From several simple strokes, they afterwards framed others more compound; and in this manner multiplied the letters and characters to infinity, contriving one or more for every word.

This multitude of letters seems the source of that ignorance which we find among the Chinese. Their whole lives being spent in learning their letters, they have no time to apply themselves to the study of things, but think themselves very learned when they are able to read.—There are scarce any of them that know all their letters: they think it is a great progress they have made, when, after forty or fifty years hard study, they are able to understand fifteen or twenty thousand.

—But the generality of their learned men come short of this: father le Compte is of opinion, that the greatest doctor among them never understood half of their letters well; for the whole number he reckons eighty thousand.—This is a prodigious inconvenience to foreigners, of which the missionaries in that country make loud complaints.

Among the Chinese letters, there are some now almost wore out of use, and only preserved out of respect to antiquity.—There is a second class much less ancient than the former, only used in public inscriptions.—A third, much more regular and beautiful, used in printing, and even in ordinary writing.—However, as the strokes are to be distinctly formed, they cannot be wrote with any expedition.—For this reason, they have invented a fourth kind, where the strokes being closer, and less distant from each other, allow them to be writ with more ease and readiness. And this they call the running letter.

The Americans had no letters before the discovery of that

country by the Spaniards.—The Acaanibas engrave their memorable events and epochs on stones, and metals: their fongs supply the rest.—In Peru, and Chili, to keep an account of their goods and chatties, and to preserve the memory of their particular affairs, the Indians have recourse to certain knots of wool; which, by the variety of their colours, and ties, serve instead of characters and writing. The knowledge of these knots, which they call *quipos*, is one of their great sciences; but which is always kept as a secret, and never revealed to the children, till the fathers think themselves at the end of their days.

Double LETTER.	} See	DOUBLE.
Final LETTER.		FINAL.
Guttural LETTER.		GUTTURAL.
Labial LETTER.		LABIAL.
LETTER Foundry.		FOUNDERY.
LETTER-Founders Furnace.		FURNACE.
LETTER-Founders Mould.		MOULD.

Numeral LETTERS, are those used instead of ciphers, to express numbers.

The Roman numerals are, C, D, I, L, M, V, X; which are all formed by describing a circle, and drawing two lines through it, crossing each other at right angles in the centre. See CHARACTER.

Dominical LETTER.	} See the article	DOMINICAL.
Nundinal LETTER.		NUNDINAL.

LETTER is also a writing addressed, and sent to one. See EPISTLE.

LETTER of Attorney, a writing authorizing an attorney to do some legal act in our stead; as, to give title of lands, to receive debts, to sue a third person, &c.

LETTER of Credit, among merchants, a letter which a merchant or banker directs to his correspondent abroad, ordering him to credit the bearer as far as a certain sum. See CREDIT.

LETTER of Exchange. See BILL, and EXCHANGE.

LETTER of Licence, in trade, is an instrument, or writing granted to a man who has failed, or broke, signed and sealed by his creditors; which letter usually gives a longer time for payment: so that the debtor having such an assurance, may go about his business without fearing an arrest.

LETTERS of Mart, or Marque, are letters under the privy seal, granted to the king's subjects; empowering them to take, by force of arms, what was formerly taken from them by the subjects of some other state, contrary to the law of mart.

LETTERS Patent, or Overt, are writings sealed with the great seal of England, whereby a man is authorized to do, or enjoy any thing, which, of himself, he could not do. They are so called, by reason of their form; as being open, with the seal affixed, ready to be shewn for the confirmation of the authority given by them.

Common persons may grant letters patent; but they are rather called patents, than letters patent; yet, for distinction, those granted by the king are sometimes called letters patent royal.

Letters patent conclude with *testis missis*; charters, with *hinc testibus*. See PATENT.

LETTERS of Respite, letters issued out by a prince, in favour of honest, unfortunate debtors against two rigorous creditors, whereby payment is delayed for a certain term.

The use of these letters is very ancient: Cassiodorus observes, they were in use in the time of Theodoric, king of the Goths; others will have them introduced towards the end of the eleventh century, by pope Urban II. in favour of those who went on the croisades.

They are still in use in France, and some other countries: and take their name *à respirando*, because they give the debtor a breathing while.

Circular LETTERS.	} See the article	CIRCULAR.
Dimissory LETTERS.		DISMISSORY.
Monitory LETTERS.		MONITORY.
Pacific LETTERS.		PACIFIC.
Paschal LETTERS.		PASCHAL.

LETTERED, LETRADOS, Literati. See LITERATE.

LEV ANDIS *militum Expensis*. See the article EXPENSIS.

LEVANT, in geography, signifies any country situate to the east of us, or the eastern side of any continent or country, or that on which the sun rises.

LEVANT, in matters of commerce, &c. is generally restrained to the Mediterranean sea; or, rather, to the country on the eastern part of it.

Hence, our trade thither is called the *Levant trade*; and a wind that blows from thence, out of the Straights-mouth, is called a *Levant wind*.

LEVANT Measures.	} See the article	MEASURE.
Bale of the LEVANT.		BOLE.

LEVANT and couchant, in law, is, when cattle have been long in another man's ground, that they have lain down, and risen again to feed.

LEVARI Facias, a writ directed to the sheriff for levying a sum

sum of money on a man's lands and tenements, who has forfeited his magnificence.

LEVATOR ARIETUM. See the article **ARIETUM**.

LEVATOR, an epithet which anatomists give to several muscles, whose use is to raise, or lift up the parts to which they belong.

There are *levators* of the eye-lids, of the omoplate, of the anus, of the scapula, &c.—See *Tab. Anat. (Myol.) fig. 2. n. 3.*

LEVATUM. See **TERRIS**, & *Catalis tentis ultra debilitum.*

LEUCOMA*, in phycis, a little white spot on the cornea of the eye, called by the Latins *albigo*.

* The word is Greek, λευκωμα, from λευκος, white.

It is occasioned by a humour gathered in this membrane; or by the scar following a wound, or by an ulcer in this part, as sometimes happens in the small-pox.

LEUCOPHLEGMATIA*, a kind of dropsy, otherwise called *anasarca*.

* The word is Greek, λευκοφλεγματια, formed from λευκος, white, and φλεγμα, pituita phlegma.

The *leucophlegmatia* consists in a tumour, or bloating of the whole outer surface of the body, or some of its parts; white and soft, easily giving way to the touch, and preserving the impression made by the finger for some time.

It may either be owing to some disorder of the blood; which, in this disease, is of a pale colour, viscid, and cold; or, to an aqueous humour extravasated, and gathered together in the muscles, and the pores of the skin. See *Supplement: article HYDROPS*.

LEVEL*, an instrument, wherewith to draw a line parallel to the horizon, and continue it out at pleasure; and by this means to find the true level, or the difference of ascent or descent, between several places, for conveying water, draining fens, &c.

* The word comes from the Latin, *libella*, the cross beam that forms the brachia of a balance; which, to be just, must stand horizontally.

There are several instruments of different contrivance, and matter, invented for the perfection of *levelling*; all of which, for the practice, may be reduced to these that follow.

Air LEVEL, that which shews the line of *level*, by means of a bubble of air inclosed with some liquor in a glass tube of an indeterminate length and thickness, whose two ends are sealed hermetically; that is closed with the glass itself, by heating it with the flame of a lamp, till it become soft and tractable.—When the bubble of air fixes itself at a certain mark, made exactly in the middle of the tube, the plane, or ruler wherein it is fixed, is *level*. When it is not *level*, the bubble will rise to one end.

This glass tube may be set in another of brass, having an aperture in the middle, whence the bubble of air may be observed.

The liquor wherewith the tube is filled, is ordinarily either oil of tartar, or aqua secunda; those not being so liable to freeze, as common water, nor to rarefaction and condensation, as spirit of wine is.

The invention of this instrument is ascribed to M. Thevenot.

Air LEVEL, with Sights, is an improvement on that last described: which, by the addition of more apparatus, becomes more commodious, and exact.

It consists of an *air level*, (*Tab. Surveying, fig. 4.*) about eight inches long, and seven or eight inches in diameter, set in a brass tube, with an aperture in the middle. The tubes are carried in a strong straight ruler, a foot long, at whose ends are fixed two sights exactly perpendicular to the tubes, and of an equal height, having a square hole, formed by two fillets of brass, crossing each other at right angles, in the middle whereof is drilled a very little hole; through which, a point on a *level* with the instrument is descried.—The brass tube is fastened on the ruler by means of two screws; one whereof, marked *A*, serves to raise or depress the tube at pleasure, for bringing it towards a *level*. The top of the ball and socket, is riveted to a little ruler that springs; one end whereof is fastened with screws to the great ruler, and the other end has a screw *F*, serving to raise and depress the instrument, when nearly *level*.

This instrument is yet less commodious than the following one; because, though the holes be ever so small, yet they will still take in too great a space to determine the point of *level* precisely.

Air LEVEL, with Telescope Sights.—This *level*, represented in *Tab. Surveying, fig. 5.* is like the last; with this difference, that instead of plain sights, it carries a telescope, to determine exactly a point of *level* at a good distance.

The telescope is in a little brass tube, about 15 inches long, fastened on the same rule as the *level*.—At the end of the tube of the telescope, marked *I*, enters the little tube *1*, carrying the eye-glass, and a hair horizontally placed in the focus of the object-glass *2*, which little tube may be drawn out, or pushed into the great one, for adjusting the telescope to different sights.—At the other end of the telescope is

placed the object-glass: the screw *3*, is for raising or lowering the little fork carrying the hair, and making it agree with the bubble of air, when the instrument is *level*; and the screw *4*, is for making the bubble of air agree with the telescope.—The whole is fitted to a ball and socket.

M. Huygens is said to have been the inventor of this *level*; which has this advantage, that it may be invented, by turning the ruler and telescope half round: and if then the hair cut the same point that it did before the turn, it is a proof the operation is just.

It may be observed, that one may add a telescope to any kind of *level*, by applying it upon, or parallel to the base, or ruler, when there is occasion to take the *level* of remote objects.

Foot-LEVEL. See the article **FOOT-LEVEL**.

Artillery Foot-LEVEL, is in form of a square, having its two legs or branches of an equal length; at a juncture whereof is a little hole, whence hangs a thread and plummet, playing on a perpendicular line in the middle of the quadrant: it is frequently divided into 90 degrees, or rather into twice 45 degrees from the middle. See *Fig. 6. lit. F.*

This instrument may be used on other occasions, by placing the ends of its two branches on a plane; for when the thread plays perpendicularly over the middle division of the quadrant, that plane is assuredly *level*.

To use it in gunnery, place the two ends on the piece of artillery, which you may rise to any proposed height by means of the plummet, whose thread will give the degree above the *level*.

Carpenters and Paviers LEVEL, consists of a long ruler, in the middle whereof is fitted, at right angles, another somewhat bigger, at the top of which is fastened a line with a plummet; which, when it hangs over a fiducial line at right angles with the base, shews that the said base is horizontal.

This and the masons *level*, though very common, are esteemed the best for the practice of building, though the operations by them can only be short.

Gunners LEVEL, for levelling cannons and mortars, is an instrument, represented *Tab. Surveying, fig. 8.* consisting of a triangular brass plate about four inches high, at the bottom of which is a portion of a circle divided into 45°; which number is sufficient for the highest elevation of cannons and mortars, and for giving shot the greatest range. On the center of this segment of a circle is screwed a piece of brass, by means whereof it may be fixed or moved at pleasure. The end of this piece of brass is made so, as to serve for a plummet and index, in order to shew the different degrees of elevation of pieces of artillery.—This instrument has also a brass foot to set upon cannon or mortars, so as when those pieces are horizontal, the whole instrument will be perpendicular.

The use of this *level* is obvious; and consists in placing the foot thereof on the piece to be elevated; in such manner as that the point of the plummet may fall on the proper degree: this is what they call *levelling* the piece.

Masons LEVEL, is composed of three rules, joined as to form an isosceles rectangle, somewhat like a Roman A; at the vertex whereof is fastened a thread, from which hangs a plummet, which passes over a fiducial line marked in the middle of the base, when the thing to which the *level* is applied is horizontal; but declines from the mark, when the thing is lower on one side than the other.

Plumb, or Pendulum LEVEL, that which shews the horizontal line, by means of another line perpendicular to that described by its plummet or pendulum.

This instrument, represented *Tab. Surveying, fig. 6.* consists of two legs, or branches, joined together at right angles; whereof that which carries the thread and plummet, is about a foot and a half long. This thread is hung towards the top of the branch, at the point *2*. The middle of the branch where the thread passes, is hollow, that so it may hang free every where but towards the bottom, where there is a little blade of silver, whereon is drawn a line perpendicular to the telescope.—The said cavity is covered by two pieces of brass, making, as it were, a kind of case, lest the wind should agitate the thread; for which reason the silver blade is covered with a glass, *G*, to the end that it may be seen when the thread and plummet play upon the perpendicular.—The telescope *1*, is fastened to the other branch, or leg of the instrument, and is about two foot long; having a hair placed horizontally across the focus of the object-glass, which determines the point of *level*, when the string and plummet hang against the line on the silver blade.

All the accuracy of this instrument depends on the telescope's being fitted at right angles to the perpendicular.—It has a ball and socket, by which it is fastened to its foot, and is said to have been the invention of M. Picard.

Reflecting LEVEL, is that made by means of a pretty long surface of water, representing the same object inverted, which we see erect by the eye; so that the point where those two objects appear to meet, is in a *level* with the place where the

surface of water is found.—This is the invention of M. Mariotte.

There is also another *reflecting level*, consisting of a mirror of steel, or the like, well polished, and placed a little before the object-glass of a telescope suspended perpendicularly.—This mirror must make an angle of 45 degrees with the telescope; in which case, the perpendicular line of the said telescope is converted into an horizontal line; which is the same with the line of *level*. The invention of this is owing to M. Cassini.

Water LEVEL, that which shews the horizontal line by means of a surface of water, or other liquid: founded on this principle, that water always naturally places itself level.

The most simple is made of a long wooden trough, or canal, whose sides are parallel to its base; so that being equally filled with water, the surface thereof shews the line of *level*.—This is the chorobates of the ancients, described by Vitruvius, Lib. VIII. c. 6.

This sort of *level* is also made with two cups fitted to the two ends of a pipe three or four foot long, about an inch in diameter; by means whereof the water communicates from the one to the other cup: and this pipe being moveable on its stand, by means of a ball and socket, when the two cups become equally full of water, their two surfaces mark the line of *level*.

This instrument, instead of cups, may also be made with two short cylinders of glass, three or four inches long, fastened to each extreme of the pipe with wax, or mastic. Into the pipe is filled some common or coloured water, which shews itself through the cylinders, by means whereof the line of *level* is determined; the height of the water, with respect to the center of the earth, being always the same in both cylinders. This *level* though very simple, is yet very commodious for levelling small distances.

LEVEL of M. Huygen's Invention consists of a telescope, *a*, (Tab. Surveying, fig. 7.) in form of a cylinder; going through a ferril, in which it is fastened by the middle.—This ferril has two flat branches, *b b*, one above, and the other below; at the ends whereof are fastened little moving pieces, which carry two rings, by one of which the telescope is suspended to a hook at the end of the screw 3; and by the other, a pretty heavy weight is suspended, in order to keep the telescope in equilibrio.—This weight hangs in the box 5, which is almost filled with linseed oil, oil of walnuts, or other matter that will not easily coagulate, for more aptly settling the balance of the weight and telescope.—The instrument carries two telescopes close and very parallel to each other, the eye-glass of the one being against the object-glass of the other, that one may see each way without turning the *level*.—In the focus of the object-glass of each telescope, must a little hair be strained horizontally, to be raised and lowered as occasion requires, by a little screw.—If the tube of the telescope be not found *level*, when suspended, a ferril, or ring 4, is put on it, and is to be slid along till it fixes to a *level*.—The hook on which the instrument is hung, is fixed to a flat wooden cross; at the ends of each arm whereof there is a hook, serving to keep the telescope from too much agitation in using, or in carriage. To the said flat cross is applied another hollow cross, that serves as a case for the instrument; but the two ends are left open, that the telescope may be secured from the weather, and always in a condition to use. The foot of this instrument is a round brass plate, to which are fastened three brass ferrils, moveable by means of joints, wherein are put flaves: and on this foot is placed the box.

LEVELLING, the art or act of finding a line parallel to the horizon, at one or more stations, in order to determine the height of one place with respect to another; for the laying grounds even, regulating descents, draining morasses, conducting waters, &c.

One place is said to be higher than another, or *out of level* with it, when it is more remote from the center of the earth; and a line equally distant from the centre of it in all its points, is called the *line of true level*: whence, because the earth is round, that line must be a curve, and make a part of the earth's circumference, or an arch concentric with it, as the line BCFG, Tab. Surveying, fig. 9. all the points whereof are equally distant from the center of the earth A. But the line of sight, which the operations of levels give, is a tangent, or a right line perpendicular to the semidiameter of the earth; one extreme of which tangent being the point of contact, the other will be that of a faint drawn from the center of the earth; and the point which determines it, will be above the surface of the earth, and of the true level, as much as that faint exceeds the radius, or semidiameter of the earth.

This extremity of the tangent is said to be in the *apparent level*; as being that given by the sight; but is easily reduced to the *true level*, because we know, by trigonometry, how much each faint exceeds the radius; and because, by measuring, we have discovered the precise length of that radius.—It was for want of the knowledge of this, that the ancients were not able to reduce the apparent level to the true one; and accordingly to prevent falling into an error never le-

welled above 20 feet at once, where such reduction was not necessary.

By the table since made, it appears, that at the distance of 100 yards the apparent level is raised above the true one about one third of a line: so that the ancients, in this respect, were more scrupulous than needed.—By means of this reduction, we are now able to level distances of one or two miles, at a single operation, which the ancients could not do in less than 300.

The operation of *levelling* is as follows: Suppose the height of the point A, (Tab. Surveying, fig. 10.) on the top of a mountain, above that of the point B, and at the foot thereof, required.—Place the level about the middle distance, between the two points, as in D, and staffs in A and B, and let there be persons instructed with signals for raising and lowering on the said staffs, little marks of pasteboard, or other matter. The level being placed horizontally by the bubble, &c. look towards the staff A E, and cause the mark to be raised, or lowered, till the middle, upper edge, or other most conspicuous part appear in the visual ray. Then measuring exactly the perpendicular height of the point A, above the point E, which suppose 6 feet 4 inches, let that down in your book: then turn the level horizontally about, that the eye-glass of the telescope may be still next the eye when you look the other way, (if you have only plain sights, the instrument need not be turned) and cause the person at the staff B to raise or lower his mark, till some conspicuous part of it fall in the visual ray, as at C; then measure the perpendicular height of C above B, which suppose 16 feet, 16 inches; let this also down in the book above the other number of the first observation; subtract the one from the other, the remainder will be 10 feet 4 inches, which is the difference of level between A and B, or the height of the point A above the point B.

Note, If the point D, where the instrument is fixed, be in the middle between the two points A and B, there will be no necessity for reducing the apparent level to the true level; the visual ray, in that case, being raised equally above the true level.

If it be further required to know whether there be a sufficient descent for conveying water from the spring A, to the point B, Tab. Surveying, fig. 11.—Here, in regard the distance from A to B is considerable, it is required that several operations be made. Having then chosen a proper place for the first station, as at I, set up a staff in the point A, near the spring with a proper mark to slide up and down the staff, as L; and measure the distance from A to I, which suppose 2000 yards. Then the level being adjusted in the point I, let the mark L be raised and I would till such time as you spy some conspicuous part of it through the telescope, or sights of the level, and measure the height A I, which suppose 13 foot 5 inches. But in regard the distance A I is 2000 yards, you must have recourse to your table for a reduction, subtracting 11 inches, which will leave the height A I, 12 feet 6 inches; and this note down in your book. Now turn the level horizontally about, so as the eye-glass of the telescope may be towards the staff at A; and fixing up another staff at H, cause the mark G to be moved up and down, till you spy some conspicuous part through the telescope, or sights. Measure the height H G, which suppose 6 yards, 4 feet, 2 inches. Measure likewise the distance of the points I H, which suppose 1300 yards; for which distance according to the table 4 inches 8 lines must be subtracted from the height H G, which consequently will but leave 6 yards, 3 feet, 9 inches, 4 lines, to be taken down in your book.

This done, remove the level forwards to some other eminence, as E, whence the staff H may be viewed; as also another staff at D, near the place whither the water is to be conveyed. The level being again adjusted in the point E, look back to the staff H; and managing the mark as before, the visual ray will give the point F. Measure the height H F, which suppose 11 feet, 6 inches. Measure likewise the distance H E, which suppose 1000 yards; for which distance the table gives 2 inches, 9 lines of abatement; which being taken from the height H F, there will remain 11 feet, 3 inches, 3 lines, which enter in your book. Lastly turning the level to look at the next staff D, the visual ray will give the point D. Measure the height of D from the ground, which suppose 8 feet, 3 inches. Measure also the distance from the station E to B, which suppose 900 yards; for which distance the table gives 2 inches, 3 lines of abatement; which being taken from the height B D, there will remain 8 feet, 9 lines, which enter as before.

For the manner of entering down observations in your book, observe that when a proper place or station for the level, between the two points, has been pitched upon, you must write down the two heights observed at that station, in two different columns, viz. under the first column, those observed in looking through the telescope when the eye was from the spring, or towards the point, which we may call *back-sights*; and under the second column, those observed when

when the eye was next the spring, which we call *fore-fights*, in the manner following:

Back-fights.		Fore-fights.	
	foot. inch. line.		foot. inch. line.
First height	12 : 6 : 0	Second height	21 : 09 : 4
corrected		Fourth height	8 : 00 : 9
Third height	11 : 3 : 3		29 : 10 : 1
	23 : 9 : 3		

Having summed up the heights of each column separately, subtract the lesser from the greater, the remainder will be the difference of level between the points A and B; as in this example,

feet. inch. line.
29 : 10 : 01
23 : 09 : 03

6 : 00 : 10—The difference of height, or level, between the points A and B.

If the distance of the two points be required, add all the distances measured, together; and dividing the difference of height by the yards of the distances, for each 200 yards you will have a descent of about 2 inches, 9 lines.

Dr. Halley suggests a new method of *levelling*, which has been put in practice by some of the French academy: this is performed wholly by means of the barometer, in which the mercury is found to be suspended to so much the less height, as the place is further remote from the center of the earth.—Hence it follows, that the different heights of the mercury, in two places, give the difference of level.

Mr. Derham, from some observations he made at the top and bottom of the Monument, found that the mercury fell one tenth of an inch at every 82 feet of perpendicular ascent, when the mercury was at 30 inches.—Dr. Halley allows of one tenth of an inch for every 30 yards; which, considering how accurately the barometers are now made, an inch in some of them being divided into an hundred or more parts, all very sensible, he thinks this method sufficiently exact to take the levels for the conveyance of water, and less liable to errors than the common levels.

The same author found a difference of three inches eight tenths, between the height of the mercury, at the top and bottom of Snowden hill in Wales.

For the common occasion of *levelling* to be performed without much apparatus of instruments, time, or trouble, the following method may serve.—Set a pole upright in a spring, pond, river, or other place whence water is to be brought, and mark how many feet, and inches, are above water.—Then set up another pole, of equal length with the other, in the place to which the water is to come. Place the center of a quadrant on the top of this last pole, the plummet hanging free; spy through the sights the top of the pole that is in the water, and if the thread cuts any degree of the quadrant, the water may be conveyed by a pipe laid in the earth.—If you cannot see from one extreme to the other, the operation may be repeated in the manner already directed.

LEVELLING Staves, are instruments used in *levelling*, serving to carry the marks to be observed, and at the same time to measure the heights of those marks from the ground.

They usually consist each of two long square wooden rulers, made to slide over one another, and divided into feet, inches, &c.

LEVER*, or **LEAVER**, in mechanics, an inflexible right line, supported, in a single point, on a fulcrum or prop; and used for the raising of weights: being either void of weight itself, or, at least, having such a weight as may be commodiously counter-balanced.

* The word is formed of the French *lever*, which signifies the time, formed of the verb *lever*, or Latin *levare*, to raise.

The *Lever* is the second, or, as others will have it, the first of those called mechanical powers, or simple machines, as being, of all others, the most simple; and is chiefly applied for raising weights to small heights.

In a *lever* there are three things considered: The weight to be raised, or sustained, as O, (*Tab. Mechanics*, fig. 1.)—

The power by which it is to be raised, or sustained, as B. And the fulcrum, or prop D, whereon the *lever* is sustained, or rather, on which it moves round, the fulcrum remaining fixed.

Levers are of three kinds: Sometimes, the fulcrum is placed between the weight and the power, as in fig. 1. this we call a *lever of the first kind*. Sometimes, the weight is between the fulcrum and the power; which is called a *lever of the second kind*, as in fig. 2. And sometimes, the power acts between the weight and the fulcrum, as fig. 3. which is the *lever of the third kind*.

The power of the *lever* is founded on the following theorem, viz, 'That the space, or arch described by each point of a *lever*, and consequently the velocity of each point of a *lever*, is as its distance from the fulcrum, or prop.'

From hence it follows, that the action of a power, and the resistance of the weight, increase in proportion to their distance from the fulcrum.

And hence also it follows, that a power will be able to sustain a weight, if the distance of the point in the *lever*, to which it is applied, be to the distance of the weight, as the weight to the intensity of the power; which, if it be ever so little increased, must raise the weight. See this doctrine demonstrated under the word *MECHANIC Powers*; and further illustrated under the word *BALANCE*: between which, and the *lever*, there is a great analogy; a *lever* of the first kind being a sort of stilyard to raise weights. See *STILYARD*.

The power and action of the *lever* will be fully illustrated by the following propositions.

1^o. If the power applied to a *lever*, of any kind, sustain a weight, the power is to the weight in a reciprocal ratio of their distances from the fulcrum.

This is the converse of that demonstrated under the head *MECHANIC Powers*.

2^o. The weight of a *lever* of the first or second kind AB, fig. 1. the distance of the center of gravity from the fulcrum CV, and the distances of the weight, and the power AC and CB, being all given; to find the power that will sustain it.—Suppose the *lever* void of gravity, but in lieu thereof a weight hung at V; if then AC be made to CV, as the gravity of the *lever* to a fourth number, we shall have the weight which the *lever* is able to sustain; and two subtracted from the given weight, the remainder will be the weight to be sustained by the power. Let CB then be to CA, as the remaining weight to a fourth weight; and we shall have the power to be applied in B, in order to sustain the given weight with the given *lever*.

3^o. The gravity of a *lever* of the first or second kind AB, the distance of its center of gravity from the fulcrum CV, the distances of the power, and the weight BC and CA, being all given; to find the weight to be sustained.—Find the part of the weight sustained by the *lever* alone, as in the former problem: in the same manner find the other part of the weight, which the power applied in B is able to sustain: add the two numbers together, and the sum is the weight required.

4^o. The gravity, and center of gravity F, of a *lever* of the second kind CB, with the weight G, its distance from the fulcrum CA, and from the power CB, being given; to find the power capable to sustain the weight.—Suppose the *lever* void of gravity, but in lieu thereof a weight equal thereto hung in F, the power required to sustain the *lever* alone; then find the power requisite to sustain the given weight G: add the powers together, and the sum will be the power required.

5^o. If a power applied to a *lever* of any kind lift a weight, the space of the first is to that of the last, as is this last to a power able to sustain the same weight; whence it follows, that the gain of force is always attended with the loss of time, and vice versa.

LEVERET, among sportsmen, a young hare in the first year of its age.

LEVIGATION, the reduction of hard and ponderous bodies as coral, tuff, precious stones, &c. into a fine, subtille powder; by grinding them with water upon porphyry, or the like, as painters do their colours.

Levigation is much used in pharmacy, and chymistry; but unless the grinding instruments be extremely hard, they will wear away, so as sometimes to double the weight of the medicine thus managed.

LEVITE*, an inferior kind of minister in the Jewish tabernacle, and temple, who had the care, and management of the sacred utensils.

* The word comes from the Greek, *λεωίτης*; the root of which is the name *Levi*, which was given to that patriarch by his mother Leah, from the Hebrew *לוי* *leui*, to be tied, or united; Leah hoping, by the birth of this son, to be more closely linked to her husband Jacob.

The *levites*, in the Jewish church, were an order inferior to the priests; and answered, in some measure, to deacons in the Christian church.

The *levites* of the old law had no settled lands allotted them for their maintenance, but lived chiefly of the offerings made to God.—They were distributed through all the tribes, each of which gave some of their cities to the *levites*, with grounds in their neighbourhood for the subsistence of their flocks.—According to the numeration made by Solomon, from the age of twenty, there were thirty eight thousand *levites* capable of serving: twenty four thousand of these he appointed for the daily ministry under the priests; six thousand to be inferior judges in the cities, and to decide matters relating to religion, and of no great consequence to the state; four thousand to be door-keepers, and to take care of the riches of the temple; and the rest to do the office of chanters, or singers.

LEVITY, the privation, or want of weight in any body, when compared

compared with another that is heavier.

In which sense, *levity* stands opposed to *gravity*.

The schools maintain, that there is such a thing as *positive* and *absolute levity*, and impute to this the rise or emergency of bodies lighter in specie than the fluids wherein they rise.

But we find by experience, that all bodies tend towards the earth, some slower, and some faster, in all fluids or mediums, whether water, air, &c.—Thus, cork is only said to be lighter than gold; because, under equal dimensions, the gold will sink in, and the cork swim upon water.

Archimedes has demonstrated, that a solid body will float any where in a fluid of the same specific gravity, and that a lighter body will keep above a heavier.—The reason is, that of bodies falling towards the earth, those which have a like number of equal parts, have equal gravity; since the gravity of the whole, is the sum of the gravity of all its parts.—Now two bodies have an equal number of equal parts, if under the same dimensions there be no intervals destitute of matter; whence it follows, that as no portion of matter is so small, but that the body wherein it is contained may be wholly divided into parts equally small, there can be no reason for the descent of these, which will not equally hold for the descent of that.

Hence it may be concluded, that those bodies which do not equally gravitate under the same dimensions, do not contain equal portions of matter; and therefore when we see, that a cube of gold subsides in water, at the same time that an equal bulk of cork swims upon it, it is evident that the gold must have a greater number of equal parts of matter, under the same bulk, than the cork, or the cork must have a greater number of vacuities than the gold; and that there are also in the water a greater number of vacuities, than in gold.

Hence, we have a clear idea both of density, or gravity, and of *levity*; and know, that the latter cannot, in a strict sense, be accounted any thing positive, but only a mere negation, or absence of body, which determines that body to be lighter than another which contains more matter.

Dr. Hooke, it is true, seems to maintain something like a positive *levity*: which, if we mistake not, is what he means by the term *levitation*; viz. a property of bodies directly contrary to that of gravitation towards the sun.

This, he thinks, he has discovered in the streams of several comets; which, though they had a descent from the nucleus of the comet towards the sun, yet they quickly returned, and went opposite to the sun, and that to a prodigious extent. In effect, where the power of gravitation ceases, it should seem some such contrary force does begin; whereof we have instances in the phenomena of attraction.—This is what Sir Isaac Newton calls the *vis repellens*, and appears to be one of the laws of nature; without which, it would be hard to account for rarefaction, and some other appearances.

PARACENTRIC SOLICITATION OF LEVITY. See **PARACENTRIC**.

LEVY, LEVARE, in law, signifies to gather, or collect: as, to levy money, to levy troops, &c.

LEVY sometimes also denotes to erect, or set up: as, to levy a mill.—*Levy* also signifies to raise, or cast up; as to levy a ditch.

LEX, Lex. See the article **LAW**.

LEX AMISSA, or legem amittere, in law, is understood of an infamous perjured person, who is said to *lose his law*; or, as Bracton has it, *non est ulterius dignus lege*. See **INFAMOUS**.

LEX JUDICIALIS, is properly *purgatio per judicium ferri*; sometimes called simply *judicium*. See **JUDICIUM**.

LEX SACRAMENTALIS, *purgatio per sacramentum*. See **OATH**, and **PURGATION**.

LEX TALIONIS. See the article **TALIO**.

LEX TERRÆ, the law and custom of the land; by which name it is distinguished from the *civil law*. See **COMMON LAW**.

LEGEM TERRÆ AMITTERE. See the article **AMITTERE**.

LEXICON*, ΛΕΞΙΚΟΝ, the same with *dictionary*.

* The word is chiefly used in speaking of Greek dictionaries: it is derived from the Greek λέξις, word, diction; or λέγω, I speak.

LIBATION, LIBATIO, a ceremony in the heathen sacrifices, wherein the priest spilt some wine, milk, or other liquor, in honour of the deity to whom the sacrifice was offered, after having first tasted it himself.

Alexander is said to have sacrificed a bull to Neptune; and for an offering to the sea-gods, to have thrown the golden vessels used for the *libation*, into the sea.

Libations were also in use under the law of Moses, being enjoined by God in Exodus xxix, and Numbers xv.

LIBEL, Famulus LIBELLUS, a writing containing injuries, reproaches, or accusations against the honour, and reputation of any person, particularly of a superior, or governor.

Platina is of opinion, that a writing, how injurious soever it

is, cannot be called a *libel*, if the author's name be to it. Libellers, among the ancient Romans, were punished with death, but in aftertimes they were only whipped. Augustus ranked *famulus libellus*, defamatory libels, among the crimes *lesse majestatis*, of high treason.—F. Baldwin has published a comment on the imperial laws against libels. Scandalous pictures are reckoned amongst libels.

A *libel*, the lawyers say, may be either in *scriptis*, or *fine scriptis*: in *scriptis*, when a writing is composed, or published to another's disgrace, which may be done either *verbis*, and *cantilenis*; as, where this is maliciously repeated, or sung in the presence of others: or *else traditione*, when the libels, or any copy of it, is delivered out to scandalize the party.

A *libel sine scriptis*, may be two fold. 1°. *Picturis*, as to paint the party in shameful, or ignominious manner: or, 2°. *Signis*, as to fix a gallows, or other ignominious signs, at the door of the party, or elsewhere.

The punishment of libelling in England, is putting the criminal in the pillory, whipping, fining, &c.

LIBEL also signifies the original declaration of any action in the civil law.

LIBELLATICI, an ancient kind of apostates from Christianity, under the persecution of Decius; who, to prevent their being obliged to renounce the faith, and sacrifice to idols in public, made application to the magistrates, and abjured their faith in private; obtaining certificates of them, either by in-treaty or by money*; by which they were attested to have complied with the orders of the emperor, and were thereby sheltered from any further molestation, on account of their religion.

* These certificates were called *libelli*; whence the people, who obtained them, came to be denominated *libellatici*.

Others, particularly the centuriators of Magdebourg, are of opinion, that the *libellatici* were only such as sed the magistrates with money, to screen them from persecution, and from being obliged to renounce Christianity.

M. Tillemont retains somewhat of each opinion; he thinks the *libellatici* applying themselves to the magistrates, bought off the sacrificing and abjuration, and obtained letters by which they were declared to have renounced Christ, and sacrificed to idols, though, in effect, they had done neither.

LIBERAL* Arts, are such as depend more on the labour of the mind, than on that of the hand; or, that consist more in speculation, than operation; and have a greater regard to amusement and curiosity, than to necessity.

* The word comes from the Latin *liber*; which, among Romans, signified a person who was not a slave, and whose will, of consequence, was not checked by the command of any master.

Such are grammar, rhetoric, painting, sculpture, architecture, music, &c.—The *liberal arts* used formerly to be summed up in the following Latin verse:

Lingua, Tropus, Ratio, Numerus, Tonus, Angulus, Astra. And the *mechanical arts*, which, however, are innumerable, under this:

Rus, Nemus, Arma, Faber, Vulnera, Lana, Rates.

LIBERALIA, feasts celebrated by the ancient Romans, in honour of Liber, or Bacchus: the same with those which the Greeks called *Dionysia*, and *Dionysia*.

They took their name from *liber*, i. e. free; a title conferred on Bacchus, in memory of the liberty or freedom which he granted to the people of Bœotia; or perhaps because wine, whereof he was the reputed deity, delivers men from care, and sets their minds at ease and freedom.—Varro derives the name of this feast from *liber*, considered as a noun adjective, and signifying *free*; because the priests were free from their function, and eased of all care during the time of the *liberalia*. For, in effect, it was the old women who officiated in the ceremonies and sacrifices of these feasts.

LIBERANDIS TERRIS. See the article **TERRIS**.

LIBERI Tauri Libertas. See the article **TAURI**.

LIBERIA, a feast held among the Romans on the day wherein their children laid aside their juvenile habits, and assumed the robe called *toga libera*.

The *liberia* were kept on the fifteenth of the calends of April; that is on the seventeenth of March.

LIBERTATES Anglicæ Custodes. See **CUSTODES**.

LIBERTUS, or LIBERTINUS, among the Romans, a *freed man*; or a person set free from a legal servitude.

These still retained some mark of their ancient state: He who made a slave free, having a right of patronage over the *libertus*: so that if the latter failed of shewing due respect to his patron, he was restored to his servitude; and if the *libertus* died without children, his patron was his heir. See **SLAVE**.

LIBERTINES, LIBERTINI, a religious sect which arose in the year 1525; whose principal tenets were, That there is but one only spirit, which is that of God; who is diffused through all things; who is and lives in all creatures; that our souls are nothing but this spirit of God: That the soul dies with the body; that sin is a mere chimera, and only subtilties

in opinion, for that it is God that does all, both good and evil; that paradise is a dream, and hell a phantom invented by priests, and religion a state-trick to keep men in awe; that spiritual regeneration only consists in fiding the remorse of conscience; repentance, in avowing to have done no evil; and that it is lawful, and even expedient, to diflemble in matters of religion.

To these they added horrible blasphemies against Jesus Christ; saying, he was nothing but a mere je ne scai quoi, composed of the spirit of God, and of the opinion of men.

These taxims occasioned their being called *Libertines*; and the word has been used in an ill sense ever since.

The *Libertini* spread principally in Holland and Brabant. Their leaders were one Quintin, a Picard, and another called Chopin, who joined with him, and became his disciple.

LIBERTY, *LIBERTAS*, is usually understood of that state wherein a man acts freely; or that power by which he determines himself voluntarily either to good or evil, to this thing or that.

In which sense *liberty* amounts to the same with *freedom*, and stands opposed to *necessity*.

Liberty may be defined, an active indifference of the will, to will, or not to will any thing.

Most of the schoolmen confound *liberty* and the will together, and make one definition serve for both. They distinguish *liberty* into a great many kinds; as,

LIBERTY of Contrariety, *Contrarietatis*, which is a freedom of doing two things not only different, but contrary to each other.

LIBERTY of Contradiction, a power either of doing a thing, or letting it alone.

Jesus Christ had not the *liberty* of contrariety, with regard to good and evil, for he could not do evil: but he had a *liberty* of contradiction with regard to good.

Next LIBERTY, *Proxima*, is a full, absolute freedom of doing any thing.

Remote LIBERTY, is a *liberty* that comprehends a natural power, though embarrassed with obstacles, which it is in our power to remove and to attain to a next *liberty*.

Thus he who has not the actual grace necessary for fulfilling his duty, but has yet the actual grace of prayer, has a next *liberty* with regard to prayer, and a remote *liberty* with regard to his duty.

Cicero defines *liberty*, the power of living after a man's own will, without any cause or impediment to oblige him to do one thing rather than another.

F. Malebranche gives us a still more philosophical definition: The will he defines to be that impression, or natural motion, which inclines towards good in the general; and by *liberty* he understands, that power which the mind has of determining this general impression towards such objects as please us; and so of directing our general inclinations to some particular things.

Whence it is easy to perceive, that though all natural inclinations be voluntary, yet they are not all free; not, we mean, with a *liberty* of indifference, which includes a power of willing, or not willing; or of willing quite the contrary to that which our natural inclinations lead us to.

For, though it is voluntarily and freely that we love good in general, it being absurd to suppose we should love any thing without the will, or that the will can ever be constrained; yet we do not love it freely (in the sense just laid down) because it is not in the power of the will not to desire to be happy.

It must be observed, however, that the mind, considered as determined towards good in general, cannot divert its motion to any particular good, unless the same mind, considered as capable of ideas, have some knowledge of that particular good: That is, in plainer terms, the will is a blind power, that cannot direct itself to any thing but what the understanding represents to it: So that the power which the will has to determine its impression towards general good, or its natural inclinations, variously, consists in the power it has to command the understanding to represent some particular good.

Thus, a person, for instance, represents some dignity to himself as a good to be wished for; immediately the will desires this good; that is, the impression which the mind continually receives towards good in general, determines it to this dignity. But as that dignity is not the universal good, nor is conceived clearly and distinctly as such by the mind (for the mind cannot conceive a thing clearly which is not) the impression we have towards good in general, is not entirely exhausted by that particular good; the mind has an inclination to go further; it does not love that dignity necessarily or invincibly, and in this respect is free.

Now, its *liberty* consists in this, that not being fully convinced that this good contains in it all the good it is capable of enjoying, it may suspend its judgment and its desire.

The case is nearly the same with regard to the knowledge of truth: we love this, as we do the enjoyment of good, by a natural impression; which impression is not invincible in the latter, excepting evidence be full, and our knowledge of the object complete. We have the same *liberty* in our false judg-

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ments, that we have in our irregular appetites. See **JUDGMENT**, and **WILL**.

The doctrine of Pelagius, with regard to *liberty*, is built on philosophy, which does not allow us to have lost our original *liberty* of doing good.

LIBERTY of Conscience, a right or power of making profession of any religion, or of serving God in any manner that a man sees fit.

This seems to be a natural right; it is vigorously opposed by the generality of the Romanists, and even by many of the Reformed, though it seems as if the reformation could scarce subsist without it. See **TOLERATION**, and **PERSECUTION**.

LIBRA, *Balanus*, one of the mechanical powers. See **BALANCE**.

LIBRA, is also one of the twelve signs of the zodiac; exactly opposite to Aries; so called, because when the sun is in this sign, at the autumnal equinox, the days and nights are equal, as if weighed in a balance.

Stars in the constellation Libra.

Names and Situations of the Stars.	Right Ascension. h m s	Longitude ° ' "	Latitude ° ' "	Magnitude
	10 52 46	9 1 22	S 6	6
	11 43 17	8 43 9	S 6	6
Preced. in fourth. scale	4 10 10	2 7 21	N 1 5	5
	9 51 43	2 3 54	N 1	5
	10 42 55	0 24 20	N 6	6
5 Bright star of fourth. scale	10 49 40	0 22 51	N 2 3	3
	0 41 07	13 30 17	N 6	6
First north. of fourth. scale	14 2 47	7 37 33	S 6	6
Second	10 23 31	4 34 38	N 6	6
	10 43 00	5 12 27	N 6	6
	8 50 18	12 00 48	N 5 6	6
	11 3 19	5 33 48	N 7	7
	11 13 30	5 37 15	N 6	6
That preced. in north. scale	10 58 34	8 16 34	N 4 5	5
South. of inform. preced. below scale	10 22 31	7 35 50	S 3	3
15				
First fourth. following scale	8 17 42	18 34 16	N 6	6
Second	14 28 1	1 13 13	N 6	6
	14 34 16	1 1 12	N 6	6
North. of inform. preced. below scale	16 41 43	1 48 23	S 4	4
	10 54 30	1 35 58	S 6	6
20				
	16 42 5	0 17 30	N 7	7
In north. foot of Lupus	20 42 13	11 27 1	S 4	4
Northern scale	15 2 40	8 31 45	N 2	2
Second following fourth. scale	17 36 48	2 49 40	N 6	6
Another	17 58 56	3 22 18	N 6	6
25				
Next after north. scale	17 1 43	8 5 44	N 4	4
	19 35 30	2 8 17	N 6	6
	20 2 23	1 40 27	N 7	7
	20 7 46	2 23 22	N 7	7
Third following fourth. scale	20 42 5	2 16 39	N 4	4
30				
	23 44 54	8 30 16	S 6	6
Following in north. scale	19 19 41	8 50 50	N 6 5	5
Preced. under north. scale	19 12 14	9 48 13	N 6 5	5
	20 48 53	4 25 27	N 3 4	4
Nor. of 2 inform. follow. bel. scales, &c.	24 16 22	8 28 9	S 4	4
35 [or before feet of fourth.				
	25 1 17	9 58 50	S 4	4
	22 39 6	0 14 7	N 6	6
	24 10	4 5 57	S 7	7
Fourth of follow. fourth. scale	23 27 00	0 1 54	N 4	4
Second below north. scale	23 2 38	4 2 52	N 4	4
40				
Last follow. fourth. scale	26 9 40	0 7 50	N 4	4
Follow. below north. scale	25 33 4	3 30 4	N 4	4
South. of follow. north. scale	26 4 4	0 7 48	N 4	4
	27 4 53	4 4 20	N 7	7
	25 32 29	12 00 9	N 6	6
45				
Midd. of those follow. north. scale	26 58 43	9 16 29	N 4 5	5
North. of the same	28 35 7	10 54 30	N 4 5	5

LIBRA, also denotes the ancient Roman pound, borrowed from the Sicilians, who called it *libra*, &c.

The *libra* was divided into twelve uncies, or ounces, equal to about ten ounces and a half of our weight.

The divisions of the *libra* were, the *uncia*, one twelfth; the *sextans*, one sixth; the *quadrans*, one fourth; the *triens*, one third; the *quincunx*, five ounces; the *semis*, six; the *sextunx*, seven; the *bes*, eight; the *dracmas*, nine; the *denarii*, ten; the *aurei*, eleven; lastly, the *as* weighed twelve ounces, or one *libra*.

The Roman *libra* was used in France for the proportions of their coin, till the time of Charlemagne, or perhaps till that of Philip I. in 1093; their sol. being proportioned, as that twenty of them were equal to the *libra*.

By degrees, it became a term of account, and every thing of the value of twenty sols, was called a *libra*.

The Romans had also a coin called *libra*, equal to twenty denarii: though Scaliger will have it, that *libra* was, even among them, a term of account, not a coin.

LIBRA *Prosa*, in our law books, denotes a pound of money in weight.

It was usual, in former days, not only to tell the money, but to weigh it; in regard many cities, lords, and bishops, having their mints, coined money, and often very bad too: for which reason, though the pound consisted of twenty shillings, they always weighed it.

LIBRARI, among the antients, were a sort of copists, who transcribed in beautiful, or, at least, legible characters, what had been wrote by the notarii in notes, and abbreviations.

LIBRARY, an edifice, or apartment destined for the placing of books; or the books themselves lodged therein. See **BOOK**. Some authors refer the origin of *libraries* to the Hebrews; and observe, that the care these took for the preservation of their sacred books, and the memory of what concerned the actions of their ancestors, became an example to other nations, particularly to the Egyptians. Osmandus, king of Egypt, is said to have taken the hint first; who, according to Diodorus, had a *library* built in his palace, with this inscription over the door, *Βιβλίον λαβόντες*. Nor were the Ptolemys, who reigned in the same country, less curious, and magnificent in books.

The scripture also speaks of a *library* of the kings of Persia, *Esdrae v. 17. vi. 1.* which some imagine to have consisted of the historians of that nation, and of memoirs of the affairs of state; but, in effect, it appears rather to have been a depository of laws, charters, and ordinances of the kings.—The Hebrew text calls it the *house of treasures*, and afterwards the *house of the rolls*, where the treasures were laid up.—We may, with more justice, call that a *library*, mentioned in the second of *Esdrae* to have been built by Nehemiah, and in which were preserved the books of the prophets, and of David, and the letters of their kings.

The first who erected a *library* at Athens, was the tyrant Pisistratus; and yet Strabo refers the honour of it to Aristotle. That of Pisistratus was transported by Xerxes to Persia, and was afterwards brought back by Seleucus Nicanor to Athens. Long after, it was plundered by Sylla, and re-established by Hadrian.—Plutarch says, that under Eumene, there was a *library* at Pergamus, containing 200,000 books.—Tyrannius, a celebrated grammarian, cotemporary with Pompey, had a *library* of 3000 volumes.—That of Ptolemy Philadelphus, according to A. Gellius, contained 700,000, all in rolls, burnt by Caesar's soldiers.—Constantine, and his successors, erected a magnificent one at Constantinople; which in the eighth century, contained 300,000 volumes, all burnt by order of Leo Isaurus: and, among the rest, one wherein the *Iliad*, and *Odyssey* were written in letters of gold, on the guts of a serpent.

The most celebrated *libraries* of antient Rome, were the Ulpian, and the Palatin. They also boast much of the *library* of Paulus Æmilius, who conquered Persus; of Lucius Lucullus, of Aulus Pollio, Atticus, Julius Severus, Domitian, Serenus, Pamphilus Martyr, and the emperors Gordian and Trajan.

Antiently, every large church had its *library*; as appears by the writings of S. Jerom, Anastasius, and others. Pope Nicholas laid the first foundation of that of the Vatican, in 1452. It was destroyed by the constable Bourbon, in the taking of Rome, and rebuilt by pope Sixtus V. and has been considerably enriched with the ruins of that of Heidelberg, plundered by count Tilly in 1622.

One of the most complete *libraries* in Europe, was said to be that erected at Florence by Cosmo de Medicis; over the gate whereof is wrote, *labor aliusque laborum*. Though it is now exceeded by that of the French king; begun by Francis I. augmented by cardinal Richlieu, and completed by M. Colbert. The emperor's *library* at Vienna, according to Lambecius, consists of 80000 volumes, and 15940 curious medals.

The *Bodleian library* at Oxford, built on the foundation of that of duke Humphry, exceeds that of any university in Europe, and even those of all the sovereigns of Europe, except the emperor's and French king's, which are each of them older by a hundred years.—It was first opened in 1602, and has since found a great number of benefactors; particularly Sir Rob. Cotton, Sir H. Savil, archbishop Laud, Sir Kenelm Digby, Mr. Allen, Dr. Pocock, Mr. Selden, and others. The Vatican, the Medicæan, that of Beffarion at Venice, and those just mentioned, exceed the Bodleian in Greek manuscripts; which yet out-does them all in oriental manuscripts.

As to printed books, the Ambrosian at Milan, and that of Wolfenbuttel, are two of the most famous, and yet both inferior to the Bodleian.

The *Cotton library* consists wholly of manuscripts, particularly of such as relate to the history and antiquities of England; which, as they are now bound, make about 1000 volumes.

LIBRATA *Terra*, a portion of ground containing four oxgangs, and every oxgang thirteen acres.

With us, it is so much land as is yearly worth 20s. In Henry the third's time, he that had *quindam libratae terras*, was to receive the order of knighthood.

Some say, that as money is divided into pounds, shillings, pence, and farthings, the same degrees are to be observed in the division of lands; and therefore, as *quadrans* signifies a farthing, so *quadrantatio* is the fourth part of an acre; *sextaria* an half; *denariata*, a whole acre; *judata*, 12 acres; and *librata*, 20 times 12 acres; i. e. 240 acres.

LIBRATION, in astronomy, an apparent irregularity in the motion of the moon, by which she seems to *librate*, or waver about her own axis; sometimes, from the east to the west; and sometimes, from the west to the east. See **MOON**. Hence it is, that some parts in the moon's western limb, or margin, at one time, recede from the centre of the disk; and at another, move towards it: by which means, some of those parts, which were before visible, sit and hide themselves in the invisible side of the moon, and afterwards become again conspicuous.

This *libration* of the moon is owing to her equable rotation round her own axis, and her unequal motion in the perimetre of her orbit. For if the moon moved in a circle, whose centre coincided with the centre of the earth, and turned round its axis in the precise time of its period round the earth; the plane of the same lunar meridian would always pass through the earth, and the same face of the moon would be constantly and exactly turned towards us. But since the real motion of the moon is in an ellipse, in whose focus is the earth, and the motion of the moon about the earth is equable; or, which is the same thing, every meridian of the moon, by the rotation, describes angles proportional to the times: the plane of no one meridian will constantly pass through the earth.

LIBRATION of the Earth, is that motion, whereby the earth is so retained in its orbit, as that its axis continues constantly parallel to the axis of the world.

This, Copernicus calls the *motion of libration*; and may be illustrated thus: Suppose a globe, with its axis parallel to that of the earth, painted on the flag of a mast, moveable on its axis, and constantly driven by an east wind, while it sails round an island; it is evident, the painted globe will be so *librated*, as that its axis will be parallel to that of the world, in every situation of the ship.

LICENCE, LICENTIA, in law, a power or authority given to another to do some lawful act.

A *licence* is a personal power, and cannot be transferred to another: though a *licence* may be granted to a man and his assigns.

LICENCE is also used in the civil law, for a permission, or leave granted by a superior.

Justinian appointed four years to be spent in the study of the law; after which, those who had discharged this obligation, were said to have *licence*, or permission to retire from study.

LICENCE is also applied to the letters, or certificates taken out in universities, whether in law, physic, or divinity.

Licence, in the Sorbonne, denotes a period of two years, which the bachelors are obliged to pass in assiduing at acts, and disputing in them, to qualify themselves for being admitted doctors. See **DEGREE**.

Letter of LICENCE. See the article **LETTER**.

LICENCE to arise, in law, *LICENTIA surgendi*, is a liberty, or space of time given by the court to a tenant, who is dispossessed of his land in a real action, to rise out of his bed and go about his business.

LICENCES, in painting, are the liberties which the painter takes in dispensing with the rules of perspective, and the other laws of his art.

Poetical LICENCE, is the liberty which poets claim of dispensing with the ordinary rules of grammar.

Antiently, poets had much greater *licences* than are now allowed.—The Greeks, by having recourse to the several dialects of their tongue, could lengthen out a word if it were too short, or retrench something from it if it were too long.—The old poets did what they pleased with their language, and subjected it not only to all their necessities, but their caprices too.

Et data Romanis venia est indigne poetis.

But these became ridiculous in course of time; and the poets are now dispossessed of most of their antient privileges.

LICENCIATE, or LICENTIATE, he who has obtained the degree of a *licence*.

Most of the officers of judicature in Spain, are known by no other name than that of *licenciates*.—To pass *licenciate* in the common law, civil law, or physic, they must have studied seven years; in divinity, ten.

LICENTIATE among us, is usually understood of a physician, who has a *licence* to practice, granted him by the college of physicians, or by the bishop of the diocese.

A person practising physic without such *licence*, in case his patient dies under his hands, is guilty of felony in the eye of the law.

LICHEN, *ΑΙΧΗΝ* a cutaneous distemper, otherwise called *impetigo*. See **IMPETIGO**.

LIE, or **LIE under the sea**.—The sailors say, a ship lies under the sea, when her helm being made fast a-lee, she has so a-hull, that the sea breaks upon her bow, or broad-side.

LIEGE,

LIEGE*, *LIGIUS*, properly signifies a *vassal*, who holds a kind of fee, that binds him in a closer obligation to his lord than other people.

* The term seems to be derived from the French *lier*, to bind; in regard of a ceremony used in rendering faith, or homage, which was by locking the vassal's thumb, or his hand, in that of the lord, to shew that he was fast bound by his oath of fidelity.—Cujas, Vigenere, and Bignon, chuse rather to derive the word from the same source with *leudi*, or *leudi*, loyal, faithful.—But Du Cange falls in with the opinion of those who derive it from *liti*, a kind of vassals, to signify attached to their lord, on account of lands or fees held of him, that they were obliged to do him all manner of service, as it they were his domestics. He adds, this was formerly called *ligium servitutum*, and the person *lige*.—In this sense, the word is used *leg. Edw. cap. 29. Judo. fidei. regis ligen a-bent esse*; that is, wholly under his protection.

By *liege homage*, the vassal was obliged to serve his lord towards all, and against all, excepting his father.—In which sense, the word was used in opposition to *simple homage*; which last, only obliged the vassal to pay the rights, and accustomed dues to his lord; and not to bear arms against the emperor, prince, or other superior lord: so that a *liege man* was a person wholly devoted to his lord, and entirely under his command *.

* *Omnia, &c. Reginaldus rex Insularum, saltem. Sciatis quod deveni homo ligus domini regis. Leobice Johanni, contra omnes mortales quantis viribus, & iud. a fidelitatem & sacramenta prestiti, &c.* M. S. penes W. Dugdale.

But it must be observed, there were formerly two kinds of *liege homage*: the one, by which the vassal was obliged to serve his lord, against all, without exception, even of his sovereign; the other, by which he was to serve him against all, except such other lords as he had formerly owed *liege homage* to.

In our old statutes, *lieges*, and *liege people*, are terms peculiarly appropriated to the king's subjects; as being *liges*, *ligi*, or *ligali*, obliged to pay allegiance to him; 8 Hen. VI. 14. Hen. VIII. &c. though private persons had their *liges* too *.

* *Reuerendus Dominus noster abbas Ramfex, propositio & hominibus de Bransbury, & monachis ecclesie Francie & Anglie, saltem. Sciatis me dedisse terram Ulfe, in depedene (hodie depedale) lude Ruffine & uxori ipsius Alfrida—ea conditione quod effecti sint homines liges.* Lib. Ramf.

LIEGE Vassalage. See the article **VASSALAGE**.

LIENTERY*, *ABINTEPIA*, in phycic, a kind of looseness, wherein the food passes so suddenly, through the stomach and guts, as to be thrown out by stool, with little or no alteration.

* The ancients were of opinion, that the *lientery* was owing to the too great immobility, and slowness of the intestine of the intestines, by which they let the food slip off before it was digested: and hence they gave it this name, which is formed from *λεν*, smooth, polished, and *τερν*, to loosen.

The *lientery* is generally owing either to a defect in the ferment of the stomach, or to a relaxation of the pylorus, attended with so brisk an irritation of the fibres of the stomach, that instead of retaining the aliment, it lets it pass.—Excess of drinking sometimes occasions this disease, by relaxing the stomach, and especially the pylorus, too immediately.

LIEUTENANT, *locum tenens*, a deputy, or officer, who holds the place of a superior, and discharges that function in his absence, which he ought to exercise in person.

Of these, some are civil; as lords *lieutenants* of kingdoms, who are the king's viceroys, and govern in his stead; and lords *lieutenants* of counties.

But the term is most frequent among military men, among whom there is a variety of *lieutenants*.—As,

LIEUTENANT General, a great officer, the next in rank to the general of an army; who, in battle, commands one of the lines, or wings; a detachment in a march, or a flying camp.—Also, a quarter at a siege, or one of the attacks—when it is his day of duty.

In France, they have also *lieutenant-generals* of their naval forces, who command immediately under the admirals.

In Holland they have a *lieutenant-admiral*, which is the same with what we call a *vice-admiral*.

LIEUTENANT-General of the Ordnance, is he who has the charge of the artillery, batteries, &c. under the master general, or in his absence. See **ORDNANCE**.

LIEUTENANT-Colonel of Foot, is the second officer in a regiment; he commands in the absence of the colonel, and in battle takes post at his colonel's left.

The dragoons have also a *lieutenant-colonel*; but the horse have not, properly, any; the first captain of the regiment supplies the office.

LIEUTENANT-Colonel of horse, being only the first captain of the regiment; who commands in the absence of the colonel, taking place of all the other captains.

Captain LIEUTENANT. See the article **CAPTAIN**.

LIFE, Vita, is a very ambiguous term.—For both God, and man, and a soul, and an animal, and a plant, are said to *live*: yet there is not any thing common to all these, beside

a kind of active existence; which, however, is of very different kind. See **ANIMAL**, and **VEGETABLE**.

Life, then, in the general, expresses a kind of active, operative existence; and is therefore conceived to consist in motion.—But, particularly,

LIFE of Body, Vita Corporis, consists in an uninterrupted motion therein.—A body, therefore, said to be *living*, must consist of various parts or members, both internal and external, so framed, and put together, as to constitute one whole. And these members must be moved, and warmed by some fluid substance, permeating the whole frame; by which heat and motion, the vital functions are to be performed.—Such are nutrition, generation, local motion, &c.

LIFE of Mind, Vita Mentis, is held by the Cartesians, to consist in a perpetual cogitation, or uninterrupted course of thinking; which seems likewise to have been Aristotle's meaning, when he calls the soul *ενεργεια*; which his interpreters call *ακτις*: thinking being the only proper act of the mind.

But Mr. Locke endeavours to refute this principle. See **THINKING**, and **SOUL**.

LIFE of Man, Vita hominis, consists in a continued communication of body and mind; or in operations, to which both the motions of the body, and ideas of the mind contribute. Thus, *e. gr.* the mind now thinking of something, on occasion of that thought, there arises a certain motion in the body.—And now, again, the body moves first, which motion is followed by some thought of the mind.

In such alternate or reciprocal operation, does the *life of man* consist; considered as he is a compound of body and mind. See **SENSATION**, and **MOTION**.

LIFE, is more particularly used for the duration of an animal's being; or, the space of time that passes between its birth and death.

LIFE, is also used for the constitution; or, that principle of heat, and motion, which animates bodies, and makes them perceive, act, and grow.

In which sense, *life*, is divided into *animal*, *sensitive*, and *vegetative*.

LIFE, in a medical sense, is defined, the circulation of the blood. See **CIRCULATION**.

Prolongation of LIFE, is made by lord Bacon one of the three branches of medicine; the other two relating to the preservation of health, and the cure of diseases.

The theory of prolonging *life*, he numbers among the desiderata.—Some means, or indications that seem to lead to it, he lays down as follows.

Things are preserved in two manners; either in their *identity*, or by *reparation*. In their *identity*, as a fly or ant in amber; as a flower, or fruit, or wood, in a conservatory of snow; a dead carcass in balsams.—By *reparation*, as a flame, or a mechanical engine, &c.—To attain to the prolongation of *life*, both these methods must be used; and the human body must be preserved both as inanimate, as flame, and as mechanical instruments are preserved.

Hence arise three intentions for the prolongation of *life*: retardation of consumption, proper reparation, and renovation of what begins to grow old.—Consumption is occasioned by two kinds of depredation; a depredation of the innate spirit, and a depredation of the ambient air.—These may be each prevented two ways; either by rendering those agents less predatory, or by rendering the passive parts (*viz.* the juices of the body) less liable to be preyed on.—The spirit will be rendered less predatory, if either its substance be condensed, as by the use of opiates, grief, &c. or its quantity diminished, as in spare and monastic diets; or its motion calmed, as in idleness and tranquillity.—The ambient air becomes less predatory, if it be either less heated by the rays of the sun, as in cold climates, in caves, mountains, and anachoretic cells; or be kept off from the body, as by a dense skin, the feathers of birds, and the use of oils and unguents, without aromatics. The juices of the body are rendered less liable to be preyed on, either by making them harder, or more moist and oily; harder, as by a coarse sharp diet, living in the cold, robust exercises, and some mineral baths: moiister, as by the use of sweet foods, &c. abstaining from salts and acerbities, and especially by such a mixture of drinks, as consists wholly of fine subtle particles, without any acrimony or acidity.

Reparation is performed by means of aliment: aliment is promoted four ways; by the concoction of the viscera, so as to extrude the aliment, by exciting the exterior parts to the attraction of the aliment, as in proper exercises and frictions, and some unctions and baths; by the preparation of the food itself, so as it may more easily insinuate itself, and, in some measure, anticipate the digestion; as in various ways of dressing meats, mixing drinks, fermenting breads, and reducing the virtues of the three into one; by promoting the act of assimilation itself, as in seasonable sleep, some external application, &c.—The renovation of what begins to grow old, is performed two ways; by the intergeneration of the habit of the body, as in the use of emollients, emplasters, unctions, &c. of such a nature, as do not extract, but im-

it from that of luminous bodies; which is called *primary*, or *innate*.

Aristotle explains the nature of *light*, by supposing some bodies to be transparent, as air, water, ice, &c. but since, in the night-time, we do not see any thing through those bodies, he says, they are only transparent potentially; whereas, in the day, they become really and actually transparent: and since it is *light* alone that can reduce that power into act, he defines *light* to be the act of a transparent body, considered as such. — He adds, that *light* is not fire, nor is it any thing bodily radiating from the luminous body, and transmitted through the transparent one; but the mere presence of fire, or some other luminous body, at the transparent one.

This is Aristotle's doctrine of *light*, which his followers mistaking, have foisted on him another, very different; making *light* and colours, to be qualities of the luminous and coloured bodies themselves, and, in all respects, like those sensations which they occasion in us: adding, that things lucid, or coloured, could not produce any sensations in us, unless they had something similar in themselves, since *nihil dat quod in se non habet*.

But the sophism is apparent; for we find, that a needle, in pricking the flesh, gives us pain, which no body ever imagined to exist in the needle. — But that it is not necessary there should be any similitude between the quality of the object, and the sensation it produces, appears still more evident from a glass prism, which is found to exhibit blue, yellow, red, and other colours extremely vivid; and yet no body will say there is any thing in the glass prism like to those sensations.

The Cartesians have refined considerably on this notion; and own that *light*, as it exists in the luminous body, is nothing but a power or faculty of exciting in us a very clear and vivid sensation; adding, that what is required to the perception of *light*, is, that we be so formed, as to be capable of such sensations; that in the hidden pores of transparent bodies, there be a certain subtle matter, which, by reason of its exceeding fineness, may penetrate even glass, and yet be strong enough to shake certain capillaments at the bottom of the eye; and, lastly, that this matter be impelled by the luminous body, so as to move the organ of sight.

Primary *light*, therefore, they say, consists in a certain motion of the particles of the luminous body, whereby they are enabled to propel, every way, the materia subtilis, lodged in the pores of transparent bodies; and secondary or derivative *light*, in a conatus to motion, or an inclination of that matter, to recede from the centre of the luminous body in right lines.

Father Malebranche explains the nature of *light*, from a supposed analogy between it and sound; the latter, it is allowed, is produced by the vibrations of the insensible parts of the sonorous body: which vibrations, if they be greater or less, that is, if they run through greater or less arches of the same circle, are still performed in the same time, and the sounds produced by them, only differ in a greater or less degree of strength; but if there be a greater number of vibrations, in the same time, in one sonorous body, than in another, these being closer, become of a different kind: and thus their sounds also differ, forming what we call different tones, or notes; the quick vibrations forming the acute, and the slower the grave notes.

Thus he supposes it to be with *light*, and colours: all the parts of a luminous body are in a rapid motion, which, by very quick pulses, is constantly compressing the subtle matter between the luminous body, and the eye, and excites vibrations of pressure. — As these vibrations are greater, the body appears more luminous; and as they are more quick, or more slow, the body is of this, or that colour.

This hypothesis, how ingenious soever, is now deservedly discarded, since the great discoveries made by Sir Isaac Newton, on the nature of *light*. — The primary *light* they talk of, we now know, consists wholly in a certain motion of the particles of the lucid body, whereby they do not propel any fictitious matter, supposed to be lodged in the hidden pores of transparent bodies; but throw off, from the luminous body, certain very small particles, which are emitted every way with great force: and the secondary, or derivative *light* consists not in a conatus, but a real motion of these particles, receding every way from the luminous body, in right lines, and that with an incredible velocity.

For if *light* consisted in a mere pressure, or pulse, it would be propagated to all distance, in the same instant of time; the contrary of which appears, from the phenomena of the eclipses of Jupiter's satellites, whose immersions, as the earth approaches towards Jupiter, are found to anticipate somewhat on the true time, and to commence sooner; and again, as the earth retires from Jupiter, their immersions, which alone in that case can be observed, happen later and later, or lose time: deviating thus, very considerably on either side, from the true time marked by the tables.

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This was first observed by M. Roemer, and since by other astronomers; the reason of which is not owing to any eccentricity; but does apparently follow from this, that the *light* of the sun, reflected from the satellites, has farther to travel, ere it reaches the eye, in the one case, than in the other, by a space equal to the diameter of the earth's annual orbit.

Light therefore, like other real bodies, does not move instantaneously, but in time. — Sir Isaac Newton has shewn, past contradiction, that the *light* of the sun is near seven minutes in its passage to the earth, which is the space of 70,000,000 miles; a velocity 10,000,000 times greater than that, wherewith a ball flies out of the mouth of a cannon.

Further, if *light* were not a body, but consisted in a mere pressure, or pulsion, it would never be propagated in right lines, but would be continually infested ad umbram. Thus Sir Isaac Newton, 'A pressure on a fluid medium (*i. e.* a motion propagated by such a medium, beyond any obstacle, which impedes any part of its motion, cannot be propagated in right lines, but will be always inflecting and diffusing itself every way, to the quiescent medium beyond that obstacle. — The power of gravity tends downwards, but the pressure of water rising from it, tends every way with an equable force, and is propagated with equal ease, and equal strength in curves, as in straight lines. — Waves, on the surface of the water, gliding by the extremes of any very large obstacle, inflect, and dilate themselves, still diffusing, gradually, into the quiescent water beyond that obstacle. — The waves, pulses, or vibrations of the air, wherein sound consists, are manifestly inflected, though not so considerably as the waves of water; and sounds are propagated with equal ease, through crooked tubes, and through straight lines; but *light* was never known to move in any curve, nor to inflect itself ad umbram.' — The rays of *light*, therefore, are small corpuscles, emitted with exceeding celerity from the luminous body. — As to the force wherewith these corpuscles are emitted, so as to enable them to move at the inconceivable rate of 10,000,000 miles in a minute; hear the same great author: 'Among bodies of the same kind and virtue, by how much any one is smaller, by so much is its attractive power greater in proportion to its bulk. This power we find stronger in small magnets, than in large ones, regard being had to the difference of their weights; and the reason is, that the particles of small magnets being nearer each other, more easily unite their forces intimately together, and act conjunctly. — For the same reason the rays of *light*, being of all other bodies the most minute, it may be expected, that their attractive powers should be, of all others, the strongest; and how strong in effect they are, may be gathered from the following rules: the attraction of a ray of *light*, according to the quantity of its matter, is, to the gravity which any projected body has, according, likewise, to the quantity of its matter, in a ratio, compounded of the velocity of the ray of *light*, to the velocity of that projected body, and of the bending, or curvature of the line, which the ray describes in the place of refraction, to the bending of the curvature, described by that projected body; provided, however, the inclination of the ray to the refracting surface, be the same with that of the projected body to the horizon. From which proportion I gather, that the attraction of the rays of *light*, is above 1,000,000,000,000,000 times greater, than the gravity of bodies on the surface of the earth, in proportion to the quantity of matter in each, if the *light* pass from the sun to the earth in the space of seven minutes. But now, as in algebra, where affirmative quantities cease, there negative ones begin; so in mechanics, where attraction ceases, there the repelling power must succeed: Therefore a ray of *light*, as soon as it is cast off from the luminous body, by the vibrating motion of its parts, and is got out of the sphere of its attraction, is propelled with an immense velocity.'

The wonderful divisibility of the parts of matter, is no where more apparent, than in the minuteness of the particles of *light*: Dr. Niewentit has computed, that an inch of candle, when converted to *light*, becomes divided into 269617040 parts, with 40 ciphers annexed; at which rate, there must issue out of it, when burning, 418,660, with 39 cyphers more, particles in the second of a minute; vastly more than a thousand times a thousand million times the number of sands the whole earth can contain; reckoning 10 inches to one foot, and that 100 sands are equal to one inch. See *Relig. Philof.* Vol. III. p. 858.

The expansion, or extension of any portion of *light*, is inconceivable; Dr. Hook shews, it is as unlimited as the universe; proving it from the immense distance of some of the fixed stars, the *light* whereof becomes sensible to the eye, by means of a telescope; nor, adds he, is it only the great bodies of the sun or stars, that are thus able to disperse their *light* through the vast expanse of the universe; but the smallest

left spark of a lucid body must do the same, even the smallest globule, struck from a steel by a flint.

Dr. s'Gravefand asserts, a lucid body to be that, which emits, or gives fire a motion in right lines; and makes the difference between *light* and heat, to consist in this. That to produce the former, the fiery particles must enter the eye, in a rectilinear motion, which is not required in the latter: On the contrary, an irregular motion seems more proper for it, as appears from the rays coming directly from the sun, to the tops of mountains, which have not near that effect with those in the valley, agitated with an irregular motion, by several reflections.

Whether or no there be always *light*, where there is fire, is disputed among authors; as also, whether or no there be any luminous body without heat; heat being a motion that may be infinitely diminished, and *light* a matter that may be infinitely rare: to which we may add, that no heat is sensible to us, unless it be more intense than that of our organs of sense.

Sir Isaac Newton observes, that bodies, and *light*, act mutually on one another: bodies on *light*, in emitting, reflecting, refracting, and inflecting it; and *light* on bodies, by heating them, and putting their parts into a vibrating motion, wherein heat principally consists. For all fixed bodies, he observes, when heated beyond a certain degree, do emit *light*, and shine; which shining, &c. appears to be owing to the vibrating motion of their parts; and all bodies, abounding in earthy and sulphurous particles, if sufficiently agitated, emit *light*, which waysoever that agitation be effected.—Thus sea-water shines in a storm, quick-silver when shaken in vacuum, cats, or horses, when rubbed in the dark; and wood, fish, and flesh, when putrefied.

The late Mr. Hawksbee has furnished us with a great variety of instances of the artificial production of *light*, by the attrition of bodies naturally not luminous; as of amber rubbed on woollen cloth in vacuum, of glass on woollen, of glass on glass, of oyster-shells on woollen, and of woollen on woollen, all in vacuum.

On the several experiments hereof, he makes the following reflections: That different sorts of bodies afford remarkably different kinds of *light*, different both in colour and in force: That the effects of an attrition are various, according to the different preparations and managements of the bodies that are to endure it; and that bodies which have yielded a particular *light*, may be brought by friction to yield no more of that *light*.

M. Bernoulli found by experiment, that mercury amalgamated with tin, and rubbed on glass, produced a considerable *light* in the air; that gold rubbed on glass did it still in a greater degree: but that, of all others, the most exquisite *light* was that produced by the attrition of a diamond; being equally vivid with that of a burning coal briskly agitated with the bellows.

Mr. Boyle tells us of a piece of shining rotten wood, which upon exhauing the air from it, was extinguished; but upon its re-admission, seemed to come to life again, and thence as before: being, no doubt, a real flame, and, like other flames, not to be preserved without air.

That the particles of *light* are attracted by those of other bodies, is evident from innumerable experiments.—This phenomenon was first observed by Sir Isaac Newton, who found by repeated trials, that the rays of *light* in their passage near the edges of bodies, whether opaque or transparent, as pieces of metals, the edges of knives, broken glasses, &c. are diverted out of the right lines, and always inflected or bent towards those bodies.

This action of bodies on *light*, is found to exert itself at a sensible distance, though it always increases as the distance is diminished; as appears very sensibly in the passage of a ray between the edges of two thin planes at different apertures; in which there is something very peculiar; the attraction of one edge being increased as the other is brought nearer it.—The rays of *light* in their passage out of glass into vacuum, are not only inflected towards the glass, but if they fall too obliquely, they will revert back again to the glass, and be totally reflected.

The cause of which reflection cannot be attributed to any resistance of the vacuum, but must be entirely owing to some force or power in the glass, which attracts or draws back the rays as they were passing into the vacuum.—And this appears farther from hence, that if you wet the posterior surface of the glass with water, oil, honey, or a solution of quick-silver, then the rays which would otherwise have been reflected, will pass into and through that liquor: which shews that the rays are not reflected till they come to that posterior surface of the glass, nor even till they begin to go out of it; for if at their going out they fall into any of the forelaid mediums, they will not then be reflected, but persist in their former course, the attraction of the glass being in this case counterbalanced by that of the liquor.

From this mutual attraction between the particles of *light* and

other bodies, arise two other grand phenomena, which we call the *refraction* and *refraction* of *light*: We know that the determination of a body in motion is changed by the interposition of another body in its way: thus *light* impinging on the surface of solid bodies, should be turned out of its course, and beaten back or reflected, so as like other falling bodies to make the angle of its reflections equal to that of incidence.—

This it is found by experience *light* does; and yet the cause of this effect is different from that just now assigned: the rays of *light* are not reflected by striking on the very parts of the reflecting bodies, but by some power equally diffused throughout the whole surface of the body, whereby it acts on the *light*, either attracting or repelling it, without contact: by which same power, in other circumstances, the rays are refracted; and by which also, the rays are first emitted from the luminous body; as is abundantly proved by great variety of arguments, by Sir Isaac Newton.

That great author puts it past doubt, that all those rays which are reflected, though they approach the body infinitely near, yet never touch it; and that those which do really strike on the solid parts of bodies, adhere to them, and are as it were extinguished and lost.

If it be asked, how it happens, since we ascribe the reflection of the rays to the action of the whole surface of the body without contact; how, I say, it happens that all the rays are not reflected from every surface, but while some are reflected, others pass through and are refracted? The answer given by Sir Isaac Newton is as follows:—Every ray of *light*, in its passage through any refracting surface, is put into a certain transient constitution or state, which in the progress of the ray returns at equal intervals, and disposes the ray at every return to be easily transmitted through the next refracting surface, and between the returns to be easily reflected by it: which alternation of reflection and transmission appears to be propagated from every surface, and to all distances. What kind of action or disposition this is, and whether it consist in a circulating or vibrating motion of the ray or the medium, or somewhat else, he does not enquire; but allows that, who are fond of hypotheses to suppose that the rays of *light*, by impinging on any reflecting or refracting surface, excite vibrations in the reflecting or refracting medium, and by that means agitate the solid parts of the body. These vibrations, thus propagated in the medium, move faster than the rays, so as to overtake them; and when any ray is in that part of the vibration which conspires with its motion, its velocity is increased, so that it easily breaks through a refracting surface: but when it is in a contrary part of the vibration, which impedes its motion, it is easily reflected; and consequently, that every ray is successively disposed to be easily reflected or transmitted by one vibration which overtakes it. The returns of which disposition of any ray to be reflected, he calls *fits of easy reflection*; and those of its disposition to be transmitted, he calls *fits of easy transmission*; and the space between the returns, the *interval of the fits*.—The reason, then, why the surface of all thick transparent bodies reflect part of the *light* incident on them, and refract the rest, is, that some rays at their incidence are in fits of easy reflection, and others of easy transmission.

For the Properties of Reflected LIGHT, see REFLECTION, MIRROR, &c.

Further, a ray of *light* passing out of one medium into another of different density, and in its passage making an oblique angle with the surface that separates the mediums, will be refracted, or turned out of its right line; by reason the rays are more strongly attracted by a denser than by a rarer medium.

That these rays are not refracted by striking on the solid parts of bodies, but without any contact, by that same force wherewith they are emitted and reflected, exerting itself differently in different circumstances, is proved in great measure by the same arguments which demonstrate reflection to be performed without contact.

For the Properties, &c. of Refracted LIGHT, see REFRACTION, LENS, &c.

In island crystal is observed a kind of double refraction, very different from what we find in any other body: the rays that fall obliquely being not only divided, with a double refraction in one and the same surface, but even the perpendicular rays themselves are most of them divided into two beams, by means of the same double refraction; which beams are of the same colour with the incident beams, and are equal in degree of *light*, at least, nearly, to each other: whence the great philosopher so often cited, takes occasion to suspect that there are in *light* some other original properties besides those hitherto described; and particularly, that the rays have different sides, ended with several original properties.

For, of these refractions, the one is performed in the usual manner, i.e. the sine of incidence is to that of refraction as 3 is to 2; and the other in an unusual manner: and yet the same ray is refracted sometimes in the one manner, and sometimes in the other, according to the various positions which

its several sides have, in respect of the crystal. These dispositions, he shews, must have existed originally in the rays, without having undergone any alterations in that respect, by the crystal.

Every ray of *light* therefore has two opposite sides, the one originally endowed with a property whereon its unusual refraction depends, and the other not endowed with that property.

Sir Isaac Newton having observed the vividly coloured image projected on the wall of a darkened room, by the sun-beams transmitted through a prism, to be five times as long as broad; setting himself to enquire into the reason of this disproportion, was led from other experiments to the experimentum crucis; whence he discovered the cause of the phenomenon to be, that some of the rays of *light* were more refracted than others, and therefore exhibited several images of the sun under the appearance of one, extended lengthwise.

Thence he proceeded to conclude, that light itself is a heterogeneous mixture of rays differently refrangible: and hence he distinguishes *light* into two kinds, viz. that whose rays are equally refrangible, which he calls *homogeneous*, *similar*, or *uniform light*; and that whose rays are unequally refrangible, which he calls *heterogeneous light*.

There are but three affections of *light*, wherein he observed its rays to differ, viz. refrangibility, reflexibility, and colour; and those rays which agree in refrangibility, agree also in the other two: whence they may be well defined homogeneous, though in some other respects they may possibly be heterogeneous.

Again, the colours exhibited by homogeneous *light*, he calls, *homogeneous colours*; and those produced by heterogeneous *light*, *heterogeneous colours*.—These definitions laid down, he advances several propositions.

As, first, That the sun's *light* consists of rays differing by indefinite degrees of refrangibility. Secondly, That rays, which differ in refrangibility, when parted from one another, do proportionably differ in the colours which they exhibit. Thirdly, That there are as many simple and homogeneous colours, as degrees of refrangibility, for to every degree of refrangibility belongs a different colour. Fourthly, Whiteness, in all respects like that of the sun's immediate *light*, and of the usual objects of our senses, cannot be compounded of simple colours, without an indefinite variety of them; for to such a composition there are required rays endowed with all the indefinite degrees of refrangibility, which infer as many simple colours. Fifthly, the rays of *light* do not act on one another in passing through the same medium. Sixthly, The rays of *light* do not suffer any alteration of their qualities from refraction, nor from the adjacent quietest medium. Seventhly, There can no homogeneous colours be produced out of *light* by refraction, which are not commixed in it before; since refraction, as was before observed, changes not the qualities of the rays, but only separates those which have divers qualities, by means of their different refrangibility. Eighthly, The sun's *light* is an aggregate of homogeneous colours; whence homogeneous colours may be called *primitive*, or *original*.

We have already observed that the rays of *light* are composed of dissimilar or heterogeneous parts; some of them being in all probability greater, others less. Now the smaller the parts are, by so much the more refrangible they are, i. e. they are so much the more easily diverted out of their rectilinear course; and those parts which differ in refrangibility, (consequently in bulk) he has also observed, differ in colour.

Hence arises the whole theory of colours: Those parts, *v. gr.* which are the most refrangible, constitute violet colour; that is, the most minute particles of *light*, when separately impelled on the organ, do there excite the shortest vibrations in the retina, which are thence communicated by the solid part of the optic nerve in the brain, and excite in us the sensation of violet colour, the dimmest, and most languid of all colours: and those particles, on the contrary, which are the least refrangible, constitute a ray of a red colour; i. e. the greatest particles of *light*, excite the longest vibrations in the retina, and so convey the sensation of a red colour, as being the most bright and vivid of all others. The other particles being distinguished into little rays, according to their respective magnitudes and degrees of refrangibility, excite intermediate vibrations, and so occasion sensations of the intermediate colours; in like manner as the vibrations of the air, according to their different magnitudes, excite sensations of different sounds.—The colours then of these little rays, not being any adventitious modifications of them, but connate, primitive, and necessary properties, resulting, in all probability, from their different magnitudes, must be perpetual, and immutable, not to be altered by any reflection, refraction, or other subsequent modification.

For the doctrine of the colours of *Light*, see COLOUR.

For the manner in which *Light* affects our senses, and how it contributes to vision, see VISION.

Light is also used, to signify the disposition of objects, with regard to the receiving of *light*.

Thus we say, a painting is seen in its proper *light*, when its situation, with regard to the *light*, is the same with that for which it was painted.

Lights aboard Ships. See the article SIGNALS.

Lights, in architecture, denote doors, windows, and other places through which the air, and *light* have a passage.

In the pantheon, all the *light* comes from on high; it has no *lights* but in the dome. See PANTHEON.

Lights, in painting, are those parts of a piece, which are illuminated, or, that lie open to the luminary by which the piece is supposed to be enlightened; and which, for this reason, are painted in bright vivid colours.

In this sense, *light* is opposed to *shadow*.

Light is also used, for the luminous body that emits it.—There are various kinds of *lights*; *general lights*, as the air; *particular lights*, as a fire, a candle, and even the sun.

Different *lights*, have very different effects on a picture, and occasion a difference in the management of every part.—A great deal therefore depends on the painter's chusing a proper *light* for his piece to be illuminated by, and a great deal more, in the conduct of the *lights* and *shadows*, when the luminary is pitched upon.

The strength and relievè of a figure, as well as its gracefulness, depends entirely on the management of the *lights*, and the joining of those to the *shadows*.

The *light* a figure receives, is either direct, or reflected, to each of which, special regard must be had.—The doctrine of *lights*, and *shadows*, makes that part of painting, called *clair-obscur*.

Light-House. See the article PHAROS.

Light-Horse, an ancient term in our English customs, signifying an ordinary cavalier, or horseman lightly armed, and so as to enter a corps, or regiment; in opposition to the men at arms, who were heavily accoutred, and armed at all points.

Light Species. See the article SPECIES.

LIGHTER, a large broad boat, or floating vessel, which goes with sails, and oars; common on the river Thames; where it is used for the carriage of timber, coals, ballast, &c.

Lighters are of several kinds; as,

A ballast gin,	A close <i>lighter</i> ,	A kiele,
A camel,	A hoy,	An open <i>lighter</i> .

LIGHTNESS. See the article LEVITY.

LIGNEA Cassia. See the article CASSIA.

<i>LIGNUM Aloe</i> , or wood of <i>Aloe</i> .	} See {	ALOES.
<i>LIGNUM Bahami</i> .		BALSAM.
<i>LIGNUM Cassia</i> .		CASSIA.

LIKE Quantities, in algebra, are those which are expressed by the same letters, under the same power, or equally repeated in each quantity.

Thus $2b$, and $3b$; and $9ff$, and $3ff$, are *like quantities*; but $2b$, and $3b^2$; and $9ff$, and $3fff$, are *unlike ones*, because the quantities have not every where the same dimensions, nor are the letters equally repeated.

LIKE Signs, or *Symbols*, in algebra, are when both are affirmative, or both negative.

If one be affirmative, and the other negative, they are *unlike signs*.

Thus $+64d$, and $+5d$, have *like signs*; but $+9f$, and $-7f$, have *unlike signs*.

LIKE Figures, in geometry, are such as have their angles equal, and the sides about those equal angles proportional. See FIGURE.

LIKE Arches, in the projection of the sphere in plano, are parts of lesser circles, containing an equal number of degrees with the corresponding arches of greater ones.

LIKE Solid Figures, in geometry, are such as are contained under *like planes*, equal in number.

LIMB, *LIMBUS*, the outermost border, or graduated edge of an astrolabe, quadrant, or the like mathematical instrument.

The word is also used for the primitive circle in any projection of the sphere in plano.

LIMB, also signifies the outermost border, or edge of the sun or moon, when the middle or disc is hid in an eclipse of either luminary.

Astronomers observe the lower and the upper *limb* of the sun, in order to find its true height, which is that of its centre.

LIMB is also used among botanists for the outer edge, or border of plants, their leaves, and flowers.

LIMBECK. See the article ALEMNIC.

LIMBUS, or *LIMB*, is a term in the Romish theology, used for that place where the patriarchs are supposed to have waited for the redemption of mankind, and where they imagine our Saviour continued from the time of his death, to that of his resurrection.

Dr Cange says, the fathers called this place *limbus*, or *quasi limbus inferorum*, as being the margin or frontier of the other world.

LIMBUS, is also used by Catholics for the place destined to receive the souls of infants, who die without baptism; who have not deserved hell, nor dying in innocence; nor yet are worthy of heaven, because of the imputation of original sin.

LIME, *calc. of stone*, a white, soft, friable substance, prepared of stone, marble, chalk, or some other stony substance, by burning in a kiln.

The great use of *lime* is in the composition of mortar for building; the fire taking away all its humidity, and opening its pores, so that it becomes easily reducible to powder, and mixible with sand.

Quick LIME, is that such as it comes out of the kiln, or furnace.

Slaked LIME, is that diluted, or drenched in water, and reserved for the making of mortar.

The best *lime*, is that made of the hardest, firmest, and whitest stones; and which is slaked at its coming out of the furnace.

Sir H. Wotton looks on it as a great error in the English, to make *lime* as they do, of refuse, and stuff without any choice; whereas the Italians, at this day, and much more the ancients, burnt their firmest stones, and even fragments of marble, where it was plentiful; which, in time, became almost marble again for its hardness, as appears in their standing theatres, &c.

We have two kinds of *lime* in common use in England; the one made of hard stone, the other of a soft, calcareous, or chalky stone; whereof the former is much the strongest.—That made of soft stone, or chalk, is fittest for plastering of ceilings and walls within doors; and that made of hard stones, for buildings, and for plasterings without doors.

Good *lime* may also be made of mill stone, not coarse and sandy, but fine and greasy; as also of all kinds of flints; though it is hard to burn them, unless in a reverberatory furnace, as being apt to run to glass.

Dieuffant recommends *lime* made of sea-shells as the best; but Goldman finds fault with it, as being impatient of moisture, and therefore easily peeling off from the outside of walls: it is however, the common *lime* used in the Indies.

Before the stones be thrown into the kiln, they are to be broke in pieces; otherwise the air contained in their cavities, too much expanded by the heat, makes them fly with too much violence, as to damage the kiln.—According to Alberti, and Palladio, *lime* will not be sufficiently burnt in less than sixty hours intense heat.

The marks of a well-burnt *lime*, according to Alberti, are, that its weight be to that of the stone in a sesquialterate proportion; that it be white, light, and sonorous; that when slaked, it stick to the sides of the vessel.—To which Boeckler adds, that when slaked it send forth a copious thick smoke; and Dieuffant, that it need a great deal of water to slake it. To preserve *lime* several years, slake, and work it up; dig a pit under ground, into which let it pass through a hole open at the bottom of the vessel. As soon as the pit is full, cover it up with sand, to prevent its drying; thus keeping it moist till it be used.—Boeckler gives another method: Cover a stratum of *lime* two or three foot high with another of sand of the like height; pour on water enough to slake the *lime*, but not to reduce it to dust after slaking. If the sand cleave into chinks, as the smoke ascends, cover them up, so as no vent may be given thereto.—This *lime*, he adds, kept ten or twelve years, will be like glue; and will, further, be of particular use in painting on walls, as being no way prejudicial to the colours. See MORTAR.

Lime is much used by tanners, skinners, &c. in the preparation of their leather.

It is also of some medicinal use; being applied externally in deflervative, and epulotic medicines.

LIME-WATER is said to be an excellent remedy, taken internally: M. Burlet has an ample account of its effects, in the *French Memoirs*, chiefly from his own experience. But, he observes, it succeeded much better in Holland, &c. than in France.—It is a powerful alterant, and like a pure alkaline water, fitted to blunt and destroy acid ferments, which are the principles of all obstructions and the cause of most chronic diseases.—Its principal use is, in cachexies, green-sickness, dropsy, icterus, obstructions of the liver, spleen, &c.

It is made, by pouring six pounds of hot water on one of quick-lime, leaving them to soak, and macerate for the space of twenty four hours.

LIME-Stone, *lapis calcarius*, is a stone, of a coarse grain, which being burnt in a kiln, makes an ingredient in mortar, plaster, &c.

Bird-LIME. See the article BIRD-LIME.

LIMITATION of assize, in law, is a certain time set down by the statute, wherein a man must alledge himself, or his ancestors to have been seized of lands sued for by writ of assize: otherwise he cannot maintain his action.

LIMITED Problem, is that which admits but of one solu-

tion, or which can only be solved one way: as to make a circle pass through three points given, not lying in a right line; to describe an equilateral triangle on a line given, &c. See PROBLEM, and DETERMINATE.

LIMITROPHOUS Column. See the article COLUMN. **LIMITS of a Planet**, its greatest excursions, or distances from the ecliptic. See PLANET.

LIMNING, the art of painting in water-colours.

In which sense, *limning* stands contradistinguished from *painting*, properly so called, which is done in oil-colours.

Limning is much the more ancient kind of painting. Till a Flemish painter, one John van Eyck, better known by the name of John of Bruges, found out the art of painting in oil, the painters all painted in water, and in fresco, both on their walls, on wooden boards, and elsewhere.—When they made use of boards, they usually glued a fine linen cloth over them, to prevent their opening; then laid on a ground of white; and lastly, they mixed up their colours with water and size, or with water and yolks of eggs, well beaten with the branches of a fig-tree, the juice whereof, thus mixed with the eggs; and with this mixture they painted their pieces.

In *limning*, all the usual colours are proper enough, excepting the white made of lime, which is only used in fresco. But the azure, and ultramarine, must always be mixed up with size, or with gum, in regard the yolks of eggs give yellow colours a greenish tincture. But there are always applied two lays of hot size ere the colours, mixed even with size, are laid on: the composition made with eggs, and the juice of the fig-tree, being only used for touching up and finishing, and to prevent the necessity of having a fire always at hand to keep the size hot; yet it is certain, that the size-colours hold the best, and are accordingly always used in cartoons, &c.—This size is made of fibres of thin leather, or of parchment.

To *limn* on linen, they chuse that which is old, half worn, and close.—This they cover with white lead, or a fine plaster beaten up with size; which, once dry, they go over it with a layer of the same size.

The colours are all ground in water, each by itself; and in proportion, as they are required in working, are diluted with size-water.—If the yolks of eggs are desired, they dilute them with a liquor made of equal quantities of common water and vinegar, with the yolk, white, and shell of an egg, and the ends of the little branches of a fig-tree cut small, all well beaten together in an earthen pan.

If it be desired to varnish the piece when finished, they go over it with the white of an egg well beaten, and then with varnish.—This, however, is only to preserve it from the wet: for the great advantage of *limning* consists in its being without gloss; in regard all its colours, thus void of lustre, may be seen in all kinds of lights; which colours in oil, or covered with varnish cannot.

LINCOLNSHIRE Plough. See the article PLOUGH.

LINCTUS, a form of medicine, the same as *lambative lach*, and *elegma*. See LAMBATIVE.

LINE, in geometry, a quantity extended in length only, without either breadth or thickness.

A line is supposed to be formed by the flux or motion of a point.

There are two kinds of lines, viz. right lines, and curve lines.

If the point A move towards B, (*Tab. Geometry, fig. 1.*) by its motion it describes a line; and this, if the point go the nearest way towards B, will be a right or straight line, whose definition therefore is the nearest or shortest distance between any two points, or a line all whose points tend the same way.—If the point go any way about, as in one of the lines ACB, or A c B, it will trace out either a crooked line, as the upper ACB; or else two or more straight ones, as in the lower ACB.

Right Lines are all of the same species; but curves are of an infinite number of different species.—We may conceive as many as there are different compound motions, or as many as there may be different ratios between their ordinates and abscissas.

Curve Lines, are usually divided into geometrical, and mechanical.

Geometrical LINES, are those which may be found exactly, and securely, in all their points.

Mechanical LINES are those, some or all of whose points are not to be found precisely, but only tentatively or nearly.

Agreeably hereto, Des Cartes and his followers define geometrical lines those which may be expressed by an algebraic equation of a determinate degree.—Which equation is also called locus.

The same persons define mechanical lines, those which cannot be expressed by an equation of a determinate degree.

Others, considering that those called by Des Cartes mechanical lines, notwithstanding their not being of a determinate degree, are not less precise, and exact, and consequently not less

less geometrical than the others; it being this precision which constitutes the geometricity of the *line*: For this reason, they chuse rather to call those *lines* which are reducible to a determinate degree, *algebraical lines*; and those which are not *transcendental lines*.

Lines are also divided into those of the *first order*, *second order*, *third order*, &c. See *CURVE*.

Lines, considered as to their positions, are either *parallel*, *perpendicular*, or *oblique*: the construction and properties of each whereof, see under *PARALLEL*, *PERPENDICULAR*, &c.

Euclid's second book treats mostly of *lines*, and of the effects of their being divided, and again multiplied into one another.

<i>Circular LINES.</i>	} See the article	<i>CIRCULAR.</i>
<i>Converging LINES.</i>		<i>CONVERGING.</i>
<i>Diverging LINES.</i>		<i>DIVERGING.</i>
<i>Generating LINE.</i>		<i>GENERATING.</i>
<i>Helispherical LINE.</i>		<i>HELISPERICAL.</i>
<i>Hyperbolic LINE.</i>		<i>HYPERBOLIC.</i>
<i>Logistic LINE.</i>		<i>LOGISTIC.</i>
<i>Normal LINE.</i>		<i>NORMAL.</i>

Proportional LINES, the manner of constructing them, their properties, &c. See *PROPORTIONAL LINES*.

<i>Quadrature LINES.</i>	} See the article	<i>QUADRATURE.</i>
<i>Reciprocal LINES.</i>		<i>RECIPROCAL.</i>
<i>Robervalian LINES.</i>		<i>ROBERVALIAN.</i>
<i>Vertical LINE.</i>		<i>VERTICAL.</i>
<i>Measure of a LINE.</i>		<i>MEASURE.</i>

LINE, in geography, and navigation, is used by way of eminence for the equator, or equinoctial *line*.

The *line* in the heavens, is a circle described by the sun in his course on the 21st day of March, and the 21st of September.—The *line* on the earth, is an imaginary circle, answering to that in the heavens.—It divides the earth, from east to west, into two equal parts, and is at an equal distance from the two poles; so that those who live under the *line*, have the poles always in their horizon.

The latitudes commence from the *line*.

The seamen use to christen their fresh men, and passengers, the first time they cut the *line*.

LINE of the *Apsides*, in astronomy, is the *line* which joins the apses; or it is the greater axis of the orbit of a planet. See *APSIDES*.

Fiducial LINE, the *line* or ruler which passes through the middle of an astrolabe, or the like instrument; and on which the sights are fitted: otherwise called *albiadae*, *index*, *dioptra*, and *mediclinium*.

Horizontal LINE, a *line* parallel to the horizon. See *HORIZON*.

<i>Isochronal LINE.</i>	} See the article	<i>ISOCHRONAL.</i>
<i>Meridian LINE.</i>		<i>MERIDIAN.</i>

LINE of the *Nodes*, in astronomy, is the *line* which joins the nodes of the orbit of a planet; or the common section of the plane of the orbit with the plane of the ecliptic.

Geometrical LINE, in perspective, is a right *line* drawn in any manner on the geometrical plane.

Terrestrial LINE, or *fundamental line*, in perspective, is a right *line*, wherein the geometrical plane, and that of the picture, or draught, intersect one another.

Such is the *line* N I, (*Tab. Perspective*, fig. 12.) formed by the intersection of the geometrical plane L M, and the perspective plane, H L.

LINE of the *Front*, in perspective, is any right *line* parallel to the terrestrial *line*.

Vertical LINE, is the common section of the vertical, and of the draught.

Visual LINE, is the *line*, or ray, imagined to pass from the object to the eye.

LINE of *Station*, in perspective, according to some writers, is the common section of the vertical and geometrical planes. Others mean by it, the perpendicular height of the eye above the geometrical plane; others, a *line* drawn on that plane, and perpendicular to the *line* expressing the height of the eye.

Objective LINE, in perspective, is any *line* drawn on the geometrical plane, whose representation is sought for in the draught, or picture.

LINE of *Distance*. See the article *DISTANCE*.

Horizontal LINE, in dialling, is the common section of the horizon, and the dial plane. See *HORIZONTAL*.

Hourly LINES, or *Hour lines*, are the common intersections of the hour circles of the sphere, with the plane of the dial. See *HORARY*, and *Hour Lines*.

Subsolar LINE, is that *line* on which the style or cock of a dial is erected, and is the representation of such an hour circle, as is perpendicular to the plane of that dial.

Equinoctial LINE, in dialling, is the common intersection of the equinoctial, and the plane of the dial.

Contingent LINE. See the article *CONTINGENT*.

<i>Dialling LINES.</i>	} See the article	<i>DIALLING.</i>
<i>Meridian LINE.</i>		<i>MERIDIAN.</i>
<i>Vertical LINE.</i>		<i>VERTICAL.</i>

LINE of *Measures*, is used by Oughtred to denote the diameter of the primitive circle in the projection of the sphere in plano, or that *line* in which the diameter of any circle to be projected falls.

In the stereographic projection of the sphere in plano, the *line* of *measures* is that *line* in which the plane of a great circle, perpendicular to the plane of the projection, and that oblique circle which is to be projected, intersects the plane of the projection; or it is the common section of a plane, passing through the eye-point, and the centre of the primitive; and at right angles to any oblique circle, which is to be projected, and in which the centre and pole of such circle will be found.

LINE of *Direction*, in mechanics, is that wherein a body either actually moves, or would move if it were not hindered.

The term is also used to signify the *line* that passes through the centre of gravity of the heavy body to the centre of the earth; which must also pass through the fulcrum, or support of the heavy body; without which it would fall.

LINE of *Gravitation* of an *heavy Body*, is a *line* drawn through its centre of gravity, and according to which it tends downwards.

LINE of the *swiftest Descent* of an *heavy Body*, is a *line* wherein the body will fall the swiftest from one point to another. or, it is that curve which a body would describe in its descent, if it moved the swiftest possible.

LINE of a *Projectile*. See the article *PROJECTILE*.

LINES on the *plain Scale*, are the *line* of chords, *line* of sines, *line* of tangents, *line* of secants, *line* of semi-tangents, *line* of leagues.—The construction and application whereof, see under the word *SCALE*, *SAILING*, &c.

LINES on *Gunter's Scale*, are the *line* of numbers, *line* of artificial lines, *line* of artificial tangents, *line* of artificial versed sines, *line* of artificial lines of rhumbs, *line* of artificial tangents of the meridian *line*, and *line* of equal parts. The construction and application whereof, see under the word *GUNTER'S Scale*.

LINES of the *Sector*, are the *line* of equal parts, or *line* of lines; *line* of chords, *line* of sines, *line* of tangents, *line* of secants, *line* of polygons, *line* of numbers, *line* of hours, *line* of latitudes, *line* of meridians, *line* of metals, *line* of solids, *line* of planes. The construction and use whereof, see under the word *SECTOR*.

LINE, in fortification, is sometimes taken for a ditch, bordered with its parapet; and sometimes for a row of gabions, or sacks of earth, extended lengthwise on the ground, to serve as a shelter against the enemies fire.

When the trenches were carried on within thirty paces of the glacis, they drew two *lines*, one on the right, and the other on the left, for a place of arms.

Fundamental LINE, is the first *line* drawn for the plan of a place, and which shews its area.

Capital LINE, is that which is drawn from the point where the two demi-gorges meet, to the point of the bastion.

Central LINE, is that drawn from the angle of the centre, to that of the bastion.

LINE of *Defence*, is that which represents the course or flight of the bullet of any sort of fire-arms, more especially of a musket-ball, from the place where the musketeer must stand to scour, and defend the face of the bastion.

LINE of *Defence* *flchant*, is that drawn from the angle of the curtain to that of the opposite bastion; without touching the face of the bastion.

This must never exceed 800 feet, which they reckon the distance at which a musket-ball will do execution.

LINE of *Defence* *vazant*, is that drawn from the point of the bastion along the face, till it come to the curtain; and shews how much of the curtain will clear or scour the face.

This is also called the *line* of *defence* *stringents*, or *flanking*.

LINE of *Approach*, or *Attack*, signifies the work which the besiegers carry on under covert, to gain the moat, and the body of the place.

LINE of *Circumvallation*, is a *line* or trench cut by the besiegers, within cannon-shot of the place, which ranges round their camp, and secures its quarters against any relief to be brought the besieged.

LINE of *Contravallation*, is a ditch bordered with a parapet, which serves to cover the besiegers on the side of the place, and to stop the sallies of the garrison.

LINES of *Communication*, are those which run from one work to another.—See *Tab. Fortif.* fig. 21. n. 2. 2. &c. see also *COMMUNICATION*.—But

The *LINE* of *Communication*, more especially so called, is a continued trench, with which a circumvallation, or contravallation is surrounded; and which maintains a communication with all its forts, redoubts, and tenailles.

LINE of the Base, is a right *line*, which joins the points of the two nearest bastions.

To LINE a work, signifies to face it, chiefly with brick or stone: *e. gr.* to strengthen a rampart with a firm wall, or to encompass a parapet or moat with good turf, &c.

LINE, in the art of war, is understood of the disposition of an army, ranged in order of battle; with the front extended as far as may be, that it may not be flanked.

An army usually consists of three *lines*; the *first* is the front, van, or advance guard; the main body forms the *second*, in which is the general's post; the *third* is a reserved body, or rear guard.

It is a rule, to leave 150 paces distance between the first *line* and the second, and twice as much between the second and third, to give room for rallying.

LINE, or LINE of battle, is also applied to the disposition of a fleet on the day of engagement; on which occasion, the vessels are usually drawn up, as much as possible, in a straight *line*, as well to gain and keep the advantage of the wind, as to run the same board.

Ship of the LINE, is a vessel large enough to be drawn up in the *line*, and to have a place in a sea-fight. See **SHIP**.

LINE of Demarcation, or Alexandrian LINE, is a meridian passing over the mouth of the river Maragnon, and by the capes of Houmas and Malabrigo; so called from pope Alexander VI. who, to end the disputes between the crowns of Castile and Portugal, about their boundaries, in 1493, drew an imaginary *line* on the globe, which was to terminate the pretensions of each. By which partition, the East-Indies fell to the lot of the Portuguese; and the West-Indies, then newly discovered, to the Castilians.

Bowling-LINE.	} See the article	BOWLING.
Bunt-LINE.		BUNT-LINES.
Crane-LINES.		CRANE-LINES.
Furling-LINES.		FURLING-LINE.
Log-LINE.		LOG-LINE.
Rat-LINES.		RAT-LINE.
Rhumb-LINE.		RHUMB-LINE.
Water-LINE.		WATER-LINE.

LINE, in fencing, is that part of the body directly opposite to the enemy, wherein the shoulders, the right arm, and the sword ought always to be found; and wherein are also to be placed the two feet, at the distance of 18 inches from each other.

In this sense, a man is said to be in his *line*, to go out of his *line*, &c.

LINE, in genealogy is a series or succession of relations in various degrees, all descending from the same common father.

Direct LINE, is that which goes from father to son; which is the order of ascendants and descendants. See **DIRECT**.

Collateral LINE, is the order of those who descend from some common father related to the former, but out of the *line* of ascendants, and descendants.—In this are placed uncles, aunts, cousins, nephews, &c.

LINE also denotes a small French measure, containing the 12th part of an inch, or 144th part of a foot. See **INCH**, &c.

The geometricians, notwithstanding its smallness, conceive the *line* subdivided into six points.

The French *line* answers to the English barley-corn.

Angling LINE.	} See the article	ANGLING, and FLOTE.
Gauge LINE.		GAUGE.
Plumb LINE.		PLUMB.
Rear LINE.		REAR.

White LINE, in printing. } See the article { **WHITE**.

LINE, linum, in agriculture, &c. } See the article { **FLAX**.

EINEA * *Alba* in anatomy, the concourse of the tendons of the oblique and transverse muscles of the abdomen; dividing the abdomen in two, in the middle.

* It is called *linea*, line, as being straight; and *alba*, from its colour, which is white.

The *linea alba* receives a twig of a nerve from the intercostals in each of its digitations or indentings, which are visible to the eye, in lean persons especially.

LINEA Mediana. See the article **MEDIANA**.

LINEAL Descent. } See the article { **DESCENT**.

LINEAL Exegesis. } See the article { **EXEGESIS**.

LINEAMENT, a fine stroke or line observed in the face, and forming the delicacy thereof; being that which preserves the resemblance, and occasions the relation of likeness or unlikeness to any other face.

It is by these, that physiognomists pretend to judge of the temper and manners of people.

LINEAMENT is also used by the painters for the out-line of a face. See **CONTOUR**.

LINEANS Punctum. See the article **PUNCTUM**.

LINEAR Problem, in mathematics, is that which may be solved geometrically, by the intersection of two right lines.

E. gr. To measure an inaccessible height by the means of two unequal sticks, &c.

This is also called a *simple problem*, and is capable but of one solution. See **PROBLEM**.

LINEAR Numbers, are such as have relation to length only. See **NUMBER**.

Such, *e. gr.* is a number which represents one side of a plane figure. If the plane figure be a square, the *linear number* is called a *root*.

LINED Meat. See the article **MOAT**.

LINEN-Mills. } See the article { **MILL**.

White LINEN. } See the article { **WHITE**.

Bleaching of LINEN. } See the article { **BLEACHING**.

LINGOT, or INGOT. See the article **INGOT**.

LINGUA, in anatomy. See the article **TONGUE**.

LINGUÆ Frænum. } See the article { **FRÆNUM**.

LINGUÆ Medietas. } See the article { **MEDIETAS**.

LINIMENT *, **LINIMENTUM**, a form of external medicine, made of unctuous substances, used to rub on any disordered part.

* The word comes from the Latin *linire*, to anoint gently.

The *liniment* is of a mean consistence, between an oil and an unguent.

The use of *liniments* is to soften asperities of the skin, moisten parts that need humectation, resolve the humours that afflict the patient, and give him pain.—There are various kinds of *liniments* used, according to the various occasions.

LINE-SEED, or LINE-SEED, a sort of grain which enters the composition of several medicines, and yields, by expression, an oil, that has most of the qualities of nut-oil, and is accordingly sometimes used in lieu thereof in painting, and to burn.

That drawn without the assistance of fire, is of much esteem in medicine, and supposed good in the cure of catarrhs, coughs, asthma's, and other diseases of the breast, &c.

LINE-STOCK, a short staff of wood, about three foot long, having at one end a piece of iron divided into two branches, each of which has a notch to hold a piece of match, and a screw to fasten it there; the other end being also fluted with iron, and pointed, to stick into the ground.—It is used by the gunners in firing cannon.

LINTEL, in architecture, the piece of timber which lies horizontally over door-posts, and window-jambs; as well to bear the thickness of the wall over it, as bind the sides of the walls together.

LINUM Catharticum, or mountain-flax, a medicinal plant, much used by the common people; being a rough harsh purge, and powerful detergent, an evacuator of viscid and watery humours from the most remote lodgments; which makes some fond of it in rheumatisms: but it is only fit for robust constitutions.

LINUM Vivum, or Incombustibile, a fossil, stony substance, of a whitish colour and woolly texture, separable into threads, or filaments, capable of being spun, and wove into a sort of cloth, which will endure the fire without consuming.

This is the same with what is otherwise called *lapis amianthus*, or *asbestos*; sometimes, *salomander's wool*, also *linum fassile*, *linum Indicum*, *Creticum*, *Cyprium*, &c.

As to the art of managing this mineral, and of spinning and weaving it, &c. the accounts we have are various.—Signior Castagnata, superintendent of some mines in Italy, gives us the art of reducing it either into a very white skin, or a very white paper either of which resists the most violent fire.

Marco Polo, the Venetian, gives us the manufacture of the *linum*, found in the province of Chinchintheas in Tartary, from one Curiscar a Turk, superintendent of the mines of that country, as follows.—The lanuginous mineral, being first dried in the sun, is then pounded in a brass mortar, and the earthy part separated from the woolly, which is afterwards well washed from filth; being thus purged, it is spun into thread like other wool, and after wove into cloth, which, if foul or spotted, they cleanse, he says, by throwing it into the fire for an hour's time, whence it comes out unharmed as white as snow: Which very method, according to the account given us by Strabo, seems to have been used, in ordering the Cretan amianthus; with this addition, that after it was pounded, and the earthy part separated from the woolly, he says it was combed; and so does Agricola.

Signior Campani, after describing four sorts of the *linum*, whereof he had specimens in his museum; the first sent him from Corfu, the second from Sestri di Ponente, the third coarser and darker than the rest, and the fourth from the Pyreneans; and after observing, that though he kept it three weeks in a glass-house fire, yet he found it unaltered, though it could not preserve a stick, wrapped in it, from the fire: he proceeds to shew the manner of spinning it, and making it into cloth, which he effected thus:—He first laid the stone in water, if warm the better, for some time to soak; then opened and divided it with his hands that the earthy parts might fall out of it, which are whitish like chalk, and serve to bind the thready parts together. This makes the water thick, and milky. That operation he repeated six or seven times,

times, with fresh water, opening and squeezing it again, and again till all the heterogeneous parts were washed out, and then the flax-like parts were collected, and laid in a sieve to dry.

As to the spinning, he first shews a method discovered to him, which is thus.—Lay the *linum*, cleaned as before, between two cards, such as they card wool withal, where let it be gently carded, and then clapped in between the cards, so that some of it may hang out of the sides; then lay the cards fast on a table, or bench; take a small reel, made with a little hook at the end, and a part to turn it by, so that it may be easily turned round. This reel must be wound over with white thread: then having a small vessel of oil ready, with which the fore-finger and thumb are constantly to be kept wet, both to preserve the skin from the corrosive quality of the stone, and to render the filaments thereof more soft and pliant; by continuing to twist about the thread on the reel in the asbestos hanging out of the cards, some of the latter will be worked up together in it; and, by little and little, the thread may, with care, be woven into a coarse sort of cloth; and, by putting it into the fire, the thread and oil will be burnt away, and the incombustible cloth remain. But finding this way, of uniting the stone with the thread, very tedious, instead of the thread, he put some flax on a distaff, and, by taking three or four filaments of the asbestos, and mixing them with the flax, he found they might be easily twisted together, and the thread thus made much more durable and strong; so that there is no need of carding, which rather breaks the filaments, than does any good: only open and separate the filaments after washing, on a table, and take them up with the flax, which is sufficient.

As to the making of paper, he says, in the washing of the stone there will remain several short pieces in the bottom of the water, of which paper may be made in the common method.

He concludes with the best way of preserving the cloth, or any thing made of the linen, which, by reason of its excessive dryness, is very apt to break and twist; and it consists in keeping it always well oiled, which is the only preservative.—When the cloth is put in the fire, the oil burns off, and the cloth comes out white and purified. See Supplement: article ASBESTUS, and LINUM INCONCHUSTIBILE.

LIONCELES, in heraldry, a term for lions, when there are more than two of them born in any coat of arms, and no ordinary between them.

LIPOTHYMIA*, or **LIPOSYCHIA**, in medicine, a sudden diminution, or failure of animal and vital actions; otherwise called a *fainting*, or *deliquium*.

* The word *lipothymia* comes from the Greek λιπομαι, *deficio*, and θυμη, *animus*; and *liposychia* from λιπος, and ψυχη, the soul.

In the *lipothymia* the pulse is very faint; the senses, both internal and external, and the animal motions, both voluntary and natural, extremely weakened, and the respiration scarce visible.

The ordinary causes of the *lipothymia*, are great losses of blood, excessive evacuations, immoderate exercise, gross hot air, such as that in the midst of crowds of people, &c.

LIPPITUDO, is used by Celsus, for a disease of the eyes, otherwise called *ophthalmia*. See **OPHTHALMIA**.

LIPPITUDO, is also used by modern writers, for a disorder particularly called *blear-eyed*; arising from a decay of the natural moisture of the eyes, which then feel dry, and appear red and angry. See **SCLEROPHTHALMIA**.

LIPS, *Labia*, the edge, or exterior part of the mouth; or that muculous extremity, which shuts and covers the mouth, both above and below.

The *lips*, besides the common integuments, consist of two parts, the exterior, hard, and muculous; the interior, soft, spongy, and glandulous, covered with a fine membrane, the fore and protuberant parts of which are red, and called *prolabia*.—Authors generally content themselves, with calling the substance of this part, spongy; but, in reality, it is glandulous, as appears by the strophulous, and cancerous humours, to which it is subject.—The muscles, of which the outer parts of the *lips* consist, are either common to them with other parts, or proper; the common are the third pair of the nose, the subcutaneous, and the buccinator.

The *lips* have six pair of muscles peculiarly belonging to them, and an odd one; of these, three are peculiar to the upper and under *lips*, the other three, and the single one, are common to both *lips*: the peculiar are, the *attollens labium superius*, *deprimens labium inferius*, *attollens labium inferius*; the three common pair are, the *zygomaticus*, the *depressor labiorum*, the *attollens labium*; and the odd one, *orbicularis*; which see.

All these parts are served with blood, by some branches of the carotids, which the veins carry back to the external jugulars.—Their nerves come from the fifth, sixth, and eighth pair of the head, and some from the par acessorium. The *lips* have a great share in the action of speech, and are of good use in taking in the food, &c.

LIPS, is also applied to the two extreme parts of the pudendum muliebre; between which is the rima, or fissure of the part. There are more peculiarly called *labia pudendi*; being soft,

oblong bodies; of a peculiar substance, not found in any other part of the body.

LIPS are also used, to signify the two edges of a wound.

LIQUEFACTION, an operation, by which a solid body is reduced into a liquid; or the action of fire or heat, on fat, and other fusible bodies, which puts their parts into a mutual intestine motion.

The *liquefaction* of wax, &c. is performed by a moderate heat; that of sal tartari, by the mere moisture of the air: all salts *liquify*; sand, mixed with alkalis, becomes *liquified* by a reverberatory fire, in the making of glass. See **GLASS**. In speaking of metals, instead of *liquefaction*, we ordinarily use the word *fusion*.

LIQUET. See the article **NON LIQUET**.

LIQUID, a body which has the property of fluidity; and besides that, a peculiar quality of wetting other bodies immersed in it, arising from some configuration of its particles, which disposes them to adhere to the surfaces of bodies contiguous to them.

Density of LIQUIDS.]

LIQUID Amber.

LIQUID Confetti.

LIQUID Laudanum.

LIQUID Measures.

LIQUID Storax.

LIQUID Sulphur.

[DENSITY.

AMBER, and BALSAM.

CONFECTS.

See LAUDANUM.

MEASURE.

STORAX.

SULPHUR.

LIQUID, among grammarians, is a name applied to certain consonants opposed to *mutes*.

L, m, n, and r, are *liquids*. See **L, M, N, &c.**

LIQUIDATE an action. See the article **ACTION**.

LIQUIDATION, the act of reducing, and ascertaining, either some dubious disputable sum, or the respective pretensions, which two persons may have to the same sum.

LIQUOR. See the article **DRINK, FLUID, &c.**

Stygian LIQUORS.

See the article **STYGIAN LIQUORS**.

Clearing of LIQUORS.

See the article **CLEARING**.

LIQUORICE, **LIQUORITTA**, called also *glycyrrhiza*, and *radix dulcis*, a sweet tasted root, of considerable use in medicine, against coughs, and other distempers of the breast and lungs. The plant which bears it, is cultivated in divers parts of England, particularly about Pontefract in Yorkshire; and in some provinces of France, Spain, Germany, and Minor-Asia; and especially in Persia, where it thrives better than any where else; there being some on the banks of the Carasu, Konia, and Karnirpa, whose roots are thicker than the stem; and whose juice, in respect of strength, virtue, &c. is greatly preferable to others. The root of the *liquorice* plant runs, or spreads a great way in the ground, and emerging into air from place to place produces so many new stems, or plants, few of which rise above five feet high. Its leaves are thick, green, shining, roundish, and glutinous; its flowers red, like the hyacinth; and its seed contained in roundish pods.

In the culture, care must be taken to have a warm, light, rich soil, or to amend it with manure: they plant it in trenches, three spits deep, in February, and March, usually in rows, at a foot distance from each other.—The parts chose for this purpose, are sets from the top of the plant, or the very top of the root; or else the runners that spread from the master-root.—In moist weather the branches may also be slipped and planted.

The roots are taken up about November, or December, after they have stood three summers in the ground; for then the *liquorice* weighs most, and will keep with less loss: not but that there is a continual diminution in this respect, from the first taking it up.

New, green *liquorice* should be chose smooth, and even, about the thickness of the middle finger, rudly without, yellowish within, easy to cut, and of an agreeable smell.

This root being boiled a long time in water, till the fluid has got a deep, yellow tincture; and the water, at length evaporated over a moderate fire; there remains a black, solid sediment, which we also call *liquorice*, or *liquorice juice*, or sometimes *Spanish juice*.

Chuse it black without side, and of a shining black within; easy to break, and of an agreeable taste.—The whitish, and yellowish *liquorice* juices are good for nought; being usually no other than compositions of sugar, starch, a little gum tragacanth, and *liquorice* powder.

The native *liquorice* juice is very sweet upon the palate, even more than sugar, or honey; and is yet accounted a great quencher of thirst; on which account Galen prescribes it in dropsies. It is very balsamic, and detergent; inasmuch that there is scarce any medicinal composition for diseases of the breast, but it is an ingredient in.

LIST*, in the manufactures, denotes the border of a stuff, or that which bounds its width on each side.

* Dr Cæge derives the word from *lister*, which, in the age of corrupt Latin, was used for the inclosures of fields, and cities, as being anciently made with cords interwaved; or from *lister*, quia campum caudibant instar listarum parvi; as inclosing the ground after the manner that a list does a piece of cloth.

All cloths, and stuffs of silk, wool, or cotton, have *lists*: *lists* contribute to the goodness of the stuff, and further serve

to shew their quality; which has given occasion to several regulations relating to their matter, colour, work, &c.

LIT is also used, to signify the inclosed field, or ground where-in the ancient knights held their jousts and combats.

It was so called, as being hemmed round with pales, barriers, or stakes, as with a list.

Some of these were double, one for each cavalier; which kept them apart, so that they could not come nearer each other, than a spear's length. See **TURNAMENT**, and **DUEL**.

LIST, **LISTEL**, or **LISTELLO**, in architecture, called also *cintrure*, *fillet*, *square*, and *reglet*; is a little square moulding, serving to crown, or accompany larger mouldings; and, on occasion, to separate the flutings of columns.

LISTENING, according to Rohault, this consists in extending, or bracing the tympanum of the ear, and putting it into such a condition, as that it shall be the more affected by any tremulous motion of the external air. See **EAR**.

LISTENING Trumpet. See the article **TRUMPET**.

LITANY*, an old church term, applied to the processions, prayers, and supplications used for appealing the wrath of God, averting his judgments, or procuring his mercies.

* The word comes from the Greek *Λησις*, supplication; of *Λησις*, I beseech.—Pezion would go further, and derive the *Λησις*, or *Λησις*, of the Greeks, from the Celtic *lit*, feast, solemnity.

Ecclesiastical authors, and the Roman order, by the word *litany*, usually mean the people who compose the procession, and assist at it; and Du Cange observes, that the word antiently signified *procession*. See **PROCESSION**.

Simon of Thessalonica mentions, that in the antient *litany*, the people went out of the church, to denote the fall of Adam; and returned into it again, to shew the return of a pious soul to God, by repentance.

On occasion of a plague that ravaged Rome, in the year 590, pope Gregory appointed a *litany*, or procession, consisting of seven bands, or companies, who, marching from the several churches of the city, met at S. Mary Major.—The first company consisted of the clergy; the second of abbots, with their monks; the third of abbesses, with their nuns; the fourth of children; the fifth, of laymen; the sixth, of widows; and the seventh, of married women.—And from this general procession, that of S. Mark, called the *grand litany*, is judged to have taken its rise.

LITANY, in a modern sense, denotes a form of prayer, sung or said in churches; consisting of several periods, or articles; at the end of each whereof is an invocation in the same terms.

LITERAL Algebra. } See the article { **ALGEBRA**.
LITERAL Character. } **CHARACTER**.

LITERALIS Calculus. See the article **CALCULUS**.

LITERARY Criticism. See the article **CRITICISM**.

LITERATI, *Littrados*, lettered, an epithet given to such persons among the Chinese, as are able to read, and write their language.

The *littrati* alone, are capable of being made mandarins.

LITERATI, is also the name of a particular sect, either in religion, philosophy, or politics; consisting principally of the learned men of that country: among whom it is called *Jukias*, i. e. learned.

It had its rise in the year of Christ 1409; when the emperor, to awaken the native affection of the people for knowledge, which had been quite banished by the preceding civil wars among them, and to stir up emulation among the mandarins, chose out forty two of the ablest among their doctors, to whom he gave a commission to compose a body of doctrine, agreeable to that of the antients, which was then become the rule or standard of the learned.—The delegate, applied themselves to the business, with a world of attention; but some fancied them rather to have wrestled the doctrine of the antients, to make it consist with theirs, than to have built up theirs on the model of the antients.

They speak of the Deity, as if it were no more than mere nature, or the natural power or virtue that produces, disposes, and preserves the several parts of the universe. It is, say they, a pure, perfect principle, without beginning or end; it is the source of all things, the essence of every being; and that which determines it to be what it is.—They make God the soul of the world; they say, he is diffused throughout all matter, and produces all the changes that happen there. In short, it is not easy to determine, whether they resolve God into nature, or lift up nature into God; for they ascribe to it many of those things which we attribute to God.

This doctrine, in lieu of the idolatry that prevailed before, introduced a refined kind of atheism.—The work being composed by so many persons of learning and parts, and approved by the emperor himself, was received with infinite applause by all the people.—Many were pleased with it, in regard, it seemed to subvert all religion: others approved it, because the little religion that it left them, could not give them much trouble.—And thus was formed the sect of the *Littrati*; which consists of the maintainers, and adherents to this doctrine.

The court, the mandarins, and the persons of fortune and quality, &c. are generally retainers to it; but a great part of the common people still hold to their worship of idols.

The *littrati* freely tolerate the Mahometans, because they adore, with them, the King of heaven, and Author of nature; but they bear a perfect aversion to all sorts of idolaters among them; and it was once resolved to extirpate them. But the disorder this would have occasioned in the empire, prevented it: they now content themselves with condemning them, in general, as heretics; which they do solemnly every year at Pekin.

LITHARGE*, a metalline substance, formed of the spume of lead; used in the composition of plasters, to give them a due consistence.

* The word is Greek, *λίθαργος*, composed of *λίθος*, a stone, and *ἀργός*, silver.

Some authors speak of two kinds of *litharge*, the one *natural*, the other *artificial*.

Natural LITHARGE, they say is a mineral, sometimes found in lead mines, reddish, scaly, brittle, and somewhat resembling white lead.—This *litharge* is so exceeding rare, that the shops sell none but the

Artificial LITHARGE; which is of two kinds, viz. that of gold, and that of silver; or rather it is the same, with this difference, that the one has undergone a greater degree of fire than the other.

Indeed naturalists are not over-well agreed what the *artificial litharge* is: some consider it as a metallic scum, raised on the surface of lead, when melted; after having served to purify gold, silver, or copper.

Others consider it as a metallic foot, or smoke, arising from those metals mixed with the lead used in purifying them; which sticking to the top of the chimnies of furnaces, is there formed in a kind of scales.

Lastly, others consider it as the lead itself, used in refining of those metals, and especially copper; which last opinion appears the most credible; and the rather on account of the great quantities of these *litharges* brought from Poland, Sweden, and Denmark; where copper mines are much more frequent, than those of gold and silver.—The drossy or recrementitious parts, fixing to the sides of the test, are the *litharge*; and according to the degree of calcination, become of divers shades of a red colour. The deep is called *litharge of gold*, and the paler, *litharge of silver*.

Litharges are desiccative, detensive, and cooling; they make the consistence of several plasters.—The potters use them to give a beautiful gloss to their ware; and they are also used by painters, dyers, skinners, and glassers. When mixed with wine, they give it a bright spritely colour, but render it extremely unwholesome.

LITHIASIS, *Λιθιασμός*, in physic, the disease of the stone. See **STONE**, and **CALCULUS**.

LITHOCOLLAR, or **LITHOCOLLUM**, a cement used by the lapidaries, to fasten their precious stones, in order for cutting them.

* The word comes from the Greek *λίθος*, stone, and *κόλλησις*, glue.

It is composed of resin and brick-dust.—For diamonds, they use melted lead, putting them into it before it be quite cold. For other cements they mix marble-dust with strong glue; and to fasten their sparks, add the white of an egg, and pitch.

LITHOMARGA. See the article **MINERAL AGARIC**.

LITHONTHRIPTICS*, medicines proper to dissolve the stone in the bladder, and kidney. See **CALCULUS**, and **STONE**.

* The word comes from the Greek *λίθος*, stone, and *σπινδω*, I break.

LITHOTOMY, an operation in chirurgery, performed upon a human body, in order to extract the stone out of the bladder.

This is performed three several ways, viz. by the *small apparatus*, the *great apparatus*, and the *high apparatus*.

The first, is by cutting through the perineum near the future, on the left side, after the stone, by the fingers of the operator, has been brought to that part.—This is called *cutting upon the gripe*; but this is almost disused, by reason it subjects the patient to great hazards and inconveniences.

In the *great apparatus*, which is that ordinarily practised, after the patient is conveniently placed and bound, the operator introduces a proper instrument, through the urinary passage into the bladder, in order to search for the stone; which being found, that instrument is withdrawn, and another grooved one is introduced the same way; which bulging in the perineum, serves to direct the knife to the neck of the bladder. After the incision, a third instrument is thrust into the aperture, till it join the former that was last introduced through the urinary passage, at which time that is withdrawn, whilst this remains to guide the forceps directly into the bladder, to bring away the stone.—This way is called *cutting upon the staff*.

The third method, called also the *high operation*, first practised by Pct. Franco, has been since described, and strenuously pleaded

pleaded for by a surgical writer, Rosset, but it soon fell into oblivion; from which it was only recalled about the year 1719, by Mr. Douglas, a Surgeon of London, who collecting what scattered hints he could find relating to it, and improving them with his own observations, paved the way for its being brought into regular use, which before it never had been.—He was soon followed by Mr. Cheselden, and some others. Of 31 patients cut by them in this manner, in a few years 25 recovered.—It is true, Mr. Cheselden has since quitted this method for the lateral operation.—Of late years, the French have begun to adopt the high operation; and M. Morand, a Surgeon of Paris, has wrote a book on the subject, chiefly taken from the English writers. See *Hist. Acad. R. Scien. an. 1728. p. 36, seqq.*

The manner of proceeding herein, is this: After the bladder is injected with a sufficient quantity of warm water, and the patient conveniently placed, the operator slowly makes an incision above the os pubis, along the linea alba, till he gets sight of the bladder, into which he directly plunges his knife, and afterwards draws out the stone.

The advantages attending this method, are, That it is performed in a very short time; that the wound easily heals; that the dilaceration of parts frequent in the other ways, is prevented; and that there is no danger of the incontinentia urinae.—On the other hand, it is thought to be chiefly practicable upon young persons, and such as are lean; the wound in old and fat persons being apt to mortify: moreover, if the operator be not very cautious, he may easily let out the intestines.

To these may be added the *lateral operation*, invented by Frere Jaques, a religious of the third order of S. Francis, towards the close of the last century, and practised by him with great reputation in the Franche Comte. But this reputation it lost again at Paris; which, however, did not hinder M. Rau, anatomy professor at Leyden, from undertaking to rectify what was amiss in it: in which he succeeded, inasmuch that the method is now known by his name, which has taken place of that of the first inventor. See *Hist. Acad. R. Scien. an. 1699, p. 34, item, an. 1728, p. 38.*

LITTER*, *Lestica*, a kind of vehicle born upon shafts; antiently esteemed the most easy and genteel way of carriage.

* Du Cange derives the word from the barbarous Latin *listeria*, draw or bedding for beasts.—Others will rather have it come from *latus*, bed, there being ordinarily a quilt and a pillow to a litter; in the same manner as to a bed.

Pliny calls the *litter* the traveller's chamber: it was much in use among the Romans, among whom it was born by slaves, kept for that purpose; as it still continues to be in the East. The Roman *listeria*, made to be born by four men, was called *tetrachorum*; that born by six, *hexachorum*; and that born by eight, *octachorum*.

The invention of *litters*, according to Cicero, was owing to the kings of Bithynia: in the time of Tiberius they were grown very frequent at Rome; as appears from Seneca; and even slaves themselves were born in them, though never by more than two persons, whereas men of quality had six or eight.

LITTLE *Bairam*. } See the article { **BAIRAM**.
LITTLE *Captan*. } **CAPTAN**.
LITTLE *Alaji*. } **MASS**.

LITTORAL *Shells*, among writers of natural history, are such sea-shells as are always found near the shores, and never far off in the deep.

Those which are found in the bottom of the sea, remote from the shore, are called *pelagian*.

LITURGY*, denotes all the ceremonies in general, belonging to divine service.

* The word comes from the Greek *λειτουργία*, service, public ministry; formed of *λαός*, public, and *εργον*, work.

In a more restrained signification, *liturgy* is used among the Romanists to signify the mass; and among us the common-prayer.

All who have written on *liturgies* agree, that, in the primitive days, divine service was exceedingly simple, only clogged with a very few ceremonies, and consisting of but a small number of prayers; but, by degrees, they increased the number of external ceremonies, and added new prayers, to make the office look more awful and venerable to the people. At length things were carried to such a pitch, that a regulation became necessary; and it was found proper to put the service, and the manner of performing it, into writing; and this was what they called a *liturgy*.

Liturgies have been different at different times, and in different countries.—We have the *liturgy* of S. Chrysostom, that of S. Peter, of S. James, the *liturgy* of S. Basil, the *Armenian liturgy*, the *liturgy* of the Maronites, of the Coph-

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tes, the Roman *liturgy*, the Gallican *liturgy*, the English *liturgy*, the Ambrosian *liturgy*, the Spanish and African *liturgies*, &c.

LITUS in medicine, the same as *liniment*. See **LINIMENT**.

LITUUS, among medalists, the staff used by the augurs, made in form of a crozier.

We frequently see it on medals, along with other pontifical instruments.—Aulus Gellius says, it was bigger in the place where it was crooked, than elsewhere.

LIVER*, a large, glandulous viscus, of a red sanguine colour, situated immediately under the diaphragm, in the right hypochondrium, which it almost fills; and thence stretching itself over the right side of the stomach, towards the left hypochondrium, it reaches behind the cartilago costalis, growing gradually thinner and narrower: It serves to purify the mafs of blood, by making a secretion of the bilious humour it contains.—See *Tab. Anat. (Splanchn.) fig. 1. lit. a. b. fig. 3. lit. k. (Angiol.) fig. 4. lit. a. e. &c. fig. 5.*

* Plato and other of the ancients, as the principle of love in the liver; whence the Latin proverb, *Cum in aetate*; and in this sense Horace frequently uses the word, as when he says, *Si turberis jecur queris Hecumen*.—The Greeks, from its concave figure, called it *hepar*, vaulted, folded, &c. The Latins call it *jecur*, q. d. *justa cor*, as being near the heart. The French call it *foie*, from *fover*, *factus*, or fire place; agreeable to the doctrine of the ancients, who believed the blood to be boiled and prepared in it.—Erasistratus, at first, called it *pancreas*, i. e. *effusum*, or mafs of blood; and Hippocrates, by way of eminence, frequently calls it *hepar*, &c.

The upper part of the liver is convex, and perfectly smooth: the under is concave, and somewhat more uneven, having four large fissures; one, through which the umbilical ligament passes; a second on the left side, receiving the pylorus, and the beginning of the duodenum; a third on the right side, near the margin, in which the gall-bladder is lodged; and the last in the upper part, affording a passage to the vena cava.

Its figure is somewhat approaching to round, with thin edges, not altogether even, but notched in some places. Its magnitude is various in different subjects, according to the proportion of the body; though in a fetus, or very young animal, it is always larger, in proportion, than in adults.—In dogs and other animals of the quadruped kind, it is divided into several distinct lobes, but in men it is generally continued; having one small protuberance, which some account a little lobe.—It is sometimes, however, observed in men to have been divided into two or three lobes.

The liver is connected to several parts, but especially to the diaphragm, to which it is fastened by a broad, thin, but strong semicircular ligament, called the *suspensory ligament*, derived from the common capula of the porta and gall ducts.—The continuity of this ligament being interrupted by the perforation of the vena cava, has given occasion to some anatomists to divide it into two.—It is likewise, by another strong ligament, which has its original from the external coat of the liver, or, which amounts to the same, from the peritonæum, tied to the cartilago xiphoides; and by a third, which is formed out of the umbilical vessels, which in adults dry up, and become a ligament, it is connected to the tendons of the abdominal muscles in the linea alba at the navel.—These several ligaments serve to keep it in its due situation: besides which, it has some other connections by the blood-vessels.

The liver has a motion, though not proper to itself, but depending on that of the diaphragm; to which being very firmly connected, it must needs obey its motion; and in expiration be drawn up, and in inspiration be let down again.—It is covered with a thin smooth membrane, derived from the peritonæum, which may be separated from the substance of the liver, though not without some danger of laceration.—The substance of the liver is vascular and glandulous; which latter part is very soft and friable, and pretty easily scraped off from the vessels, to which the glands every way adhere, as it were in bunches; which has made the anatomists call the considerable ones, the *internal lobes* of the liver.

The glands adhering thus to the vessels, and constituting those lobes, are wrapped up together in proper membranes; whence this appearance of distinct lobes.—Every one of these glands, according to Malpighi, is composed of six unequal files, or faces. They are all clothed with their proper membranes, and have each an excretory duct; several of which joining together, form little trunks, which run all along with the branches of the porta; and these again uniting, form longer trunks, which are always found full of bile, and constitute the porus bilarius; which being distributed all over the liver, receives in the foregoing manner, the bile; which is separated by these glands, and terminating in the meatu hepaticus, and in the ductus communis, at length discharges the bile into the duodenum.

Besides this discharge by the porus bilarius, which is supposed to be the great one, the liver also delivers part of its bile into the gall-bladder, by a duct, called the *cyst-hepatic duct*, first discovered by Dr. Glisson; by means whereof, there is

an immediate communication between the porus biliaris and the gall-bladder; a particular description of which last part, see under the words GALL, CYST-HEPATIC, &c. Besides these gall-veffels, which are peculiar to the *liver*, it abounds with blood-veffels, especially veins; whereof the porta and cava are diffeminated through the whole fubftance of it.—And here it is particularly remarkable of the porta, that after the manner of arteries, it fhoots itfelf from a trunk into branches; and being at laft loft in capillaries, delivers the blood into the cava, by which it is immediately reconveyed to the heart.

The porta is formed out of the concurrence of divers veins, which, meeting together, make one of the moft confiderable venous trunks of the body, as to its bulk; though contrary to the courfe of other veins, it runs not far in a trunk, but is foon diftributed again by ramifications into the *liver*.

The blood conveyed into the *liver* by the porta, after the manner of the arteries, is received again, after having been purged of its bile in the glands of the *liver*, into innumerable veins, which empty themfelves into the cava, and are vulgarly, though improperly, called *branches* of the cava; but they ought to be efteemed the proper blood-veffels of the *liver*; as the emulgents are of the kidneys; and which, as all the reft do, except the pulmonary vein, empty themfelves into the cava; the common channel by which the blood returns to the heart.

The arteries, which are called the *hepatic*, come from the right branch of the coeliac.—Dr. Gilfon thinks the porta does fo much the office of an artery, that no more arteries are neceffary, than thofe which furnifh nourifhment to the membranes and capfula; but Dr. Drake judges they ferve for the nourifhment of the whole part.—Thefe arteries are much bigger in men, than in other animals.—Mr. Cowper had feveral preparations, wherein the ftem of each hepatic artery was as large as a goose-quill, and the branches in the *liver*, every where equal in magnitude to thofe of the porus biliaris, which they accompany.—Dr. Drake conjectures, that in this vifcus in a human body, a larger ftream, and direfter impetus of arterious blood is required to drive on the venous, becaufe of the erect pofture, than in animals of an horizontal pofition of body. For which reafon hories, &c. though of much larger fize, and having much bigger *livers*, have thefe arteries much fmaller than men; and not only fo, but curled like the ten-trills of a vine, to break the impetus, which, in that pofture, is not fo neceffary as in the erect.

The *liver* has its nerves from the hepatic plexus, formed on the right hypochondrium by the branches of the intercoftal, which wrapping themfelves about the arteries, make a fort of net-work; and after fpreading themfelves on the membrane and furface, difappear.—The lymphaducts are numerous, though not eafily difcernible in human fubjects, for want of live diffections; but in other animals that may be difsected alive, they become very confpicious, by applying a ligature to the porta and the biliary duct.—For the ufe of the LIVER in the fecretion of bile, fee BILE.

LIVER of antimony. See the article ANTIMONY.

LIVERY, properly fignifies a colour, to which a perfon has fome particular fancy, and by which he chufes to diftinguifh himfelf or his retainers, from others.

Liveries are ufually taken from fancy, or continued in families by fucceffion.—The antient cavaliers, at their tournaments, diftinguifhed themfelves by wearing the *liveries* of their miftreffes: Thus people of quality make their domeftics wear their *livery*.

Father Meneftrier, in his treatife of *Carroufals*, has given a very ample account of the mixtures of colours in *liveries*. Dion tells us, that Oenomaus was the firft who invented green and blue colours for the troops which, in the circus, were to reprelent land and fea-fights.

The Romifh church has alfo her feveral colours and *liveries*; white, for confefors and virgins, and in times of rejoicing; black, for the dead; red, for the apoftles and martyrs; blue or violet, for penitents; and green, in times of hope.

Formerly great men gave *liveries* to feveral, who were not of their family or fervants, to engage them in their quarrels for that year; but this was prohibited by the ftatute 1 Hen. IV. and no man, of whatever condition, was allowed to give any *livery*, but to his domeftic officers, and council learned in the law.

LIVERY, in law, alfo denotes the delivery of poffeffion, to thofe tenants which held of the king in capite, or by knights fervice. See POSSESSION.

LIVERY, is alfo ufed for the writ, which lies for an heir to obtain the poffeffion, or feifin of his lands at the king's hands.

LIVERY of Seifin, is a delivery of poffeffion of land or tenements, or things corporeal, to him who hath right, or probability of right to them.

Livery of Seifin, is a ceremony ufed in the common law, in conveyance of lands, tenements, &c. where an eftate in fee-fimple, fee-tail, or other freehold, fhall pafs; and is a teftimonial of the willing departing of him who makes the *livery*, from the thing whereof the *livery* is made, as well as of a

willing acceptance by the other party, of all that whereof the firft has difvefted himfelf.

Antiently, there were a pair of gloves, a ring, knife, an ear of wheat, &c. delivered in fign of *livery* and *feifin*. The ufual manner of *livery of feifin* is thus.—If it be in the open field where is no houfe or new building, and if the eftate pafs by deed, one openly reads it, or declares the effect of it; and after that is fealed, the venter takes it in his hand, with a clod of earth, or a twig or bough, which he delivers to the vendee, in the name of poffeffion, or feifin, according to the purport of the deed.—If there be a houfe or building on the land, the ceremony is to be done at the door of it, none being then left within; and the ring of the door is delivered to the vendee, who enters alone, fhuts the door, and prefently opens it again.—If it be a houfe without land or ground, the *livery* is made, and poffeffion given, by delivery of the ring of the door and deed only; and where it is without deed, either of lands or tenements, there the party declares by word of mouth, before witneffes, the eftate he parts with, and then delivers feifin, or poffeffion as aforefaid: in which cafe the land paffes as well as by deed, by virtue of the *livery of feifin*.

LIVES. See ANNUITY, and POLICY of Insurance.

LIVRE *, a French money of account, confifting of twenty fols; each fol containing twelve deniers.

* The origin of the word is fetched hence, that antiently the Roman *libra*, or pound, was the ftandard by which the French money was regulated; twenty fols being made equal to the *libra*.—By degrees the *libra* became a term of account, fo that any coin juft worth twenty fols was a *livre*, or *libra*; and fince the time of Charlemagne, all contracts have been made on the foot of this imaginary coin; though the fols have frequently charged their weight and alloy.

The *livre* is of two kinds, *Tournois*, and *Parifis*.

LIVRE *Tournois*, as above, contains twenty fols Tournois, and each fol twelve deniers Tournois.

LIVRE *Parifis*, is twenty fols Parifis, each fol Parifis worth twelve deniers Parifis, or fifteen deniers Tournois. So that a *livre Parifis*, is equivalent to twenty five fols Tournois: the word *Parifis* being ufed in oppofition to *Tournois*, by reafon of the rate of money, which was one fourth higher at Paris, than at Tours.

One penny fterling was equal to thirteen and a half deniers Tournois: fo that the Englifh pound fterling, was equal to thirteen *livres*, fix fols, eight deniers of French money; while the exchange was on the foot of fifty four pence fterling, to a French crown of fixty fols Tournois; which was the late par between England and France.—But at prefent, the French crown is but equal to 27 d. $\frac{1}{2}$ fterling, on which footing the *livre* is but equivalent to 10 d. $\frac{1}{2}$ fterling.

There have fince been pieces of gold ftruck of twenty fols value, and under Henry III. in 1575, fpecies of fiver of like value: Both the one and the other were called *francs*, and thus the imaginary coin became real.

It appears that the Romans alfo had a kind of money which they called *libra*, or *libella*; which was the tenth part of their denarius; fo called, becaufe equivalent to an *as*; which, at firft, weighed a *libra*, or pound of copper.—Scaliger adds, that they ufed *libra* as a term of account, not as a coin: *Libra erat collectio nummorum, non nummus*.

LIXIVIOUS, LIXIVIAL, or LIXIVIATE, in chymiftry, is underftood of falts extracted from burnt vegetables by lotion.

Lixivious falts, are the fixed falts of plants, &c. extracted by calcining the plants, or reducing them to afhes; and afterwards making a lixivium of thofe afhes with water.

Mr. Boyle obferves, that the difference between *lixivious* and urinous falts, confifts in this, that the former change the diffolution of fublime in common water into a yellow colour, which the latter do not. See ALKALI.

LIXIVIUM, *Lye*, a liquor made by the infufion of wood-afhes; and which is more or lefs pungent and penetrating, as it is more or lefs impregnated with falts, and fiery particles abounding therein.

What is left after the evaporation of fuch a liquor, is called a *lixivious falt*; fuch as all thofe are, which are made by incineration.

Lixiviums are of notable ufe, not only in medicine, but alfo in bleaching, fugar-works, &c. See BLEACHING, SUGAR, and POT-ASHES.

LOAD a Mortar. } See the article {MORTAR.
Training a LOAD. } TRAINING.

LOADSTONE. See MAGNET, and DIRECTION.

LOAM, or LOME, the common fuperficial earth; confifting of clay, with a fmall admixture of fand in it. See EARTH, and CLAY.

The word, it muft be obferved, is ufed with great uncertainty; by fome authors, for the black mother earth, called *mould*; by others, for a reddifh earth ufed in making bricks. See Supplement: article LOAM.

LOAM is alfo ufed for a fort of mortar made of this laft earth, by tempering it with mud, water, ftaw, &c.

LOBBY. See the article ANTICHAMBER.

LOBE, ΔΟΒΟΖ, amongst anatomists, is applied to each of the two parts whereof the lungs consist.

This separation into *lobes*, is of use in dilating the lungs, by causing them to receive more air, and preventing their being too much squeezed, when the back is bent.—For this reason it is that beasts, which are always inclining towards the earth, have more *lobes* in their lungs than men: even their liver is divided into *lobes*, whereas that of man is continued. See *Tab. Anat. (Splanchn.) fig. 14. lit. d. d.*, &c. see also **LIVER**.

LOBE is also used for the tip of the ear; which is more fat and fleshy than any other part thereof.

Du Laurent says, that the word *lobe*, in this last sense, comes from the Greek λωβειν, to shame, or be ashamed: this part of the ear being said to blush, when the person is ashamed.

LOBE is also used in speaking of fruits and grains.

Thus the bean consists of two equal parts, called *lobes*, which compose the body thereof, and are encompassed with the outer skin.—And all other grains, even the smallest, are divided, like the bean, into two *lobes*, or equal parts; as Dr. Grew has shewn in his *Anatomy of Plants*.

LOBULE, LOBELLUS, in anatomy, a little *lobe*.

Each lobe of the lungs is divided into several lesser lobes, or *lobules*, which are fastened on each side, to the largest branches of the trachea.—Each *lobule* consists of a great number of little round vesicles, which have all a communication with one another.—It is into these vesicles that the air enters, by the trachea in inspiration; still quitting them again in expiration. See *Tab. Anat. (Splanchn.) fig. 14. lit. f. f.*, &c.

LOCAL, something supposed to be tied, or annexed to some particular place.

Thus, in law, a thing is said to be *local*, i. e. annexed, or fixed to the freehold.—An action of trespass for battery, &c. is transitory, not *local*; that is, it is not necessary, that the place where battery was committed, should be set down as material in the declaration; or if it be set down, the defendant cannot traverse it by saying, he did not commit the battery in the place mentioned in the declaration, and so avoid the action.

Chose LOCAL. See the article **CHOSE**.

LOCAL Customs, are those peculiar to some lordship, or other district, and not agreeable to the general customs of the country. See **CUSTOM**.

Trespass LOCAL. See the article **TRESPASS**.

LOCAL Problems, in mathematics, is such an one, as is capable of an infinite number of different solutions; by reason the point, that is to solve it, may be indifferently taken within a certain extent; e. gr. any where in such a line, within such a plane figure, &c. which is called a *geometrical locus*.

A *local problem* may be either *simple*, as when the point sought is in a right line; *plane*, as when the point sought is in the circumference of a circle; *solid*, as when the point required is in the circumference of a conic section; or *surfsolid*, as when the point is in the perimeter of a line of a higher kind, as the geometers call it.

LOCAL, or artificial *Memory*. See the article **MEMORY**.

LOCAL Colours, in painting, are such as are natural and proper for each particular object in a picture.

They are so called, to distinguish them from the *clair obscure*, which consists wholly of black and white.

LOCAL Motion. See the article **MOTION**.

LOCATION, in the civil law, an act by which any thing is let out, on rent.

The second title of the nineteenth book of the *Digest*, is on the subject of *location* and *conduction*.—*Location* and *conduction* are relative terms, and are used as well for the action of him that lets, as for that of him who takes on that letting.

Tacit LOCATION, is, when the person who takes, continues on the premises beyond the term of his lease; which, by the civil law he is allowed to do, at least for the space of a year; on the same terms.

LOCH*, or LOHOCK, in pharmacy, a composition of a middle consistence between a syrup and a soft electuary; chiefly used for discares of the lungs.

* The word is originally Arabic; but continues still in use among the apothecaries.

The Latins call it *linctus*, and the Greeks λικτισμα, by reason the manner of taking it is licking.

LOCHIA, or LOCHES, ΔΟΧΙΑ, the evacuations consequent on the delivery of a woman in child-bed.

As soon as the uterus is eased of its load, its fibres, as also those of the peritonæum, the muscles of the abdomen, &c. which have been extremely distended during the last period of gestation, begin to contract themselves, and their vessels; particularly the uterus, which by this means expels the blood amassed in it.—At first pure blood is evacuated, and in considerable quantities; afterwards it is diluted, and comes out more sparingly; at length it becomes viscid, pale, &c.—These are called the *loches*.

LOCIS Communibus. See the article **COMMUNIBUS**.

LOCK, a little instrument used for the shutting and fastening of doors, chests, &c. only to be opened by a key.

The *lock* is reckoned the master-piece in smithery; a great deal of art and delicacy being required in contriving and varying the wards, springs, bolts, &c. and adjusting them to the places where they are to be used, and to the various occasions of using them.

From the various structure of *locks*, accommodated to their different intentions, they acquire various names.—Those placed on outer doors are called *stock-locks*; those on chamber doors, *spring-locks*; those on trunks, *trunk-locks*, *pad-locks*, &c.

Of these, the *spring-lock* is the most considerable, both for its frequency, and the curiosity of its structure.—Its principal parts are, the main-plate, the cover-plate, and the pin-hole: to the main-plate belong the key-hole, top-hook, cross-wards, bolt-toe or bolt-nab, drawback spring tumbler, pin of the tumbler, and the staples; to the cover-plate belong the pin, main-ward, cross-ward, step-ward, or dap-ward; to the pin-hole belong the hook-ward, main cross-ward, flank, the pot or bread, bow-ward, and bit.

LOCULAMENTUM, in botany, denotes a cell, or partition in a seed-pod, for the seed of a plant. See **SEED**.

In some plants, we only find one *loculamentum* in a pod; in others two, three, or more.

LOCUS, Place, in a general sense. See the article **PLACE**.

Locus Geometricus denotes a line, by which a local or indeterminate problem is solved. See **LOCAL Problems**, and **GEOMETRICAL**.

A *locus* is a line, any point of which may equally solve an indeterminate problem.

This, if a right line suffice for the construction of the equation, is called *locus ad rectum*; if a circle, *locus ad circulum*; if a parabola, *locus ad parabolam*; if an ellipsis, *locus ad ellipsin*; and so of the rest of the conic sections.

The *loci* of such equations as are right lines; or circles, the ancients called *plain loci*; and of those that are paraboles, hyperboles, &c. *for d loci*.

Wolffius, and other moderns, divide the *loci* more commodiously into orders, according to the number of dimensions to which the indeterminate quantities rise.—Thus, it will be a *locus of the first order*, if the equation $x = ay$; a *locus of the second* or quadrate order, if $y^2 = ax$, or $y^2 = a^2 - x^2$, &c. A *locus of the third* or cubic order, if $y^3 = ax$, or $y^3 = a^2 - x^2$, &c.

It is better to conceive the nature of the *locus*, suppose two unknown and variable right lines AP, PM, (*Tab. Analysis, fig. 29, 30.*) making any given angle APM with each other; the one whereof, as AP, we call x , having a fixed origin in the point A, and extending itself indefinitely along a right line given in position; the other PM, which we call y , continually changing its position, but always parallel to itself. An equation only containing these two unknown quantities x and y , mixed with known ones, which expresses the relation of every variable quantity AP (x) to its correspondent variable quantity PM (y): the line passing through the extremities of all the values of y , i. e. through all the points M, is called a *geometrical locus*, in general, and the *locus* of that equation in particular.

All equations, whose *loci* are of the *first order*, may be reduced to some one of the four following formula's:

$$1. y = \frac{bx}{a} \quad 2. y = \frac{bx}{a} + c \quad 3. y = \frac{bx}{a} - c \quad 4. y = c - \frac{bx}{a}$$

Where the unknown quantity y is supposed always to be freed from fractions, and the fraction that multiplies the other unknown quantity x , to be reduced to this expression $\frac{b}{a}$, and all the known terms to this c .

The *locus* of the first formula being already determined: To find that of the second, $y = \frac{bx}{a} + c$; in the line AP, (*fig. 31.*)

take A B = a , and draw B E = b , A D = c , parallel to PM. On the same side AP, draw the line A E of an indefinite length towards E, and the indefinite straight line DM parallel to A E. I say the line DM is the *locus* of the aforesaid equation, or formula; for if the line MP be drawn from any point M thereof parallel to A Q, the triangles ABE, APF, will be similar: and therefore AB (a): BE (b): : AP (x): PF = $\frac{bx}{a}$; and consequently PM (y) = PF ($\frac{bx}{a}$) + FM (c).

To find the *locus* of the third form, $y = \frac{bx}{a} - c$, proceed thus: Assume AB = a , (*fig. 32.*) and draw the right lines B E = b , A D = c , parallel to PM, the one on one side AP, and the other on the other side: and through the points A, E, draw the right line A E of an indefinite length towards E, and through the point D, the line DM parallel to A E: I say, the

the indefinite right line G M shall be the *locus* sought; for we shall have always $PM(y) = PF \left(\frac{bx}{a} \right) - FM \cdot c$.

Lastly, to find the *locus* of the fourth formula, $y = c - \frac{bx}{a}$; in AP (fig. 33.) take $AB = a$, and draw $BE = b$, $AD = c$, parallel to PM, the one on one side A P, and the other on the other side; and through the points A, E, draw the line A E indefinitely towards E, and through the point D draw the line D M parallel to A E. I say D G shall be the *locus* sought; for if the line M P be drawn from any point M thereof, parallel to A Q, then we shall have always $PM(y) = FM(c) - PF \left(\frac{bx}{a} \right)$.

Hence it appears, that all the *loci* of the first degree are straight lines, which may be easily found, because all their equations may be reduced to some one of the foregoing formula's. All *loci* of the second degree are conic sections, viz. either the parabola, the circle, ellipsis, or hyperbola; if an equation therefore be given, whose *locus* is of the second degree, and it be required to draw the conic section, which is the *locus* thereof; first draw a parabola, ellipsis, and hyperbola; so, as that the equations expressing the natures thereof, may be as compound as possible: in order to get general equations, or formula's, by examining the peculiar properties whereof we may know which of these formula's the given equation ought to have regard to; that is, which of the conic sections will be the *locus* of the proposed equation.—This known, compare all the terms of the proposed equation with the terms of the general formula of that conic section, which you have found will be the *locus* of the given equation; by which means you will find how to draw the section which is the *locus* of the equation given.

For example; let AP(x), PM(y), be unknown, and variable straight lines, (fig. 34.) and let m, n, p, r, s, be given right lines: In the line AP take $AB = m$, and draw $BE = n$, $AD = r$, parallel to PM; and through the point A draw $AE = s$, and through the point D, the indefinite right line D G parallel to A E. In D G take $DC = p$, and with C G, as a diameter, having its ordinates parallel to P M, and the line CH = p, as the parameter, describe a parabola CM: then the portion thereof, included in the angle PAD, will be the *locus* of the following general formula.

$$\frac{xy}{m} - \frac{xy}{mn} + \frac{xy}{mn} - 2ry + \frac{xy}{m} + r + r = 0.$$

$$-\frac{cp}{m} + ps.$$

For if from any point M of that portion there be drawn the right line M P, making any angle A P M with M P; the triangles ABE, APF, shall be similar; therefore $AB(m) : AE(s) :: AP(x) : AF$ or $DG = \frac{ex}{m}$. And $AB(m) : BE(n) :: AP(x) : PF = \frac{nx}{m}$. And consequently GM or $PM - PF - FG = y - \frac{nx}{m} - r$, and CG or $DG - DC = \frac{ex}{m} - s$. But from the nature of the parabola $GM = CG \times CH$; which equation will become that of the general formula, by putting the literal values of those lines.

Again; if through the fixed point A you draw the indefinite right line A Q (fig. 35.) parallel to P M, and you take $AB = m$, and draw $BE = n$, parallel to AP, and through the determinate points A, E, the line $AE = s$; and if in AP you take $AD = r$, and draw the indefinite straight line D G parallel to A E, and take $DC = s$: this being done, if with the diameter C G, whose ordinates are parallel to AP, and parameter the line $CH = p$, you describe a parabola CM; the portion of this parabola contained in the angle B A P shall be the *locus* of this second equation, or formula.

$$x - \frac{2n}{m}x + \frac{xy}{mn} - 2ry + \frac{2nr}{m} + r + r = 0.$$

$$-\frac{cp}{m} + ps.$$

For if the line M Q be drawn from any point M, therein, parallel to AP: then will $AB(m) : AE :: A Q$ or $PM(y) : AF$ or $DG = \frac{xy}{m}$. And $AB(m) : BE(n) :: A Q(y) : QF = \frac{ny}{m}$. And therefore GM or $QM - QF - FG = x - \frac{ny}{m} - r$; and CG or $DG - DC = \frac{ex}{m} - s$. And so by the common property of the parabola, you will have the foregoing second equation, or formula. So likewise may be found general equations, or formula's to the other conic sections.

Now if it be required to draw the parabola, which we find to be the *locus* of this proposed equation $yy - 2ay - bx + c = 0$; compare every term of the first formula with the terms of the equation, because yy in both is without fractions; and then will $\frac{2n}{m} = 0$, because the rectangle xy not

being in the proposed equation, the said rectangle may be esteemed as multiplied by 0; whence $n = 0$, and $m = c$; because the line AE falling in A B, that is, in AP in the construction of the formula, the points B, E, do coincide. Therefore, destroying all the terms affected with $\frac{n}{m}$ in the formula,

and substituting m for c , we shall get $yy - 2ry - px + r + r + p = 0$. Again, by comparing the correspondent terms $-2ry$, and $-2ay$, as also $-px$, and $-bx$, we have $r = a$, and $p = b$; and comparing the term wherein are neither of the unknown quantities x, y , we get $r + p = c$, and substituting a and b for r and p , then will $s = \frac{c-a-b}{b}$, which is a negative expression when a is greater than c , as is here supposed. There is no need of comparing the first terms yy and yy , because they are the very same. Now the values of n, r, p, s , being thus found, the sought *locus* may be constructed by means of the construction of the formula, and after the following manner.

Because $BE(n) = b$, (fig. 36.) the points B, E, do coincide, and the line A E falls in AP; therefore through the fixed point A draw the line A D (r) = a parallel to P M, and draw D G parallel to A P, in which take $DC = \frac{a-b-c}{b}$; then with D C, as a diameter, whose ordinates are right lines parallel to P M, and parameter the line CH (p) = b , describe a parabola: I say, the two portions O M M, R M S, therefore, contained in the angle P A O, formed by the line AP, and the line A O drawn parallel to P M, will be the *locus* of the given equation, as is easily proved. If in a given equation, whose *locus* is a parabola, xx without a fraction; then the terms of the second formula must be compared with those of the given equation.

Thus much for the method of constructing the *loci* of equations which are conic sections. If, now, an equation, whose *locus* is a conic section, be given; and the particular section whereof it is the *locus*, be required:

All the terms of the given equation being brought over to one side, so that the other be equal to 0, there will be two cases.

Case 1. When the rectangle xy is not in the given equation. 1^o. If either yy or xx be in the same equation, the *locus* will be a parabola. 2^o. If both xx and yy are in the equation with the same signs, the *locus* will be an ellipsis, or a circle. 3^o. If xx and yy have different signs, the *locus* will be an hyperbola, or the opposite sections regarding their diameters.

Case 2. When the rectangle xy is in the given equation. 1^o. If neither of the squares xx or yy , or only one of them, be in the same, the *locus* of it will be an hyperbola between the asymptotes. 2^o. If yy and xx be therein, having different signs, the *locus* will be an hyperbola, regarding its diameters. 3^o. If both the squares xx and yy are in the equation, having the same signs you must free the square yy from fractions; and then the *locus* will be a parabola, when the square of $\frac{1}{2}$ the fraction multiplying xy , is equal to the fraction multiplying xx ; an ellipsis, or circle, when the same is less; and an hyperbola, or the opposite sections, regarding their diameters, when greater.

LOCUSTAE, is used by botanists for the tender extremities of the branches of trees; such as, it is supposed, John the baptist fed on in the wilderness.

Some also used *locustæ* for the beards, and pendulous seeds of oats, and of the graminia paniculata; to which the name is given on account of their figure, which something resembles that of a locust.

LODESMAN, or **LOCMAN**, a pilot established for conducting vessels in and out of harbours, or up and down navigable rivers. See **PILOT**.

LODGMET, in military affairs, sometimes denotes an incampment made by an army.

LODGMET is more frequently used for a work cast up by the besiegers, during their approaches, in some dangerous post, which they have gained, and where it is absolutely necessary to secure themselves against the enemies fire; as in a covert-way, in a breach, the bottom of a moat, or any other part gained from the besieged.

Lodgments are made by casting up earth, or by gabions, or palisades, wool-packs, fascines, mantelets, or any thing capable of covering soldiers in the place they have gained, and are determined to keep.

LOG, a sea term, signifying a small piece of timber of a triangular figure, on board a ship; into one end whereof a convenient quantity of lead is cast, to make it swim upright in the water: the other end being fastened to the

Log-Line, a little cord, or line fastened to one end of the *log*, and wound round a reel, fixed for that purpose in the gallery of the ship.

This line, from the distance of about ten fathom off the *log*, has certain knots or divisions, which ought to be at least 50 foot from each other: though it is the common practice at sea, not to have them above 42 feet asunder.

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The use of the *log* and *line*, is to keep account, and make an estimate of the ship's way, or distance run; which is done by observing the length of line unwound in half a minute's time, told by a half-minute glass; for so many knots as run out in that time, so many miles the ship falls in an hour. Thus, if there be four knots veered out in half a minute, the ship is computed to run four miles an hour.

To *heave* the Log, as they call it, they throw it into the water, letting it run till it comes without the eddy of the ship's wake; then one holding a half-minute glass, turns it up just as the first knot turns off the reel (though some turn the glass as soon as the *log* touches the water.) As soon as the glass is out, the reel is stopped, and the knots run off are told, and their parts estimated.

The log ought to be heaved every hour, or every two hours.

The *log* is a very precarious way of computing, and must always be corrected by experience and good sense, there being a great deal of uncertainty, both in the heaving of it, in the course of the currents, and in the strength of the wind, which seldom keeps the same tenor for two hours together; which is the interval, between the times of using the *log*, in short voyages, though in longer ones they heave it every hour. Yet is this a much more exact way of computing, than any other in use; much preferable certainly to that of the Spaniards and Portuguese, who guess at the ship's way, by the running of the froth, or water by the ship's side; or to that of the Dutch, who use to heave a chip over-board, and to number the paces they walk on the deck, while the ship swims between any two marks, or bulk heads on the side.

Log-Board, is a table divided into four or five columns, whereon are marked the reckoning of every day; from whence they are entered into the *log-book* or *travel* book, ruled and columned just as the *log-board* is: whence it may be transferred into the journals, and how much the ship gains in her course, be estimated daily.

In the first column of the *log-board* is entered the hour of the day, from 1 to 1: in the second, the rhumb, or the direction of the vessel, with regard to the points of the compass: In the third, the number of knots run off the reel each time of heaving the *log*: in the fourth, the wind that blows: and in the fifth, observations made of the weather, variation of the compass, &c.

LOGARITHMIC, or *Logarithmical*, relating to logarithms.

Thus we say, *logarithmic*, arithmetic, curve, line, scale, spiral. See **ARITHMETIC**, &c.

LOGARITHMS*, the indices of the ratio's of numbers one to another, or, a series of artificial numbers proceeding in arithmetical proportion, corresponding to as many others proceeding in geometrical proportion; contrived for the easing and expediting of calculation.

* The word is formed from the Greek *λογος*, ratio, and *αριθμος*, number; *q. d.* ratio of numbers.

LOGARITHMS have been usually defined *numerationum proportionum æquidifferentium conites*; but this definition Dr. Halley and Stiefelius think deficient, and more accurately define them, the indices or exponents of the ratio's of numbers; ratio being considered as a quantity sui generis, beginning from the ratio of equality, or 1 to 1=0; and being affirmative when the ratio is increasing, and negative when it is decreasing.

The nature and genius of *logarithms* will be easily conceived, from what follows:—A series of quantities increasing or decreasing according to the same ratio, is called a *geometrical progression*; e. gr. 1. 2. 4. 8. 16. 32. &c. A series of quantities increasing or decreasing, according to the same difference, is called an *arithmetical progression*; e. gr. 3. 6. 9. 12. 15. 18. 24. Now, if underneath the numbers proceeding in a geometrical ratio, be added as many of those proceeding in the arithmetical one; these last are called the *logarithms* of the first.

Suppose, e. gr. two progressions:

Geomet. 1. 2. 4. 8. 16. 32. 64. 128. 256. 512.

Arithmet. 0. 1. 2. 3. 4. 5. 6. 7. 8. 9.

Logarithms.

0 will be the *logarithm* of the first term, *viz.* 1; 5, of the 16th, 32, 7, the *logarithm* of the 8th, 128, &c.

The doctrine and use of *logarithms*, may be conceived from the following propositions.

1^o. If the *logarithm* of unity be 0, the *logarithm* of the factum or product will be equal to the sum of the *logarithms* of the factors.—For as unity is to one of the factors, so is the other factor to the product. So that the *logarithm* of the product, is a fourth equidifferent term to the *logarithm* of unity, and those of the factors: but the *logarithm* of unity being 0, the sum of the *logarithms* of the factors must be the *logarithm* of the factum, or product. *q. e. d.*

Hence, since the factors of a square are equal to each other, i. e. a square is the factum or product of its root multiplied

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into itself; the *logarithm* of the square will be double the *logarithm* of the root.

In the same manner it appears, that the *logarithm* of the cube is triple; of the biquadrate, quadruple; of the fifth power, quintuple; of the sixth, sextuple, &c. of the *logarithm* of the root.

Unity, therefore, is to the exponent of the power, as the *logarithm* of the root to the *logarithm* of the power.

So that the *logarithm* of the power is had, if the *logarithms* of the root be multiplied by its exponent; and the *logarithm* of the root is had, if the *logarithm* of the power be divided by its exponent.

And hence we derive one of the great uses of *logarithms*, which is to expedite and facilitate the business of multiplication, and extraction of roots; the former of which is here performed by mere addition, and the latter by multiplication.—Thus 3, the sum of the *logarithms* 1 and 2, is the *logarithm* of 6, the product of 2 and 3.—In like manner 7, the sum of the *logarithms* 2 and 5, is the *logarithm* of 128, the product of 4 and 32.—Again, 3, the *logarithm* of the square root 8, is half the *logarithm* of 64, the square root of 64; and 2, the *logarithm* of the cube root 4, is subtriple the *logarithm* of the cube root 64.

2^o. If the *logarithm* of unity be 0, the *logarithm* of the quotient will be equal to the difference of the *logarithms* of the divisor and dividend.—For as the divisor is to the dividend, so is unity to the quotient; therefore the *logarithm* of the quotient is a fourth equidifferent number to the *logarithms* of the divisor, the dividend, and the *logarithm* of unity. The *logarithm* of unity, therefore, being 0, the difference of the *logarithm* of the divisor, and that of the dividend, is the *logarithm* of the quotient. *q. e. d.*

Hence appears another great advantage of *logarithms*, viz. their expediting the business of division, and performing it by a bare subtraction. E. gr. 2, the difference between 7 and 5, is the *logarithm* of the quotient 4, out of 128 by 32. In like manner, 5, the difference between 8 and 3, is the *logarithm* of the quotient 32, out of 256 by 8.

An example or two will render the use of *logarithms* in multiplication, division, &c. obvious.

Nom.	Log.	Nom.	Log.
Multiply 68	1.83250	Divide 816	2.91168
by 12	1.07918	by 12	1.07918
	816	63	1.83250
	9	9	0.95424
	9	9	0.95424
	9	9	0.95424
Sq. 81	2.190848(0.95424 sq. R.		
	Cube 729	3.286272(0.95424	

Cule R.

The properties of *logarithms* hitherto mentioned, and their various uses, are taken notice of by Stiefelius; but they come all far short of the use of *logarithms* in trigonometry, first discovered by the lord Napier.

To find the *logarithm* of any number, and to construct a canon of *logarithms* for natural numbers.—1^o. Because 1. 10. 100. 1000. 10000. &c. constitute a geometrical progression, their *logarithms* may be taken at pleasure: to be able, then, to express the *logarithms* of the intermediate numbers by decimal fractions, take 0.0000000, 1.0000000, 2.0000000, 3.0000000, 4.0000000, &c.—2^o. It is manifest, that for those numbers which are not contained in the scale of geometrical progression, the just *logarithms* cannot be had: yet may they be had so near the truth, that, as to matters of use, they shall be altogether as good as if strictly just.—To make this appear, suppose the *logarithm* of the number 9 were required: between 1.0000000 and 1.0000000, find a mean proportional, and between their *logarithms* 0.0000000 and 1.0000000 an equidifferent mean, which will be the *logarithm* thereof; that is, of a number exceeding three by 1.0000000, and therefore far remote from nine. Between 3 and 10, therefore find another mean proportional, which may come somewhat nearer 9; and between 10 and this mean another still; and so on between the numbers next above and next underneath 9, till at last you arrive at 9.1000000; which not being one millionth part from 9, its *logarithm* may, without any sensible error, be taken for that of 9 itself. Seeking then in each case for the *logarithms* of the mean proportionals, you will at last have 0.954251, which is exceedingly near the true *logarithm* of 9.—3^o. If in like manner you find mean proportionals between 1.0000000 and 3.1622777, and assign convenient *logarithms* to each, you will at length have the *logarithm* of the number 2, and so of the rest.—4^o. There needs not however, be so much pains taken in investigating the *logarithms* of all numbers; since those that consist of aliquot parts being divided, and others mutually multiplying each other, their *logarithms* are easily found.—Thus if the *logarithm*

5 C c c

of the number 9 be bisected, we shall have the *logarithm* 0.4771215 of the number 3.

The indices, or characteristics of *logarithms*, correspond to the denominative part of the natural numbers, as the other member of the *logarithm* does, to the denominative part of the number: *i. e.* the index shews the denomination, or place of the last (or left hand) figure of the number, and consequently of all the rest.—Thus 0, affixed to a *logarithm*, denotes the last figure of the number, to which the *logarithm* answers, to be nothing distant (*i. e.* is in) the place of units. The index 1 shews the last figure of its number to be distant 1 place from the place of units, *i. e.* to be in the place of tens, and consequently the number itself to be either 10, or some number between that and 100, and so of the other indices.—Hence all numbers, which have the same denominative, but not the same numerative parts, as all numbers from 1 to 10, from 10 to 100, &c. will have *logarithms*, whose indices are the same, but the other members different. Again, all numbers which have the same numerative, but not denominative part, will have different indices; but the rest of the *logarithms* the same.—If a number be purely decimal, to its *logarithm* is affixed a negative index, shewing the distance of its first significant figure, from the place of units.—Thus the *logarithm* of the decimal, 256 is 1.43824, of the decimal, 0256 is 2.40824, &c.

The first canon of *logarithms* for natural numbers, from 1 to 20000, and from 90000 to 100000, was constructed by Hen. Briggs, with the approbation of the inventor, the lord Napier, and the manner of constructing them shewn.—The chasm between 20000 and 90000, was filled up by Adrian Ulach.—In the common tables we have only a canon from 1 to 10000.—There are various other methods of constructing *logarithms*, by Dr. Halley, Mr. Cotes, Dr. Brook Taylor, &c. which the reader may find in the *Philosophical Transactions*.

To find the *logarithm* for a number greater than any in the common canon, but less than 1000000.—Cut off four figures on the left of the given number, and seek the *logarithm* in the table; add as many units to the index, as there are figures remaining on the right; subtract the *logarithm* found from that next following it, in the table: then, as the difference of numbers in the canon, is to the tabular distance of the *logarithms* answering to them, so are the remaining figures of the given number to the *logarithmic* difference; which if it be added to the *logarithm* before found, the sum will be the *logarithm* required. Suppose, *v. gr.* the *logarithm* of the number 92375 required. Cut off the four figures 9237, and to the characteristic of the *logarithm* corresponding to them, add an unit; then,

From the *logarithm* of the numb. 9238=3.9655780
Subtract *logarithm* numb. 9237=3.9655309

Remains tabular difference 471

10—471—5
5) 2 ——— 1
235

Now to the *logarithm* 4.9655309

Add the difference found 235

The sum is the *logarithm* required 4.9655544

To find the *logarithm* of a fraction.—Subtract the *logarithm* of the numerator, from that of the denominator, and to the remainder prefix the sign of subtraction.—Thus suppose it required to find the *logarithm* of the fraction $\frac{7}{3}$,

Logarithm of 7=0.8450980

Logarithm of 3=0.4771213

Logarithm of $\frac{7}{3}$ =0.3679767

The reason of the rule is, That a fraction being the quotient of the denominator divided by the numerator; its *logarithm* must be the difference of the *logarithms* of those two; so that the numerator being subtracted from the denominator, the difference becomes negative.—Stifelius observed, that the *logarithms* of a proper fraction, must always be negative, if that of unity be 0; which is evident, a fraction being less than one.

For an improper fraction, *v. gr.* $\frac{3}{2}$, its numerator being greater than its denominator, its *logarithm* is had, by subtracting the *logarithm* of the latter, from that of the former.

The *logarithm* of 9=0.9542425

Logarithm of 5=0.6989700

Logarithm $\frac{3}{2}$ =0.2552725

In the same manner may a *logarithm* of a mixt number, as $3\frac{1}{2}$ be found, it being first reduced into an improper fraction $\frac{7}{2}$.

To find the number corresponding to a *logarithm* greater than any in the table.—First from the given *logarithm*, subtract the *logarithm* of 10, or 100, or 1000, or 10000, till you have a *logarithm* that will come within the compass of the table; find the number corresponding to this, and multiply it by 10, or 100, or 1000, or 10000, the product is the number required.

Suppose, for instance, the number corresponding to the *logarithm* 7.7589982 be required; subtract the *logarithm* of the number 10000, which is 4.0000000, from 7.7589982; the remainder is 3.7589982, the number corresponding to which is 5741.1100, this multiplied by 10000, the product is 57411100, the number required.

To find the number corresponding to a negative *logarithm*.

—To the given negative *logarithm*, add the last *logarithm* of the table, or that of the number 10000; *i. e.* subtract the first from the second, and find the number corresponding to the remainder; this will be the numerator of the fraction, whose denominator will be 10000; *v. gr.* suppose it be required to find the fraction corresponding to the negative *logarithm* —0.3679767, subtract this from 4.0000000

The remainder is — 3.6320233, the number corresponding to which is 4285.11, the fraction sought therefore is $\frac{4285.11}{10000}$.—The reason of the rule is, that as a fraction is the quotient, arising on the division of the numerator by the denominator, unity will be to the fraction, as the denominator to the numerator; but as unity is to the fraction corresponding to the given negative *logarithm*, so is 10000 to the number corresponding to the remainder; therefore if 10000 be taken for the denominator, the number will be the numerator of the fraction required.

To find a fourth proportional to three given numbers.—Add the *logarithm* of the second to that of the third, and from the sum subtract the *logarithm* of the first; the remainder is the *logarithm* of the fourth required. *E. gr.* let the given numbers be 4. 68. and 3.

Logarithm 68=1.8325089

Logarithm 3=0.4771213

Sum=2.3096302

Logarithm 4=0.6020600

Logarithm required 1.7075732

The number in the tables corresponding to which is 51.—This problem is of the utmost use in trigonometry. See TRIANGLE, and TRIGONOMETRY.

LOGIC*, the art of thinking justly; or of making a right use of our rational faculties, in defining, dividing and reasoning.

* The word is Greek, λογικη, derived from λογος, *sermo*, discourse; in regard, thinking is only an inward, mental discourse, wherein the mind converses with itself.

Logic is also sometimes called *dialectica*; and sometimes the canonical art, as being a canon, or rule, for directing us in our reasonings.

As, in order to think aright, it is necessary that we apprehend, judge, discourse, and dispose or methodize rightly: hence apprehension, judgment, discourse, and method, become the four fundamental articles of this art; and it is from our reflections on those operations of the mind, that logic is or ought to be wholly drawn.

Lord Bacon divides logic into four branches, according to the ends proposed in each: for a man reasons, either to find what he seeks, or to judge of what he finds, or to retain what he judges, or to teach what he retains; whence arise so many arts of reasoning, *viz.* the art of *inquisition*, or invention; the art of *examining*, or judgment; the art of *preserving*, or of memory; and the art of *elocution*, or delivering.

Logic having been extremely abused, is now in some disrepute.

The schools have so clogged it with barbarous terms and phrases, and have run it out so much into dry, useless subtilties, that it seems rather intended to exercise the mind in wrangling and disputation, than to assist it in thinking justly. It is true, in its original, it was rather intended as the art of cavilling, than of reasoning; the Greeks, among whom it had its rise, being a people who piqued themselves mightily upon their being able to talk *ex tempore*, and to argue, by turns, on either side the question.—Hence their dialectic, to be always furnished with arms for such encounters, invented a set of words and terms, rather than rules and reasons, fitted for the uses of contention and dispute.

Logic, then, was only an art of words, which frequently had no meaning, but served well enough to hide ignorance instead of improving knowledge; to baffle reason instead of assisting it; and to confound the truth, instead of clearing it.—Much of that heap of words, and rules, which we have borrowed from the old logic, is of little use in life; and is so far out of the common usage, that the mind does not attend to them without trouble; and finding nothing in them to reward its attention, it soon discharges itself, and loses all ideas it had conceived of them.

But logic disengaged from the jargon of the schools, and reduced into a clear and intelligible method, is the art of conducting the understanding in the knowledge of things, and the discovery of truth.

From its proper use we gain several very considerable advantages; for 1^o. The consideration of rules, incites the mind to a closer attention and application in thinking; so that we hereby become assured that we make the best use of our faculties. 2^o. We hereby, more easily, and accurately discover, and point out the errors and defects in our reasoning; for the common light of reason, unassisted by logic, frequently observes an argumentation to be faulty, without being able to determine wherein the precise failure consists.—3^o. By these reflections on the order and manner of the operations of the mind, we are brought to a more just and complete knowledge of the nature of our own understanding. See SOUL, and UNDERSTANDING.

LOGICAL Concrete. } See the article } **CONCRETE.**

LOGICAL Part. } PART.

LOGISTA, the title of an officer at Athens, whose business was to receive, and pass the accounts of magistrates, when they came out of their office.

The *logistæ* were in number ten: they were elected by lot; and had ten euthyni, or auditors of accounts under them.

LOGISTIC, or *Logarithmic line*, a curve so called, from its properties and uses, in constructing and explaining the nature of logarithms.

If the right line A X, (*Tab. Analysis*, fig. 37.) be divided into any number of equal parts, and to the points of those divisions A, P, p, &c. be drawn lines continually proportional, the points N, M, m, &c. form the *logistic*, or *logarithmic line*, or *curve*.

Here the Abcissides A P, A p, &c. are the logarithms of the semiordinates P M, p m, &c.

Hence, if A P = x, A p = v, P M = y, p m = z, and their logarithms y and z = l y and l z; x will be = l y, and v = l z, consequently x : v = l y : l z, that is, the denominators of the ratios A N : P M, and A N : p m, are to one another, as the abscissides A P and A p.

Hence it follows, that there may be infinite other *logistic* lines invented, provided x m : v m : l y : l z, that any of the roots or powers, may be the logarithms of the semiordinates.

The *logistic* will never concur with the axis, except at an infinite distance, so that A X is its asymptote.

Quadrature of the LOGISTIC. See the article **QUADRATURE**.

LOGISTIC, or *logarithmic Spiral*, a line whose construction is as follows.—Divide the quadrant of a circle into any number of equal parts, in the points P, p, &c. (*Tab. Analysis*, fig. 22.) and from the radii C P, C p, C p, &c. cutting off C M, C m, C m, &c. continually proportional, the points M, m, m, &c. form the *logistic spiral*.

The arches therefore A P, A p, &c. are the logarithms of the ordinates C M, C m, &c. whence also it follows, that there may be infinite *logistic spirals*.

LOGISTICA, or **LOGISTICAL Arithmetic**, a denomination sometimes given to the arithmetic of sexagesimal fractions, used by astronomers in their calculations.

It was so called from a Greek treatise of one Barlaamius Monachus, who wrote about sexagesimal multiplication very accurately, and entitled his book *λογιστική*. This author Vossius places about the year 1350, but he mistakes the work for a treatise of algebra.

Shakerly, in his *Tabula Britannica*, has a table of logarithms adapted to sexagesimal fractions, which therefore he calls *logistical logarithms*; and the expeditious arithmetic of them, which is by this means obtained, and by which all the trouble of multiplication and division is saved; he calls *logistical arithmetic*.

LOGOGRIPIUS*, a kind of symbol, or riddle, proposed to students for their solution, in order to exercise and improve the mind.

* The word comes from the Greek *λογος*, discourse, and *γρίψ*, or *γρίψω*, net.

The *logogriphus* usually consists in some equivocal allusion, or mutilation of words, which, literally taken, signify something different from the thing intended by it; so that it is a kind of medium, between a rebus, and proper ænigma. See REBUS, &c.

According to Kircher, *logogriphi* are a kind of canting arms: Thus a person called Leonard, who bore in his arms a lion, and nard, or spikenard; according to that father, made a *logogriphus*. *Oedip. Egypt.*

In another place, the same author defines *logogriphus* to be an ænigma, which, under one name or word, will bear various meanings, by adding or retrenching some part of it.—This kind of enigmas is well known to the Arabs, among whom are authors who treat expressly of it.

LOHOCH. See the article **LOCH**.

LOINS, *Lumbi*, in anatomy, that part of the body about the reins; properly the lower part of the spine of the back, composed of five vertebrae, larger than those of the back, and serving them as a base; having their articulation pretty loose, that the motion of the loins may be more free.—See *Tab. Anat. (Osteol.)* fig. 2. n. 14. fig. 7. n. 16. fig. 9. * fig. 11. See also SPINE, and VERTEBRÆ.

LOLLARDS*, a religious sect which arose in Germany, about the beginning of the fourteenth century; so called from its author Walter Lollard, who began to dogmatize in 1315.

* The monk of Canterbury derives the origin of the word *loillard* among us from *loium*, a tare, as if the *Lollards*, were the tares sown in Christ's vineyard.—Abelly says, that the word *loillard* signifies praising God, from the German *loben*, to praise, and *lirr*, Lord; because the *Lollards* employed themselves in travelling about from place to place, singing psalms and hymns.

Lollard, and his followers, rejected the sacrifice of the mass, extreme unction, and penances for sin; arguing that Christ's sufferings were sufficient. He is likewise said to have set aside baptism, as a thing of no effect; and repentance, as not absolutely necessary, &c.—Lollard was burnt alive at Cologne, in 1322.

In England the followers of Wickliff were called, by way of reproach, *Lollards*, from some affinity there was between some of their tenets; though others are of opinion, that the English *Lollards* came from Germany.

They were solemnly condemned by the archbishop of Canterbury, and the council of Oxford.

LONG Accent, in grammar, &c. a mark which shews that the voice is to stay some time on the vowel which it is placed over.

Its figure is thus (—).

LONG Boat, is the largest and strongest boat belonging to a ship, that can be hoisted a-board of her. See **BOAT**.

Its use is to bring any goods, provisions, &c. to, or from the ship; or, on occasion, to land men any where, and particularly to weigh the anchor.

LONG Hand.

LONG Measure.

LONG Muscles, in anatomy.

LONGEVITY, length of life. See **LIFE**, and **AGE**.

From the different *longevities* of men in the beginning of the world, after the flood, and in these ages, M. Derham draws a good argument, for the interposition of a divine providence.

Immediately after the creation, when the world was to be peopled by one man and woman, the ordinary age was 900 years and upwards.—Immediately after the flood, when there were three persons to stock the world, their age was cut shorter, and none of those patriarchs, but Shem, arrived at 500.—In the second century we find none that reached 240: in the third, none but Terah that came to 200 years: the world, at least a part of it, by that time being so well peopled, that they had built cities, and were cantoned out into distant nations.—By degrees, as the number of people increased, their *longevity* dwindled; till it came down at length to 70 or 80 years: and there it stood, and has continued to stand, ever since the time of Moses.—This is found a good medium, and by means hereof the world is neither overstocked nor kept too thin; but life and death keep a pretty equal pace.

That the common duration of man's life has been the same in all ages since the world was peopled, is plain both from sacred, and profane history. To pass by others, Plato lived to 81, and was accounted an old man; and the instances of *longevity* produced by Pliny, L. 7. c. 48, as very extraordinary, may most of them be matched in modern histories; particularly in Dr. Plot's *Nat. Hist. of Oxf. and Staff.*—Among others, he tells of twelve tenants to the same person, who made up 1000 years; to say nothing of old Parr, who lived 152 years, 9 months; or of H. Jenkins of Yorkshire, who lived 169 years; or of the countess of Desmond, or Mr. Ecklestone, both of Ireland, who each exceeded 140 years.

LONGIMETRY, the art of measuring lengths; both accessible, as roads, &c. and inaccessible, as arms of the sea, &c.

Longimetry is a part of trigonometry, and a dependant on geometry, in the same manner as altimetry, planimetry, tereometry, &c.

The art of *longimetry*, see under the names of the instruments used in it, particularly THEODOLITE, CHAIN, &c.

LONGISSIMUS Dorsi, is a muscle of the back, which, at its beginning, is not to be distinguished from the sacro-lumbaris; arising with it from the hinder part of the os ilium, and os sacrum, and the first vertebra of the loins.

It runs upwards along the whole tract of the back, and is connected by tendons to each transverse process in its way, and ends sometimes in the first vertebra of the back, and sometimes in the first of the neck, and, as some authors say, reaches now and then to the processus mammillaris of the os petrosum.

In conjunction with some others, this helps to keep the body erect.

LONGISSIMUS Oculi. See **OBLIQUUS Superior**.

LONGITUDE of the Earth, is sometimes used to denote its extent from west to east; according to the direction of the equator.

By which it stands contradistinguished from *latitude of the earth*, which denotes its extent from one pole to the other.

LONGITUDE of a Star, in astronomy is an arch of the ecliptic, counted from the beginning of Aries, to the place where a star's circle of *longitude* cuts the ecliptic.

The *longitude* of a star, as *S*, (*Tib. Astronomy*, fig. 14. n. 2.) is an arch of the ecliptic *E L*, comprehended between the beginning of Aries, and the circle of *longitude* *T M*, drawn through the centre of the star *S*.

Longitude stands in the same relation to the ecliptic, that *right ascension* does to the equator.

In which sense, the *longitude* of a star amounts to much the same as the star's place in the ecliptic, reckoned from the beginning of Aries; which to find, see *PLACE of the Sun or Star*.

LONGITUDE of the Sun or a Star, from the next equinoctial point, is the number of degrees and minutes they are from the beginning of Aries or Libra, either before or after them; which can never be more than an 180 degrees.

LONGITUDE of a place in geography, is its distance from some first meridian; or an arch of the equator, intercepted between the meridian of the place, and the first meridian.

LONGITUDE, in navigation, is the distance of a ship or place, east or west, from another, counted in degrees of the equator. If this distance be counted in leagues or miles, or in degrees of the meridian, and not in those proper to the parallel of latitude, it is usually called *departure*.

To discover an exact method of finding the *longitude* at sea, is a problem that has extremely perplexed the mathematicians of these two last ages; and for the solution whereof, great rewards have been publicly offered by the English, French, Dutch, and other nations: this being the only thing wanting to render navigation perfect. Various are the attempts that authors have made for this purpose, and various the methods they have proposed; but still without success; all their schemes being found either false, precarious, impracticable, or in some way or other defective: so that the palm is still unascertained.

What most of them aim at, is a method of determining the difference of time between any two points on the earth: for, every 15 degrees of the equator answering to an hour, *i. e.* one degree to 4 minutes of time, and one minute of a degree to 15 seconds of time; the difference of time being known, and turned into degrees, will give the *longitude*, and vice versa.

This, some have pretended to effect by clocks, watches, and other automata; but always in vain; no time-keeper, excepting a pendulum (which cannot be applied at sea) being sufficiently sure and exact for the purpose. See **PENDULUM**.

Others, with more probability, and to better purpose, search for a means to find the *longitude* in the heavens: for, if the exact times of any celestial appearance be known for two places, the difference of those times gives that of the *longitude* of those places.—Now in the ephemerides, we have the motions of the planets, and the times of all the celestial phenomena, as the beginning and ending of eclipses, conjunctions of the moon with other planets, its entrance into the ecliptic, &c. accurately calculated for some one place. Therefore if the hour and minute be known, wherein any of the same phenomena are observed in an unknown place, the difference between the hour and minute, of that place, and that other to which the tables are calculated, and consequently the difference of their meridians, and their *longitude* from each other, are known also.

Now the difficulty here does not consist in the exact finding of the time, which is easily had from the sun's altitude or azimuth; but the defect lies in the paucity of proper appearances, capable of being thus observed: for all slow motions (*v. gr.* that of Saturn) are at once excluded; as shewing but little difference in a considerable space of time; and it being here required, that the phenomenon be sensibly varied in two minutes time, an error of two minutes in time producing another of thirty miles in the *longitude*.—Now there are no phenomena in the heavens that have these requisites, excepting the several stages of an eclipse of the moon; her *longitudes*, or place in the zodiac; her distance from the fixed stars, or appulse to them; her ingress into the ecliptic, or the points of her orbit, where that cuts the ecliptic; and the conjunction, distance, and eclipses of Jupiter's satellites.—Of each of which in their order.

1°. The method by the eclipses of the moon, is very easy, and sufficiently accurate, were there but eclipses every night.—At the moment wherein we see the beginning or middle of a lunar eclipse by a telescope, we have nothing to do but take the altitude or azimuth of some fixed star, from which the hour and minute are easily found; or without the altitude, if the star be in the meridian.—This hour and minute, therefore, thus found, and compared with that expressed in the tables, gives the *longitude*.

2°. The moon's place in the zodiac, is a phenomenon more frequent than that of her eclipses; but then the observation

thereof is difficult, and the calculus intricate and perplexed, by reason of two parallaxes; so that it is scarce practicable to any tolerable degree of accuracy.—Indeed, by waiting till the moon comes into the meridian of the place, and then taking the altitude of some remarkable star, (the altitude being supposed to be first known) from this altitude, and the latitude, we shall be able to find the time pretty accurately; though it will be better to do it by some star in the meridian.

—Now, the time being found, it will be easy to find what point of the ecliptic is then in the meridian, or mid-heaven.

—Thus we shall have the moon's place in the zodiac, corresponding to the time of our place.—Then in the ephemeris, we find what hour it is in the meridian of the ephemeris, when the moon is in that part of the zodiac: thus we shall have the hour, and minute of the two places for the same time; the difference of which, will give the difference of *longitude*.

3°. In regard there are many times when the moon cannot be observed in the meridian, there is therefore another still more frequent phenomenon from which the *longitude* is sought, *viz.* the moon's appulse, and recess from the fixed stars: for from thence the moon's true place may be investigated for the given time of observation.—But this method, by reason of the parallaxes, and the solution of oblique spherical triangles and the various cases, is so very difficult and perplexed, that mariners will scarce be able to make use of it; nor does it seem necessary here to give the praxis thereof. Those, however, who are disposed to use it, will find very great help in it from a starry zodiac, published under the direction of Dr. Halley, containing all the stars to which the moon's appulse can be observed.

4°. To find the *longitude* by the moon's ingress into the ecliptic, observe the moment of that ingress: then, in the ephemeris, see what hour it is in the meridian of the ephemeris, when that ingress happens.—The difference between these times, gives the difference of *longitude*. See **MOON**.

5°. The phenomena of Jupiter's satellites are generally preferred to those of the moon, for finding the *longitude*; by reason the former are less liable to parallaxes, and do, further, afford a very commodious observation, in every situation of that planet above the horizon.—Their motion is very swift, and must be calculated for every hour; and for that reason they are not found in the common ephemerides, but are had elsewhere. Now, to find the *longitude* by means of these satellites; with a good telescope, observe a conjunction of two of them, or of one of them with Jupiter, or any other like appearance; and, at the same time, find the hour and minute from the meridian altitude of some star; then consulting tables of the satellites, observe the hour and minute wherein such appearance happens in the meridian of the place to which the tables are calculated.—The difference of time, as before, will give the *longitude*.

All methods which depend on the phenomena of the heavens having this one defect, that they cannot be observed at all times; and being, besides difficult of application at sea, by reason of the motion of the ship; there are some, who, leaving the moon, and the satellites, have recourse to clocks, and other automata: which, could they be made perfectly just and regular, so as to move with the sun, without either gaining or losing, and without being affected with the change of air, and of climates, the *longitude* would be had with all the ease and accuracy imaginable; nothing more being required but to set the machine by the sun at the time of departure; and when the *longitude* of any place is desired, to find the hour and minute from the heavens, (which is done at night by the stars, and in the day by the sun;) for the difference between the time, thus observed, and that of the machine, gives the *longitude*.—But no such machine has been yet discovered: wherefore recourse has been still further had to other methods.

Mr. Whiston and Mr. Ditton have proposed a method of determining the *longitude*, by the flash and report of great guns.—Sounds, it is known, move pretty equally in all their stages, whatever the sonorous body be that occasions them, or whatever the medium that conveys them. If then a mortar or great gun be exploded at a place whose *longitude* is known, the difference between the time wherein the flash (which moves, as it were, instantaneously) is seen, and the sound, which moves at the rate of four seconds in a mile, is heard, will give the distance of those places from each other; whence, if their latitudes be known, the difference of *longitude* will be likewise known.

Again, if the hour and minute of the explosion be known, (for the place where it is made) by observing the hour and minute from the sun or stars, at the place whose *longitude* is required; the difference between those times, will give the difference of *longitude*.

Again, if the said mortar be loaded with an iron shell full of combustible matter, and poised perpendicularly, it will carry the same a mile high, which will be seen near a hundred miles; if therefore neither the sound should be heard, nor the flash seen, the distance of any remote place from the

place of the mortar, may be determined from the altitude of the shell above the horizon of the place unknown: and the distance and latitudes known, the *longitude* is easily found.

According to this scheme, it was proposed to have such mortars fixed at proper distances, and at known stations, on all the frequented coasts, islands, capes, &c. and to be exploded at certain hours, for the observation of mariners.

This method, though good in the theory, yet is found useless in the practice; as being extremely troublesome, and yet precarious.—It supposes that sounds may be heard forty, fifty, or sixty miles; of which, it is true, we have instances, but they are very rare; and, ordinarily, the report of a cannon is not heard above half so far; and sometimes much less.

—It supposes, again, sound to move always with equal velocity; whereas, in fact, its velocity is increased or diminished as it moves with or against the wind.—It supposes, again, the strength of powder uniform; and that the same quantity carries the same range; the contrary whereof is known to every gunner.—We say nothing of thick cloudy nights, when no lights can be seen; nor of stormy nights, when no sound can be heard; even at inconsiderable distances.

80. We have another method of finding the *longitude*, proposed by the same Mr. Whiston, viz. by the inclinatory, or dipping-needle: which see under the article *DIPPING-Needle*.

Angle of <i>Longitude</i> .	} See	ANGLE.
Argument of <i>Longitude</i> .		ARGUMENT.
Circles of <i>Longitude</i> .		CIRCLE.
Degree of <i>Longitude</i> .		DEGREE.
Parallax of <i>Longitude</i> .		PARALLAX.
Refraction of <i>Longitude</i> .		REFRACTION.

Longitude of Motion, is used by Dr. Wallis for the measure of motion, estimated according to the line of direction; on which principle, *longitude* of motion is the distance, or length, which the centre of any moving body runs through, as it moves on in a right line.

The same author calls the measure of any motion, estimated according to the line of direction of the vis motrix, the *altitude* of it.

Bohau also uses the terms *longitude*, and *altitude* in the same sense, in many places of his writings, which an ordinary reader finds hard to understand, for want of this interpretation. By *altitude* also in his nineteenth proposition de fibrillis, he means the thickness of the vessel matter in the blood-vessels; or the greatest length a vessel particle is extended into, from the side of the canal to its axis.

LONGITUDINAL, in anatomy, is used to signify some part, or member extended in length, or posited lengthwise.

The membranes which compose the vessels, are woven out of two kinds of fibres, the one *longitudinal*, the other *circular*, cutting the *longitudinal* at right angles.

The *longitudinal* fibres are tendinous and elastic; the *circular*, muscular and motrices, like sphincters.

LONGUS, Long, an epithet given by anatomists, to a great number of muscles, hereby contradistinguished from *brevis*.

The second extensor of the carpus is called *longus*, in comparison of the third extensor, which is called *brevis*, short.

The *longus* has its origin in the bottom of the humerus, and lying along the radius, passes underneath the ligamentum annulare, and is inserted into the carpus.

The second of the flexors of the neck is also called the *longus*, or *longus colli*, and sometimes *rectus*.—It has its origin in the lateral part of the body of the four upper vertebrae of the back, and is inserted into the body of the four vertebrae of the neck, and sometimes into the occiput; this, in conjunction with the scalenum, bends the neck.

The third of the six muscles of the elbow, or arm, which is the first of its extensors, is also called *longus*, as being the longest of the extensors.—It has its origin on the upper side of the omoplate, near the neck, and descending by the hind part of the arm, is inserted into the olecranon by a strong aponeurosis, which is common to it and the second and third extensor of the arm.

The second muscle of the thumb, which is the first of its extensors, is also called *longus*, as being longer than another extensor of the same thumb, called *brevis*. The *longus* proceeds from the upper and external part of the bone of the elbow, and, rising over the radius is inserted, by a forked tendon, into the second bone of the thumb, which it extends.

One of the four muscles of the radius is also called the *longus*.—This is the first of the two supinators, and has its origin three or four fingers breadth above the outer apophysis of the humerus, whence running along the radius, it is inserted into the inner parts of its lower apophysis.—It is called *longus* with regard to the other supinator, which is called *brevis*.—These two muscles serve to turn the radius, so as the palm of the hand looks upwards; which makes the supination.

The first of the abductors of the leg is also called the *longus*, or *longus triceps*, and bears this title more justly than any of

the others, as being the longest muscle in the whole body.—It is also denominated *fasciatus*, on account of its bearing some resemblance to a (fascia) leather; and *fastidiosus*, or taylor's muscle, because it serves to bend the legs inward, as the taylor's use to have them when at work. See *Tab. Anat. (Miol.)*

fig. 1. n. 40. fig. 2. n. 38.

LONGUS Cubiti, is a muscle, which, with others, extends the cubitus.—It arises from the inferior costa of the scapula, nigh its neck, and passing betwixt the two round muscles, descends on the back side of the humerus; where it joins with the *brevis*, and *brachialis externus*.

LOOF, or, as it is usually pronounced, *LUFF*, a term used in conding of a ship.—Thus,

Loof up, is to bid the steersman keep nearer to the wind.

Loof into an Harbour, is to sail into it close by the wind.

To spring the Loof, or *Luff*, is when a ship that was going large before the wind, is brought close by the wind.

When a ship sails on a wind, that is, on a quarter-wind, they say to the steersman, *keep your luff! steer no more! keep her to! touch the wind!* have a care of the lee-latch! All which words signify much the same thing, and bid the man at helm to keep the ship near the wind.

Loof of a Ship, denotes that part of her aloft, which lies just before the cheff-trees.

Hence, the guns which lie here are called *loof-pieces*.

LOOKING-Glass, a plain glass speculum, or mirror, which being impervious to the light, reflects its rays, and so exhibits the images of objects placed before it.

The theory of *looking-glasses*, and the laws whereby they give the appearances of bodies, see under *MIRROR*.

The manner of grinding and preparing *LOOKING-glasses*, is as follows:—A plate of glass is fixed to a horizontal table, and to another lesser table is fixed another plate, over the hind part of which is added a box loaded with flones, and other weights.—Over the first plate is sprinkled fine sand and water, in a sufficient quantity, for the grinding, and the second or less plate is laid on it, and thus worked this and that way, till each has planed the other's surface.—As they begin to grow smoother, finer sand is used, and at last powder of fine.—Being thus fitted for polishing, a wooden parallel-spindle, lined with tripoli earth, or burnt tin, tempered with water, is laid on the plate, and worked to and again, till the glass have got a perfect politure.

It is found extremely difficult to bring the glass to an exact plainness. Hevelius judges more art required to bring glass to a perfect plane, than to a sphere.—For polishing large plates of glass, they have a machine for the purpose.

The plates being polished, a thin blotting paper is spread on a table, and sprinkled with fine chalk; and this done, over the paper is laid a thin lamina, or leaf of tin, on which is poured mercury, which is to be equally distributed over the leaf, with a hare's foot, or cotton. Over the leaf is laid a clean paper, and over that the glass plate.—With the left hand the glass-plate is pressed down, and with the right the paper is gently drawn out; which done, the plate is covered with a thicker paper, and loaded with a greater weight, that the superfluous mercury may be driven out, and the tin adhere more closely to the glass. When it is dried, the weight is removed, and the *looking-glass* is complete.

Some use an ounce of mercury with half an ounce of marcasite, melted by the fire; and left the mercury evaporate in smoke, pour it into cold water; and when cold, squeeze it through a cloth or leather. Some also add a quarter of an ounce of lead and tin to the marcasite, that the glass may dry the sooner. See *FOLIATING*.

LOOM, the weaver's frame; a machine whereby several distinct threads are wove into one piece.

Looms are of various structures, accommodated to the various kinds of materials to be wove, and the various manner of weaving them; viz. for woollens, silks, linens, cottons, cloths of gold; and other works, as tapestry, ribbands, stockings, &c. divers of which will be found under their proper heads. See *WEAVING*.

Heir-Loom, in law. See the article *HEIR-Loom*.

LOOP-Hole, in the sea language, are holes made in the coamings of the hatches of a ship, to fire muskets through in a close fight.

LOOSE Style. See the article *STYLE*.

LOOSENED. See the article *HOOF-loosened*.

LORD*, a title of honour attributed to those who are noble, either by birth, or creation; and vested with the dignity of a baron.

* The word is of Saxon origin, and primarily denotes a bread-giver, alluding to the hospitality of our ancient nobles: It is formed, according to Cambræn, from *hlaford*, afterwards *hlaford*, a compound of *hlaf*, bread, and *ford*, to supply, afford.

In this sense, *lord* amounts to the same with *peer* of the realm, *lord of parliament*.

LORD is also applied to those so called by the courtesy of England; as also sons of a duke, or marquiss; and the eldest son of an earl.

LORD is also an appellation given to divers persons honourable by office; as *lord chief justice*, *lord chancellor*, *lord of the treasury*, *admiralty*, &c.

LORD is also a title sometimes given to an inferior person who has a fee, and consequently the homage of tenants within his manor.

For by his tenants he is called *lord*, and in some places, for distinction sake, *land-lord*.

It is in this last signification that the word *lord* is principally used in our law-books; where it is divided into *lord paramount*, and *lord mesn*.

LORD MESN, is he that is owner of a manor, and by virtue thereof hath tenants holding of him in fee, and by copy of court-roll; and yet holds himself of a superior *lord* called *lord paramount*.

We also read of *very lord*, and *very tenant*. See **VERY**.

Very LORD, is he who is immediate *lord* to his tenant; and *very tenant*, he who holds immediately of that *lord*.

So that where there is *lord paramount*, *lord mesn*, and tenant; the *lord paramount* is not *very lord* to the tenant.

LORD High-admiral of England, is one of the great officers of the crown, whose trust and honour is so great, that it has seldom been given, excepting to some of the king's younger sons, or near kinsmen.

To him is, by the king, intrusted the management of all maritime affairs, as well in respect of jurisdiction, as protection; with the government of the British navy; and a power to decide all controversies, and causes maritime, as well civil as criminal; such as happen either on our own coasts, or beyond sea, among his majesty's subjects.

To him also belong such wrecks and prizes, as are called *lagon*, *jefson*, and *station*; that is, goods lying in the sea floating, or cast on shore, excepting in such royalties as are granted to other *lords* of manors, &c. with all great fishes, called *royal fish*, except whales and sturgeon; a share of prizes in time of war, and the goods of pirates and felons condemned.

The *lord high admiral* has under him many officers of high and low condition; some at sea, others at land; some of a military, others of a civil capacity: some judicial, others ministerial.

In his court, called the *court of admiralty*, all process issue in his name, not the king's, as they do in all other courts; so that the dominion and jurisdiction of the sea, may justly be filed another commonwealth, or kingdom apart, and the *lord high admiral*, the viceroy of the maritime kingdom.

He hath under him a lieutenant, who is judge of the admiralty, commonly a doctor of the civil law; the proceedings in this court, in all civil matters, being according to the civil law: but in criminal matters, they proceed by a special commission from the secretary, according to the laws of England.

LORD Privy Seal, has his office by patent: before the thirtieth of Henry VIII. he was, generally, an ecclesiastic; since which, the office has been usually conferred on temporal peers, above the degree of barons.

The *lord privy-seal* receiving a warrant from the signet office, issues the *privy-seal*, which is an authority to the lord chancellor to pass the great seal, where the nature of the grant requires the great seal.—But *privy-seals* for money begin in the treasury, from whence the first warrant issues, countersigned by the lord treasurer.—On the *lord privy seal* are attendant four clerks, who have two deputies to act for them.

LORD Steward of the King's Household, is the principal officer for the civil government of the king's servants below stairs; over the officers of which he has jurisdiction.

He is constituted by the delivery of the white staff, which is effeemed his commission.—By virtue of his office, without any other commission, he judges of all offences committed within the court, or the verge thereof, and gives judgment according to their several deserts.

At the death of the sovereign, he breaks his staff over the grave in which the royal corps is deposited, and thereby discharges all the officers under his power.

LORD Advocate. } See the article. { **ADVOCATE.**
LORD High Treasurer. } **TREASURER.**

LORD Chamberlain of the Household. }
LORD Great Chamberlain of England. } See **CHAMBERLAIN.**

LORD High Chancellor of England. }
LORDS of the Bed-chamber. } See { **CHANCELLOR.**
LORDS of the Treasury. } **BED-CHAMBER.**
 } **TREASURY.**

LORDS-Lieutenants of Counties, are officers of great distinction, appointed by the king for the managing the standing militia of the county, and all military matters therein.

They are generally of the principal nobility, and of the best interest of the county: they are to form the militia in case of a rebellion, &c. and march at the head of them, as the king shall direct.

They have the power of commissioning colonels, majors, captains, and subaltern officers; also to present the king

with the names of deputy-lieutenants; who are to be selected from the best gentry in the county, and act in the absence of the *lords-lieutenants*.

Subservient to the *lords-lieutenants*, and deputy-lieutenants, are the justices of peace; who, according to the order they receive from them, are to issue out warrants to the high and petty-constables, &c. for military service, &c.

LOT, in a law sense. See the article **SCOT**.

LOTION, **LOTIO**, popularly called *wasb*; denotes a form or medicine made up of liquid matters, chiefly used for beautifying the skin, and cleansing it from those deformities which a disordered blood sometimes throws on it; or rather, which are occasioned by a preternatural secretion. For, generally speaking, those distempers of the skin, which are accounted signs of a foul blood, proceed from the natural salts thrown off by the cutaneous glands, which ought to be washed away through the kidneys; so that instead of sweetners, which are usually prescribed on these occasions, Dr. Quincey thinks the urinary discharge should be promoted, or that of the skin rectified by proper *lotions*, or ointments and frictions.

LOTION also denotes a remedy, holding a medium between a fomentation and a bath.

There are refreshing and somniferous *lotions* for feverish persons, made of leaves, flowers and roots boiled, wherewith the feet and hands of the patient are washed; and after washing, wrapped up in linen steeped in the same decoction till dry.

There are *lotions* also for the head and hair, made of the ashes of vine-twigs.

LOTION of the Philosophers, in chymistry, is a cohobation which nature makes of what is raised up, and afterwards falls back again to the bottom of the vessel.

LOTION, in pharmacy, denotes a preparation of medicines, by washing them in some liquid, either made very light, so as to take away only the dregs; or sharp, so as to penetrate them, in order to clear them of some salt, or corrosive spirit, as is done to antimony, precipitates, magisteries, &c. or intended to take away some foulness, or other ill quality; or to communicate some good one.

LOTTERY, a kind of game at hazard, wherein several lots of merchandise, or sums of money, are deposited as prizes, for the benefit of the fortunate.

The design of *lotteries*, and the manner of drawing them, are too well known among us to need a description: they are very frequent in England and Holland, where they cannot be set on foot without the permission of the magistrate.—In France too, there have been several *lotteries* in favour of their hospitals.

M. le Clerc has composed a treatise of *lotteries*, wherein is shewn what is laudable, and what blameable in them.—

Gregorio Leti has also a book on the subject of *lotteries*.—Father Menestrier has a treatise on the same, published in 1700; where he shews their origin, and use among the Romans.—He distinguishes several kind of *lotteries*, and takes occasion to speak of chances, and resolves several cases of conscience relating thereto.

LOVE. } See the article. { **PLEASURE**, and **PAIN.**
Platonic LOVE. } **PLATONIC.**

LOUIS, **LEWIS**, **LOUIS D'OR**, or **LEWIDORE**, a French coin, first struck in 1640, under the reign of Louis XIII. and which has now a considerable currency.

Louis d'ors, at first, were valued at ten livres, afterwards at eleven, and at length at twelve and fourteen. In the latter end of the reign of Louis XIV. they were risen to twenty, and in the beginning of that of Louis XV. to thirty and thirty six, nay, forty and upwards; with this difference, however, that in the last coinings the weight was augmented in some proportion to the price, which, in the former reign, was never regarded.

On one side of the coin is the king's head seen, with his name; and on the other, a cross composed of eight L's canonized with crowns. The legend is, *Christus regnat, vivit, imperat*.—The reverse has been frequently changed; at present, it bears a hand of justice crossed in a saltire, with a scepter.

There are also *white Louis's*, or *Louis d'argent*; some of 120, others of sixty sols piece, called also *cusis*; and among us, *French crowns*, *half crowns*, &c.

On the one side of this is the king's head, and on the other the French arms, with this legend, *Sit nomen Domini benedictum*.

Knights of S. Louis, is the name of a military order, instituted by Louis XIV. in 1693.

Their collar is of a flame colour, and passes from left to right.—The king is their grand master.—There are in it eight great crosses, and twenty four commander.—The number of knights is not limited. At the time of their institution, the king charged his revenue with a fund of three hundred thousand livres, for the pensions of the commanders and knights.

LOW Airs, in horsemanship. See the article **AIRS**.

Low Plank, in fortification.

Low Hemisphere.

Low Mass.

Low Style.

Low-Bellers, in our statute-books, are persons who go in the night-time with a light and a bell; by the sight and noise whereof, birds sitting on the ground become stupefied, and so are covered with a net and taken.

Lower Exchequer.

Lower Ocean.

Lower prior Dial.

Lowering the Flag.

Lowest Region.

LOXODROMIC Table. See the article **TABLE**.

LOXODROMICS, the art or method of oblique sailing, by the loxodromy, or rhumb. See **SAILING**, and **RHUMB**.

LOXODROMY*, **LOXODROMIA**, the line which a ship describes in sailing on the same collateral rhumb. See **RHUMB**.

* The word is Greek, formed of *λοξος*, oblique, and *δρομος*, course.

The *loxodromy*, called also the *loxodromic line*, cuts all the meridians in the same angle, called the *loxodromic angle*. See **ANGLE**.

LOZENGE*, or **LOZANGE**, a kind of parallelogram, or quadrilateral figure, consisting of four equal and parallel sides, whose angles are not right, but whereof two opposite ones are acute, and the other two obtuse; the distance between the two obtuse ones being always equal to the length of one side.

* Scaliger derives the word *lozenge* from *laurencia*; this figure resembling, in some respects, that of a laurel-leaf.

In geometry, it is ordinarily called *rhombus*; and when the sides are unequal, *rhomboides*.

LOZENGE, in heraldry, is a rhombus, or figure of equal sides, but unequal angles: resembling a quarry of glass in our old windows; placed erect, point-ways.—See *Tab. Herald. fig. 69*. It is in this figure that all unmarried gentlemen and widows bear their coats of arms; because, as some say, it was the figure of the Amazonian shield; or, as others, because it is the ancient figure of the spindle.

The *lozenge* differs from the *fusil*, in that the latter is narrower in the middle, and not so sharp at the ends. See **FUSIL**.

LOZENGE is also a form of medicine, made into small pieces, to be held or chewed in the mouth, till they are melted there: the same with what are otherwise called *trochisci*, *troches*.

LUCARIA*, an ancient feast celebrated by the Romans.—Sext. Pompeius observes, that the *Lucaria* were solemnized in the wood, where the Romans, defeated and pursued by the Gauls, retired and concealed themselves.

* The word, according to Festus, and Sext. Pompeius, comes from *lucus*, a grove, or wood.—Varro derives it from *lucē*, the ablativē of the word *lux*, light and liberty.—But the former etymology seems the more natural.

It was held in the month of July, in memory of the asylum they found in that wood, which was between the Tyber and the road called *Via salaria*.

LUCIANISTS, or **LUCANISTS**, a religious sect, so called from Lucianus, or Lucanus, a heretic of the second century; being a disciple of Marcion; whose errors he followed; adding some new ones to them.

Epiphanius says, he abandoned Marcion; teaching that people ought not to marry, for fear of enriching the Creator; and yet other authors mention that he held this error in common with Marcion, and other Gnostics.—He denied the immortality of the soul; asserting it to be material.

There was another sect of *Lucianists*, who appeared some time after the Arians.—They taught, that the Father had been a Father always, and that he had the name even before he begot the Son; as having in him the power, or faculty of generation; and in this manner they accounted for the eternity of the Son.

LUCID Intervals, the fits of lunatics, or maniacs, wherein the phrenzy leaves them in possession of their reason.

It is said, lunatics are capable of making a will in their *lucid intervals*.

LUCIDA Corona, a fixed star, of the second magnitude, in the northern crown. See **CORONA Borealis**.

LUCIDA Lyra, a bright star, of the first magnitude, in the constellation Lyra. See **LYRA**.

LUCIDUM Septum. See the article **SEPTUM**.

LUCIFERIANS, a religious sect, who adhered to the schism of Lucifer bishop of Cagliari, in the fourth century.

S. Augustine seems to intimate, that they believed the soul transmitted to the children from their fathers.—Theodoret says that Lucifer was the author of a new error.—The *Luciferians* increased mightily in Gaul, Spain, Egypt, &c.

The occasion of the schism was, that Lucifer would not allow any acts he had done to be abolished.—There were but two *Luciferian* bishops, but a great number of priests and deacons.—The *Luciferians* bore a peculiar aversion to the Arians.

LUDI Circenses. See the article **CIRCENSES**.

LUDI Florales. See the article **FLORALES**.

LUDICROUS Games. See the article **GAMES**.

LUES, in a general sense, is used for a disease of any kind.

LUES, in a more particular sense, is restrained to contagious and pestilential diseases.

LUES, in the more common and modern use of the word, especially when joined with *gallica*, or *venerica*, is restrained only to the French pox. See **VENEREAL Disease**.

LUFF, a sea term, the same with *loof*. See **LOOF**.

LULLY's Art. See the article **ART**.

LUMBAGO, pains about the loins, and the small of the back; such as precede ague-fits and fevers.

They arise commonly from fullness, and acrimony; in common with a disposition to yawning, shuddering, and erratic pains in other parts; and go off with evacuation, generally by sweat, and other critical discharges of fevers.

LUMBAL Glands. See the article **GLAND**.

LUMBAL Nerves. See the article **NERVE**.

LUMBARI S, an epithet given to those branches of the aorta, which carry the blood to the muscles of the loins.

LUMBARI S, is also applied to certain veins, which bring back the blood from the loins into the trunk of the vena cava.

There is also a muscle of the thigh which bears this name. See **PSOAS**.

LUMBRICAL*, **LUMBRICALIS**, an appellation given to four muscles of the hand, and as many of the feet, which act as adductors of the fingers, and toes.

* The word is formed from *lumbus*, worm; on account of their figure, and function, when given them a resemblance to worms.—On which account, they are also called *vermicularis*.

LUMBRICALES Manus, are muscles of the hands, commonly supposed to be nothing but branches of the tendons of the perforans, which go to the inside of the first bone on each finger, and are supposed to contribute to the variety of motions with the first phalanx, by giving a diversion to the direct actions of the other tendons; but in some cases, they are supposed to draw the fingers towards the thumb.—Though Mr. Cowper observes, that some of them have distinct origins; and suspects that the rest may have likewise, and therefore makes them distinct muscles.

LUMBRICALES Pedis, are muscles of the feet, which arise, as in the hand, one from each tendon of the perforans, or profundus, and go to the inside of each of the lesser toes.

LUMINOSA Semita. See the article **SEMITA**.

LUMINOUS Columna. See the article **COLUMN**.

LUMINOUS Fire. See the article **FIRE**.

LUNA, in astronomy, the moon. See the article **MOON**.

LUNA, in the jargon of the chymists, signifies *silver*; so called from the supposed influence of the moon thereupon.

The medicinal virtues of this metal, Dr. Quincy says, are none at all, until it have undergone very elaborate preparations. See **SILVER**.

Crystals of LUNA. See the article **CRYSTAL**.

Vitriol of LUNA. See the article **VITRIOL**.

LUNALE Bezoardicum. See the article **BEZOARDICUM**.

LUNAR, something belonging to the moon. See **MOON**.

LUNAR periodical Months, consist each of twenty seven days, seven hours and a few minutes.

LUNAR synodical Months, consist of twenty nine days, twelve hours, and three quarters of an hour.

LUNAR Years, consist of three hundred and fifty four days, or twelve synodical months.

In the first ages, the year used by all nations was *lunar*: the variety of course being more frequent in this planet, and of consequence more conspicuous, and better known to men, than those of any others.—The Romans regulated their year, in part, by the moon, even till the time of Julius Cæsar. The Jews too had their *lunar* months.—Some rabbins pretend, that the *lunar* month did not commence till the moment the moon began to appear; and that there was a law, which obliged the person who discovered her first, to go and inform the sanhedrin thereof.—Upon which the president solemnly pronounced the month begun, and notice was given of it to the people by fires lighted on the tops of mountains. But this looks somewhat chimerical.

LUNAR Dial. See the article **DIAL**.

LUNAR Eclipse. See the article **ECLIPSE**.

LUNAR Horoscope. See the article **HOROSCOPE**.

LUNAR Rainbow. See the article **RAINBOW**.

LUNATIC

LUN

LUNATIC, LUNATICUS, a person affected, or governed by the moon.—Hence, epileptics were anciently called *lunatic*, in regard the paroxysms of that disease seem to be regulated by the changes of the moon.

Mad people are still called *lunatics*, from an ancient opinion, that they are much influenced by that planet.—A much sounder philosophy hath taught us, that there is something in it; but not in the manner the ancients imagined; nor otherwise than what the moon has in common with other heavenly bodies, occasioning various alterations in the gravity of our atmosphere, and thereby affecting human bodies.

LUNATION, the period or space of time between one new moon and another.

Lunation is also called *synodical month*; consisting of 29 days, 12 hours, and three quarters of an hour. See **MONTH**, &c.

At the end of 19 years the same *lunations* always return, on the same day; but not at the same precise time of the day; there being a difference of one hour, 27 minutes, and 33 seconds: wherein the ancients were mistaken, taking the use of the golden number to be more sure and infallible than it is.

It has been found since, that in 312 years and a half, the *lunations* gain a day on the beginning of the month; so that when they came to reform the calendar, the *lunations* happened in the heavens, four or five days sooner than was shewn by the golden number.—To remedy which, we now make use of the perpetual cycle of epacts.

We take 19 epacts, which answer to a cycle of 19 years; and when at the end of 300 years the moon has gained a day, we take 19 other epacts: which is also done, when by the omission of an intercalary day, which happens three times in 400 years, the calendar is adjusted to the sun.

Care is taken that the index of the epacts must never be changed, excepting at the conclusion of a century, when there is occasion for it, on account of the metempsychosis, or precession; that is, of the lunar or solar equation.—

When the bixestile or intercalary day is suppressed without a lunar equation, the next following, or lower index is taken, as was done in 1700.—When there is a lunar equation, without suppressing the bixestile, the next preceding, or higher index is taken; as will be done in 2400.—When there is both an equation, and a suppression, as in 1800; or neither the one nor the other, as in 2000; the same index is retained. See **EPACT**.

LUNE, LUNULA, in geometry, a plane in form of a crescent, or half-moon; terminated by the circumference of two circles, that intersect each other within.

Though the quadrature of the entire circle was never yet effected, yet geometers have found out the squares of many of its parts.—The first partial quadrature was that of the *lunula*, given by Hippocrates of Scio, who, of a shipwrecked merchant, commenced geometer. See **CIRCLE**, and **QUADRATURE**.

Let *AEB* (Tab. Geometry, fig. 8.) be a semicircle, and *GC=GB*; with the radius *BC* describe a quadrant *AFB*; then will *AEBFA* be Hippocrates's *lune*.

And since *B C^2 = 2 GB^2*, the quadrant *AGBC* will be equal to the semicircle *AEB*; taking away therefore from each the common segment *AFBGA*; *AEBFA = to the triangle ACB = GB^2*.

LUNE, in fortification. See the article **DEMI-LUNE**.

LUNETTE, in fortification, an enveloped counter-guard, or elevation of earth, made in the middle of the *fois*, before the curtain, about five fathom in breadth.

Lunettes are usually made in ditches full of water, and serve to the same purpose as *saussibrays*, to dispute the passage of the ditch.

The *lunette* consists of two faces, which form a re-entering angle; and its terreplein being only twelve feet wide, is a little raised above the level of the water; having a parapet three fathom thick.

LUNGS, a part of the human body, composed of vessels, and membranous vesicles; serving for respiration.

The lungs are connected, above, to the fauces, by means of the trachea; and below, to the vertebrae of the thorax; and to the sternum and diaphragm, by means of the pleura.—They are divided into two great lobes, by the mediastinum, and those again into others lesser; the right sometimes into three or four, by means of some fissures running from the fore to the back edge.—The great lobes, when inflated, resemble each of them a horse's hoof in figure, but together they are liker an ox's inverted.—See Tab. Anat. (Splanchn.) fig. 12. *it. t. t. fig. 14.*

The substance of the *lungs* is membranous, consisting chiefly of innumerable cells or vesicles; which seem to be nothing but expansions of the membranes of the bronchia, to which they hang like grapes in clusters; so that by blowing into one of the branches of the bronchia, those cells or vesicles belonging to it, are blown up; the rest, which do not, remaining still flaccid and unaltered. See **BRONCHIA**.

LUP

These clusters of vesicles, or cells, are called the *internal lobules*; by which name they are distinguished from the lesser lobes spoken of.—They are separated from one another by interstices, which receive the vessels; and are filled up with membranes propagated from the lobules, and lying some parallel, some angular.—These lobules discover and display themselves very exactly, if the larger trunks of the bronchia be laid open, and the lesser branch into; by which means every lobule belonging to that branch will be inflated, and rise very distinctly, and shew its extent.

The whole substance of the *lungs* is covered with a common membrane, which is divisible into two coats; the outer thin, smooth, and nervous; the inner somewhat thicker and rougher, consisting mostly of the extremities of vessels and veins, through the impression of which it is pitted, and resembles, in some measure, a honey-comb.—Some affirm, that in this coat are abundance of perforations or pores, so disposed, that they readily imbibe any humidity from the cavity of the thorax, but suffer nothing to escape into it: but this seems little more than fancy.

The vessels of the *lungs* are the bronchia, the pulmonary and bronchial arteries and veins, nerves and lymphatics.—Of these vessels some are *proper*, and some *common*, in respect of the service they are of to the rest of the body.—The *common* are the bronchia, the pulmonary artery and vein, the nerves and lymphatics; the *proper* are the bronchial artery and vein.

Dr. Willis, contrary to the common opinion, ascribes to the *lungs* a great number of nerves, which come from the trunk of the par vagum; and which, being distributed through the substance of the *lungs*, embrace the aerious and sanguiferous vessels. He also asserts, that the vesicles have muscular fibres, to enable them to exert a greater contractive force in expiration; though others deny any such fibres.—Diemerbroeck observes, that the vesicles admit not only of air, but also of other grosser matters; and instances two asthmatic persons which he opened; the one a stone-cutter, the vesicles of whose *lungs* were so stuffed with dust, that, in cutting, his knife went as if through a heap of sand; and the other a feather-driver, in whom the vesicles were full of the fine dust, or down of feathers. See **ASTHMA**.

Polypus of the LUNGS. See the article **POLYPUS**.

LUNISOLAR, in astronomy and chronology, denotes something composed of the revolution of the sun, and of that of the moon.

LUNISOLAR Year, is a period of years made by multiplying the cycle of the moon, which is nineteen, by that of the sun, which is twenty eight; the product of which is five hundred thirty two; in which space of time, those two luminaries return to the same point.

LUNULAR Angle. See the article **ANGLE**.

LUPERCALIA*, feasts instituted in ancient Rome, in honour of the god Pan.

* The word comes from *Lupercal*, the name of a place under the Palatine mountain, where the sacrifices were performed.

The *lupercalia* were celebrated on the fifteenth of the calends of March, that is, on the fifteenth of February, or, as Ovid observes, on the third day after the ides. They are supposed to have been established by Evander.

On the morning of this feast, the *luperci*, or priests of Pan, ran naked through the streets of Rome, striking the married women they met on the hands and belly, with a thong, or strap of goat's leather, which was held an omen promising them fecundity, and happy deliveries. See **LUPERCAL**.

The reason of this indecent custom, in celebrating the *lupercalia*, took its rise from Romulus and Remus; for while they were assisting at this feast, a body of robbers, taking hold of the occasion, plundered them of their flocks. Upon this the two brothers, and all the youth that were with them, throwing off their clothes, to be the more expeditious, pursued the thieves, and recovered their prey.—This succeeded so well, that thenceforward this ceremony became a part of the *lupercalia*.

This feast was abolished in the time of Augustus, but it was afterwards restored, and continued to the time of the emperor Anastasius.—Baronius says, it was abolished by the pope, in 496.

LUPERCAL, a name given to the priests of the god Pan.

The *luperci* were the most ancient order of priests in Rome; they were divided into two colleges, or companies, the one called *Fatui*, and the other *Quintili*. To these Cæsar added a third, which he called *Julii*.

Suetonius mentions the institution of this new college of *luperci*, as a thing that rendered Cæsar more odious than he was; however, it appears from the same passage of Suetonius, that this new company was not instituted by Cæsar, nor in honour of Pan, but by some friends of Cæsar, and in honour of himself.

LUPI Crepitus. See the article **CREPITUS**.

Centaurus cum LUPO. See the article **CENTAURUS**.

LUPI

LUPUS, *Wolf*, in astronomy, a southern constellation, consisting of nineteen stars. See **CENTAUR**.

LURE*, in falconry, a piece of red leather cut in form of a bird, with two wings, fluck with feathers; and sometimes baited with a piece of flesh: wherewith to reclaim, or call back a hawk.

* The word comes from the French *lurre*, which signifies the fame; formed, according to Skinner, from the Anglo-Saxon, *leura*, traitor; or, according to Tripaud, from *lora*, craftiness.

LUSTER, or **LUSTR**, gloss, or brightness appearing on any thing; particularly on manufactures of silk, wool, or stuff.

LUSTR is also used for a certain composition, or manner of giving that gloss, or brilliance.

The *lustre* of silks, in which their chief beauty consists, is given them by washing in soap, then clear water, and dipping them in alum-water cold.

The *lustre* of black taffety is given by double-brewed beer, boiled with orange or lemon juice; that of coloured taffeties with water of gourd, distilled in an alembic.

Curriers give a *lustre*, or gloss to their leather, several ways, according to the colour to be illustrated.—For blacks, the first *lustre* is with juice of barberries; the second with gum arabic, ale, vinegar, and Flanders glue boiled together: for coloured leathers, they use the white of an egg beaten in water: Morocco's have their *lustre* from juice of barberries, and lemon or orange.

For hats, the *lustre* is frequently given with common water, sometimes a little black dye is added.—The same *lustre* serves skinners, except that in white furs they never use any black dye.—For very black furs, they sometimes prepare a *lustre* of galls, copperas, Roman alum, ox's marrow, and other ingredients.

The *lustre* is given to cloths and mohairs, by pressing them under the calendar. See **CALENDAR**, and **PRESSING**.

LUSTRAL, an epithet applied by the antients, to the water used in their ceremonies, to sprinkle and purify the people.

From them the Romanists have borrowed the holy water used in their churches.

LUSTRAL DAY, *Dies Lustricus*, that whereon the illustrations were performed for a child, and its name given; which was usually the ninth day from the birth of a boy, and the eighth from that of a girl. Though others performed the ceremony on the last day of that week wherein the child was born, and others on the fifth day from its birth.

Over this feast-day the goddess Nundina was supposed to preside, the midwives, nurses, and domestics handed the child backwards and forwards, around a fire burning on the altars of the gods, after which they sprinkled it with water. The old women mixed saliva and dust with the water.—The whole ended with a sumptuous entertainment.

LUSTRATION, *Expiation*; sacrifices, or ceremonies, by which the Romans purified their cities, fields, armies, or people defiled by any crime, or impurity.

Some of their *lustrations* were public, others private.

There were three species, or manners of performing *lustration*; viz. by fire and sulphur; by water; and by air; which last was done by fanning and agitating the air round the thing to be purified.

There was also a peculiar kind of *lustration* for young children.

Lomier has a volume express on the *lustrations* of the antients: Joh. Lomeieri Zutphanensis *Epimenides, seu de veterum gentium Lustrationibus*; first printed at Utrecht in 1681, and since, with additions, in 1702. 4^o.

All persons, slaves only excepted, he shews, were ministers of some sort of *lustration*.—When any one died, the house was to be swept after a particular manner, by way of purification: the priest threw water on new married people, with the like intention.—To purify themselves, people would even sometimes run naked through the streets; such was their extravagance. And, as if fancy was not fertile enough in inventing modes of *lustration*, they even used enchantments to raise the dead, in order to get instructions what they must do to purge themselves of their sins. Add, that they frequently raised the opinion of the sanctity of their expiations by fictitious miracles.

The birds, say they, practise *lustration*, both by washing themselves, and throwing water on their nest. The hen takes straw, and uses it to purify her chickens.—There was scarce any action, at the beginning and end of which the gentiles did not perform some ceremony to cleanse themselves, and appease the gods. When they had no animals to sacrifice, they made the figure of the beast they would offer in dough, metal, or other matter; and thus sacrificed in effigy.

Some expiations were performed in the water; for which reason certain fountains and rivers were in great reputation:

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others were performed in the air.—A certain heathen cald ed himself to be *laouste* sifted in a sieve, as we now sift corn: another hanging himself by a cord, and was tossed backwards and forwards: another shut his eyes, and set himself blindfold to find out a nosegay tied to a cord: others played at see-saw, as a more efficacious way of appeasing the gods.

Fire was much used for expiation: Sometimes the penitents were cast into the fire; at others, they were only brought to the flame, or smoke.

It was common on these occasions, to shed human blood: The priests of Cybele, Belona, and Isid, made cruel incisions on themselves.—Erechtheus, king of Attica, sacrificed his daughter to Proserpina. Several hid their throats cut at Rome, to obtain the emperor's health from the gods. Those who commanded armies, offered one of their soldiers to appease the anger of the gods; that he alone might suffer all the wrath the army deserved.

All sorts of perfumes and odoriferous herbs, had place in *lustration*.—The egg was much used among them, as being the symbol of the four elements: its shell, they say, represents the earth; the yolk, a globe of fire; the white, resembles the water; and besides it has a spirit, they say, which represents the air. For this reason it is, that the bonzas, or Indian priests, believe to this day that the world came out of an egg.—There is scarce any pot-herb, pulse, tree, mineral, or metal, which they did not offer the gods by way of expiation: Nor did they forget milk, bread, wine, or honey: what is more, they made use of the very pittle, and urine.

The poets had reign'd that the gods purified themselves, and they did not omit to purify their statues.—They made a *lustration* for children, the eighth day after their birth.—When a man who had been falsely reputed dead, returned home, he was not to enter his house by the door.—It was a settled custom to offer no expiation for those who were hanged by order of justice; or that were killed by thunder. Neither did they offer any for those who were drowned in the sea; it being their common opinion, that their souls perished with their bodies. And hence it was, that persons in danger of shipwreck, threw their bodies through their bodies, that they might not die in the sea; where they thought their souls, which they supposed to be a flame, would be totally exting.

The most celebrated expiatory sacrifice was the hecatomb, when they offered ten sacred beasts; though they commonly did not offer so many; but contented themselves with killing twenty five; but these being quadrupeds, their feet came to an hundred.

Lustrations, and *lustratory* sacrifices were not only performed for men, but also for temples, altars, theatres, trees, fountains, rivers, sheep, fields and villages. When the Arval brothers offered a victim for the fields, their sacrifice was called *ambracalia*.

Cities were all to be purified, from time to time: Some walked the victim round their walls, and then slew him.—

The Athenians sacrificed two men, one for the men of their city, and the other for the women. The Corinthians sacrificed the children of Medea so; though the poets say, Medea killed them herself. The Romans performed the ceremony of purifying their city every fifth year; whence the name of *lustrum*, was given to the space of five years.

Divers of the expiations were austere: some fasted; others abstained from all sensual pleasures: some, as the priests of Cybele, castrated themselves; others, that they might live chaste, eat rue, or lay under the branches of a shrub called *agnus castus*. See **AGNUS CASTUS**.

The postures of the penitents were different, according to the different sacrifices: They sometimes joined prayers to the solemnity; at other times, a public confession of sins was made.—The Indians, when they sacrificed to Hercules, called him a thousand reproachful names; and that when they incurred his anger, if any respectful term come out of their mouth.

The priests changed their habits, according to the ceremonies to be performed: white, purple, and black, were the most usual colours. They had their heads always covered, and long hair, except in the sacrifices of Saturn, Hercules, Honour, and a few others: only the priests of Isis were shaven, because that goddess underwent the same operation, after the death of her husband Osiris.—In some ceremonies the priests were shod, in others bare-foot: the poets express the former by the word *vincula*. They had no girdles; nay, they durst not pronounce the word *joy*, because ivy cleaves to every thing.—In the sacrifices of Venus, and the Moon, every one took the habit of the contrary sex.—Every thing was to be done by odd numbers; because they looked on an even number which may be equally divided, as the symbol of mortality and destruction. The odd number was with them holy: hence Neptune's trident, Cerberus's three heads, and Jupiter's thunder-dart, with three points.

They cast into the river, or at least out of the city, the animals, or other things that had served for a *lustration*, or sacrifice of atonement; and thought themselves threatened with some great misfortune, when by chance they trod upon them

—At Marfeilles, they took care to feed a poor man for some time; after which, they charged him with all the sins of the country, and drove him away: Those of Leucade fastened a number of birds to a man charged with their sins, and in that condition cast him headlong from a high tower; and if the birds hindered his being killed, they drove him out of the country.

Part of these ceremonies were abolished by the emperor Constantine, and his successors; the rest subsisted till the Gothic kings were masters of Rome, under whom they expired; except that several of them were adopted by the popes, and brought into the church, where they make a figure to this day: witness the numerous consecrations, benedictions, exorcisms, ablutions, sprinklings, processions, feasts, &c. still in use in the Romish church.

LUTRUM*, a term used by the Romans, to signify a space of five years.

* Varro derives the word from *luc*, to pay; because at the beginning of every fifth year, they paid the census, or tribute imposed by the censors; whose authority, at their first institution, was continued them for five years; though afterwards it was bridged to one.—Others rather derive the word from *lustrare*, to make a review; because once in five years the censors reviewed the army.

LUTRUM was also a ceremony, or sacrifice used by the Romans, after numbering their people once in five years. See **LUSTRATION**.

LUTE, **LUTUM**, in chymistry, a composition of certain tenacious substances, wherewith to close the apertures, and junctures of vessels in distillation, &c.

Under *lute* is comprehended any sort of cement, or plaister, used either in the construction of furnaces, or in fitting to them vessels of glass, or earth, that are to resist a very violent fire.—Some *Lutes* are made of flower and water; others, of quick-lime and whites of eggs; others of iron filings, brick-dust, and linsed oil; others, of potter's earth, river sand, horses dung, powder of broken pots, caput mortuum of vitriol, dross of iron, beaten glass, flocks of wool mixed with silt water or bullock's blood.

The *lute* used by Lemery, was only two parts of sand, and one of clay, tempered together in water; which does very well for joining the noses of retorts, and their receivers in distilling of volatile spirits, &c.

In distilling by the alembic, or vesica, or copper body, with its head or serpentine, a wet bladder serves very well to *lute* the junctures of the vessels; but for the distillation of corrosive spirits, as also to stop the cracks of glasses, &c. the following composition is recommended, *viz.* starch boiled, or fish-glue dissolved in spirit of wine, with flower of sulphur, mastic, and lime slacked in milk. See *Supplement: article LUTE*.

LUTE*, a musical instrument of the string-kind; which had antiently but five rows of strings; though in course of time four, five, or six more have been added.

* Some derive the word from the German *laute*, which signifies the fiddle; or from *laute sonare*.—Scaliger and Bochart derive it from the Arabic, *allaud*.

The *lute* consists of four principal parts: the table; the body or belly, which has nine or ten sides; the neck, which has nine or ten stops or divisions marked with strings; and the head or cross, wherein are screws, for raising or lowering the strings to the proper tone.—In the middle of the table is a rose, or passage for the sound. There is also a bridge that the strings are fastened to, and a piece of ivory between the head and the neck, to which the other extremity of the strings are fitted. In playing, the strings are struck with the right hand, and with the left the stops are pressed.

The *lutes* of Bologna are esteemed the best; on account of the wood, which is said to have an uncommon disposition for producing a sweet sound.—The theorbo is an improvement on the common *lute*.

Temperament of the LUTE, denotes the alteration requisite to be made in the intervals, both with regard to concords, and discords, in order to render them more just on that instrument.

Arch-LUTE. See the article **ARCHLUTE**.

Theorbo-LUTE. See the article **THEORBO**.

LUTHERANISM, the sentiments of Dr. Martin Luther, and his followers, with regard to religion.

Lutheranism had its rise in the 16th century: its author was born at Eisleben in Thuringia, in 1483.—After his studies, he entered himself among the Augustines; and in 1512, took the cap of a doctor in theology, in the university of Wittenberg. In 1516, he attacked the school divinity in several theses.—In 1517, Leo X. having ordered indulgences to be dispensed to those who should contribute towards the building of St. Peter's church at Rome, he gave a commission thereof to the Dominicans.—The Augustines thinking they had a title to it before any body else, John Staupitz, their commissary-general, appointed Luther to preach against those dispensers of indulgences. See **INDULGENCE**.

Luther acquitted himself, in a manner, that perhaps the commissary had not imagined: from the preachers of indulgences

he proceeded to indulgences themselves, and inveighed very warmly, both against the one and the other.

At first he only advanced ambiguous propositions; but being engaged in dispute about them, he maintained them openly, and without reserve; insomuch, that in 1520 he was solemnly condemned and excommunicated by the pope.—But neither the pope's thunder, nor the condemnation of several universities, could make any impression of terror upon him; but he continued preaching, writing and disputing, not against indulgences only, but against several other corruptions which then prevailed in the church.

The character of the man, the strength of his arguments, and the weakness of his adversaries cause, soon procured him a number of followers.—And thus it was that *Lutheranism* was formed; the adherents whereto were called *Lutherans*, from *Lutherus*, a name which has a Greek turn, and which he assumed in lieu of his family name, *Lettor*, or *Lausthor*; it being the custom of those days, for men of learning to give themselves Greek names: witness Erasmus, Melancthon, Bucer, &c.

In 1523, Luther quitted the habit of a religious, and in 1524, married; after having been a happy instrument of reforming a great part of Germany, under the protection of George duke of Saxony.—He died at his native place, in 1546.

The first who received *Lutheranism*, were the people of Mansfeld, and the Saxons: it was preached at Kreichshaw, in 1521.—It was received at Gollars, Rostock, Riga in Livonia, Rentling, and at Hall in Suabia, at Augsburg, Hamburg, and Treptow in Pomerania, in 1522.—In Prussia, in 1523; at Einbeck in the dutchy of Lunenburg, at Nuremberg, and Breslaw, in 1525.—In Hesse, in 1526; at Aldenburg, Strassburg, and Brunfwick, in 1528; at Göttingen, Lemgou, and Lunenburg, in 1530; at Munster, and Paderborn in Westphalia, in 1532; at Ehlingen, and Ulm, in 1533; in the dutchy of Grubenhagen, at Hanover, and in Pomerania, in 1534; in the dutchy of Wirtemberg, in 1535; at Cöthun, in the lower Lusatia, in 1537; in the county of Lippe, in 1538; in the electorate of Brandenburg, at Bremen, Hall in Saxony, Leipsic in Misnia, and at Quedlinburg, in 1539; at Embden in East-Friesland, Hailbron, Halberstadt, and Magdeburg, in 1540; in the palatinate of the dutchy of Newburg, at Regensburg, and Wismar, in 1542; at Buxtehude, Hildesheim, and at Osnaburg, in 1543; in the lower Palatinate, in 1546; in Mecklenburg, in 1552; in the Marquisate of Durlach, and that of Hochberg, in 1556; in the county of Bunheim, in 1564; at Haguenaw, and in the lower marquisate of Baden, in 1568; and in the dutchy of Magdeburg, in 1570. *Journ.* T. I. p. 460, seq.

Lutheranism has undergone some alterations since the time of its foundation.—Luther rejected the epistle of St. James, as inconsistent with the doctrine of St. Paul, in relation to justification; he also set aside the Apocryphal; both which are now received as canonical, in the Lutheran church.

Luther reduced the number of sacraments to two, *viz.* baptism, and the eucharist; but he believed the impanation, or consubstantiation: that is, that the matter of the bread and wine remain with the body and blood of Christ; and it is in this article, that the main difference between the Lutheran and English churches consists.

Luther maintained the mass, to be no sacrifice; he exploded the adoration of the host, auricular confession, meritorious works, indulgences, purgatory, the worship of images, &c. which had been introduced in the corrupt times of the Romish church. He also opposed the doctrine of free-will; maintained predestination, asserted that we are necessitated in all we do, that all our actions done in a state of sin, and even the virtues themselves, of heathens, are crimes; that we are only justified by the imputation of the merits and satisfaction of Christ. He also opposed the fastings in the Romish church, monastical vows, the celibate of the clergy, &c.

Some authors reckon thirty nine different sects, which at different times have sprung up among the Lutherans, *viz.* the Antinomians, Samojatenes, Inferens, Antidiphorists, Antiswenfeldians, Antiglandrians, Anticalvinists, Layers on of hands, Bissacramentales, Trissacramentales, Majorites, Adiphorists, Quadrissacramentales, Luthero-calvinists, Ametes, Medislandrians, Confectionists from and wavering, Swenfeldians, Onandrians, Stanoandrians, Antilancarians, Zuinghians simple, Zuinghians figurative, Carlytadians, Eurgic Trisists, Arrabonarii spiritual, Succeldians, Servists, Davidites, or Davidi Georgians, Menanites, &c. *Journ.* T. I. p. 475.

LUTHERANS, a sect of protestants who profess *Lutheranism*, or adhere to the doctrine and tenets of Luther.

The *Lutherans*, of all Protestants, are those who differ least from the Romish church.—They are divided into several sects; the principal whereof are recited in the following articles, and in their proper places in the course of this book.

Moderate LUTHERAN, one who softens or mitigates Luther's doctrine;

doctrine; or follows the doctrine of Luther thus mitigated. — Melancthon was the first of this sect.

Lax LUTHERAN, is an appellation given to those who complied with the Interim, and who formed three different parties; that of Melancthon, Pacius, or Pfessinger, and that of the university of Leipzig, and the divines of Franconia.

Rigid LUTHERAN, one who still maintains the ancient Lutheranism of Luther, and the first *Lutherans*.

As to the articles of predestination, and grace, the *Lutherans* are no longer rigid. — The head of the *rigid Lutherans* was Flaccius Illyricus, the chief of the four authors of the *Ecclesiastical History divided into Centuries*; known under the name of *Magdeburg Centuries*, or *Centuriators*. — This man could not bear the least alteration to be made in Luther's doctrine.

LUTHERO-CALVINIST, one who holds the opinions of Calvin, together with those of Luther; so far as they are capable of subsisting together.

LUTHERO-OSIANDRIAN, one who blends together the doctrine of Luther, and that of Lucas Osiander.

LUTHERO-PAPIST, an appellation given to those *Lutherans* who excommunicated the Sacramentarians.

LUTHERO-ZUINGLIAN, one who jumbles together the opinions of Luther and Zuinglius.

Martin Bucer, of Scheffstadt in Alsace, who, from a dominican, by a twofold apostasy, as the Romanists call it, became a *Lutheran*, was the head of the *Luthero-Zuinglians*; whose tenets were not so much a mixture of *Lutheranism* and *Zuinglianism*. — But what rather entitled them to the appellation was, that they formed a society, who agreed to tolerate and bear with each other's opinions.

LUTHERN *, a kind of window over the cornice, in the roof of a building; standing perpendicularly over the naked of the wall; and serving to illuminate the upper story.

* The word comes from the French, *lucarne*, of the Latin, *lucerna*, light, or lantern.

The French architects distinguish these into various kinds, according to their various forms; as *square*, *semicircular*, *bull's eyes*, *flat arches*, *flamingo lutherns*, &c.

LUTUM Sapientiae, is the hermetical seal; made by melting the end of a glass vessel by a lamp, and twisting it up with a pair of pliers.

LUXATION *, **LUXATIO**, in medicine and surgery, the slipping of the head of a bone from its proper receptacle into another place; whereby the natural motion of the joint is destroyed.

* The word is Latin, formed from *luxare*, to loosen.

Luxation is the same with what is otherwise called *dislocation*; being the displacing of a bone, or rather the disjoining of two bones, articulated together for the motion of the part.

Luxations are either *violent*, proceeding from some external cause; as falls, strains, blows, leaps, extensions, &c. — Or *gentle*, arising from internal causes; as a natural laxity of the ligaments, a fluxion of humours, or gradual collection thereof between the joints, &c.

Luxation, properly, has place only amongst bones whose structure determines them to a manifest motion, such are all those united by diarthrosis; those articulated by synarthrosis, where there is no manifest motion, are indeed subject to fracture, caries, exostosis, &c. but not to *luxation*. See **DIARTHROSIS**, &c.

Luxations, again, are either *perfect*, or *imperfect*.

Perfect, or **complete LUXATION**, ΕΞΑΡΘΗΜΑ, is that where the head of a bone is actually started out of the cavity of another. — This is known by a tumour, or protuberance, formed by the head of the separated bone, which raises up the skin, and muscular flesh above its natural level in the part not destined to receive it; and a hollowness or sinking in the place from whence it is started, perceivable by the touch. — It is also attended with great pain, a total abolition of motion, and a shortening of the limb.

Imperfect, or **partial LUXATION**, ΠΑΡΑΡΘΗΜΑ, called also *subluxation*, is where the motion is only much impaired, the joint weakened, and a deformity perceivable in it, when compared with the opposite part, which is found. — This is otherwise called a *strain*, when it proceeds from an external cause; or, simply, a *relaxation*, when from an internal one.

A *luxation* is said to be *simple*, when it has no other accident or injury accompanying it; — *complicated*, when it is attended with a wound, inflammation, fracture, or the like.

The cure of a *luxation*, is by a speedy reduction of the dislocated member to its natural place. — To this are necessary, 1^o. *Extension*, αὐτοτενσις, which a luxated as well as fractured member requires; as well on account of the contraction of the tendons, as that the head of the bone may more directly be intruded into its seat. — This extension is made either by the hands alone, which is called *modus paleofricus*, because, among wrestlers, dislocated members use to be reduced after this manner; or by ligatures, or towels; or by instruments, or great machines, when the *luxation* is difficult, and inveterate.

2^o. After extension, follows the intruding of the joint into the natural cavity; which, likewise, may either be effected by the hands only, or by the heel, (as when the head of the os

humeri is fallen into the arm-pit) or by means of ladders, doors, pestles, or Hippocrates's instrument, called *anabæ*. — This way is termed *methodical*, by way of distinction from the third, which is called *organical*, because performed by large instruments, and machines, but now altogether out of use. Goumelinus to these adds *ambrosius*, the very act of reducing the member into its own place, which is to be known by the sound usually heard, and from the use and motion of the reduced joint.

Lastly, because on account of the laxity of the tendons, &c. the reduced bone cannot remain in its natural position, it is necessary yet further to apply compresses and bandage; by whose means the articulation is preserved safe, till the ligaments may acquire their usual strength of elasticity and attraction.

LYCANTHROPY *, ΛΥΚΑΝΘΡΩΠΙΑ, a species of madness, wherein those affected run, in the night time, howling about the fields like wolves; and sometimes bite and snarl like dogs: whence the disease is also called by the antients, *cynanthropy*.

* The word is formed of the Greek λυκος, wolf, and ανθρωπος, q. d. man-wolf.

Lycanthropy is also used by some to express an imaginary metamorphosis of a man into a wolf, by magic power; wherein the persons affected seem not only to themselves in the form of wolves, but to others.

LYCEUM, ΛΥΚΕΙΟΝ, the name of a celebrated school, or academy at Athens, where Aristotle explained his philosophy.

The place was composed of portico's, and trees planted in the quincunx form, where the philosophers disputed walking. Hence, *philosophy of the lyceum* is used, to signify the philosophy of Aristotle, or the peripatetic philosophy.

Suidas observes, that the *lyceum* took its name from its having been originally a temple of Apollo *Lyceus*; or rather, a portico, or gallery built by Lycus, son of Apollo; but others mention it to have been built by Pisistratus, or Pericles.

LYCOCTONON. See the article **ACONITE**.

LYDIAN Mode. See the article **MODE**.

LYGMOS, ΛΥΓΜΟΣ. See the article **HICCUP**.

LYMPH, **LYMPHA**, in anatomy, a thin transparent humour, something like water; secreted from the serum of the blood in all parts of the body, and returned to the blood again, by proper ducts of its own, called *lymphatics*; and supposed, by some, to be the immediate matter of nutrition.

If the *lymph* be chymically examined, it will be found to contain a great deal of volatile, but no fixed salt, some phlegm, some sulphur, and a little earth.

The use of the *lymph* may be gathered from the consideration of the parts into which it discharges itself. — That which comes from the head, neck, and arms, is thrown into the jugular and subclavian veins. — All the lymphatics, which the parts in the cavity of the thorax send out, empty themselves into the thoracic duct; and the *lymph* from all the rest of the body, flows to the common receptacle: so that there can be no doubt, but that its chief use is to dilute, and perfect the chyle, before it mixes with the blood.

LYMPHATICS, or **LYMPH DUCTS**, a sort of fine, small transparent vessels, generally arising from the glands, and conveying back to the blood a transparent liquor called *lymph* or *lymph*.

These, though not so visible as the other vessels, because of their minuteness, and transparency, are, however, existent in all parts of the body; but the difficulty of finding them, has prevented their being described in many parts.

The *lymphatics* are contracted at small and unequal distances by two opposite semi-lunar valves, which permit the lymph to pass through them towards the heart; but shut, like flood-gates, upon its returning.

They arise in all parts of the body, but after what manner, needs no great dispute; for without doubt, all the liquors in the body, excepting the chyle, are separated from the blood in the fine capillary vessels, by a different pipe from the common channel in which the rest of the blood moves: but whether this pipe be long or short, whether it be visible or invisible, it is still a gland, whilst it suffers some part of the blood to pass through it; denying a passage to the rest.

Now, the glands which separate the lymph must be of the smallest kind, for they are invisible to the finest microscope; but their excretory ducts, the *lymphatic vessels*, unite with one another, and grow larger, as they approach the heart: yet they do not open into one common channel, as the veins do; for sometimes we find two, or three, or more *lymphatics*, running by one another; which only communicate by short intermediate ducts, and which unite, and immediately divide again. — In their progress, they always touch at one or two conglobate or vesicular glands, into which they discharge themselves of their *lymph*. — Sometimes the whole *lymphatic* opens, at several places, into the gland; and sometimes it sends in only two or three branches, whilst the main trunk passes over, and joins the *lymphatic* which arise from the opposite sides of the gland, exporting again their lymph to their common receptacle.

The glands of the abdomen, which receive the *lymphatics* from all its parts, as likewise from the lower extremities, are the glandule inguinales, hæmæ, iliacæ, lumbares, mesentericæ, and hepaticæ; all which send out new *lymphatics*, which pour their contents into the receptaculum chyli; as those of the chest, head, and arms do into the ductus thoracicus, jugular and subclavian veins.

These glands are round and smooth bodies, about the bigness of a hazel nut, bigger or lesser, according to the number of *lymphatics* they receive.—Their substance is membranous, and their whole bulk divided into little cells, which receive the lymph from the *lymphatics*; and are therefore improperly called *glands*, because they separate no liquor from the blood. It is true, that their exporting *lymphatics*, communicating with their arteries, do receive a lymph from them; but this is done without the help of conglobate glands; as the lacteal veins do with the capillary arteries of the guts: the chief use of their vesicular bodies seems to be, that the slow-moving lymph may receive a greater velocity from the elastic contraction of their membranous cells, as well as from the new lymph immediately derived from the arteries. See GLAND.

LYRA, a constellation in the northern hemisphere.

The number of its stars in Ptolemy's and Tycho's catalogues are 10, in the Britannic catalogue 19; the names, places, longitudes, latitudes, and magnitudes whereof, are as follow:

Stars in the constellation Lyra, or Vultur Cadens.

Names and Situations of the Stars.	Sign.	Longitude.	Latitude North.	Magnit.
South, in the preced. wing of the Vult.	♊	3 35 39	59 24 42	5
North. of the fame	♊	5 55 19	62 46 40	6
Lucida in the shell called <i>Lyra</i>	♊	10 57 18	51 45 31	1
Bright star the most nor. of the adjacent	♊	14 17 42	62 26 05	5
Another contiguous.	♊	14 17 17	62 22 31	6
South of these	♊	13 46 55	60 23 13	5
Contiguous also to this	♊	13 47 29	60 22 16	7
lyre	♊	14 19 42	55 29 48	6
Sou. of the preced. in the jugum of the	♊	14 17 58	55 13 58	6
North. of the preced. in the jugum	♊	14 35 39	56 01 48	3
Preced. in the root of either horn	♊	17 03 51	59 26 39	3
Subseq. of the fame	♊	17 21 39	59 21 54	4
North. of those that foll. in the jugum	♊	17 37 00	55 03 28	3
South. of the fame	♊	17 53 36	54 28 16	6
	♊	20 35 18	54 33 02	6
In the middle of the body	♊	21 54 08	58 03 44	6
	♊	21 43 39	53 09 02	6
In the eastern part of the shell	♊	25 46 19	60 42 51	5
South. of the fame	♊	26 14 11	59 36 20	5

LYRÆ *Lucida*. See the article LUCIDA.

LYRE, LYRA, a stringed instrument much used among the antients; said to have been invented by Mercury, on occasion of his finding a dead shell-fish, called by the Greeks, *chelone*, and Latins, *testudo*, left on an inundation of the Nile; of the shell whereof he formed his *lyre*; mounting it with seven strings, according to Lucian, and adding a kind of jugum to it, to stretch or loosen the strings.

Boetius relates the opinion of some, who say, that Mercury's *lyre* had but four strings, in imitation of the mundane music of the four elements.—Diodorus Siculus says it had but three strings, in imitation of the three seasons of the year; which were all the Greeks counted, viz. spring, summer, and winter.—Nicomachus, Horace, Lucian, and others, make it have seven strings, in imitation of the seven planets.

This three, four, or seven stringed instrument, they say Mercury gave to Orpheus; who being torn to pieces by the Bacchantes, the *lyre* was hung up by the Lesbians in Apollo's temple.—Others say, Pythagoras found it in some temple in Egypt, and added an eighth string.—Nicomachus says, that when Orpheus was killed this *lyre* was cast into the sea, and thrown up at Antissa, a city of Lesbos; where the fishermen finding it, gave it to Terpander; who carried it into Egypt, and called himself the inventor.—The seven strings were diatonically

disposed, by tones, and semi-tones; and Pythagoras's eighth string made up the octave.

Mr. Barnes, in the prolegomena to his edition of *Anacreon*, has an enquiry into the antiquity and structure of the *lyre*; of which he makes Jubal the first inventor. For the several changes this instrument underwent, by the addition of new strings, he observes, that according to Diodorus it had originally only three; whence it was called τριχορδον. Afterwards, it had seven strings; as appears from Homer, Pindar, Horace, Virgil, &c. Festus Avienus gives the *lyre* of Orpheus nine strings. David mentions an instrument of that sort strung with ten, in *psalterio decachorda*. Timotheus of Miletus added four to the old seven, which made eleven. Josephus, in his *Jewish Antiquities*, makes mention of one with twelve strings; to which were afterwards added six others, which made eighteen in all.—Anacreon himself says, p. 253. of Mr. Barnes's edition, *canto viginti totis chordis*.—For the modern *lyre*, or Welsh harp, consisting of forty strings, it is sufficiently known.

From the *lyre*, which all agree to be the first instrument of the stringed kind in Greece, there arose an infinite number of others, differing in shape, and number of strings; as the psalterium, trigon, sambucus, pectis, magadis, barbiton, testudo, (the two last used promiscuously, by Horace, with the *lyre* and *cithara*) epigonium, fimmicum, and pandura; which were all struck with the hand, or a plectrum. See PSALTERY, SAMBUCA, MAGADIS, BARBITON, and CITHARA.

LYRE, among painters, staturaries, &c. is an attribute of Apollo, and the mules. See ATTRIBUTE.

LYRIC, something sung, or played on the lyre or harp. See LYRE.

LYRIC is more particularly applied to the antient odes, and stanza's; which answer to our *airs*, or *songs*, and may be played on instruments.

The antients were great admirers of *lyrick verses*; which name, Mr. Barnes observes, they gave to such verses as were sung to the lyre.

This species of poetry was originally employed in celebrating the praises of gods and heroes; though it was afterwards introduced into feasts, and public divinations: it is a mistake to imagine Anacreon, as the Greeks do, the author of it; since it appears from scripture to have been in use above a thousand years before that poet.—Mr. Barnes shows how unjust it is to exclude heroic subjects and actions from this sort of verse, *lyrick poetry* being capable of all the elevation and sublimity such subjects require; which he confirms by the example of Alcaeus, Sappho, Anacreon, and Horace, and by his own essay, *A triumphal Ode inscribed to the duke of Marlborough*, at the head of this edition: he concludes with the history of *lyrick poetry*, and of those antients who excelled in it.

The characteristic of *lyrick poetry*, which distinguishes it from all others, is *sweetness*.—As gravity rules in heroic verse; simplicity, in pastoral; tenderness, and softness, in elegy; sharpness, and poignancy, in satyr; mirth, in comedy; the pathetic, in tragedy; and the point, in epigram; so in the *lyrick*, the poet applies himself wholly to soothe the minds of men, by the sweetness and variety of the verse, and the delicacy of the words, and thoughts; the agreeableness of the numbers, and the description of things most pleasing in their own nature.

LYSIARCHA, an antient kind of magistrate, being the pontiff of Lycia, or superintendent of the sacred games of that province.

Strabo observes, that the *lysiarcha* was created in a council, consisting of the deputies of twenty three cities; that is, of all the cities in the province: some of which cities had three voices, others two, and others but one.

Cardinal Norris says, that the *lysiarcha* presided in matters of religion; in effect, the *lysiarcha* was nearly the same with the *asarcha*, and *syriarcha*; who though they were all the heads of the councils, or states of those provinces, yet were they established principally to take care of the games and feasts celebrated in honour of the gods, whose priests they were, inaugurated at the same time that they were created *lysiarcha*, *syriarcha*, or *asarcha*.

M.

M A C

M, A liquid consonant, and the twelfth letter in the alphabet.

It is pronounced by striking the upper lip against the lower; in which the pronunciation of this letter agrees with that of *b*: the only difference between the two consisting in a little motion made in the nose in pronouncing *M*, and not in *b*: whence it happens, that those who have taken cold, for *M* ordinarily pronounce *b*; the nose, in that case, being disabled from making the necessary motion. Quintilian observes, that the *M* sometimes ends Latin words, but never Greek ones; the Greeks always changing it in that case into *n*, for the sake of the better sound.

M is also a numeral letter, and among the antients was used for a thousand; according to the verse,

M caput est numeri quem scimus mille tenere.

When a dash is added at the top of it, as *ↀ*; it signifies a thousand times a thousand.

M, in astronomical tables, and other things of that kind, is used for *Meridional* or southern; and sometimes for *Meridian*, or mid-day.

M, in medicinal prescription, is frequently used to signify a maniple, or handful.

M is sometimes also put at the end of a recipe, for *misce*, mingle; or for *mixture*, a mixture. Thus, *m. f. julapium* signifies, mix and make a julap.

M, in law, the brand or stigma of a person convicted of manslaughter, and admitted to the benefit of his clergy.—It is to be burnt on the brawn of his left thumb.

MACARONIC, or **MACARONIAN** *, a kind of burlesque poetry; consisting of a jumble of words of different languages, with words of the vulgar tongue latinized, and Latin words modernized.

* *Macaronic*, among the Italians, as has been observed by Cælius Rhodiginus, signifies a coarse clownish man; and because this kind of poetry, being patch'd out of several languages, and full of extravagant words, is not so polite and smooth as those of Virgil, &c. the Italians, among whom it had its rise, gave it the name of *Macaronian* or *Macaronic* poetry. Others choose to derive it à *Macaronibus*, from *Macarons*, a kind of confection made of meal not boulded, sweet-almonds, sugar, and the whites of eggs; accounted a great dainty among the country-people in Italy; which, from their being compo'd of various ingredients occasion'd this kind of poetry, which consists of Latin, Italian, Spanish, French, English, &c. to be called by their name.

For an instance; a bold fellow, in the *Macaronic* stile, says;
Englavori omnes Scadrones & Regimandos, &c.

For another example:

*Archeros pistoliferos suriamque manantium,
Et grandem cimentam quæ inopinam facta ruella est:
Toxinumque alto troublantem corda clochero, &c.*

Theoph. Polingius, a Benedictin monk of Mantua, was the first who invented, or at least cultivated, this kind of verse: For tho' we have a *Macaronica Ariminensis* in a very old letter, beginning, *Est Autor Typis Leonici atque Paransus*; yet it seems to have been the work of Guarinus Capellus Sarlinas, who in the year 1526 printed six books of *Macaronic* poetry, in *Cabinum Gogomæ Regem*: but as both these came out after the first edition of Polingius, which was published under the name of Merlinus Coccejus in 1520; so were they likewise much inferior to his both in the style, invention, and episodes, wherewith he has enriched the history of Baldus; which make the subject of his poem.—The famous Rabelais first transferred the *Macaronic* style out of the Italian verse into French prose, and on the model thereof formed some of the best things in his *Pantagruel*.

Merlin Coccejus met with so much success in his new way, that he compos'd another book partly in *Macaronic* style, called *Il Chors del tri per uno*; but with very different success. After this, appeared in Italy, *Macaronica de syndicato, & condonazione dellorrs Samsons Lombi*, a low performance; and *Macaronis Porras*, an excellent one; by Stefano a Jesuit. In 1620, Bajani published a *Carnavale Tabula Macaronica*. The last Italian who wrote in this way, was Casar Urfinus, to whom we owe the *Capriccia Macaronica magistri Stopini poetæ Pouzanensis*, printed in 1636.

The first who succeeded in the *Macaronic* stile among the French was Antonius de Arena Prevostian de Bragardissima l'illa de Soleris, in two poems, which he has left us, of *Arte Danfanti*, & de *Guerra Neapolitana Romana & Genuesi*. He was followed by another lawyer, who wrote *Historia bravissima Caroli V. Imperat. a Provincialibus passanis triumphanter fugati*. Some time after, Remi Belleau, among his other French poetries, printed *Dictionum nutriticum de l'illo Hogenotico, & rusticoque; regimine ad sedoles*; a piece much valued. This

M A C

was succeeded by *Cacafanga Reijfo Suiffi Lanquenetorum per M. J. B. Liebiardum Recatolicatum Spalporcinum poetam*; to which Stephen Tabouret returned an answer in the same strain. Lastly, John Edward de Monin entered the lists, and left us *inter tere-tismata sua carmen arenaicum de quorundam nugigerulorum pijs-fa in-supportabili*. The *Recitus veritabilis super terribili esmeuta paisanorum de Ruellio*, is one of the best pieces of this kind.

We have little in English in the *Macaronian* way; indeed scarce any thing, except some little loose pieces collected in Camden's remains: which is no discredit to our authors: for one may say of such pieces in general,

*Turpe est difficile habere nugas,
Et stultus labor est ineptiarum.*

But the Germans and Nederlanders have had their *Macaronic* poets; witness the *Certamen catholicum cum Calvinistis*, of one Martinus Hamconius Frisius, which contains about twelve hundred verses, all the words whereof begin with the letter *C*.

MACE, **MACIS**, a medicinal bark, or rind of a fruit, being the second of the 3 coats, which cover the nutmeg. See **NUTMEG**. It is of an astringent and drying nature, and is used as a corrector in cardiac and cathartic compositions.

MACEDONIANS. See the article **SEMIARIANS**.

MACERATION, in pharmacy, the operation of dissolving a solid body by means of water, or some other liquor.

In this sense, the word amounts to much the same with liquefaction or liquation. See **LIQUEFACTION**.

MACERATION is also used for the infusing a body in any men-struous fluid, in order to a solution of its principles, whether with or without fire.

In which sense *Maceration* amounts to much the same with *Digestion*.

Others restrain *Maceration* to that particular kind of digestion, which is performed in thick substances, as when, having mixed roses with fat to make Unguent. Rosatum, the mixture is exposed for some days to the sun, that the virtue of the roses may be the better communicated to the fat.

MACHINE, **MACHINA** *, in the general, signifies any thing that serves to augment, or to regulate moving powers: or it is any body destined to produce motion, so as to save either time or force.

* The word comes from the Greek, *μηχανη*, *Machine*, *Invention*, *Art*.—And hence, in strictness, a *Machine* is something that consists more in art and invention, than in the strength and solidity of the materials; and for this reason it is that the inventors of *Machines* are called *Ingenieurs*.

Simple MACHINES are those otherwise called mechanical powers.

There are six simple *Machines*, to which all others may be reduced; viz. the balance, lever, wheel, pulley, wedge, and screw.—For the doctrine of which, see **BALANCE**, **LEVER**, &c.

Compound MACHINE is that which is composed of several simple ones combined together.

The number of compound *Machines* is now almost infinite; and yet the antients seem to have out-done the moderns in this respect; their *Machines* of war, architecture, &c. being described as vastly superior to ours.

Architectonical MACHINE, is an assemblage of pieces of wood so disposed, as that, by means of ropes and pulleys, a small number of men may raise vast loads, and lay them in their places. Such are cranes, &c.

'Tis hard to conceive what sort of *Machines* the antients must have used to raise those immense stones found in some of the antique buildings.

Hydraulic, or Water-MACHINE, is either used to signify a simple *Machine*, serving to conduct or raise water; as a sluice, pump, &c. or several of these acting together, to produce some extraordinary effect; as the

MACHINE of Marly, the primum mobile whereof is an arm of the river Seine, which, by its stream, turns several large wheels, which work the handles, and these with pistons raise the water into the pumps, and with other pistons force it up in pipes against the ascent of a hill to a reservoir in a stone tower, 62 fathom higher than the river; sufficiently to supply Versailles with a constant stream of 200 inches.

Military MACHINES, among the antients, were of three kinds; the first serving to launch arrows, as the scorpion; or javelins, as the catapulta; or stones, as the balista; or fiery darts, as the pyrabolus; the second serving to beat down walls, as the battering ram and terebra: and the third to shelter those who approached the enemies wall; as the tortoise or testudo, the vinea, and the towers of wood. See **SCORPION**, **ARIES**, &c. The *Machines of War* now in use, consist in artillery, bombs, petards, &c.

MACHINE, in dramatic poetry, is when the poet brings some

divinity or supernatural being upon the stage; to perform some exploit, or solve some difficulty out of the reach of human power.

The *Machines* of the drama are gods, angels, ghosts, &c. They are so called from the *Machines* or contrivances by which they are represented upon the stage, and afterwards removed again.

Hence, the use of the word *Machine* has also passed into the epic poem; though the reason of its name be there wanting. It denotes, in both cases, the intervention or ministry of some divinity: but as the occasion of *Machines*, in the one and the other, are somewhat different, the rules and laws of managing them are different likewise.

The ancient dramatic poets never brought any *Machine* on the stage, but where there was an absolute necessity for the presence of a god; and they were generally laughed at for suffering themselves to be reduced to such a necessity. Accordingly, *Aristotle* lays it down as an express law, that the unravelling of the piece should arise from the fable itself, and not from any foreign *Machine*, as in the *Medea*. Horace is something less severe, and contents himself with saying, that the gods should never appear, unless where the *nodus*, or knot, is worthy of their presence; *Nec deus interfit, nisi dignus vindice nodus—Inciderit*.

But 'tis quite otherwise with the epopee; in that there must be *Machines* every-where, and in every part. Homer and Virgil do nothing without them. Petronius, with his usual fire, maintains, that the poet should deal more with the gods than with men, that he should every-where leave marks of his prophetic raptures, and of the divine fury that possesses him; that his thoughts should be all full of fables, that is, of allegories and figures: In fine, he will have a poem distinguished from an history in all its parts; not so much by the verses, as by that poetical fury, which it expresses itself wholly by allegories; and does nothing but by *Machines*, or the ministry of the gods.

A poet, therefore, must leave it to the historian to say, that a fleet was dispersed by a storm, and driven to foreign shores; and must himself say, with Virgil, that Juno went to seek *Æolus*, and that this god, at her request, turned the winds loose against the Trojans.—He must leave the historian to write, that a young prince behaved himself with a great deal of prudence and discretion on all occasions; and must say, with Homer, that Minerva led him by the hand in all his enterprizes.—Let an historian say, that Agamemnon, quarrelling with Achilles, hath a mind to shew him, though mistakenly, that he can take Troy without his assistance. The poet must say, that Thetis, piqued at the affront her son had received, flies up to heaven, there to demand vengeance of Jupiter; and that this god, to satisfy her, sends the god Somnus, or Sleep, to Agamemnon, to deceive him, and make him believe, that he shall take Troy that day.

It is thus that the epic poets used *Machines* in all parts of their works; in the *Iliad*, *Odyssey*, and *Æneid*, the proposition mentions them; the invocation is addressed to them; and the narration is full of them: they are the causes of actions; they make the knots; and at last they unravel them.—This last circumstance is what Aristotle forbids in the drama; but it is what Homer and Virgil have both practised in the Epopee. Thus Minerva fights for Ulysses against Penelope's lovers; helps him to destroy them; and, the next day, herself makes the peace between Ulysses and the Ithacans; which closes the *Odyssey*.

The use of *Machines*, in the epic poem, is, on some accounts, intirely opposite to what Horace prescribes for the theatre. In tragedy, that critic will never have them used without an absolute necessity; whereas, in the Epopee, they should never be used, but where they may be as well let alone; and where the action appears as if it did not necessarily require them. How many gods and *Machines* does Virgil implore to raise the storm that drives *Æneas* into Carthage? which yet might easily have happened in the ordinary course of nature! *Machines*, in the epic poem, therefore, are not contrivances of the poet, to recover himself after he has made a false step; nor to solve any difficulty peculiar to some part of the poem; but it is the presence of a divinity, and some supernatural and extraordinary action, which the poet inserts in most of the incidents of his work, to render it more majestic and admirable, and to train up his readers to piety and virtue. This mixture should always be so managed, as that the *Machines* may be retrenched, without retrenching any thing from the action.

As to the manner in which the *Machines* are to act; it may be observed, that, in the old mythology, there are gods both good, bad, and indifferent; and that our passions may be converted into so many allegorical divinities: so that every thing, both good and bad in a poem, may be attributed to these *Machines*, and may be transacted by them.—They don't, however, always act in the same manner; sometimes they act without appearing, and by simple inspirations, which have nothing in them extraordinary or miraculous; as when we say the devil suggested such a thought, &c. The second manner

of acting is intirely miraculous; as when a divinity presents itself visible before men, so as to be known by them; or when they disguise themselves under some human form without discovering themselves. The third manner partakes of each of the two, and consists in oracles, dreams, and extraordinary inspirations: all which Boffu calls *Demi Machines*. All these manners ought to be so managed, as to carry a verisimilitude; and though verisimilitude be of a vast extent in *Machines*, as being founded on the divine power; yet it has its bounds.

Horace proposes three kinds of machines for the stage; the first is a god visibly present among the actors, which, he says, should never be introduced but on a great occasion. The second contains more incredible and extraordinary *Machines*; as the metamorphosis of Progne into a swallow, or of Cadmus into a serpent; and even these *Machines* he does not absolutely condemn, or exclude them out of the poem, but only out of the scene, and the sight of the spectators: they are not to be represented, he says; but they may be recited. The third kind of *Machines* is absolutely absurd, and he rejects it intirely: the instance he gives, is that of a child taken alive out of the belly of a monster that had devoured it. The other two manners are allowed indifferently in the Epopee; and without that distinction of Horace, which only suits the stage; it being in the drama alone, that a difference may be made between what passes in the scene, or the sight of the spectators, and what behind the curtain.

MACROCEPHALUS*, ΜΑΚΡΟΚΕΦΑΛΟΣ, denotes a person with an head larger or longer than the common size. See **HEAD**.

* The word is compounded of the Greek μακρῶς, great, and κεφαλή, head.

MACROCOSM*, ΜΑΚΡΟΚΟΣΜΟΣ, denotes the great world; that is, the universe.

* The word is compounded of the Greek μακρῶς, long, large, and κόσμος, world.

In which sense it stands contra-distinguished from *microcosm*, a term used to express man.

MACULÆ, in astronomy, dark spots appearing on the luminous faces of the sun, moon, and even some of the planets.

In which sense *Maculæ* stand contra-distinguished from *faculæ*. See **FACULÆ**.

Solar MACULÆ are dark spots, of an irregular, changeable figure, observed in the face of the sun, first taken notice of by Scheiner 1611. and afterwards accurately observed by Galileus, Hevelius, Mr. Flamsteed, Cassini, Kirch, &c.

Many of these *Maculæ* appear to consist of heterogeneous parts; whereof the darker and more dense are called by Hevelius, nuclei, and are incompassed, as it were, with atmospheres, somewhat rarer and less obscure; but the figure both of the nuclei and intire *Maculæ* are variable.—In 1644. Hevelius observed a small thin *Macula*, which, in two days time, grew to ten times its bulk; appearing withal much darker, and with a larger nucleus; and such sudden mutations are frequent. The nucleus, he observed, began to fall sensibly before the spot disappeared, and that, ere it quite vanished, it broke into four, which, in two days, again re-united. Some *Maculæ* have lasted 2, 3, 10, 15, 20, 30, but seldom 40 days; tho' Kirchus observed one in 1681, which remained from April 26th to the 17th of July.—The spots move over the sun's disk with a motion somewhat slower near the limb than near the centre: that observed by Kirch was twelve days visible on the sun's disk; for fifteen days more it lay behind it, it being the usual rule to return to the limb whence they departed in 27, sometimes in 28 days.

Lastly, it must be observed, that the *Maculæ* contract themselves nearer the limb, and, in the middle of the disk, appear much larger; those often running into one in the disk, which, in the limb, were separate: that many of them arise in the middle of the disk, and many disappear in the same; and that none of them are observed to deviate from their path near the horizon; whereas Hevelius, observing Mercury in the sun near the horizon, found him too low, being thrust 27 seconds beneath his former path.

From these phenomena we collect, 1^o, that, since Mercury's depression below his path arises from his parallax, the *Maculæ*, having no parallax from the sun, are nearer him than that planet:—but, since they are hid behind the sun three days longer than they are in the hemisphere visible to us, it follows also, that they do not adhere to the surface of the sun, but are at some distance from it.

2^o, That, since they arise and disappear in the middle of the sun's disk, and undergo various alterations with regard both to bulk, figure, and density, they must be formed *de novo*, and again dissolved about the sun; and that they are therefore, in all probability, a kind of solar clouds, formed out of its exhalations.

3^o, Since then the solar exhalations rise over his body, and are suspended at a certain height from it, it appears, from the laws of hydrostatics, that the sun must be encompassed with some fluid to drive those exhalations upwards; which fluid must be denser as it is lower, and rarer as higher, like our atmosphere:

atmosphere. And since the *Macule* dissolve and disappear in the very middle of the sun's disk, the matter thereof, i. e. the solar exhalations, must fall back again to the sun; whence there must arise changes in the sun's atmosphere, and consequently in the sun itself.

4°. Since the revolution of the *Macule* round the sun is very regular; and since their distance from the sun is very small; it is not properly the *Macule* that move round the sun, but it is himself, together with his atmosphere, wherein the *Macule* swim, that, in the space of 27 days, moves round his own axis; and hence it is, that the *Macule*, being viewed obliquely near the limb, appear narrow and oblong.

5°. Since the sun appears with a circular disk in every situation, his figure, as to sense, must be spherical.

MADDER, a red, bitter root of a plant, called by botanists, *Rubia Tinctorum*, much used by dyers to give a strong and rich red colour.

It has its uses also in medicine, being found of service in obstructions of the viscera, and cachectic constitutions; and is generally made up in form of decoctions, diet-drinks, and medicated ales. See Supplement, Article RUBIA.

MADNESS, MANIA, in medicine. See MANIA.

MADRIER, in the military art, a thick plank, sometimes armed with iron plates, having a cavity sufficient to receive the mouth of a petard when charged; with which it is applied against a gate, or other body designed to be broken down. See PETARD.

MADRIER also denotes a long and broad plank, used for supporting the earth in mining, carrying on faps, making caponiers, galleries, and the like.

There are also *Madrirs* lined with tin, and covered with earth; serving as defences against artificial fires, in lodgments, &c. where there is need of being covered over head.

MADRIGAL *, in the modern Italian, Spanish, and French poetry, denotes a little amorous piece, containing a certain number of free unequal verses, not tied either to the scrupulous regularity of a sonnet, or the subtlety of an epigram; but consisting of some tender, and delicate, yet simple thought, suitably expressed.

* Menage derives the word from *Mandra*, which, in Latin and Greek, signifies a sheepfold; imagining it to have been originally a kind of pastoral or shepherd's song; whence the Italians formed their *Madrigale*, and we *Madrigal*. Others rather chose to derive the word from *Madrugar*, which, in the Spanish, signifies to rise in the morning; the *Madrigals* being formerly sung early in the morning, by those who had a mind to serene their mistresses.

The *Madrigal*, according to M. le Brun, is an epigram without any thing very brisk and sprightly in its fall or close: something very tender and gallant is usually the subject of it: and a certain beautiful, noble, yet chaste, simplicity, forms its character.

The *Madrigal* is usually looked on as the shortest of all the lesser kinds of poems, except the epigram. It may consist of fewer verses than either the sonnet or roundelay. There is no other rule regarded in mingling the rhimes, and verses of different kinds, but the fancy and convenience of the author. This poem, however, really allows of less licence than many others; whether we regard the rhyme, the measures, or the purity of expression.

MAGAS, MAGADIS, the name of a musical instrument in use among the ancients.

There were two kinds of *Magades*; the one a string-instrument, the invention whereof is ascribed by some to Sappho; by others to the Lydians; and by some to Timotheus of Miletus.

The other was a kind of flute, which, at the same time, yielded very high and very low notes.—The former kind was, at least, much improved by Timotheus of Miletus, who is said to have been impeached of a crime; for that, by increasing the number of chords, he spoiled and discredited the ancient music.

MAGAZINE, in the military art, a place in fortified towns, where all sorts of stores are kept, and where carpenters, wheelwrights, smiths, &c. are employed in making things needful to furnish out the train of artillery.

MAGDALEN.—*Religious of St. MAGDALEN*, is a denomination given to divers communities of nuns, consisting generally of penitent courtezans; sometimes also called *Magdalenites*.

Such are those at Metz, established in 1452; those at Paris in 1492; those at Naples, first established in 1324, and endowed by queen Sancha, to serve as a retreat for public courtezans, who should quit the trade, and betake themselves to repentance; and those of Rouen and Bourdeaux, which had their original among those of Paris.

In each of these monasteries there are three kinds of persons and congregations: the first consists of those who are admitted to make vows; and these bear the name of *St. Magdalen*: the congregation of *St. Martha* is the second, and is composed of those whom it is not judged proper to admit to vows: finally, the congregation of *St. Lazarus* is composed of such as are detained there by force.

The Religious of *St. Magdalen* at Rome were established by

pope Leo X. Clement VIII. settled a revenue on them, and further appointed, that the effects of all public prostitutes, dying intestate, should fall to them; and that the testaments of the rest should be invalid, unless they bequeathed a portion of their effects, which was to be at least a fifth part, to them.

MAGI, or **MAGIANS** *, a title which the ancient Persians gave to their wife-men or philosophers.

* The learned are in great perplexity about the original of the word *Magus*, *Μαγος*. Plato, Xenophon, Herodotus, Strabo, &c. derive it from the Persian language, in which it signified a priest, or person appointed to officiate in holy things, as *druid* among the Gauls, *gymnosophist* among the Indians, and *Levite* among the Hebrews. Others derive it from the Greek *μαγος*, great; which, they say, being borrowed of the Greeks by the Persians, was returned in the form of *μαγος*; but Volpius, with more probability, brings it from the Hebrew *מגיד* *magi*, to meditate; whence *מגלים* *maglim*, in Latin *meditabundi*, q. d. people addicted to meditation.

Magi, among the Persians, answered to *σοφισται*, or *philosophoi*, among the Greeks, *sapientes* among the Latins, *druids* among the Gauls, *gymnosophists* among the Indians, and *priests* or *priests* among the Egyptians.

The ancient *Magi*, according to Aristotle and Laertius, were the sole authors and conservators of the Persian philosophy; and the philosophy principally cultivated among them was theology, and politics, they being always esteemed as the interpreters of all laws, both divine and human; on which account they were wonderfully revered by the people.—Hence Cicero observes, that none were admitted to the crown of Persia, but such as were well instructed in the discipline of the *Magi*, who taught *τα πολιτικά*, and shewed princes how to govern.

Plato, Apuleius, Laertius, and others agree, that the philosophy of the *Magi* related principally to the worship of the gods: they were the persons who were to offer prayers, supplications, and sacrifices, as if the gods would be heard by them alone.

But, according to Lucian, Suidas, &c. this theology, or worship of the gods, as it was called, about which the *Magi* were employed, was little more than the diabolical art of divination: so that *μαγεία*, strictly taken, was the art of divination.

Porphyry defines the *Magi* well: Cicero calls them *divina sapientes*, & in *isilem ministrantes*; adding, that the word *Magus* implied as much in the Persian tongue.—These people, says he, are held in such veneration among the Persians, that Darius, the son of Hytaspes, among other things, had it engraven on his monument, that he was the master of the *Magi*.

Philo-Judeus describes the *Magi* to be diligent inquirers into nature, out of the love they bear to truth; and who, setting themselves apart from other things, contemplate the divine virtues the more clearly, and initiate others in the same mysteries.

Their descendants, the modern *Magi*, or fire-worshippers, are divided into three classes; whereof the first and most learned neither eat nor kill animals, but adhere to the old institution of abstaining from living creatures. The *Magi* of the second class refrain only from tame animals: nor do the last kill all indifferently; it being the firm and distinguishing dogma of them all, *την μεταμετεμψυχωσιν εναυ*, that there is a transmigration of souls. See METEMPSYCHOSIS.

To intimate the similitude between animals and men, they use to call the latter by the name of the former: thus, their fellow-priests they called lions, the priestesses lionesses, the servants crows, &c.

MAGIC, MAGIA, MAFEIA, in its ancient sense, the science, or discipline and doctrine of the *Magi*, or wife-men of Persia.

The origin of *Magic*, and the *Magi*, is ascribed to Zoroaster: Salmalius derives the very name from Zoroaster, who, he says, was surnamed *Mog*, whence *Magus*. Others, instead of making him the author of the Persian philosophy, make him only the restorer and improver thereof; alleging, that many of the Persian rites, in use among the *Magi*, were borrowed from the Zabii among the Chaldeans, who agreed in many things with the *Magi* of the Persians; whence some make the name *Magus* common to both the Chaldeans and Persians. Thus Plutarch mentions, that Zoroaster instituted *Magi* among the Chaldeans; in imitation whereof the Persians had theirs too.

MAGIC, in a more modern sense, is a science which teaches to perform wonderful and surprising effects.

The word *Magic* originally carried with it a very innocent, nay, a very laudable, meaning, being used purely to signify the study of wisdom, and the more sublime parts of knowledge; but, in regard the ancient *Magi* engaged themselves in astrology, divination, forcery, &c. the term *Magic* in time became odious, and was only used to signify an unlawful and diabolical kind of science, depending on the assistance of the devil, and departed souls.

If any wonder how so vain and deceitful a science should gain so much credit and authority over mens minds, Pliny gives the reason of it. 'Tis, says he, because it has possessed itself

of three sciences of the most esteem among men, taking from each all that is great and marvellous in it. Nobody doubts but it had its first origin in medicine; and that it insinuated itself into the minds of the people, under pretence of affording extraordinary remedies. To these fine promises it added every thing in religion that is pompous and splendid, and that appears calculated to blind and captivate mankind. And, lastly, it mingled judiciary astrology with the rest, persuading people, curious of futurity, that it saw every thing to come in the heavens. Agrippa divides *Magic* into three kinds; *Natural*, *Celestial*, and *Ceremonial*, or *Superstitious*.

Natural MAGIC is no more than the application of natural active causes to passive things or subjects; by means whereof many surprising, but yet natural, effects are produced.

Baptista Porta has a treatise of natural *Magic*, or of secrets for performing very extraordinary things by natural causes. The natural *Magic* of the Chaldeans was nothing but the knowledge of the powers of simples and minerals. The *Magic*, which they called *Theurgia*, consisted wholly in the knowledge of the ceremonies to be observed in the worship of the gods, in order to be acceptable to them. By virtue of these ceremonies, they believed, they could converse with spiritual beings, and cure diseases.

Celestial MAGIC borders nearly on judiciary astrology: it attributes to spirits a kind of rule or dominion over the planets; and to the planets a dominion over men; and, on those principles, builds a ridiculous kind of system.

Superstitious or Gentic MAGIC consists in the invocation of devils. Its effects are usually evil and wicked, tho' very strange, and seemingly surpassing the powers of nature; they are supposed to be produced by virtue of some compact, either tacit or express, with evil spirits: but the truth is, these supposed compacts have not the power that is usually imagined; nor do they produce half those effects ordinarily ascribed to them.

Naude has published an apology for all the great men suspected of *Magic*.—Agrippa says, that the words used by those in compact with the devil, to invoke him, and to succeed in what they undertake, are, *Dies, mie, jesquet, benediset, dou vima, entemaus*. There are an hundred other superstitious formulas of words prescribed for the same occasion, composed at pleasure, or gathered from several different languages, or patched from the Hebrew, or formed in imitation of it.

MAGIC Lantern, an optic machine, by means whereof little painted images are represented on an opposite wall of a dark room, magnified to any bigness at pleasure.

Construction of the MAGIC Lantern.—Suppose ABCD (Tab. Optics, Fig. 10.) a common tin lantern, to which is added a tube to draw out, FG. In H is fixed a metallic concave speculum of a foot diameter at most, or four inches at least; or, in lieu thereof, near the extremity of the tube, there must be placed a convex lens, consisting of a segment of a small sphere, its diameter not exceeding a few inches. In the focus of the concave speculum, or lens, is placed a lamp L; within the tube, where it is soldered to the side of the lantern, is placed a small lens, convex on both sides, being a portion of a small sphere, having its focus about the distance of three inches. The extreme part of the tube FM is square, and has an aperture quite thro', so as to receive an oblong frame, NO, passed into it: in this frame are round holes an inch or two in diameter. According to the bigness of these holes, are drawn circles on a plain thin glass; and in these circles are painted any figures or images at pleasure, with transparent water-colours. These images, fitted into the frame, and placed invertedly, at a little distance from the focus of the lens I, will be projected on an opposite white wall of a dark room, prodigiously magnified, in all their colours, and an erect situation.

Or thus:—Every thing being managed as in the former; into the sliding tube FG, insert another convex lens K, the segment of a sphere somewhat larger than I. Now, if the picture be brought nearer to I than the distance of the focus, diverging rays will be propagated as if they proceeded from P: wherefore, if the lens K be so placed, as that P is very near its focus, the image will be exhibited on the wall exceedingly magnified.

Theory of the MAGIC Lantern.—The lamp being placed in the focus of the concave speculum, or any convex glass, the rays will be propagated parallel to each other, and the image will be strongly illuminated, and will therefore emit a great number of rays upon the lens I. But, being supposed to be placed near the lens I, the inverted image of the picture inverted must be formed on the opposite wall, exceedingly magnified after its refraction thro' the lens; and it will be still the more magnified, as the lens is a segment of a less sphere, and as the picture is placed nearer the focus of the lens: in a dark place, therefore, the picture will be represented prodigiously large, and extremely vivid.

To lighten the light, specula are preferred to lenses; the focus of a speculum being nearer than that of a lens.

De Chales orders the diameter of the lens I to be two, four, or five digits, and in a subduple proportion to the other K; i. e. if I be five digits, K must be 10; and the diameter of

the speculum, according to the same, is to be two digits. Zahnus chooses to have the diameter of I $\frac{1}{3}$ of a foot, and that of K one foot and $\frac{1}{3}$, &c.

Little animals being included in the *Magic Lantern*, in the manner observed in speaking of the microscope; or any little transparent objects flattened to a slice of tale or glass, and substituted instead of images, the *Magic Lantern* will become a microscope.

MAGIC Square, a square figure formed of a series of numbers in arithmetical proportion, so disposed in parallel and equal ranks, as that the sums of each row, taken either perpendicularly, horizontally, or diagonally, are equal.

The several numbers which compose any square number (for instance, 1, 2, 3, 4, 5, &c. to 25 inclusive, which compose the square number 25) being disposed after each other in a square figure of 25 cells, each in its cell; if then you change the order of these numbers, and dispose them in the cells in such manner, as that the five numbers, which fill an horizontal rank of cells, being added together, shall make the same sum with the five numbers in any other rank of cells, whether horizontal or vertical, and even the same number with the five in each of the two diagonal ranks; this disposition of numbers is called a *Magic Square*, in opposition to the former disposition, which is called a *Natural Square*. See the figures following:

Natural Square.

1	2	3	4	5
6	7	8	9	10
11	12	13	14	15
16	17	18	19	20
21	22	23	24	25

Magic Square.

16	14	8	2	25
3	22	20	11	9
15	6	4	23	17
24	18	12	10	1
7	5	21	19	13

One would imagine, that these *Magic Squares* had that name given them, in regard this property of all their ranks, which, taken any way, make always the same sum, appeared extremely surprising, especially in certain ignorant ages, when mathematics passed for *Magic*. But there is a great deal of reason to suspect, that these squares merited their name still further by the superstitious operations they were employed in, as the construction of talismans, &c. for, according to the childish philosophy of those days, which attributed virtues to numbers, what virtues might not be expected from numbers so wonderful?

However, what was at first the vain practice of makers of talismans and conjurers, has since become the subject of a serious research among mathematicians; nor that they imagine it will lead them to any thing of solid use or advantage. *Magic Squares* favour too much of their original to be of much use; but only as 'tis a kind of play, where the difficulty makes the merit, and it may chance to produce some new views of numbers, which mathematicians will not lose the occasion of.

Eman. Moschopolus, a Greek author of no great antiquity, is the first that appears to have spoken of *Magic Squares*; and, by the age wherein he lived, there is reason to imagine he did not look on them merely as a mathematician. However, he has left us some rules for their construction.—In the treatise of Cor. Agrippa, so much accused of *Magic*, we find the squares of seven numbers; viz. from three to nine inclusive, disposed *magically*; and it must not be supposed, that those seven numbers were preferred to all the others without some very good reason. In effect, 'tis because their squares, according to the system of Agrippa, and his followers, are planetary. The square of 3, for instance, belongs to Saturn, that of 4 to Jupiter, that of 5 to Mars, that of 6 to the Sun, that of 7 to Venus, that of 8 to Mercury, and that of 9 to the Moon. M. Bachet applied himself to the study of *Magic Squares*, on the hint he had taken from the planetary squares of Agrippa; as being unacquainted with the work of Moschopolus, which is only in manuscript in the French king's library; and, without the assistance of any other author, he found out a new method for those squares whose root is uneven; for instance, 25, 49, &c. but he could not make any thing of those whose root is even.

After him came M. Frenicle, who took the same subject in hand. A certain great algebraist was of opinion; that whereas the sixteen numbers, which compose the square, might be disposed 20922789888000 different ways in a natural square (as from the rules of combination 'tis certain they may) they could not be disposed in a *Magic Square* above sixteen different ways. But M. Frenicle shewed, that they might be thus disposed 878 different ways; whence it appears how much his method exceeds the former, which only yielded the 55th part of *Magic Squares* of that of M. Frenicle.

To this inquiry he thought fit to add a difficulty, that had not yet been considered: the *Magic Square* of 7, for instance, being constructed, and its 49 cells filled, if the two horizontal ranks of cells, and, at the same time, the two vertical

ones,

ones, the most remote from the middle, be retrenched, that is, if the whole border or circumference of the square be taken away; there will remain a square, whose root will be 5, and which will only consist of twenty-five cells. Now it is not at all surprising, that the square should be no longer *magical*, in regard the ranks of the large one were not intended to make the same sum, excepting when taken intire with all the seven numbers that fill their seven cells; so that being mutilated each of two cells, and having lost two of their Numbers, it may be well expected, that their remainders will not any longer make the same sum. But M. Frenicle would not be satisfied, unless when the circumference or border of the *Magic Square* was taken away, and even any circumference at pleasure, or in nine, several circumferences at once, the remaining square were still *magical*: which last condition, no doubt, made these *Squares* vastly more *magical* than ever.

Again, he inverted that condition, and required that any circumference taken at pleasure, or even several circumferences, should be inseparable from the square; that is, that it should cease to be *magical* when they were removed, and yet continue *magical* after the removal of any of the rest. M. Frenicle, however, gives no general demonstration of his methods, and frequently seems to have no other guide but his groping. 'Tis true, his book was not published by himself, nor did it appear till after his death, viz. in 1693.

In 1703, M. Pognard, Canon of Brulle, published a treatise of sublime *Magic Squares*. Before him there had been no *Magic Squares* made but for series of natural numbers that formed a square; but M. Pognard made two very considerable improvements; 1^o. Instead of taking all the numbers that fill a square, for instance, the thirty-six successive numbers, which would fill all the cells of a natural square whose side is 6, he only takes as many successive numbers as there are units in the side of the square, which in this case are six; and these six numbers alone he disposes in such manner, in the thirty-six cells, that none of them are repeated twice in the same rank, whether it be horizontal, vertical, or diagonal: whence it follows, that all the ranks, taken all the ways possible, must always make the same sum, which M. Pognard calls repeated progression. 2^o. Instead of being confined to take these numbers according to the series and succession of the natural numbers, that is, in an arithmetical progression, he takes them likewise in a geometrical progression, and even in an harmonic progression. But with these two last progressions the *Magic* must necessarily be different from what it was: In the squares, filled with numbers in geometrical progression, it consists in this, that the products of all the ranks are equal, and in the harmonic progression, the numbers of all the ranks continually follow that progression: he makes squares of each of these three progressions repeated.

This book of M. Pognard gave occasion to M. de la Hire to turn his thoughts the same way, which he did with such success, that he seems to have well nigh completed the theory of *Magic Squares*. He first considers uneven *Squares*: all his predecessors on the subject having found the construction of even ones by much the most difficult; for which reason M. de la Hire reserves those for the last. This excess of difficulty may arise partly from hence, that the numbers are taken in arithmetical progression. Now in that progression, if the number of terms be uneven, that in the middle has some properties, which may be of service; for instance, being multiplied by the number of terms in the progression, the product is equal to the sum of all the terms.

M. de la Hire proposes a general method for uneven squares, which has some similitude with the theory of compound motions, so useful and fertile in mechanics. As that consists in decomposing motions, and resolving them into others more simple, so does M. de la Hire's method consist in resolving the square that is to be constructed, into two simple and primitive squares. It must be owned, however, it is not quite so easy to conceive those two simple and primitive squares in the compound or perfect square, as in an oblique motion to imagine a parallel and perpendicular one.

Suppose a square of cells, whose root is uneven; for instance 7, and that its forty-nine cells are to be filled *magically* with numbers, for instance, the first 7. M. de la Hire, on the one side, takes the first seven numbers, beginning with unity, and ending with the root 7; and on the other, 7, and all its multiples to 49 exclusively; and as these only make six numbers, he adds 0, which makes this an arithmetical progression of seven terms as well as the other. 0, 7, 14, 21, 28, 35, 42. This done, with the first progression repeated, he fills the square of the root 7 *magically*. In order to this, he writes in the first seven cells of the first horizontal rank, the seven numbers proposed, in what order he pleases, for that is absolutely indifferent; and it is proper to observe here, that those seven numbers may be ranged in 5040 different manners in the same rank. The order in which they are placed in the first horizontal rank, be it what it will, is that which determines their order in all the rest. For the second horizontal rank, he places in its first cell, either the third, the fourth, the fifth, or the sixth number, from the first number of the first rank; and after that writes the six others in the order as they follow.

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For the third horizontal rank, he observes the same method with regard to the second, that he observed in the second with regard to the first, and so of the rest. For instance, suppose the first horizontal rank filled with the seven numbers in their natural order, 1, 2, 3, 4, 5, 6, 7, the second horizontal rank may either commence with 3, with 4, with 5, or with 6; but in this instance it commences with 3, the third rank therefore must commence

1	2	3	4	5	6	7
3	4	5	6	7	1	2
5	6	7	1	2	3	4
7	1	2	3	4	5	6
2	3	4	5	6	7	1
4	5	6	7	1	2	3
6	7	1	2	3	4	5

with 5, the fourth with 7, the fifth with 2, the sixth with 4, and the seventh with 6. The commencement of the ranks which follow the first being thus determined, the other numbers, as we have already observed, must be written down in the order wherein they stand in the first going on to 5, 6, and 7, and returning to 1, 2, &c. till every number in the first rank be found in every rank underneath, according to the order arbitrarily pitched upon at first. By this means it is evident,

that no number whatever can be repeated twice in the same rank; and by consequence that the seven numbers 1, 2, 3, 4, 5, 6, 7, being in each rank, they must of necessity make the same sum. It appears, from this example, that the arrangement of the numbers in the first rank being chosen at pleasure, the other ranks may be continued in four different manners; and since the first rank may have 5040 different arrangements, there are no less than 20160 different manners of constructing the *Magic Square* of seven numbers repeated.

1	2	3	4	5	6	7
2	3	4	5	6	7	1
3	4	5	6	7	1	2
4	5	6	7	1	2	3
5	6	7	1	2	3	4
6	7	1	2	3	4	5
7	1	2	3	4	5	6

The order of the numbers in the first rank being determined; if in beginning with the second rank, the second number 2, or the last number 7, should be pitched upon; in one of those cases one of the diagonal ranks would have the same number constantly repeated; and, in the other case, the other diagonal would have it repeated; of consequence therefore, either the one or the other diagonal would be false, unless the number repeated seven times should happen to be 4; for four times seven is equal to the sum of 1, 2, 3, 4, 5, 6, 7; and, in general, in every square consisting of an uneven number of terms, in arithmetical progression, one of the diagonals would be false according to those two constructions, unless the term, always repeated in that diagonal, were the middle term of the progression.

It is not however at all necessary to take the terms in an arithmetical progression; for, according to this method, one may construct a *Magic Square* of any numbers at pleasure, whether they be according to any certain progression or not. If they be in an arithmetical progression, it will be proper, out of the general method, to except those two constructions, which produce a continual repetition of the same term, in one of the two diagonals; and only to take in the case, wherein that repetition would prevent the diagonal from being just. Which case being absolutely disregarded, when we computed that the square of 7 might have 20160 different constructions; it is evident, that by taking that case in, it must have vastly more.

To begin the second rank with any other number besides the second and the last, must not however be looked on as an universal rule. It holds good for the square of 7, but if the square of 9, for instance, were to be constructed, and the fourth figure of the first horizontal rank were pitched on for the first of the second, the consequence would be, that the fifth and eighth horizontal ranks would likewise commence with the same number, which would therefore be repeated three times in the same vertical rank, and occasion other repetitions in all the rest. The general rule therefore must be conceived thus: Let the number in the first rank pitched on, for the commencement of the second, have such an exponent of its quota, that is, let the order of its place be such, as that if an unit be taken from it, the remainder will not be any just quota part of the root of the square; that is, cannot divide it equally. If, for example, in the square of 7, the third number of the first horizontal rank be pitched on for the first of the second, such construction will be just; because the exponent of the place of that number, viz. 3, subtracting 1, that is, 2, cannot divide 7. Thus also might the fourth number of the same first rank be chosen, because 4—1, viz. 3, cannot divide 7; and for the same reason the fifth or sixth number might be taken: But in the square of 9, the fourth number of the first rank must not be taken, because 4—1, viz. 3, does divide 9. The reason of this rule will appear very evidently, by considering

dering in what manner the returns of the same numbers do or do not happen, taking them always in the same manner in any given series. And hence it follows, that the fewer divisions the root of any square to be constructed has, the more different manners of constructing it there are; and that the prime numbers, that is, those which have no divisions, as 5, 7, 11, 13, &c. are those whose squares will admit of the most variations in proportion to their quantities.

The squares constructed, according to this method, have some particular properties not required in the problem: For the numbers that compose any rank parallel to one of the two diagonals, are ranged in the same order with the numbers that compose the diagonal, to which they are parallel. And as any rank parallel to a diagonal must necessarily be shorter, and have fewer cells than the diagonal itself, by adding to it the corresponding parallel which has the number of cells by which the other falls short of the diagonal; the numbers of those two parallels, placed,

First Primitive.

1	2	3	4	5	6	7
3	4	5	6	7	1	2
5	6	7	1	2	3	4
7	1	2	3	4	5	6
2	3	4	5	6	7	1
4	5	6	7	1	2	3
6	7	1	2	3	4	5

Second Primitive.

0	7	14	21	28	35	42
21	28	35	42	0	7	14
42	0	7	14	21	28	35
14	21	28	35	42	0	7
35	42	0	7	14	21	28
7	14	21	28	35	42	0
28	35	42	0	7	14	21

bring the two into one, by adding together the numbers of the two corresponding cells of the two squares, that is, the two numbers of the first of each, the two numbers of the second, of the third, &c. and dispose them in the forty-nine corresponding cells of a third square; it will likewise be *magical*, in regard its rank, formed by the addition of equal sums to equal sums, must of necessity be equal among themselves. All that remains in doubt is, whether or no, by the addition of the corresponding cells of the two first squares, all the cells of the third will be filled in such manner, as that each not only contain one of the numbers of the progression from 1 to 49, but also that this number be different from that of any of the rest, which is the end and design of the whole operation.

As to this, it must be observed, that if in the construction of the second *Primitive Square*, care has been taken in the commencement of the second horizontal rank, to observe an order with regard to the first, different from what was observed in the construction of the first square; for instance, if the second rank of the

Perfect Square.

1	9	17	25	33	41	49
24	32	40	48	7	8	16
47	6	14	15	23	31	39
21	22	31	38	46	5	13
37	47	4	12	20	28	29
11	19	27	35	36	46	3
34	42	43	2	10	18	26

this manner, we have all the numbers in the progression from 1 to 49, without having any of them repeated; which is the *Perfect Magic Square* proposed.

The necessity of constructing the two *Primitive Squares* in a different manner, does not at all hinder but that each of the 20160 constructions of the one may be combined with all the 20160 constructions of the other: of consequence therefore 20160 multiplied by itself, which makes 406425600, is the number of different constructions that may be made of the *Perfect Square*, which here consists of the 49 numbers of the natural progression. But as we have already observed, that a *Primitive Square* of seven numbers repeated may have above 20160 several constructions, the number 406425600 must

as it were, end to end, still follow the same order with those of the diagonal: besides, that their sums are likewise equal; so that they are magical on another account.

Instead of the squares, which we have hitherto formed by horizontal ranks, one might also form them by vertical ones; the case is the same in both.

All we have hitherto said regards only the first primitive square, whose numbers, in the proposed example, were 1, 2, 3, 4, 5, 6, 7; here still remains the second primitive, whose numbers are 0, 7, 14, 21, 28, 35, 42. M. de la Hire proceeds in the same manner here as in the former; and this may likewise be constructed in 20160 different manners, as containing the same number of terms with the first. Its construction being made, and of consequence all its ranks making the same sum, it is evident, that if we

come vastly short of expressing all the possible constructions of a perfect *Magic Square* of the forty-nine first numbers.

As to the *Even Squares*, he constructs them like the *Uneven* ones, by two *Primitive Squares*; but the construction of *Primitives* is different in the general, and may be so a great number of ways: and those general differences admit of a great number of particular variations, which gives many different constructions for the same even square. It scarce seems possible to determine exactly, either how many general differences there may be between the construction of the primitive squares of an even square and an uneven one; nor how many particular variations each general difference may admit of: and of consequence we are still far from being able to determine the number of different constructions of all those that may be made by the primitive squares.

MAGISTER, MASTER, a title frequently found in old Writings; noting the person who bore it to have attained some degree of eminence in *scientia aliqua, præsertim in literaria*. In old times, those we now call *Doctors*, were called *Magistri* or *Masters*.

MAGISTERY, **MAGISTERIUM**, in Chymistry, a very fine powder made by solution and precipitation; or, a precipitate of some solution made by a salt, or other body, which breaks the force of the solvent.

MAGISTERY of Bismuth is a fine powder, made by dissolving bismuth in spirit of nitre, and pouring on it salt water, which precipitates the *Magistry* to the bottom.

MAGISTERY of Lead is a fine powder, made by dissolving faccharum saturni in distilled vinegar, and then precipitating it with oil of tartar *per deliquium*.

MAGISTERY is also used in speaking of resins, or the refinous extracts of scammony, jalap, turbiti, &c. which are made by drawing a tincture from the matter in spirit of wine, and precipitating it with water.

Mr. Boyle takes the proper notion of a *Magistry* to consist in a preparation of a body, whereby it is wholly, or at least in great measure, by means of some extraneous addition, converted into a body of a different kind; as when iron or copper is turned into crystals of Mars and Venus.

MAGMA, **MATMA**, among Chymists, &c. the dregs or recrement of a Composition, remaining after all the more fluid parts are expressed.

MAGNA Arteria, the same with Aorta. See AORTA.

MAGNA Charta*, the Great Charter of liberties of England, granted in the ninth year of Henry the third, and confirmed by Edward the first.

* The reason of its being termed *magna* or great, is either because of the excellency of the laws and liberties therein contained; or because there was another charter, called *Charta de foresta*, established with it, which was the lesser of the two; or else because it contained more than any other charters; or in regard of the wars and troubles in the obtaining of it; or of the great and remarkable solemnity in the denouncing excommunications against the infringers of it.

Magna Charta may be said to derive its origin from king Edward the confessor, who granted divers liberties and privileges both civil and ecclesiastical by charter: The same with some others were also granted and confirmed by king Henry I. by a celebrated great charter now lost. His successors king Stephen, king Henry II. and king John, confirmed or re-enacted the same; but that last prince violating his charter, the barons took up arms, and his reign ended in blood. Henry III. who succeeded him, after having procured an inquisition to be made by twelve men in each county, what the liberties of England were in the time of Henry I. granted a new charter, being the present *Magna Charta*; which he several times confirmed, and as often broke again: till, in the thirty-seventh year of his reign, he came to Westminster-hall; where, in the presence of the nobility and bishops, with lighted candles in their hands, *Magna Charta* was read, the king all the while laying his hand on his breast, and at last solemnly swearing faithfully and inviolably to observe all the things therein contained, as he was a man, a christian, a soldier, and a king. Then the bishops extinguished their candles, throwing them on the ground, crying, Thus let him be extinguished and stink in hell who violates this charter.

The *Magna Charta* is the basis of the English laws and liberties. It was thought to be so beneficial to the subject, and a law of so great equity in comparison of those which were formerly in use, that king Henry, for the granting it, had the fifteenth penny of all the moveable goods both temporal and spiritual. — Sir Edward Coke observes, the *Magna Charta* has been above thirty times confirmed.

MAGNET, **MAGNES***, the *Leadstone*; a sort of ferruginous stone, in weight and colour resembling iron ore, and very hard and heavy; endued with divers extraordinary properties, attractive, directive, inclinatory, &c.

* The *Magnet* is also called *Lapis Herculeus*, from Heraclea, a city of Magnesia, a port of the ancient Lydia, where it is said to have been first found, and from which it is usually supposed to have taken its name. Though others derive the word from a shepherd named *Magnus*, who first discovered it with the non of his crook on mount Ida. It is also called *Lapis nauticus*, by reason of its use in navigation; and *sidereus*, from its attracting iron, which the Greeks called *sidus* ♀.

The *Magnet* is indeed a true iron ore, and is usually found in iron mines, and sometimes in very large pieces, half *Magnets*, half common ore. Its colour is different, according to the different countries it is brought from. Norman observes, that the best are those brought from China and Bengal, which are of an iron or sanguine colour; those of Arabia are reddish, those of Macedonia blackish; and those of Hungary, Germany, England, &c. the colour of unwrought iron. Neither its figure nor bulk are determined, but it is found of all forms and sizes. See Supplement, article *MAGNETS*.

The ancients reckoned five kinds of *Magnets*, different in colour and virtue: the Ethiopic, Magnesian, Boeotic, Alexandrian, and Natolian. They also took it to be of two kinds, male and female: but the chief use they made of it was in medicine; especially for the cure of burns, and defluxions on the eyes.—The moderns, more happy, take it to conduct them in their voyages.

The most distinguishing properties of the *Magnet* are, That it attracts iron, and that it points to the poles of the world; and in other circumstances also dips or inclines to a point beneath the horizon, directly under the pole; and that it communicates these properties by touch, to iron.—On which foundation are built the mariners' needles; both the horizontal, and the inclinatory, or dipping needles. See *NEEDLE, DIPPING, &c.*

The attractive power of the *MAGNET* was known to the ancients, and is mentioned even by Plato and Euripides, who call it the *Herculean Stone*; because it commands iron, which subdues every thing else: But the knowledge of its directive power, whereby it disposes its poles along the meridian of every place, and occasions needles, pieces of iron, &c. touched with it, to point nearly north and south, is of a much later date: though the exact time of its discovery, and the discoverer himself, are yet in the dark. The first tidings we hear of it, are in 1260, when Marco Polo the Venetian is said by some to have introduced the mariners' compass; though not as an invention of his own, but as derived from the Chinese, who are said to have had the use of it long before: though some imagine, that the Chinese before that had borrowed it from the Europeans.

Flavio de Gioia a Neapolitan, who lived in the thirteenth century, is the person usually supposed to have the best title to the discovery: And yet Sir G. Wheeler mentions, that he had seen a book of astronomy much older, which spoke of the use of the needle; though not as applied to the uses of navigation, but of astronomy. And in Guyot de Provins, an old French poet, who wrote about the year 1180, there is express mention made of the *Loadstone*, and the compass; and their use in navigation is obliquely hinted at.

The variation of the *MAGNET*, or its declination from the pole, was first discovered by Seb. Cabot, a Venetian, in 1500; and the variation of that variation by Mr. Gellibrand, an Englishman, about the year 1625.

Lastly, The dip or inclination of the needle, when at liberty to play vertically, to a point beneath the horizon, was first discovered by another of our countrymen, Mr. R. Norman, about the year 1576. See the article *DIPPING NEEDLE*.

Phænomena of the MAGNET. 1°. In every *Magnet* there are two poles, one whereof points northward, the other southward; and if the *Magnet* be divided into ever so many pieces, the two poles will be found in each piece. 2°. These poles, in different parts of the globe, are differently inclined towards a point under the horizon. 3°. These poles, though contrary to one another, do help mutually towards the *Magnet's* attraction and suspension of iron. 4°. If two *Magnets* be spherical, one will turn or conform itself to the other, so as either of them would do to the earth; and after they have so conformed or turned themselves, they will endeavour to approach or join each other; but if placed in a contrary position, they will avoid each other. 5°. If a *Magnet* be cut through the axis, the parts or segments of the stone, which before were joined, will now avoid and fly each other. 6°. If the *Magnet* be cut by a section perpendicular to its axis, the two points, which before were conjoined, will become contrary poles; one in one, the other in the other segment. 7°. Iron receives virtue from the *Magnet* by application to it, or barely from an approach near it, though it do not touch it; and the iron receives this virtue variously, according to the parts of the stone it is made to touch, or even but to approach to. 8°. If an oblong piece of iron be any way applied to the stone, it receives virtue from it, only as to its length. 9°. The *Magnet* loses none of its own virtue by communicating any to the iron; and this virtue it can communicate to the iron very speedily; though the longer the iron touches or joins the stone, the longer will its communicated virtue remain in it; and a better *Magnet* will communicate more of it, and sooner, than one not so good. 10°. Steel receives virtue from the *Magnet* better than iron. 11°. A needle touched by a *Magnet* will turn its ends the same way towards the poles of the world, as the *Magnet* itself does. 12°. Neither *Loadstone* nor needles touched by it do conform their poles exactly to those of the world, but have usually some variation from them: and this variation is different in divers places, and at divers times in the same place. 13°. A *Loadstone* will take up much more iron when armed

or capped, than it can when naked. And though an iron ring or key be suspended by the *Loadstone*, yet the *magnetical* particle do not hinder that ring or key from turning round any way, either to the right or left. 14°. The force of a *Loadstone* may be variously increased or lessened by the various application of iron, or another *Loadstone* to it. 15°. A strong *Magnet* at the least distance from a lesser or a weaker, cannot draw to it a piece of iron adhering actually to such lesser or weaker stone; but if it come to touch it, it can draw it from the other: But a weaker *Magnet*, or even a little piece of iron, can draw away or separate a piece of iron contiguous to a greater or stronger *Loadstone*. 16°. In these northern parts of the world, the south pole of a *Loadstone* will raise up more iron than the north pole. 17°. A plate of iron only, but no other body interposed, can impede the operation of the *Loadstone*, either as to its attractive or directive quality. Mr. Boyle found this true in glasses sealed hermetically; and glass is a body as impervious, as most are, to any effluvia. 18°. The power or virtue of a *Loadstone* may be impaired by lying long in a wrong position, as also by rust, wet, &c. and it may be quite destroyed by fire. 19°. A piece of iron wire, well touched, will, upon being bent round in a ring, or coiled round on a stick, &c. generally, quite lose its directive virtue; but it will always have it much diminished: and yet if the whole length of the wire were not entirely bent, so that the ends of it, though but for the length of one tenth of an inch, were left straight, the virtue will not be destroyed in those parts; though it will in all the rest. This was first observed by Mess. Grimaldi and de la Hire; and is confirmed by the experiments of Mr. Derham; who adds further, that though coiling or bending the wire as above, would always destroy its virtue by day, yet it would not do it in the evening. 20°. The sphere of the activity of *Magnets* is greater and less at different times: in particular, that reserved in the repository of the Royal Society will keep a key or other body suspended to another, sometimes, at the height of eight or ten feet; and at others, not above four feet. To which we may add, that the variation of the *magnetical* needle from the meridian varies at various times of the day; as appears from some experiments of Mr. Graham. See *VARIATION*. 21°. By twisting a piece of wire touched with a *Magnet*, its virtue is exceedingly diminished, and sometimes so disordered and confused, that in some parts it will attract, and in others repel; and even in some places, one side of the wire seems to be attracted, and the other side repelled, by one and the same pole of the stone. 22°. A piece of wire that has been touched, being split or cleft in two, the poles are sometimes changed; as in a cleft *Magnet*; the north becoming the south, and the south the north: And yet sometimes one half of the wire will retain its former poles, and the other half will have them changed. To which it may be added, that laying one or other side of the half uppermost, causes a great alteration in its tendency or aversion to the poles of the *Magnet*. 23°. A wire being touched from end to end with the same pole of the *Magnet*, the end whereat you begin will always turn contrary to the pole which touched it: If it be again touched the same way with the other pole of the *Magnet*, it will then be turned the contrary way. 24°. If a piece of wire be touched in the middle with only one pole of the *Magnet*, without moving it backwards or forwards; in that place will be the pole of the wire, and the two ends will be the other pole. 25°. If a *Magnet* be heated red-hot; and again cooled either with its south pole towards the north in a horizontal position, or with its south pole downwards in a perpendicular position; its poles will be changed. 26°. Mr. Boyle (to whom we are indebted for the following *magnetical* phenomena) found he could presently change the poles of a small fragment of a *Loadstone*, by applying them to the opposite vigorous ones of a large *Magnet*. 27°. Hard iron tools well tempered, when heated by a brisk attrition, as filing, turning, &c. will, while warm, attract thin filings or chips of iron, steel, &c. though not when cold; though there are not wanting some instances of their retaining the virtue when quite cold. 28°. The iron bars of windows, &c. which have a long time stood in an erect position, grow permanently *magnetical*; the lower ends of such bars being the north pole, and the upper the southern. 29°. A bar of iron that has not stood long in an erect posture, if it be only held perpendicularly, will become *magnetical*; and its lower end the north pole; as appears from its attracting the south pole of a needle: but then this virtue is transient, and, by inverting the bar, the poles will shift their places. In order therefore to render the quality permanent in an iron bar, it must continue a long time in a proper position. But the fire will produce the effect in a short time: for as it will immediately deprive a *Loadstone* of its attractive virtue; so, it soon gives a verticity to a bar of iron, if, being heated red-hot, it be cooled in an erect posture, or directly north and south. Nay, tongs and pokers, by being often heated and set to cool again in a posture nearly erect, have frequently gained this *magnetical* property. 30°. Mr. Boyle found, that by heating a piece of English oaker red hot, and placing it to cool in a proper posture, it manifestly acquired a *magnetic* virtue. And an excellent *Magnet* of the same ingenious Gentle-

man's, having lain near a year in an inconvenient posture, had its virtue surprisingly impaired; as if it had been injured by fire. 31^o. A needle well touched, it is well known, will point north and south: if it have one contrary touch of the same stone, it will be deprived of its faculty; and by another such touch it will have its poles quite changed. 32^o. If a bar of iron have gained a verticity by being heated red-hot, and cooled again, north and south, and then hammered at the two ends; its virtue will be destroyed by two or three smart blows on the middle. 33^o. By drawing the back of a knife, or long piece of steel wire, &c. leisurely over the pole of a *Loadstone*; carrying the motion from the middle of the stone to the pole; the knife or wire will accordingly attract one end of a needle: but if the knife or wire be passed from the said pole to the middle of the stone, it will repel that end of the needle which in the other case it attracts. 34^o. Either a *Magnet* or a piece of iron being laid on a piece of cork, so as to swim freely in water; it will be found, that which soever of the two is held in the hand, the other will be drawn to it: so that iron attracts the *Magnet* as much as it is attracted by it; action and re-action being always equal. In this experiment, if the *Magnet* be set afloat, it will direct its two poles to the poles of the world. 35^o. A knife, &c. touch'd with a *Magnet*, acquires a greater or less degree of virtue, according to the part it is touched on. It receives the strongest touch, when it is drawn leisurely from the handle towards the point over one of the poles: and if the same knife thus touched, and thus in possession of a strong attractive power, be retouched in a contrary direction, *viz.* by drawing it from the point towards the handle over the same pole, it immediately loses all its virtue. Lastly, a *Magnet* acts with equal force *in vacuo*, and in the open air.—See farther under the article MAGNETISM.

Artificial Magnet, in chymistry, *MAGNES Arsenicalis*, denotes a mixture of equal parts of arsenic, sulphur, and antimony, melted together over the fire, and condensed in manner of a stone.

It is a very gentle caustic, and was first invented by Angelus Sala.—It has its name *Magnet*, because being worn during malignant diseases, it is supposed to preserve the wearer from infection, by a *magnetical* power.

MAGNETISM, **MAGNETISMUS**, that quality or constitution of a body, and its pores, whereby it is rendered *magnetic*, or a *Magnet*.

Magnetism is found to be a transient power, capable of being produced and destroyed again.

The *laws* of **MAGNETISM** are laid down by Mr. Whiston in the following propositions.—1^o. The *Loadstone* has both an attractive and a directive power united together; whereas iron touched by it has only the former; *i. e.* the *Magnet* not only attracts needles or filings of steel, but directs them to certain different angles, with respect to its own surface and axis: whereas iron, touched with it, does little or nothing more than attract them; still suffering them to be along or stand perpendicular to its surface and edges in all places; without any such special direction.

2^o. Neither the strongest nor the largest *Magnets* give a better directive touch to needles, than those of a less size or virtue: to which it may be added, that whereas there are two qualities in all *Magnets*, an attractive and a directive one; neither of them depend on, or are any argument of the strength of the other.

3^o. The attractive power of *Magnets* and of iron, will greatly increase or diminish the weight of needles on the balance: nay, it will overcome that weight, and sustain other additional weights too: while the directive power has a much smaller effect. Galendus indeed, as well as Merfennus and Dr. Gilbert, maintain it has none at all; but by mistake; for Mr. Whiston found from repeated trials on large needles, that after the touch they weighed less than before. One of 4584 $\frac{1}{2}$ grains lost 21 grains by the touch; and another of 65726 grains weight, no less than 14 grains.

4^o. It is probable, that iron consists almost wholly of the attractive particles; and the *Magnet* of the attractive and directive together; mixed probably with other heterogeneous matter; as having never been purged by the fire, which iron has: And hence may arise the reason why iron, after it has been touched, will lift up much greater weights than the *Loadstone* that touched it.

5^o. The quantity and direction of *magnetic* powers, communicated to needles, is not properly, after such communication, owing to the *Magnet* which gave the touch; but to the goodness of the steel that receives it, and to the strength and position of the terrestrial *Loadstone*, whose influence alone those needles are afterwards subject to, and directed by: so that all such needles, if good, move with the same strength, and point to the same angle; what *Loadstone* soever (provided it be good) they have been excited by. Nor does the touch seem to do much more in *magnetic*, than attrition does in electrical cases; *i. e.* it serves to rub off some obstructing particles, that adhere to the surface of the steel, and open the pores of the bodies touched, and so make way for the entrance and exit of such effluvia as occasion or assist the powers we are speaking of. Hence Mr. Whiston takes occasion to observe, that the directive power

of the *Loadstone* seems to be mechanical; and to be derived from *magnetic* effluvia, circulating continually round it.

6^o. The absolute attractive power of different armed *Loadstones* is, *ceteris paribus*, according to the quantity, not of their diameters or solidities, but of the surfaces of the *Loadstones*; or in a duplicate proportion of their diameters.

7^o. The power of good *Magnets* unarmed, not sensibly different in strength, similar in figure and position, but unequal in magnitude, is sometimes a little greater, sometimes a little less, than in the proportion of their similar diameters.

8. The *Loadstone* attracts needles that have been touched, and others that have not been touched, with equal force, at distances unequal, *viz.* where the distances are to one another as 5 to 2.

9^o. Both poles of a *Loadstone* equally attract needles, till they be, tho' roughly, touched; then it is, and then only, that one pole begins to attract one end, and repel the other: tho' the repelling pole will still attract upon contact, nay at very small distances, notwithstanding.

10^o. The attractive power of *Loadstones*, in their similar position to, but different distances from *magnetic* needles, is in the sesquiduplicate proportion of the distances of their surfaces from their needles reciprocally; or as the mean proportionals between the squares and the cubes of those distances reciprocally; or as the square roots of the fifth powers of those distances reciprocally. Thus the *magnetic* power of attraction, at twice the distance from the surface of the *Loadstone*, is between a fifth and sixth part of that power at the first distance. At thrice the distance the power is between the fifteenth and sixteenth part, at four times the distance the power is thirty-two times as small, and at six times the distance eighty-eight times as small. Where it is to be noted, that the distances are not taken, as in the laws of gravity, from the centre; but from the surface; all experience assuring us, that the *magnetic* power resides chiefly, if not wholly, in the surfaces of the *Loadstones* and iron; without any particular relation to any centre at all. The proportion here laid down was determined by Mr. Whiston, from a great number of experiments of Mr. Haukebee, Dr. Brook Taylor, and himself. The force they measured by the chords of those arcs, by which the *Magnet*, at several distances, draws the needle out of its natural direction, to which chords (as he has demonstrated) it is ever proportional. The numbers in some of their most accurate trials he gives us in the following table, setting down half the chords, or the sines of half those arcs of declination, as the true measures of the power of *Magnetism*.

Distances in inches.	Degrees of inclination.	Sines of $\frac{1}{2}$ arcs.	Rat. sesquidupl.
20	2	175	466
14 $\frac{1}{2}$	4	349	216
13 $\frac{1}{2}$	6	523	170
12 $\frac{1}{2}$	8	697	138
11 $\frac{1}{2}$	10	871	105
10 $\frac{1}{2}$	12	1045	87
9 $\frac{1}{2}$	14	1219	70

11^o. An inclinatory, or dipping-needle, of six inches radius, and of a prismatic or cylindric figure, when it oscillates along the *magnetic* meridian, performs there every mean vibration in about 6 $\frac{1}{2}$ or 360 $\frac{1}{2}$ ''; and every small oscillation in about 5 $\frac{1}{2}$ or 330 $\frac{1}{2}$ ''; and the same kind of needle, four feet long, makes every mean oscillation in about 24'', and every small one in about 22''.

12^o. The intire power of *Magnetism* in this country, as it affects needles a foot long, is to that of gravity nearly as 1 to 300; and as it affects needles four feet long, as 1 to 600.

13^o. The quantity of *magnetic* power accelerating the same dipping-needle, as it oscillates in different vertical planes, is ever as the co-sines of the angles made by those planes, and the *magnetic* meridian, taken on the horizon.

Thus if we would estimate the quantity of forces in the horizontal and vertical situations of needles at London; we shall find that the latter, in needles a foot long, is, to the intire force along the *magnetic* meridian, as 90 to 100; and in needles four feet long, as 9667 to 10000: whereas in the former, the intire force in needles a foot long, is as 28 to 100; and in those four feet long, as 2569 to 10000. Whence it follows, that the power by which horizontal needles are governed in these parts of the world, is but one quarter of the power by which the dipping-needle is moved.

Hence also, since the horizontal needle is moved only by a part of the power which moves the dipping-needle; and that it only points to a certain place in the horizon, because that place is the nearest its original tendency of any its situation will allow it to tend to; whenever the dipping-needle stands exactly perpendicular to the horizon, the horizontal needle will not respect one point of the compass more than another, but will wheel about every way uncertainly.

14^o. The time of oscillation and vibration, both in dipping and horizontal needles equally good, is as their length directly; and the actual velocity of their points along their arcs is always equal.

Hence

Hence *magnetic* needles are, *ceteris paribus*, still better the longer they are; and that in the same proportion with their length.

15°. The earth, on which we live, includes within it a vast spherical *Magnet*, concentric thereto, having its own poles, meridians, equator, and parallels; and all much of the same general nature with those of small *terrella*, or spherical *Loadstones*, in the possession of the curious among us.

16°. The power of a good *terrella*, or a spherical *Loadstone*, as it affects a needle a foot long, is equal to the *magnetic* power of that internal *Loadstone* about two and an half, or three diameters off such *Loadstone*. From which consideration, the quantity of *magnetic* attraction, at all distances from the internal *Loadstone*, for needles a foot long, may be determined; and from the same consideration it appears, that the diameter of this internal *Loadstone* is about eleven hundred and fifty miles. To which we may add, that, in regard Sir Isaac Newton has demonstrated, that the power of gravity diminishes within the earth, and is less there than at its surface, nearly in the proportion of its greater nearness to the centre, the *magnetic* power, at two thousand nine hundred miles distance from us, and nearly one thousand and sixty from the earth's centre, which is $\frac{1}{12}$ of the power of gravity here, will be somewhat greater than the power of gravity there: Which limit is worthy our attention, gravity being stronger than *Magnetism* on the one side of it, and weaker on the other; we mean, as it affects needles of one foot diameter. At that limit, therefore, at least near the *magnetic* poles, iron a foot long will be twice as heavy, and fall twice as fast, as any other natural body; *viz.* by the union of those two equal powers, gravity and *Magnetism*; and of consequence, above that limit, such an iron will be less than twice as heavy, below it more than twice as heavy, as any other natural body.

17°. The earth's internal *Loadstone* is not fixed to our upper parts, but is moveable with respect thereto, and actually revolves on the earth's axis from east to west in a certain long period of time; as appears, beyond contradiction, from the constant variation of the horizontal needle westward, as well as the regular increase of inclination of the dipping needle.

The only way to render this motion, *i. e.* the variation possible and intelligible (to use Dr. Halley's words) is to suppose it to turn about the centre of a globe, having its centre of gravity fixed and immovable in the same common centre of the earth. This moveable internal surface must likewise be loose, and detached from the external parts of the globe, which may be reckoned the shell, and the other the nucleus, or inner globe, included within it, with a fluid medium between. Now, from the variation's moving westwards, it is plain, that the foresaid nucleus has not precisely attained the same degree of velocity with the exterior parts in their diurnal revolution, but so nearly equals it, that, in three hundred and sixty-five revolutions, the difference is scarce sensible, and must probably have arisen from hence, that the impulse, whereby the diurnal motion was impressed on the earth, was given to the external parts, and thence communicated to the internal.

18°. This internal *Magnet* has one central pole northwards, in the nature of the poles of our common *Loadstones*; but its southern pole appears not to be central, but rather circular, and that at a great distance from the southern pole of the earth.

19°. The northern *magnetic* pole is now situate about the latitude of 76 degrees $\frac{1}{2}$; *i. e.* 13 degrees $\frac{1}{2}$ from the north pole of the earth, and about 30 degrees eastward from the meridian of London.

20°. The southern *magnetic* circular pole has its centre, or central pole, nearly in the parallel of 60 degrees; and, in a meridian passing along the east coast of Borneo, about 117 degrees eastward of London. Its radius is also an arc of a great circle of about 44 degrees.

21°. The respective motion of the internal *Magnet*, or the velocity, *v. g.* of its north-pole, appears to be 27 deg. 0 min. in 144 years, *i. e.* upwards of one degree in five years; so that it makes an intire revolution in 1920 years.

Hence, as the number of degrees in the upper earth's diurnal revolution is to the number of days in the revolution of the internal *Magnet*, *i. e.* as 1 is to 700000, so is the respective motion of this *Magnet* from east to west to the real motion of the upper earth from west to east; or, to speak strictly, so is the difference of their motions from west to east to the intire motion of the upper earth the same way. This external fixed earth has therefore communicated almost all its motion already to the internal *Magnet*, and can communicate no more than this difference of their motion, and that only in an infinite term of years; or, in other words, this real internal motion can never be the seven hundred thousandth part swifter than it is at present. This internal motion, therefore, began with the commencement of the diurnal motion of the upper earth; and has gone on still faster and faster by the communication of that motion through the intermediate fluid. Since, therefore, action and reaction are equal, and tend to contrary parts, the internal *Loadstone*, thus accelerated by the upper part, must have all along retarded that upper earth, and made the

diurnal rotation still slower and slower. This acceleration on one side, and retardation on the other, must have been very great at the first beginning of the diurnal motion, when the difference of their motion was equal to the intire motion itself, and must have been diminishing ever since. To which cause is probably owing that acceleration of the moon's motion with respect to that of the earth, since the time of the old astronomers, first taken notice of by Dr. Halley, and embraced by Sir Isaac Newton. And the same consideration seems to suggest a method for determining the age of the world; for, were the proportions of the quantity of matter in the upper earth to the internal *Magnet*, with the tenacity of the intermediate fluid, &c. known, one might go back from the known difference of their velocity now, and find those differences and quantities of motion themselves, *a priori*, in all past ages; or, were the velocity of the first diurnal rotation of the upper earth known, we might geometrically determine, *a priori*, how long ago that rotation began, or how ancient our earth is.

22°. The variation of *magnetic* needles from the azimuth of the meridians of the internal *Magnet* is derived from the difference of the strength of the several parts of the internal *Magnet*'s surface; which as it is only to be known by experience, that variation cannot be determined beforehand, unless where there are good accounts how much it had formerly been; it being probable, that it returns round, and will be the same in any year of the next revolution of the internal *Magnet*, that it has been in the like year of any former revolution, or will itself have a revolution in about 1920 years.

23°. The two fixed *magnetic* poles in our upper earth, first introduced by Dr. Halley, as necessary to solve the irregularity of the variation of the horizontal needle from the meridians of the moveable internal *Magnet*, seem not to have any just foundation in nature, the like irregularities being found in the common *terrella*, or spherical *Loadstones*, and being best accounted for from the composition of the *Magnets*, which are found to have parts of different degrees of purity, strength, and perfection; so that, where the parts are weaker than ordinary, the stronger neighbouring parts prevail, and draw the needle that way: not but Dr. Gilbert's notion of prominent and depressed parts on *Magnets* may have some room, and be allowed to contribute somewhat to such variations.

For the causes of *MAGNETISM*, or the manner in which these phenomena of the *Magnet* are produced, we have yet no hypothesis that will satisfactorily account for them.—Plutarch tells us, the *Magnet* attracts iron, by emitting some spiritual effluvia, whereby the contiguous air being opened and driven on either side, does again drive that contiguous to it; and thus the action being communicated round, the iron is thereby protruded: but this is contradicted by the equally vigorous action of the *Loadstone* in vacuo, and in the open air.—Others of the ancients ascribe the action of the *Magnet* to a soul that animates it; and others to I know not what sympathy between the effluvia of the iron and those of the *Magnet*.

An opinion that has much prevailed among the moderns, is that of Des Cartes, maintained by Malebranche, Rohault, Regis, &c. and even admitted and confirmed by Mr. Boyle, &c. In this it is supposed, that there is continually flowing, from the poles of the world, a subtle, impalpable, and invisible matter, channelled or striated: which matter circulating round the earth, in the plains of the meridians, re-enters at the pole opposite to that from which it issued, and passes again thro' the poles parallel to its axis: that the *Magnet* has two poles answerable to those of the earth; and that out of these there issues a matter like that just mentioned: and that this matter, entering in at one of the poles, gives the impulse whereby iron tends to the *Magnet*, and produces what we call attraction.

—Now, besides the *magnetical* matter re-entering the poles of the *Magnet*, there is always a certain quantity thereof circulating round the *Magnet*, composing a kind of vortex about it. The space wherein this matter moves, is the sphere of activity of the *Magnet*, within which its attractive faculty is confined.

As to its directive faculty, or the inclination of a needle touched with it to the poles of the world, and its dip to a point beneath the horizon, they follow from the same principle; since, were the *Magnet* or needle to have any other situation, the *magnetic* matter would strike on its other surface in vain; and, not being able to get admission, would, by degrees, change its situation, till such time as its pores corresponded to the course of the *magnetical* matter; which situation having once acquired, it would cease to move, the *magnetical* matter then ceasing to disturb it.

The form or essence of a *Magnet* therefore is supposed to consist in its being perforated by an infinite number of parallel pores; some whereof are disposed to admit the striated matter from the north pole of the world, others that of the south: hence the north and south poles of the *Magnet*.

M. Hartsoeker maintains, that the *Magnet* is no more than a common stone, full of an infinite number of hollow prisms,

which, by the diurnal motion of the earth, are ranged parallel to each other, and nearly parallel to the axis of the earth. These prisms have their cavities filled with an extremely subtle matter, which, by the diurnal motion of the earth, is passed from prism to prism; thus, making a circulation, and returning into the prisms where it first began. From these principles he deduces all the phenomena of the *Magnet*; and M. Andry does the same, from the doctrine of alkali and acid.

For the directive power of the *Magnet*, Mr. Whiston, from the first, second, third, &c. laws of *Magnetism*, inclines to think it mechanical; and ascribes it to magnetic effluvia circulating continually round the *Loadstone*; of which circulations, he thinks, there are evident indications in magnetic experiments; as Mr. Boyle thinks there are of the *Magnetism* or magnetic effluvia of the earth; though these effluvia were never yet rendered sensible, as electric effluvia begin to be.—But the attractive power Mr. Whiston thinks intirely immaterial, as the power of gravity is; not being able to devise any such motion of a subtle fluid belonging to the *Loadstone*, as will account for the attractive power in the squiduplicate proportion of the distances reciprocally; though if he could, yet would that be no more than to remove the immediate power of the Supreme Being one step further; the last resort of all mechanical principles whatever being into the immaterial power and efficiency of the Deity.

MAGNETISM is also used, by some chemists, to signify a certain virtue, whereby one thing becomes affected at the same time with another, either in the same or in a different manner. This amounts to the same with what they otherwise call *Sympathy*. See **SYMPATHY**.

MAGNETICAL Amplitude, an arch of the horizon, contained between the sun, at his rising and setting, and the east or west point of the compass. See **AMPLITUDE**.

MAGNETICAL Azimuth. See the article **AZIMUTH**.

MAGNIFYING, among philosophers, is chiefly used in speaking of microscopes, which are said to *magnify* objects, that is, to make them appear bigger than they really are; though, in reality, they do not, nor cannot, *magnify* any object, but only shew it nearer, and discover more of its parts, than before were taken notice of.

Magnifying GLASS, in optics, denotes a little spherical convex lens; which, in transmitting the rays of light, reflects them so, as that the parallel ones become converging, and those which were diverging become parallel; by means whereof, objects viewed through them appear larger than when viewed by the naked eye. See **MICROSCOPE**.

MAGNITUDE, any thing that has parts without (or *extra*) to parts connected together by some common term.

Magnitude is any thing locally extended, or continued; or that has several dimensions.

The origin of all *Magnitude* is a point, which, though void of parts itself, yet its flux forms a line, the flux of that a surface, and of that a body.

Magnitude amounts to much the same with what is otherwise called *quantity*.

Literal MAGNITUDE denotes a *Magnitude* expressed by letters.

Numerical MAGNITUDE is that expressed by numbers.

Broken MAGNITUDE denotes a fraction.

Complex MAGNITUDE is that formed by multiplication.

Incommensurable MAGNITUDE is that which has no proportion to unity.

Apparent MAGNITUDE of a body, in optics, is that measured by the optic or visual angle, intercepted between rays drawn from its extremes to the centre of the pupil of the eye.

It is one of the fundamental maxims in this science, that whatever things are seen under the same or equal angles, appear equal; and *vice versa*.

The *apparent Magnitudes* of an object at different distances are in a ratio less than that of their distances reciprocally.

The *apparent Magnitudes* of the two great luminaries the sun and moon, at rising and setting, are a phenomenon that has extremely embarrassed the modern philosophers. According to the ordinary laws of vision, they should appear the least when nearest the horizon, as being then farthest distant from the eye; and yet we find the contrary to be true in fact.—Ptolemy, in his *Almagest*. l. 1. c. 3. has ascribed this appearance to a refraction of the rays by vapours, which actually enlarge the angle under which the moon appears; just as the angle is enlarged by which an object is seen from under water: And his commentator Theon explains distinctly how the dilatation of the angle in the object immersed in water is caused.

—But it was afterwards discovered, that there is no alteration in the angle: upon which, another solution was started by the Arab Alhazen; and followed and improved by Vitellio, Kepler, Peckham, Rog. Bacon, and others. According to Alhazen, the sight apprehends the surface of the heavens as flat, and judges of the stars as it would of ordinary visible objects extended upon a wide plain; that the eye sees them under equal angles, but withal perceives a difference in their distances, and (on account of the semidiameter of the earth, which is interposed in one case, and not in the other) that it

is hence induced to judge those which appear more remote to be greater. See *Robin's Remarks on Smith's Optics*. Des Cartes, and from him Dr. Wallis, and most other authors, account for the appearance of a different distance under the same angle, from the long series of objects interposed between the eye and the extremity of the sensible horizon, which makes us imagine it more remote than when in the meridian, where the eye sees nothing in the way between the object and itself. This idea of a great distance makes us imagine the luminary the bigger; for any object being seen under any certain angle, and believed, at the same time, very remote, we naturally judge it must be very large, to appear under such an angle at such a distance. And thus a pure judgment of the mind makes us see the sun or the moon bigger in the horizon than in the meridian; notwithstanding their images painted on the retina are really less in the former situation than the latter.

This hypothesis F. Gouye destroys, by observing, that the narrower and more confined the sensible horizon is, the greater does the sun or moon appear; the contrary of which ought to happen on the principle laid down.

Gassendus is of opinion, that the pupil of the eye, which is always more open as the place is more dark; being more so in the morning and evening than at other times, by reason the earth is covered with gross vapours; and besides, being obliged to pass through a longer column or series of vapours to reach the horizon, the image of the luminary enters the eye at a greater angle, and is really painted there larger at the former times than the latter.

In answer to which, it may be said, that, notwithstanding this dilatation of the pupil, occasioned by the obscurity, if the moon be viewed through a little pin-hole made in a paper, she appears less when in the horizon, than in the meridian.

F. Gouye, finding both the conjectures false, advances a third, which is, that, when the luminaries are in the horizon, the neighbourhood of the earth, and the gross vapours wherewith they then appear enveloped, have the same effect with regard to us, as a wall, or other dense body, placed behind a column; which, in that case, appears bigger than when insulate, and uncompassed on all sides with an illumined air.—Further, it is observed, that a column, when fluted, appears bigger than before, when it was plain; the flutes being so many particular objects, which, by their multitude, occasion the mind to imagine the whole object, whereof they are composed, of a larger extent.—The same thing may be said of the several objects seen towards the horizon, to which the sun or moon correspond at their rising and setting.—And hence it is, that they appear larger still, when they rise or set between trees; the narrow, yet distinct, intervals whereof have the same effect with regard to the apparent diameter of the luminary, as a greater number of flutes with regard to the shaft of a column.

MAGOPHONIA *, the name of a feast among the antient Persians, held in memory of the expulsion of the magians.

* The word is formed from *Magos*, magus, and *phos*, slaughter.

The magus Smerdis having usurped the throne of Persia, upon the death of Cambyzes, 521 years before Jesus Christ, seven of the principal lords of the court conspired to drive him out of it. Their design was executed with good success; Smerdis, and his brother, another magus, called Pitiathes, were killed. Upon which, the people also rose, and put all the magi to the sword; inasmuch that there would not one have escaped, had not night come upon them. Darius, son of Hytaspes, was then elected king: and, in memory of this massacre of the magi, a feast was instituted, says Herodotus, called *Magophonia*.

MAHIM, MAHEM, MAIHEM, or MAYHEM *, in law, a *Maim*, or corporal hurt, whereby a man loseth the use of any member, that is, or may be, of defence to him in battle; as the eye, hand, foot, scalp of the head, fore-tooth, or, as some say, a finger, or toe.

* The word comes from the French, *Molain*, of *Molaigner*, to mutilate: The canonists call it *membris mutilatio*; and all agree, it consists in the loss of a member, or of the use thereof.

If any one shall, of malice, or forethought, cut or disable any limb or member of another person, with intention in so doing to *maim*, or disfigure him, it is felony without benefit of clergy; and, when the case is difficult to judge whether it be a *Mahim*, or not, the judges commonly view the party wounded, and sometimes take the opinion of surgeons.

MAHOMETANISM, or MAHOMETISM, the system of religion broached by *Mahomet*, and still adhered to by his followers.

Mahometanism is embraced by the Turks, Persians, and several nations among the Africans, and many among the East-Indians.

The system of *Mahometanism* is contained in the *Koran*, commonly called the *Alcoran*.

The first and chief article of the *Mahometan* creed is, that there is no other god but God; which they have from the *alcoran*, where these words are repeated incessantly: *There is no other god but him. Your God is the only God. I am God, and there*

there is no other God but me.—This grand axiom of their theology seems to have been taken from the Jews, who were continually rehearsing those words of Deuteronomy, *Hear, O Israel, the Lord our God is One*.

For this reason, the *Mahometans* account all such as own any thing of number in the divinity, to be infidels or idolaters. And accordingly, one of the first lessons they teach their children is, That God is neither male nor female, and consequently can have no children.

The second article of *Mahometanism* consists in this, *That Mahomet was sent from God*. By which they exclude all other religions; under pretence that their prophet was the last and greatest of all the prophets that God would ever send; and that as the Jewish religion ceased with the coming of the Messiah, so likewise the Christian religion was to be abrogated with the coming of *Mahomet*. Not but that they own Moses and Jesus Christ to have been great prophets; but *Mahomet* they hold to be *The Prophet*, by way of excellence; and the paraclete or comforter promised in scripture.

These are the two fundamentals of *Mahometanism*; so that when any is to make profession of that faith, they content themselves with his rehearsing these words, *There is no other god but God, and Mahomet is his envoy or prophet*.

To these articles the *Mahometans* have added that of bathing or purification, in imitation of the Jews. And such an opinion have they of these purifications, that it is purely on that account they seem to have retained the practice of circumcision. For they pretend, with the Jews, that, if the least part of the body remained unwashed, the bathing is of no effect. Hence they find themselves under a necessity of being circumcised, that the part covered by the prepuce may also have its share in the lotion.

Prayer is also one of the things to which the *Mahometans* are obliged; and they always are to perform it five times a day, to distinguish themselves from the Jews, who only do it thrice. Some of their periods or hours of prayer they hold to be necessary, and of divine obligation; others they esteem convenient and prudential. That at nine a-clock in the morning, they do not esteem necessary; but those at noon and in the afternoon are held to be *jure divino*. They are obliged to observe an infinity of things in order to be heard. If they speak or smile in praying, they say their prayers are vain; and it is the same thing if they weep, unless it be with the thought of paradise or hell. In many of their prayers they use beads.

The *Mahometans* believe, with the Christians and Jews, a resurrection of the dead: They hold, that, ere that time, an *Anti-Mahomet* will come; and that Jesus Christ will descend from heaven to kill him, and to establish *Mahometanism*. To which they add a great many more chimeras, relating to Gog and Magog; and the beast that is to come out of Mecca. The mountains, they say, are to fly in the air like birds, and at last the heavens will melt, and drop down upon the earth. They add however, that, some time after, God will renew and re-establish the earth; that then the dead will be raised, &c. See further under *ALCORAN*.

MAIDEN, an edged instrument used in some countries, particularly Scotland, for the beheading of criminals.

The *Maiden* is a broad piece of iron, of a foot square, sharp on the lower part, and loaded above with lead, so as scarce to be lifted: At the time of execution, it is pulled up to the top of a narrow wooden frame ten foot high, with a groove on each side for the *Maiden* to slide in.—The prisoner's neck being fastened to a bar underneath, on a sign given, the *Maiden* is let loose, and the head in an instant separated from the body.

MAJESTY, MAJESTAS *, a title or quality given to kings, and which frequently serves as an appellation to distinguish them by.

* The word seems composed of the two Latin words, *major*, greater, and *status*, state.

The emperor is called, His *Cæsarian* or *Imperial Majesty*; the king of Spain, his *Catholic Majesty*; the king of France, his most *Christian Majesty*; the king of Great-Britain, his *Britannic Majesty*, &c. Some have also extended this title to the popes.

Paquier observes, that our forefathers used this quality exceeding sparingly; and that the frequent use of the word, which now obtains, had not its beginning before the reign of their Henry II. He instances several letters of St. Gregory, who, writing to king Theodoret and Theodoric, only compliments them with *Excellency*. See *EXCELLENCY*.

Till the time of Charles V. the king of Spain had no title but that of *Highness*: And before our king Henry VIII. the kings of England were only addressed under the titles of *Grace*, and *Highness*.

At the peace of Munster, there was a great contest between the ministers of the emperor and those of France: The first would not allow the title of *Serenity* to the king of France, and the latter would not give that of *Majesty* to the emperor. At last it was agreed, that, whenever the French king should write with his own hand to the emperor, he should give him the title of *Imperial Majesty*; and reciprocally, when the em-

peror should write to the king, he should give him that of *Royal Majesty*.

Under the Roman republic, the title *Majesty*, *Majestas*, belonged to the whole body of the people, and to the principal magistrates; so that to diminish or wound the *Majesty* of the commonwealth, was to be wanting in respect to the state, or to its ministers.—But the power afterwards passing into the hands of a single person, the appellation of *Majesty* was transferred to the emperor, and the imperial family. Pliny compliments Trajan on his being contented with the title of *Greatness*; and speaks very invidiously on those who affected that of *Majesty*. And yet *Majesty* seems to be the modestest and justest title that can be attributed to sovereigns, since it signifies no more at bottom, than the royalty or sovereign power.

MAIL, MAILLE, is primarily applied to the meshes or holes in net-work.

Coat of MAIL is a piece of defensive armour, made of iron wire interwoven net-wise: called also a *habergeon*. See *HABERGEON*.

Antiently they also wore shirts of *Mail* under the waistcoat, to serve as a defence against swords and poniards. We also read of gloves of *Mail*.

MAIL, or MALL, also signifies a round ring of iron; whence the play of pall-mall, from *palla*, a ball, and *maille*, the round ring through which it is to pass.

MAILED implies a thing speckled, or full of specks; as the feathers of hawks, partridges, &c. or the furs of some wild beasts.

MAIN-MORTE, a term in some antient customs, still obtaining in Burgundy, signifying a right which the lord has, on the death of the chief of a family that is *Mainmortal*, of taking the best moveable in the house; or, in default of that, the right hand of the deceased was offered him, in token that he could serve him no longer. See *MORT-MAIN*.

MAINOUR, MANOUR, or MEINOR, in law, signifies the thing that a thief takes away, or steals.

Thus, to be taken with *Mainour*, is to be taken with the thing stolen about him.—If the defendant were taken with the *Mainour*, and so carried to court, in antient times they would arraign him on the *Mainour*, without any appeal or indictment.

MAINPRISE *, in law, the taking or receiving a man into friendly custody, who otherwise might be committed to prison; upon security given for his forth-coming at a day assigned.

* The word is compounded of the French *main*, hand, and *pris*, or *prins*, taken.

They who thus undertake for any one, are called *Mainpennors*, because they receive the person into their hands; whence also comes the word *Mainpennable*, denoting the person who may be thus bailed.

Manwood makes a great difference between bail and *Mainprise*: he that is *mainprised* is already laid to be at large after the day he is set to *Mainprise* till the day of his appearance; but it is quite otherwise where a man is let to bail to four or two men, by the lord justice in eye of the forest, or any other judge, until a certain day; for there he is always accounted by the law to be in their ward and custody for the time; and they may, if they please, keep him in prison all that time. So that he who is bailed is not supposed to be at large, or at his own liberty: whereas, under *Mainprise*, a man is supposed to go at large, and is not liable to be confined by his sureties or *Mainpennors*. See *BAIL*.

The author of the *Mirror of Justice* says, that pledges are those who bail, or redeem any thing but the body of a man; and *Mainpennors* those who free the body: on which footing, pledges belong properly to real and mixed actions, and *Mainpennors* to personal.

MAINTENANCE, MANUTENENTIA *, in law, and unlawful maintaining, or upholding a cause, or suit between others; either by word, writing, countenance, or deed.

* The word is metaphorically taken from the succouring a young child, that learns to go by one's hand; but it is used in the evil part in some of our statutes.

When a man's act in this kind is esteemed *Maintenance*, and when not, see *Brooks and Kitchen*. See also *BARRATOR*. There lies a writ against a *Maintainer*, called a *Writ of Maintenance*.

MAJOR, in the art of war, a name given to several officers of different qualities, and functions.—Thus,

MAJOR-General is a general officer who receives the general's orders, and delivers them out to the *Majors* of brigades, with whom he concert's what troops are to mount the guard, what to go on parties, and what to form detachments, or to be sent on convoys, &c.

It is his business also to view the ground to incamp on, and do other services; he is subordinate to the general, and lieutenant-general, and the next commanding officer to them.

MAJOR of a brigade, either of horse or foot, is he who receives orders, and the word, from the major-general, and gives them to the particular majors of each regiment.

MAJOR of a regiment is an officer, whose business is, to convey all orders to the regiment, to draw it up, and exercise it; to see

it march in good order, to look to its quarters, and to rally it, if it happen to be broke in an engagement, &c.

The *Major* is the only officer of a regiment of foot, who is allowed to be on horseback in time of service; but he always rides, that he may speedily get from place to place, as occasion requires.

MAJOR of a regiment of horse is the first captain of the regiment; and commands in the absence of the colonel.

Town-MAJOR is the third officer in order in a garrison, being next to the deputy-governor.

He ought to understand fortification, and hath charge of the guards, rounds, patrols, and centinels.

There are also *Aids-Major*, *Drums-Major*, and other officers; so called by reason of some seniority or prerogative that they have over the rest.

MAJOR, in law, a person who is of age to manage his own affairs. See **AGE**.

By the civil law, a man is not a *Major* till the age of twenty-five years; in England, he is a *Major* at twenty-one, and in Normandy at twenty.

MAJOR, in logic, is understood of the first proposition of a regular syllogism.

It is called *Major*, because it has a more extensive sense than the *minor* proposition, as containing the principal term. See **PROPOSITION**.

MAJOR and MINOR, in music, are applied to concords which differ from each other by a semi-tone.

There are *Major* and *minor* thirds, &c.

Major tone is the difference between the fifth and fourth; and *Major* semi-tone the difference between the *Major* fourth and the third. The *Major* tone surpasses the *minor* by a comma. See **TOPE**.

MAJOR-DOMO, an Italian term, frequently used to signify a steward, or master of the household.

The title of *Major-Domo* was formerly given in the courts of princes to three different kinds of officers. 1. To him who took care of what related to the prince's table, or eating, otherwise called *eleator*, *praefectus mensae*, *architriclinus*, *dapifer*, and *princeps coquorum*. 2. *Major-Domo* was also applied to the steward of the household. 3. The title of *Major-Domo* was also given to the chief minister, or him to whom the prince deputed the administration of his affairs, foreign and domestic, relating to war as well as peace.—Instances of *Major-Domos* in the two first senses are frequent, both in the English, French, and Norman affairs.

MAKE, in law, signifies to perform, and execute.

Thus, to *make* his law, is to perform that law to which a man had formerly bound himself; *v. gr.* to clear himself of action commenced against him by his own oath, and the oath of his neighbours.

So, to *make* services, or customs, is nothing else but to perform what belongs to them.

MALACIA, *μαλακία* *, a disease consisting in a depraved appetite, wherein the patient covets and longs for some particular kind of food with extraordinary earnestness, and eats it to excess.

* The word seems derived from the Greek *μαλακός*, soft; too lax a tone of the stomach being generally the occasion of indigestion, and of these unusual cravings.

Many authors confound this affection with another called *pica*, which consists in a deprivation of appetite leading the patient to covet things unnatural and absurd, as lime, coals, &c. See **PICA**.

The *Malacia* seems to arise from an evil disposition of the menstruum in the stomach; or from some defect in the imagination, which determines it to some one thing rather than another. See **Supplement**, Article **MALACIA**.

MALANDERS, *malandria*, a disease in horses, so called from the Italian, *malandare*, to go ill.

It consists in certain ulcerous chaps, or chinks, appearing on the inside of the fore-legs, just against the bending of the knee, which void a red, sharp, and pungent humour.

MALE, the sex which has the parts of generation without-side, and which has ordinarily the pre-eminence over the other.

In this sense *Male* stands opposed to *female*.

For the proportion of *Males* to *females*, see **MARRIAGE**.

MALEBRANCHISM, the doctrine or sentiments of father *Malebranche*, a priest of the oratory of France.

Malebranchism is in a great measure the same with Cartesianism. It must be owned however, that though *F. Malebranche* thought the same with *Des Cartes*, yet he does not so properly seem to have followed him, as to have met with him.

Malebranchism is contained in the *Recherche de la verité*; and to give a general notion of it, we need only repeat what *M. Fontenelle* says of that work. The *Inquiry after truth*, says he, is full of God: God is the only agent, and that too, in the strictest sense. All power of acting, all actions belong immediately to him. Second causes are no causes. They are only occasion: that determine the action of God; or occasional causes.

F. Malebranche, however, does not here lay down his system entire, with regard to religion, or rather the manner in which he would reconcile religion to his system of philosophy: That he relieved for his *Entretien chretien*, printed in 1677, where he proves the existence of a God, the corruption of human nature by original sin, and the necessity of a mediator, and of grace.

Malebranchism, notwithstanding, appears to many persons not only ill grounded, but even dangerous and destructive to religion: and it has accordingly been vigorously opposed by many zealous French authors. The first was *M. Foucher*. After him came *M. Arnaud*; and in 1715, (the year *F. Malebranche* died) *F. du Tertre*, a Jesuit, published an ample confutation (as he imagines) of his whole system.—That part which relates to our seeing all things in God, has been answered by *Mr. Locke*.

MALEDICTION, *MALEDICTIO*, in law, a curse usually annexed to donations of lands, &c. to churches, and religious houses; imprecating the most dreadful punishments on those who should infringe them.

MALIGNANT, in medicine, that quality in a disease which renders it more than ordinarily dangerous, and difficult of cure.

Malignant is generally applied to such fevers as are epidemical, or infectious, and are attended with spots and eruptions of various kinds.

MALLEABLE, something hard and ductile, and that may be beaten, forged, and extended under the hammer without breaking.

All metals are *Malleable*, excepting quick-silver; but gold is so in the greatest degree of all. The chymists have long sought the fixation of Mercury, or to render it *Malleable*. See **MERCURY**.

It is a popular error, that even the art of making glass *Malleable* was known; its nature is incapable of it. For if it were ductile, its pores would not be opposite to each other, and of consequence it would not be transparent; so that its principal criterion would be lost.

MALLEOLUS, a process in the lower part of the leg, just above the foot.

There is one *internal*, and another *external Malleolus*.

The *internal Malleolus* is an eminence of the tibia; the *external* of the fibula: the two together form the ankle.—See **Tab. anat. (osteol.)** fig. 3. n. 23.

MALLET, a large kind of hammer, made of wood; much used by artificers who work with a chisel, as sculptors, masons, and stone-cutters, whose *Mallet* is ordinarily round; and by carpenters, joiners, &c. who use it square. See **HAMMER**.

MALLEUS, in anatomy, denotes one of the bones of the ear; so called from its resemblance to a hammer, or mallet; first discovered, as some assert, by Alexander Achillinus: though others have mistakenly attributed it to *Jac. Carpenis*. Vid. *Douglas Bibl. Anat.* p. 48. See also **EAR**.

MALMSEY, or *MALVASY*, a rich luscious kind of wine brought from Greece or Candia; so called from *Malvasia*, a city in Peloponnesus, the ancient *Epidaurus*, whence this celebrated liquor was first brought.

That brought from Candia is now esteemed the best.

MALMSEY, or *MALVOISY*, is also the name of a kind of muscadine wine brought from Provence.

MALT denotes barley cured, or prepared to fit it for making a potable liquor, under the denomination of beer or ale.

The manner of making *Malt*, Sir Robert Murray describes as follows:—Take good barley newly threshed, &c. put about six English quarters in a stone trough full of water, where let it steep till the water be of a bright reddish colour; which will be in about three days, more or less, according to the moisture or dryness, and the smallness or bigness of the grain, and the season of the year, or the temperature of the weather.—In summer, *Malt* never makes well; in winter, it requires longer steeping than in spring or autumn. It may be known when it is steeped enough, by other marks besides the colour of the water; as by the excessive swelling of the grain, if it be over-steeped, and by too much softness; being, when it is in a right temper, like the barley prepared to make broth. When it is sufficiently steeped, take it out of the trough, and lay it on heaps, to let the water drain from it; then after two or three hours turn it over with a scoop, and lay it in a new heap, about twenty or twenty-four inches deep.

This is called the *coming heap*, in the right management whereof lies the principal skill. In this heap it may lie forty hours, more or less, according to the forementioned qualities of the grain, &c. before it come to the right temper of *Malt*; which that it may do equally, is the principal thing desired.

While it lies in this heap, it must be carefully looked to, after the first fifteen or sixteen hours; for about that time the grains begin to put forth roots: which when they have equally and fully done, the *Malt* must within an hour after be turned over with a scoop; otherwise the grains will begin to put forth the blade or spire also, which must by all means be prevented.—If all the *Malt* do not come equally, but that

which

which lies in the middle, being warmest, come the soonest : turn it, so that the outmost may lie inmost ; and thus manage it till it be all alike.

As soon as the *Malt* is sufficiently come, turn it over, and spread it to a depth not exceeding five or six inches ; and, by that time it is all spread out, begin and turn it over and over again three or four times. Afterwards, turn it over in like manner once in four or five hours, making the heap deeper by degrees ; and continue so to do for the space of forty-eight hours at least.—This frequent turning it over cools, dries, and deadens the grain, whereby it becomes mellow, melts easily in brewing, and separates intirely from the husk.

Then throw up the *Malt* into an heap, as high as you can, where let it lie, till it grow as hot as your hand can endure it. This usually comes to pass in about thirty hours.—This perfects the sweetness and mellowness of the *Malt*.

After it is sufficiently heated, throw it abroad to cool, and turn it over again about six or eight hours after, and then lay it on a kiln with hair-cloth or wire spread under it ; where, after one fire, which must last for twenty-four hours, give it another more flow, and afterwards, if need be, a third ; for, if the *Malt* be not thoroughly dried, it cannot be well ground, neither will it dissolve well in the brewing ; but the ale it makes will be red, bitter, and unfit to keep.

The best fuel for drying it is peat or turf ; the next is charcoal. If there be not enough of one kind, burn the best first ; for that gives the strongest impression.—Indeed, the best and most natural method of drying it is in the sun, in the months of April and May. This yields the palest, the most wholesome, and the finest liquor. However this be, take care the *Malt* be not smoked in the drying.—As to the complexion or colour of *Malt*, the white is accounted the best, because the most natural.

For the manner of preparing liquors of MALT, see BREWING.

MALT Liquors have different names, as well as different virtues, properties, and uses, both from the different manners of preparing the *Malt*, whence they are distinguished into *pale* and *brown*, and from the different manners of preparing or brewing the *Liquors* themselves : whence they are divided into *beer* and *ale*, *strong* and *small*, *new* and *old*.

Malt drinks are either pale or brown, as the *Malt* is more or less dried on the kiln ; that, which is the slenderest dried, tinging the liquor least in brewing, and therefore being called *pale* : whereas that higher dried, and as it were roasted, makes it of an higher colour.—A mixture of both these makes an amber colour ; whence several of these *Liquors* take their name.

Now, it is certain the pale *Malt* has most of the natural grain in it, and is therefore the most nourishing ; but, for the same reason, it requires a stronger constitution to digest it. Those who drink much of it, are usually fat and sleek in their bloom ; but are often cut off with sudden fevers ; or, if they avoid this, they fall early into a distempred old age.

The brown *Malt* makes a drink much less viscid, and fitter to pass the several strainers of the body ; but, if very strong, it may lead on to the same inconveniencies with the pale ; tho' a single debauch wears off much more easily in the brown.

Dr. Quincy observes, that the best pale *Malt Liquors* are those brewed with hard waters, as those of springs and wells, in regard the mineral particles, wherewith these waters are impregnated, help to prevent the cohesions of those drawn from the grain, and enable them to pass the proper secretions the better ; as the viscid particles of the grain do likewise defend these from doing the mischief they might otherwise occasion.—But softer waters, as rain and river waters, seem best suited to draw out the substance of high-dried *Malts*, which retain many fiery particles in their texture, and are therefore best lost in a smooth vehicle.

For the differences in the preparations of *Malt Liquors*, they consist chiefly in the use of hops, as in beer ; or in their omission, as in ale.

The difference made by hops is best discovered from the nature and qualities of the hops themselves : these are known to be a subtle grateful bitter ; in their composition, therefore, with this *Liquor*, they add somewhat of an alkaline nature, i. e. particles that are subtile, active, and rigid.—By which means, the ropy, viscid parts of the *Malt* are more divided and subtilized, and are therefore not only rendered more easy of digestion and secretion in the body, but also, while in the *Liquor*, they prevent it from running into such cohesions as would make it ropy, viscid, and four.

For want of this, in unhopped drinks, that clammy sweetness, which they retain after working, soon turns them acid, and unfit for use ; which happens sooner or later, in proportion to the strength they receive from the *Malt*, and the comminution that has undergone by fermentation.

It is a common opinion, that ale is more diuretic than beer, that is, unhopped liquor more than that with hops in it : which may hold in some constitutions, in regard ale being more smooth, softening, and relaxing, where urine is to be promoted by enlarging the passage, as in thin, dry constitutions, this is the most likely to effect it.—But, where the promoting of urine is to be done by attenuating, and breaking the

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juices, and rendering them more fluid, it is certainly best answered by those drinks which are well hopped.

As to the dispute, whether or no hops tend to breed the stone ; it is too long to enter upon here. Quincy is of opinion, there is but little reason for the affirmative side of the question ; and, in the general, makes no scruple to say, that, for one constitution damaged by beer, there are numbers spoiled by ale.

—This last manifestly fouls the glands, stuffs the vessels with slime and viscidities, makes the body unwieldy and corpulent, and paves the way for cachexies, jaundice, asthma, and at last incurable dropies.—The urinary passages, also, which it is supposed to clear, will, in time, be filled by it with slough and matter of as ill consequence as gravel.

The different strengths of *Malt Liquors* also make their effects different.—The stronger they are, the more viscid parts they carry into the blood ; and though the spirituous parts make these imperceptible at first, yet, when those are evaporated, which will be in a few hours, the other will be sensibly felt by pains in the head, nauousefulness at the stomach, and lassitude or listlessness to motion.—This, those are the most sensible of, who have experienced the extremes of drinking these *Liquors*, and wines ; for a debauch of wine they find much sooner wore off, and they are much more lively and brisk afterwards, than after suddling *Malt Liquors*, whose viscid remains will be long ere they are shaken off.

Malt Liquors therefore are, in general, the more wholesome for being small ; i. e. of such a strength as is able to carry a small degree of warmth into the stomach, but not so great as to prevent their being proper diluters of the necessary food. Indeed, in robust people, or those who labour hard, the viscidities of the drink may be broken into convenient nourishment ; but, in persons of another habit and way of living, they serve rather to promote obstructions and ill humours.

The age of *Malt Liquors* is the last thing by which they are rendered more or less wholesome.—Age seems to do nearly the same thing as hops ; for those *Liquors* which are longest kept, are certainly least viscid ; age breaking the viscid parts, and, by degrees, rendering them smaller, and fitter for secretion. But this is always determined according to their strength ; in proportion to which, they will sooner or later come to their full perfection, as well as decay ; for, when ale or beer is kept till its particles are broken and comminuted as far as they are capable, then it is that they are best ; and, beyond this, they will be continually on the decay, till the finer spirits are intirely escaped, and the remainder becomes vapid and four.

MALTA.—*Knights of MALTA*, an order of military religious, who have borne various other names ; as, Hospitaliers of St. John of Jerusalem, Knights of St. John, Knights of Rhodes, order of Malta, religion of Malta, &c.

About the year 1048, some Neapolitan merchants founded a church after the Latin rite at Jerusalem, giving it the name of *Santa Maria della Latina*. They also founded a monastery of religious after the order of St. Bennet, for the reception of pilgrims ; and afterwards an hospital near the monastery, to take care of the diseased, under the direction of a master or rector, to be nominated by the abbot of Santa Maria della Latina. Besides which, they also built a chapel in honour of St. John Baptist.

In 1099, Godfrey of Bulloign, having taken Jerusalem, endowed this hospital with some demesnes which he had in France ; and others imitating his liberality, the revenues of the hospital became considerably augmented. Upon this, Gerhard Torn their rector, in concert with the Hospitaliers, resolved to separate from the abbot and religious of Santa Maria, and to form a distinct congregation, under the name and protection of St. John Baptist : and hence it was, that they had the name of *Hospitaliers*, or *Brothers of St. John of Jerusalem*.

Pope Paschal II. by a bull in the year 1113, confirmed the donations made to this hospital, which he settled under the protection of the holy see ; ordering, that the rectors, after Gerhard's death, should be chosen by the Hospitaliers. Raymond de Puy, Gerhard's successor, took the title of *Master* : and he gave a rule to the Hospitaliers, which was approved by Calixtus II. in 1120.—Such was the first rise of the order of *Malta*.

Their first grand master, finding the revenues of the hospital vastly to exceed what was necessary for the entertainment of poor pilgrims and diseased persons, resolved to employ the surplus against the infidels ; and, with this view, he offered himself to the king of Jerusalem.—

He divided his Hospitaliers into three classes : the first consisted of nobles, whom he destined to the profession of arms, for the defence of the faith, and the protection of pilgrims ; the second consisted of priests or chaplains, who were to say mass ; and the third of servitors, who were not noble, but were also appointed for the war.—He also regulated the manner of admitting knights brothers ; and had the whole confirmed by pope Innocent ; who gave them for arms a white cross in a field argent ; which continues still the standard of this order.

After the loss of Jerusalem, they retired first to Margath, then to Acre, which they defended very vigorously in 1290. After the intire loss of the Holy Land, they withdrew to Cy-

prus, where king Henry of Lusignan, whom they had followed thither, gave them the city of Jamislon.—Here they continued 18 years; when, taking the island of Rhodes from the Saracens in 1308, they settled there. And now it was that they first took the name of Knights, viz. *Knights of Rhodes*. Andronicus, emperor of Constantinople, granted to their grand master, Fulk de Villaret, the investiture of this order; and the donation was confirmed by pope Clement. The year following, with the assistance of Amadeus IV. duke of Savoy, they defended themselves, and their island, against an army of Saracens. In 1480, their grand master d' Aubusson made a vigorous defence against Mahomet II. and preserved the island, in spite of a formidable army which besieged it for the space of three months.—But, in 1522, it was attacked by Soliman with an army of three hundred thousand men, and taken by him, after having been in the possession of the Knights 213 years.

After this loss, the grand master and knights retired first into the isle of Candia. Some time after, pope Clement VII. gave them Viterbo. Lastly, Charles V. in 1530, gave them the island of Malta, which they still hold; and hence they come by the appellation of *Knights of Malta*; though their proper name is that of *Knights of the order of St. John of Jerusalem*; and their grand master, among his other titles, still retains that of *master of the hospital of St. John, and guardian of the poor of our Saviour Jesus Christ*.

The order of *Malta* have no other dominions besides their island, and some other little places in the neighbourhood, the chief whereof are Goza and Comino.

The government is both monarchical and aristocratical, the grand master being the sovereign, and the chapter the senate.—It is monarchical with regard to the inhabitants of *Malta*, and the isles adjacent, and even with regard to the Knights in every thing relating to the statutes and rule of their order; and it is aristocratical with regard to the decision of any important affairs, which are not to be dispatched, but by the grand master and the chapter.

There are two councils; the one ordinary, composed of the grand master as chief, and the grand crosses; the other complete, consisting of the grand master, the grand crosses, and the two senior knights of each language.

By the languages of *Malta* are meant the several nations whereof the order is composed.—Of these there are eight, viz. Provence, Auvergne, France, Italy, Arragon, Germany, Castile, and England.

The pillar (as he is called) of the language of Provence is the grand commander of the order; he of Auvergne the grand marshal; he of France the grand Hospitaler; he of Italy the grand admiral; he of Arragon grand conservator, or draper, as he was antiently called; the pillar of the language of Germany is grand bayliff; and he of Castile grand chancellor: the language of England, which has been extinct since the time of the reformation under king Henry VIII. had for its pillar or chief the grand turcopoler, or colonel of the cavalry. The language of Provence is the first, on account of Raimond de Puy, their first grand master, who was a Provençal.

In each language there are several grand priories, and capital bailiages. To each language belongs an hall, where the Knights eat, and hold their ordinary assemblies. Each grand prior has a number of commanderies.

The commanderies are either magisterial, or else by right, or, finally, by favour. The magisterial are those annexed to the grand mastership, whereof there is one in each grand priory: Commanderies by right are those which come by right of seniority; their seniority is computed from the time of their admission; but they must first have lived five years at *Malta*, and have made four caravanes, or cruising voyages, on the Turks and Corsairs: Commanderies by favour are those which the grand master, or the grand priors, have a right of conferring; one of these they confer every five years on whom they please.

The noble Knights are called Knights by right; and none but these can be bailiffs, grand priors, or grand masters.—Knights by favour are those, who, not being noble of themselves, are raised on account of some great exploit, or some notable service, into the rank of nobles.

The servitors, or serving-brothers, are of two kinds; 1^o. The servitors of war, whose functions are the same with those of the Knights. 2^o. The servitors of religion, whose whole business is to sing the praises of God in the conventual church, and to officiate each in his turn as chaplain on board the vessels and galleys of the order.

The brothers of obedience are priests, who, without being obliged to go to *Malta*, take the habit of the order, make the vows, and attach themselves to the service of some of the churches of the order, under the command of a grand prior, or commander, to whom they pay obedience.

The Knights of majority are those who, according to the statutes, are admitted at sixteen years of age.—The Knights of minority are those who are admitted from the time of their birth; which, however, cannot be done, without a dispensation from the pope.

The chaplains can only be admitted regularly from ten to fifteen years of age; after fifteen, they must have a brief from the pope; till fifteen, the grand master's letter is sufficient. These are called *diacons*, and must give proof of their being born of creditable families.

For the proofs of nobility to be made before the admission of Knights, in the language of Germany, they go back six generations; in the rest, it is sufficient to go back to the great-grandfather on the father's or mother's side.

All the Knights, after their profession, are obliged to wear a white cross, or star with eight points, over the cloak or coat on the left-side; which is the proper habit of the order, the golden cross being only an ornament.

There are also female Hospitalers of the order of St. John of Jerusalem, sometimes also called *Chevalieresses*, or *Sister-Knights*, of equal antiquity with the Knights themselves; whose business was to take care of the women-pilgrims, in an hospital apart from that of the men.

MALTA, MALTAH, in antiquity, denotes any cement, or glutinous body, which has the faculty of binding things together.

Antient writers make mention of divers sorts of *Maltha*, native and factitious: one of the latter much in use was composed of pitch, wax, plaster, and grease.

Another kind, wherewith the Romans plastered and whitened the insides of their aqueducts, was made of lime slacked in wine, incorporated with melted pitch, and fresh figs.

Natural *Maltha* is a kind of bitumen, wherewith the Asiatics plaster their walls.—When this is once set on fire, water will not quench it; but serves rather to make it burn more fiercely.

MAMALUKES, MAMMELUKES, or MAMMALUCKS*, the name of a dynasty, which reigned a considerable time in Egypt.

* The word comes from *مملوك* *regere, imperare*, the Arabic participle passive whereof is *مملوك* *Mamluc*, which signifies *subject*, or one under the dominion of another. Scaliger holds, that the word is Arabic; but that it properly signifies something bought with money; but others will have it signify any thing acquired, either as prize or purchase.

The *Mamaluks* were originally Turkish and Circassian slaves, bought of the Tartars by Melchaleh, to the number of a thousand; whom he bred up to arms, and raised some to the principal offices of the empire.—They killed sultan Moadam in 1250, being affronted at his concluding a treaty with his prisoner St. Louis, without their privacy. This Moadam was the last sultan of the Ajoobites; to whom succeeded the *Mamaluks*, the first of whom was sultan Azeeddin, or Mouz Ibec, the Turcoman.

Others say, that the *Mamaluks* were ordinarily chosen from among the Christian slaves, and that they were the same thing, in great measure, with the janizaries among the Turks. They never married. The first are said to have been brought from Circassia; and some add, that they first began to be talked of about the year 869.

MAMMÆ. See the article BREASTS.

MAMMÆANÆ. Vide ALIMENTARY.

MAMMIFORM, MAMMIFORMIS, in anatomy, a name given to two apophyses of the bone in the back part of the skull; so called from their resembling a breast.

MAMMILLARY, MAMMILLARIS, in anatomy, an epithet given to two little protuberances, somewhat resembling the nipples of the breast, found under the fore-ventricles of the brain, and supposed to be the organs of smelling.—See Tab. Anat. (osteol.) fig. 7. n. 2. fig. 13. let. d.

These are called *apophyses Mammillares*.

There is also a muscle called *Mammillaris*, or *Mastoides*, serving to stoop the head.

MANAGE, or MANEGE*, an academy, or place for learning to ride the great horse; as well as for breaking horses to the proper motions and actions.

* The word is borrowed from the French *Manège*, and that from the Italian *Meneggio*, or, some will have it, *à manu agende*, from acting with the hand.

In every *Manège* is a centre, or a place destined for vaulting round a pillar; a course or career for running the ring; and, on the side, are pillars, between which are placed the horses intended for high airs.

MANAGE is also used for the exercise itself, either of the horse, or the rider. See HORSEMANSHIP.

MANCIPLE, MANCEPS, in old authors, denotes a caterer.

There was antiently an officer in the Temple called by this name: he is now called the steward; and both name and office is still retained in the colleges in both universities.

MANDAMUS, a writ issuing out of the court of king's bench, sent by the king to the head of some corporation, commanding them to admit or restore a person into his place or office.

MANDAMUS was also a charge to the sheriff, to take into the king's hands all the lands and tenements of the king's widow, who, against her oath formerly given, married without the king's consent.

MANDARIN *, a name given by the Portuguese to the nobility and magistracy of the eastern countries, especially to those of China.

* The word *Mandarin* is unknown in this sense among the Chinese, who in lieu thereof call their grandees and magistrates *Quan*, or *Quan-fu*, q. d. servant or minister of a prince.

There are in China nine orders of *Mandarins*; or nine degrees of nobility; which have as many different animals for their characteristics.—The first is distinguished by a crane, the second by a lion, the third by an eagle, the fourth by a peacock, &c.

There are in all thirty-two or thirty-three thousand *Mandarins* in China. There are *Mandarins* of letters, and *Mandarins* of arms; both the one and the other of which pass several examinations: besides civil mandarins, or those of justice.

Since the time that the Tartars have rendered themselves masters of China, most of the tribunals, or courts of justice, &c. instead of one *Mandarin* for a president, have two; the one a Tartar, the other a Chinese.

The *Mandarinate* is not hereditary, nor are any raised to it but men of letters.

MANDARIN is also a name which the Chinese give to the learned language of the country.

Besides the proper and peculiar language of each nation and province, they have one common to all the learned men in the empire; and which is that in China which the Latin is in Europe.—This they call the *Mandarin* tongue, or the language of the court.—Their public officers, as notaries, lawyers, judges, and chief magistrates, all write and speak the *Mandarin*.

MANDATE, MANDATUM, in the canon law, denotes a rescript of the pope, by which he commands some ordinary, collector, or presenter, to put the person there nominated in possession of the first benefice vacant in his collation.

An apostolical *Mandate* for the provision of benefices, is a monitorial and comminatory letter from the pope to a bishop, by which he is enjoined to provide a subsistence for those who have been ordained by him, or his predecessors, from the tithes to sacred orders inclusively; and to allow them this subsistence till they be provided of a benefice. This practice was occasioned by the bishops formerly laying hands on great numbers, and afterwards abandoning them to misery and want.

At first the popes only gave monitorial *Mandates*, which were no more than simple prayers and requests, that did not bind the ordinary; afterwards they gave preceptory *Mandates*, which did not annul the provisions of the ordinary; at last they set up executory *Mandates*, by which the provisions made by the ordinary, in prejudice of the *Mandate*, were declared null; and the executor of the *Mandate*, in default of the ordinary, conferred the benefice on the mandatory: but the pope's power in issuing these *Mandates* is now very much restrained.

MANDIBULA, the jaw. See MAXILLA. Hence

MANDIBULARES, or *manducatorii musculi*. See MASSETERS.

MANDIL, or MANDRI, the name of a kind of cap or turban worn by the Persians.

The *Mandil* is formed, by first wrapping round the head a piece of fine white linen five or six ells long; over this they wrap, in the same manner, a piece of silk of the same length, and oftentimes of great value.—To make the *Mandil* genteel, care must be taken, that, in wrapping the silk, it be so managed, as that the several colours found in the several folds make a kind of waves, somewhat like what we see in marbled paper.

This dress is extremely majestic, but at the same time very heavy: It serves either as a shelter to the head from cold, or as a screen from the excessive heat of the sun; it is said, that a blow of a cutlass will not penetrate it.—In rainy weather they cover it up with a kind of case or hood, made of red cloth.

The mode of the *Mandil* has been altered of late: during the time of Schah-Abbas II. it was round at top; in the time of Schah-Soliman, they brought one end or the silk out of the middle of the *Mandil* over the head; and, lastly, in the reign of Schah Husein, the end of the silk, in lieu of its being gathered as before, was plaited in manner of a rose; and thus the Persians account extremely graceful, and use it to this day.

MANDRAGORA, or MANDRAGORAS, MANDRAKE, a medicinal plant, which makes a principal ingredient in the unguentum populeum.

There are two kinds of *Mandradora*: the male and the female; each bearing a kind of apples: those of the male, as well as the leaves, roots, &c. being twice as large as those of the female; but the juice of each is a narcotic poison, equally violent. Naturalists tell strange stories of this plant; but, setting aside its soporiferous virtue, the modern botanists will scarce warrant any of them, not even that human figure ordinarily ascribed to its roots, especially since the discovery of the artifice of Charlatan's in fashioning it, to surprise the credulity of the people. See Supplement, Article MANDRAGORA.

Chinese MANDRAGORAS is the plant ginseng. See GINSENG.

MANDREL, a kind of wooden pulley, making a member of the turner's lathe.

Of these there are several kinds; as

Flat MANDRELS, which have three or more little pegs or points near the verge, and are used for turning flat boards on.

Pin MANDRELS, which have a long wooden shank to fit into a round hole made in the work to be turned.

Hollow MANDRELS, which are hollow of themselves, and used for turning hollow work.

Screw MANDRELS, for turning screws, &c.

MANDUCATION, the action of *cheewing*, otherwise called *Mastication*.

Manducation is a term seldom used but in speaking of the eucharist.—The Catholics maintain a real *Manducation* of the body of Christ; the Reformed, on the contrary, take this *Manducation* to be only figurative, and by faith.—St. Augustine calls it *spiritual Manducation*.

MANEQUIN, among painters. See LAYMAN.

MANES, a poetical term, signifying the shades, or souls of the deceased.

The heathens used a world of ceremonies and sacrifices to appease the *Manes* of those who died without burial. See LEMURES and LEMURIA.

Di MANES were the same with *Inferi*, or the infernal gods, who tormented men; and to these the heathens offered sacrifices, to allay their indignation.

The heathen theology is a little obscure with regard to these gods *Manes*. Some hold, that they were the souls of the dead; others, that they were the genii of men; which last opinion suits best with the etymology of the word.

The heathens, 'tis pretty evident, used the word *Manes* in several senses; so that it sometimes signified the ghosts of the departed, and sometimes the infernal or subterraneous deities, and in general all divinities that presided over tombs.

The evocation of the *Manes* of the dead seems to have been very frequent among the Thessalians; but it was expressly prohibited by the Romans.

MANIA, in medicine, MADNESS; a vehement kind of delirium, without a fever.

The cause of the *Mania* is thus accounted for by Quincy.

—As often as the species of things, wherewith we have been acquainted, are hurried together, we may be said to dream; and thence in sleep these species are added with other things, and variously compounded, from the manifold repercussions of the animal spirit, which arise from the cause producing sleep, and pressing the nerves, so as to revert the fluctuation of their juice. A delirium is therefore the dream of waking persons, wherein ideas are excited without order or coherence, and the animal spirits are driven into irregular fluctuations.

If then the cause inducing a delirium be of that nature, that it can excite ideas or motions of a considerable impetus, without any regularity or order, such a delirium will be attended with boldness or rage, and violent motions of the body; that is, a *Mania* will be produced.

Now it is plain, that all the known causes of this distemper give a greater disposition to the blood for motion, and render it fluxile, but not consistent, and uniformly thick enough; and therefore that they dispose persons likewise to continued fevers, since they occasion the blood to be thrown out of the heart with an increased force, unless some other cause intervenes, whereby the efficacies of these are interrupted in disposing the blood into febrile motions; and the blood is so disposed, as often as it can be rarefied into its minutest parts; that is, so uniformly rarefied, that it can easily, with any force by the motion received from the heart, go into parts divisible at the occurrences of those orifices, into which it ought to be distributed: for then the cohesion of the parts, which can be but very small, will not be any obstruction to the increase and propagation of the blood's velocity. But if it happen that the efficient cause, or the heart, throws the blood with a greater force, or that the blood can be more easily propelled in any given time, it will occasion, at the same time, that some parts of the blood will be more nearly united, so as to form molecules, consisting of cohering particles; which molecules will cohere to one another, and not so easily obey the direction of the heart's propelling force. The blood hereupon cannot be uniformly rarefied, nor enter so easily into the small orifices of the vessels, and so soon travel through them; and therefore there will no fever arise, but a delirium without a fever, wherein the heat of the blood will be greater, and the pressure in the brain uncertain: whence uncertain recursions of the spirits, inordinate undulations, confused vibrations of the nerves, and a remarkable energy of imagination; whence will proceed audacity and passion beyond measure.—It is a disease very hard to cure, and is generally found to baffle the physician. See Supplement, Article MANIA.

MANICHEES, or MANICHEANS, MANICHÆI, a sect of ancient heretics, who asserted two principles; so called from their author *Manes*, or *Manicheus*, a Persian by nation.

This heresy had its first rise about the year 277, and spread itself principally in Arabia, Egypt, and Africa. St. Epiphanius, who treats of it at large, observes, that the true name of this heresiarch

heresarch was Cubricus; and that he changed it for *Manes*, which in the Persian or Babylonish language signifies vessel. A rich widow, whose servant he had been, dying without issue, left him store of wealth; after which he assumed the title of the apostle or envoy of Jesus Christ.

He established two principles, viz. a good and an evil one: The first, which he called *Light*, did nothing but good; and the second, which he called *Darkness*, nothing but evil.—This philosophy is very antient; and Plutarch treats of it at large in his *Isis and Osiris*.

Our souls, according to *Manes*, were made by the good principle, and our bodies by the evil one; those two principles being, according to him, co-eternal, and independent of each other. He borrowed many things from the antient Gnostics; on which account many authors consider the *Manicheans* as a branch of the Gnostics.

In truth, the *Manichean* doctrine was a system of philosophy, rather than of religion. They made use of amulets, in imitation of the Basilidians; and are said to have made profession of astronomy and astrology. They denied that Jesus Christ assumed a true human body, and maintained it was only imaginary. They pretended that the law of Moses did not come from God, or the good principle, but from the evil one; and that for this reason it was abrogated. They obtained intirely from eating the flesh of any animal; following herein the doctrine of the antient Pythagoreans.—The rest of their errors may be seen in St. Epiphanius and St. Augustine; which last, having been of their sect, may be presumed to have been thoroughly acquainted with them.

Though the *Manicheans* professed to receive the books of the New Testament, yet, in effect, they only took so much of them as suited with their own opinions. They first formed to themselves a certain idea or scheme of Christianity; and to this adjusted the writings of the apostles; pretending that whatever was inconsistent with this, had been foisted into the New Testament by later writers, who were half-Jews.—On the other hand, they made fables and apocryphal books pass for apostolical writings; and even are suspected to have forged several others, the better to maintain their errors. St. Epiphanius gives a catalogue of several pieces published by *Manes*, and adds extracts out of some of them.

Manes was not contented with the quality of Apostle of Jesus Christ, but he also assumed that of the Paraclet, whom Christ had promised to send. He left several disciples, and among others, Addas, Thomas, and Hermas. These he sent, in his life-time, into several provinces to preach his doctrine.—*Manes* having undertaken to cure the king of Persia's son, and not succeeding, was clapt into prison upon the young prince's death; whence he made his escape; but he was apprehended soon after, and burnt alive.

Towards the middle of the twelfth century the sect of *Manicheans* took a new face, on occasion of one Constantine, an Armenian, and an adherer to it; who took upon him to suppress the reading of all other books besides the evangelists and the epistles of St. Paul, which he explained in such manner, as to make them contain a new system of *Manicheism*. He intirely discarded all the writings of his predecessors; rejected the chimæra's of the Valentinians and their thirty Æons; the fable of *Manes*, with regard to the origin of rain, which he made to be the sweat of a young man in hot pursuit after a maid; and other dreams; but still retained the impurities of Basilides. In this manner he reformed *Manicheism*, inasmuch that his followers made no scruple of anathematizing Scythian, Buddas, and even *Manes* himself; Constantine being now their great apostle. After he had seduced an infinite number of people, he was at last stoned by order of the emperor.

MANICORDION *, a musical instrument, in form of a spinet.

* Du Cange derives the word fr. m. *Monocord*, on a supposition this instrument has but one chord; but he is mistaken; it has fifty, or more.

Its strings are covered with pieces of scarlet cloth, to deaden, as well as soften, the sound; whence it is also called the *dumb Spinett*, and is much used in nunneries for the religious to learn to play on; so as not to disturb the silence of the dormitory.—Scaliger makes the *Manicord* more antient than the spinet or harpsichord.

MANIFESTO, an apology, or public declaration in writing, made by a prince, shewing his intentions in any enterprize, the motives that induced him to it, and the reasons on which his right and pretensions are founded.

MANILLE, or **MENILLE**, in commerce, one of the principal commodities carried by the Europeans to the coasts of Africa, to traffic with the negroes in exchange for slaves. It is a large brass ring, in form of a bracelet, either flat or round, plain or engraven; which the natives used to deck themselves withal, putting them on the small of the leg, and the thick of the arm above the elbow.

The better sort among the Negroes wear silver and gold *Manilles*; but these are of their own manufacture; most of the money they receive for their other merchandizes being melted into *Manilles*.

MANIPULATION, a term used in the mines, to signify the manner of digging the silver, &c. out of the earth. See **SILVER**.

MANIPULUS, **MANIPULE** *, among the Romans, was a little body of infantry, which, in the time of Romulus, consisted of an hundred men; and in the time of the consuls, and first Cæsars, of two hundred.

* The word properly signifies an handful; and, according to some authors, was first given to the handful of hay which they bore at the end of a pole, to distinguish themselves by, before the custom was introduced of bearing an eagle for their ensign; and hence also the phrase, an handful of men. But Vegetius, Modestas, and Varro, give other etymologies of the word: The last derives it from *manus*, a little body of men following the same standard. According to the former, this corps was called *Manipulus*, because they fought hand in hand, or all together: *Con-tubernium autem Manipuli vocabatur ab eo, quod conjunctis manibus pariter dimicabant*.

Each *Manipule* had two centurions, or captains, called *manipularii*, to command it; one whereof was lieutenant to the other.—Each cohort was divided into three *Manipules*, and each *Manipule* into two centuries.

Aulus Gellius quotes an old author, one Cincius, who lived in the time of Hannibal (whose prisoner he was), and who, writing on the art of war, observes, that then each legion consisted of sixty centuries, of thirty *Manipules*, and of ten cohorts.—And again, Varro and Vegetius mention it as the least division in the army, only consisting of the tenth part of a century; and Spartan adds, that it contained no more than ten men. This shews, that the *Manipulus* was not always the same thing.

MANIPULUS is also an ecclesiastical ornament, worn by the priests, deacons, and subdeacons in the Romish church. It consists of a little fillet in form of a stole, three or four inches broad, and made of the same stuff with the chasuble; signifying and representing an handkerchief, which the priests in the primitive church wore on the arm, to wipe off the tears they were continually shedding for the sins of the people.—There still remains a mark of this usage in a prayer rehearsed by those who wear it; *Mercar, Domine, portare Manipulum fletus & doloris*.

The Greeks and Maronites wear two *Manipules*, one on each arm.

MANIPULUS, in physic, denotes a measure, or fixed quantity of herbs, or leaves, viz. an handful; or so much as the whole hand can grasp: It is generally marked in prescription with *M*.

MANNA, in pharmacy, a medicinal drug, of great use in the modern practice, as a gentle purgative, and cleanser of the first passages.

Manna is a white sweet juice oozing from the branches and leaves of a kind of ash-tree, chiefly in Calabria, during the heats of summer.

Manna has been commonly held a kind of *mel aerium*, or honey-dew, which, falling in the night, gathers on certain trees, and even on rocks, and on the earth itself; where it hardens with the sun. But what refutes this opinion is, that such dews melt in the sun; whereas *Manna* whitens and hardens in it. Add, that such dews are only found on the tops and extremes of the leaves; whereas *Manna* is chiefly found to lodge near the trunks of the branches: and that the honey-dew falls only on trees open to the air; whereas *Manna* is found on trees which are under cover; as was experienced by Dr. Cornelius, who gathered *Manna* from branches covered on purpose with cloth; and Lobel assures us, that *Manna* had been gathered from branches of the ash, which had been thrown the day before into a cellar. It is much more rational to rank *Manna* amongst the number or gums, which, exuding from the juice of the tree, and mixing with some saline particles of the air, is condensed into those flakes in which we see it.

The Italians gather three kinds of *Manna*:—*Manna di corpo*, which oozes spontaneously from the branches of the tree in the month of July.—*Manna forata*, or *foratella*, which is not gathered till August, after an incision of the tree, when the flux of the first has ceased.—*Manna di fronda*, which issues of itself, in little drops, like a kind of sweat, from the nervous part of the leaves of the ash, and gathers into grains about the bigness of those of wheat, which are hardened by the sun in August. The leaves are frequently found so loaded with these grains, that they seem covered with snow.

Manna is a gentle and safe purge; and is also used in broths: Altimarus, a physician of Naples, has written a treatise expressly upon it; and Donzellio another.—*Manna*, though accounted a kind of honey, purges the bile; whereas common honey increases it. Formerly the Syrian *Manna* was in the most repute, but now it gives way to the Calabrian. Fuchsius observes that the peasants of mount Libanus eat *Manna* ordinarily, as others do honey. At Mexico they are said to have a *Manna*, which they eat as we do cheese.

The *Manna* most esteemed is that in flakes; which many take to be factitious, and the work of the Jews at Leghorn; but it is certainly natural: And what gives it this figure is, that they put straws and slips of wood in the incisions, along which the *Manna* gliding, is condensed as it comes out, and assumes this form. See Supplement, Article **MANNA**.

MANNA is also a scripture-term, signifying a miraculous kind of food which fell from heaven for the support of the Israelites in their passage through the wilderness: being in form of coriander-seeds; its colour like that of bdellium, and its taste like honey.

They called it *Manna*, either from the Hebrew word, *manah*, a gift, to intimate its being a gift from heaven; or from *minnah*, which signifies to prepare, because the *Manna* came to them ready for eating, and needed no preparation but gathering; or from the Egyptian word, *Man*, what is it? which last etymology seems the more probable, in regard the scripture takes notice of the surprize they were under when they first saw this new food descend.

Salmasius, however, prefers another: According to him, the Arabs and Chaldeans used the word *Man* to signify a kind of dew or honey that fell on the trees, and was gathered in great abundance on mount Libanus. On which footing the Israelites did not use the term *Manna* out of surprize, but because they found this food fall with the dew, in the same manner as the honey-dew so well known to them under the name of *Man*. Salmasius adds, that the *Manna* of the Israelites was in reality no other than that honey, or dew condensed; and that the one and the other were the same with the wild honey wherewith St. John was fed in the wilderness. So that the miracle did not consist in the formation of any new substance in favour of the Israelites; but in the punctual manner in which it was dispensed by providence for the sustenance of so vast a multitude.

MANNER, in painting, &c. expresses that particular character observable in the works of painters, poets, and other artists, by which their pencil, hand, or style, are distinguished.

The curious in pictures know the *Manners* of the painters; and distinguish readily between the *Manners* of Rubens, Titian, and Da Vinci; between the ancient, and the new *Manner* of the same painter; and between the Flemish, and the Italian *Manner*.

Manner is used with respect both to the invention, the design, and the colouring. The *Manner* of Michael Angelo, or Raphael, may even be known in their scholars. Thus we say, such a piece is of Raphael's school, &c.

MANNERS, in poetry, denote the inclinations, genius, and humour, which the poet gives to his persons, and whereby he distinguishes his characters.

Aristotle defines *Manners*, to be that which discovers the inclination of him who speaks, and shews what he will resolve upon, or what reject, before he has actually determined: whence he concludes, that *Manners* have not place always, and in all kinds of discourses.

One instance will make this definition clear. In the first book of Virgil, *Aeneas* is represented extremely pious, and determined to execute the will of the gods at all adventures. In the fourth book, he has a difficult choice proposed; being engaged on the one hand, out of a principle of love, gratitude, and honour, not to quit Dido; and having, on the other hand, an express order from the gods to depart for Italy.—Now, before it appears on which side he has determined, what he has before said, should shew his will and inclinations, and which part he will take.—And those preceding discourses, which discover his future resolution, make what we call the poetical *Manners*.

Those make it past doubt he will abandon Dido, to obey the gods: this he does in effect: and the *Manners* therefore are good, and well-conducted.—Had he disobeyed the orders of Jupiter, to stay with Dido, the *Manners* had been ill; in regard they would have foretold a resolution contrary to what he was really to take.—But had there been nothing to make us foresee any resolution of *Aeneas* at all, neither that which he actually took, nor the contrary, in that case there had been no *Manners* at all.

It is the *Manners*, as before observed, that distinguish the characters: and, unless the *Manners* be well expressed, we shall never be acquainted with the persons at all; nor, consequently, shall we be either terrified with foreseeing their dangers, nor melted into pity by seeing their sufferings.

The *Manners* should have four qualities; they should be good, like, suitable, and equal.

The *Manners* are good, when they are well marked or expressed; that is, when the discourse of the persons makes us clearly and distinctly see their inclinations, and what good or evil resolutions they will take.—Likeness of *Manners* only relates to known and public persons, whose characters are in history, with which the poetic characters must agree; that is, the poet must not give a person any quality contrary to any of those which history has already given him. And here it may be observed, that the evil qualities given to princes and great men, ought to be omitted by the poets, if they be contrary to the character of a prince, &c. but the virtues opposite to those known vices ought not to be imposed, as by making him generous and liberal in the poem, who was avaricious in the history.

The *Manners* must likewise be suitable; that is, they must be agreeable to the age, sex, rank, climate, and condition of the person that has them. Horace observes, *Interit multum Da-*

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visne loquatur an heros.—Again, the *Manners* must be equal; that is, they must be constant, or consistent through the whole character; or the variety or inequality of the *Manners*, as in nature, so in the drama, must be equal. The fearful must never be brave, nor the brave timorous; the avaricious must never be liberal, nor *vice versa*. In this part, Shakepear's *Manners* are admirable.

Besides these four qualities above-mentioned, there is a fifth essential to their beauty; which is, that they be necessary; that is, that no vicious quality, or inclination, be given to any poetic person, unless it appear to be absolutely necessary, or requisite to the carrying on of the action.

MANOMETER, or **MANOSCOPE** *, an instrument to shew, or measure, the alterations in the rarity or density of the air.

* The word is formed from the Greek *maner*, rarus, and *metron*, mensura, &c.

The *Manometer* differs from the barometer in this, that the latter only measures the weight of the atmosphere, or of the column of air over it; but the former the density of the air in which it is found: which density depends not only on the weight of the atmosphere, but also on the action of heat and cold, &c.—Authors, however, generally confound the two together; and Mr. Boyle himself gives us a very good *Manometer* of his contrivance, under the title of a *statical barometer*; the structure whereof see under the word **BAROMETER**.

MANOR, or **MANNOR** *, an ancient lordship, or royalty; consisting of demesnes and services, and of a court-baron, as incident thereto.

* The word is formed from the French *manoir* a mansion-house; and that from the Latin, *Manere*, to remain, or dwell, as being the lord's usual place of residence.

Manor is the same with what was formerly called *baronia*, *barony*.

A *Manor* is a kind of noble fee granted out partly to tenants for certain services to be performed, and partly reserved to the use of the lord's family, with jurisdiction over his tenant for the lands or estates held of him.

For the original of *Manors*,—we are told there was antiently a certain compass of ground, granted by the king to some man of worth, for him and his heirs to dwell upon, and to exercise some jurisdiction, more or less, within that circuit, such as he thought good to grant: but performing, withal, such services, and paying such yearly rent, as by this grant was required. Now, the lord afterwards, parceling the same to other meaner men, received rent and services from them, and by that means, as he became tenant to the king, the inferiors became tenants to him.

But at this time a *Manor* rather signifies a jurisdiction, and royalty incorporeal, than the land and suit: For a man may now have a *Manor* in gross, i. e. the right and interest of a court-baron, with the perquisites, and another enjoy every foot of land belonging to it.

A *Manor* may be compounded of divers things, as of an house, arable land, pasture, meadow, wood, rent, advowson, court-baron, &c. And this ought to be, by long continuance of time, beyond man's memory.

It is held by some, that a *Manor* cannot now be made, since a court-baron cannot be made; and without a court-baron, and at least two suitors, there can be no *Manor*.

MANSE, **MANSUS**, **MANSA**, or **MANSUM** *, in antient law-books, denotes an house, or habitation; either with or without land.

* The word is formed a *Manendo*, abiding; as being the place of dwelling or residence.

Capital MANSE, *Mansum capitale*, denotes the manor-house, or lord's court.

MANSUS Presbyteri, is a parsonage, or vicarage-house, for the incumbent to reside in.

This was originally, and still remains, an essential part of the endowment of a parish-church, together with the glebe and tithes.—It is sometimes called *Presbyterium*.

MANSION, *MANSIO*, a dwelling-house or habitation, especially in the country.

MANSION is more particularly used for the lord's chief dwelling-house within his fee, which is otherwise called the *capital messuage*, or chief manor place.

MANSIO, or **MANSUS**, was sometimes also used in the same sense with *habe*; that is, for as much land as one plough could till in a year. See **HIDE**.

MAN-SLAUGHTER, **HOMICIDE**; the unlawful killing a man, without any prepened malice.

As, when two persons who before meant no harm to one another, falling out on some sudden occasion, the one kills the other.

Man-slaughter differs from murder, as not being done with foregoing malice; and from chance-medley, because it hath a present intent to kill.—It is esteemed felony, but admitted to the benefit of the clergy, for the first time.

By a law of king Canutus, if a man is killed openly and premeditatedly,

meditatedly, the murderer shall be committed to the relations of the deceased: but if, on his trial, the fact be proved, but not to have been wilful, the bishop is to judge him.

MANSORII *Misfult*, the same with *massifiers*. See *MASSIFTER*.

MANTELETS, in war, a kind of moveable parapets made of planks, about three inches thick, nailed one over another, to the height of almost six feet, generally cated with tin, and set upon little wheels; so that in a siege, they may be driven before the pioneers, and serve as blinds, to shelter them from the enemy's small shot.

There are also other forts of *Mantelets*, covered on the top, whereof the miners make use, to approach the walls of a town, or castle.—See *Tab. Fortif. fig. 17*.

It appears from *Vegetius*, that these were in use among the ancients, under the name of *vineæ*; but they were built lighter, and much larger than ours, being eight or nine feet high, as many broad, and sixteen long: They were defended by a double covering, the one of boards, the other of fagots, with the ribs of others, and were cased without with skins steeped in water, to prevent fire.

MANTLE, or **MANTLE-tree**, in architecture, is the lower part of a chimney; or that piece of timber which is laid across the jambs, and sustains the compartment of the chimney piece. See *CHIMNEY*.

MANILE, or **MANTLING**, in heraldry, that appearance of folding of cloth, flourishing, or drapery, that is in any achievement, drawn about the coat of arms.

It is supposed originally to have been the representation of a *Mantle*, or military habit worn by ancient cavaliers over their armour to preserve it from rust; or as others hold, a short covering only worn over the helmet; which in after-times was lengthened, and made to hang from the helmet below the whole shield. See *Tab. Herald. fig. 29*.

The *Mantle* is always laid in blazon to be doubled, that is, lined throughout with one of the furs, as ermin, pean, vair, &c. See *COAT*.

MANTLE is likewise a term used in falconry.—They say, the hawk *mantles*, that is, spreads her wings after her legs.

MANUCAPTION, in law, a writ which lies for a man, who, being taken on suspicion of felony, and offering sufficient bail for his appearance, is refused to be admitted thereto by the sheriff, or other having power to let to mainprise.

MANUDUCTOR *, a name given to an ancient officer in the church, who, from the middle of the choir where he was placed, gave the signal for the choristers to sing, and marked the measure, beat time, and regulated the music.

* The Greeks called him *Mesachoros*, because seated in the middle of the choir: But in the Latin church, he was called *Manuductor*, from *manus* and *duco*, I lead; because he led and guided the choir by the motions and gesture of the hand.

MANUFACTURE *, a place where several artists and workmen are employed in the same kind of work; or make a commodity of the same kind.

* The word comes from the Latin, *Manufactus*, q. d. made with hands.

MANUFACTURE is also popularly used to signify the work itself; and by extension, the like work carried on independently in different parts of a country.

In this sense, we say the woollen *Manufacture*, silk *Manufacture*, velvet *Manufacture*, tapestry *Manufacture*, nussling *Manufacture*, &c. *Manufacture* of hats, stockings, &c.

MANUMISSION, **MANUMISSIO** *, an act whereby a slave, or villain, is set at liberty, or let out of bondage.

* The word comes from the Latin *manus*, hand, and *mittere*, to send; *quia servus mittebatur extra manum, seu potestatem domini sui*.

Some authors define *Manumission* an act by which a lord enfranchises his tenants, who till that time had been his vassals, and in a state of slavery, inconsistent with the sanctity of the Christian faith.

Among the Romans, the *Manumission* of slaves was performed three several ways. 1^o. When, with his master's consent, a slave had his name entered in the census, or public register, of the citizens. 2^o. When the slave was led before the prætor, and that magistrate laid his wand, called *Indictio*, on his head. 3^o. When the master gave the slave his freedom by his testament.—*Servius Tullius* is said to have first set on foot the first manner; and P. *Valerius Publicola* the second: A particular account is given of the third in the *Institutes* of *Justinian*.

It was not necessary, that the prætor should be on his tribunal to perform the ceremony of *Manumission*: he did it any where indifferently, in his house, in the street, in going to bathe, &c. He laid the rod on the slave's head, pronouncing these words, *Dico eum liberum esse more Quiritium*; I declare him a freeman after the manner of the Romans. This done, he gave the rod to the lictor, who struck the slave with it on the head, and afterwards with his hand on his face and back: And the notary, or scribe, entered the name of the new-freed man in the register, with the reasons of his *Manumission*.

The slave had likewise his head shaved, and a cup given him by his master, as a token of freedom. *Tertullian* adds, that he had then also a third name given him: If this were so, three names were not a token of nobility, but of freedom. The emperor *Constantine* ordered the *Manumission* at Rome to be performed in the churches.

Of *Manumission* there have also been various forms in England: In the time of the conqueror, villains were *manumitted* by the master's delivering them by the right hand to the viscount in full court, shewing them the door, giving them a lance, and a sword, and proclaiming them free.

Others were *manumitted* by charter.—There was also an implicit *Manumission*; as when the lord made an obligation for payment of money to the bondman at a certain day; or sued him, where he might enter without suit; and the like.

MANURING of ground, the application of a matter proper for meliorating the soil, and rendering it more fertile.

The matters used for *Manure* are various in various countries: The most ordinary are dung, lime, and marl.

In some parts of England and Ireland they use sea-shells, as those of cockles, periwinkles, &c. which are found to agree well with boggy, heathy, clayey, wet or stiff land; as they seem to give it a kind of ferment, as barn does to bread, opening and loosening the clods, and by that means, making way for the roots to penetrate, and the moisture to enter into the fibres of them.—This kind of *Manure* continues a long time before its effects are exhausted; whereas lime, &c. spend themselves at once. The shells being hard, melt away very slowly, so that the operation needs not be repeated for twenty or thirty years.

In the west of England, they *manure* their land with a brackish sea-sand; which Dr. *Bury* observes, quickens dead land: so that what would otherwise be the barrenest part of that country, is now the richest. Sea-salt, he observes, is too strong and active of itself, and that it does best when mingled with loam. Glauber orders the mixture to be made up and burnt like bricks, and then applied.

In some countries they burn the surface of their heathy ground, instead of *manuring* it. This others think but ill husbandry, inasmuch as it impoverishes it; and by destroying the sap of the earth, and roots of the grass, and other vegetables, renders it useless for several years after the third, when it is plowed.

Dr. *Jackson* observes, that all the ground about Nantwich, where salt or brine is split, is, when dug up, an excellent *Manure* for grazing ground; and even bricks, thoroughly impregnated with it, dissolve and fertilize land very considerably. Dr. *Beal* says, it is a common observation of gardeners, and skilful husbandmen, that frost and snow improve and fertilize the land both more speedily and more effectually than the influence and warmth of the sun.

Dr. *Lifter* tells us, that in some parts of the north-riding of Yorkshire the soil is sandy, and the people *manure* it with clay. The soil, with any other *Manure*, bears nothing but rye; but with clay, it bears oats, barley, &c. This clay *Manuring* will, by certain experience, last forty-five years in the ground ere it need be repeated.

The bogs in Ireland are said to be best improved by sandy, or other gravelly *Manures*. See *Supplement, Article MANURE*.

MANUSCRIPT, a book, or paper, written with the hand.

By which it stands opposed to a printed book, or paper.

A *Manuscript* is usually denoted by the two letters MS, and in the plural by MSS, or MMSS.—What makes public libraries valuable, is the number of ancient *Manuscripts* deposited in them.

MANWORTH, in old law-books, denotes the price or value of a man's head.

In ancient times, every man, according to his degree, was rated at a certain price; according to which, satisfaction was made to his lord, if any one killed him.

MANZEL. See the article *CARAVANSERA*.

MAP, a plain figure, representing the surface of the earth, or a part thereof, according to the laws of perspective.

A *Map* is a projection of the surface of the globe, or a part thereof, on a plane surface; representing the forms and dimensions of the several countries and rivers; with the situations of cities, mountains, and other places.

Maps are either *universal*, or *particular*.

Universal MAPS are those which exhibit the whole surface of the earth; or the two hemispheres.

Particular MAPS are those which exhibit some particular region, or part thereof.

Each kind are frequently called *Geographical*, or *Land-Maps*, in contra-distinction to *Hydrographical*, or *Sea-Maps*, representing only the seas and sea-coasts; and properly called *Charts*.

There are three qualifications required in a *Map*. 1^o. That all places have their just situation with regard to the chief circles of the earth, as the equator, parallels, meridians, &c. because

on these depend many properties of regions, as well as celestial phenomena. 29. That the magnitudes of the several countries have the same proportion as on the surface of the earth. 30. That the several places have the same distance and situation with regard to each other, as on the earth itself.

For the Foundation of MAPS, and the laws of projection, see PERSPECTIVE, and PROJECTION of the Sphere.—The application thereof, in the construction of MAPS, is as follows.

Construction of a MAP, the eye being placed in the axis.—Suppose, *v. g.* the northern hemisphere to be represented with the eye in a point of the axis, *v. g.* the fourth pole: For the plane, wherein the representation is to be made, we take the plane of the equator, and from all the points of the surface of the northern hemisphere, conceive lines passing through the plane to the eye; which points, connected together, constitute the Map required.

In this case, the equator will be the limit of the projection; the pole, the centre. The meridians will be right lines passing from the pole to the equator: the parallels of latitude, &c. circles concentric with the equator; and all the other circles, and arches of circles, as the horizon, vertical circles, &c. ecliptic, &c. conceived in that hemisphere, will be ellipses, or arches of ellipses.

The better to apprehend the projection of the circles on the plane, conceive a radiant cone, whose vertex is the eye, its base the circle to be represented, and its sides the rays passing between the circle and the eye. Suppose this cone cut by the plane. It is obvious, that, according to the various position of the cone, there will be a different section, and consequently a different line of representation.

For the application of this doctrine in practice:—In a plane, *v. g.* a paper, take the middle point P (Tab. geography, fig. 2.) for the pole; and from this, as a centre, describe a circle, of the intended bigness of your Map, to represent the equator. These two may be pitched on at pleasure, and from these all the other points and circles are to be determined. Divide the equator into 360°, and drawing right lines from the centre to the beginning of each degree, these will be meridians; whereof that drawn to the beginning of the first degree, we suppose the first meridian.

For the parallels.—There are four quadrants of the equator; the first, 0, 90; the second, 90, 180; the third, 180, 270; the fourth, 270, 0; which, for the better distinction, we will note with the letters A B, B C, C D, D E. Taking one of these, *v. g.* B C, from the several degrees thereof, as also from 23°, 30', and 66°, 30' thereof, draw occult right lines to the point D, marking where these lines cut the semidiameter B P C; and from P, as a centre, describe arches passing through the several points in P C.—These arches will be parallels of latitude.

The parallel at 23° 30', will be the tropic of Cancer, and that at 66° 30', the arctic circle. The meridians and parallels thus described, from a table of longitudes and latitudes, lay down the places; reckoning the longitude of each place on the equator, commencing at the first meridian, and proceeding to the meridian of the place; and for the latitude of the place, choosing a parallel of the same latitude: the point where this meridian and parallel intersect, represents the place; and in the same manner all the other places may be determined, till the Map be complete.

For the ecliptic, half of which comes in this hemisphere; we have observed, that it makes an ellipse; so that the points through which it passes are to be found. The first point, or that wherein the ecliptic cuts the equator, is the same with that wherein the first meridian cuts the equator, which is therefore distinguished by the sign of Aries: the last point of this half ellipse, or the other intersection of the equator, and ecliptic, *viz.* the end of Virgo, will be in the opposite point of the equator, *viz.* at 180°. The middle point of the ellipse is that wherein the meridian 90 cuts the tropic of Cancer. Thus we have three points of the ecliptic determined: for the rest, *viz.* for 1° and 15° of Taurus, 1° and 15° of Gemini, 10° of Leo, 10° of Virgo, the declinations of those points from the equator must be taken from a table, and set off in the Map. See DECLINATION, &c.

Thus where the meridian of 120° cuts the parallel of 5°, that point will be 5° degrees of Aries. Where the meridian 27° cuts the parallel, 11° will be the first degree of Taurus; and so of the rest. These points being all joined by a curve line, will be a portion of an ellipse representing the ecliptic.

Maps of this projection have the first qualification above required; but they are defective in the second: the surface being stretched further, as it approaches nearer the equator. For the third, they are still further out.

By this method may almost the whole earth be represented in one Map, placing the eye, *v. g.* in the antarctic pole, and assuming for the plane of projection that of some circle near it, *v. g.* the antarctic circle.—Nothing is here required besides the former projection, but to continue the meridian, draw parallels on the other side of the equator, and complete the ecliptic; but this distorts too much for practice.

This projection is of all others the easiest; but that, where the eye is placed in the place of the equator, is preferred for use.

It is, in effect, of the latter kind that Maps are ordinarily made. The former are added to them, in small, by way of supplement, to represent the intermediate spaces left between the two hemispheres.—Further, as the situation of the ecliptic, with regard to the earth, is continually changing; strictly speaking, it has no place on the earth's surface; but is used to be represented according to its situation some certain moment; *viz.* so as the beginning of Aries and Libra may be in the intersections of the first meridian and equator.

Construction of MAPS, with the eye in the plane of the equator.—

This method of projection, though more difficult, is yet much juster, more natural, and more commodious, than the former. To conceive it, we suppose the surface of the earth cut into two hemispheres by the intire periphery of the first meridian, each of which hemispheres we represent in a distinct Map. The eye is placed in the point of the equator 90° distant from the first meridian; and for the transparent plane, wherein the representation is to be, we take the plane of the first meridian. In this projection, the equator is a right line, and the meridian 90° distant from the first, is also a right line; but the other meridians, and all the parallels of the equator, are arches of circles, and the ecliptic is an ellipse.

The method is thus. From a point E, as a centre, (fig. 3.) describe a circle according to the intended bigness of the Map. This represents the first meridian, and is opposite; for, drawing the diameter B D, there arise two semicircles, the one whereof B A D is the first meridian, the other B C D its opposite, or the meridian of 180°. This diameter B D represents the meridian of 90 degrees, whereof the point B is the arctic pole, and the point D the antarctic. The diameter A C, perpendicular to that B D, is the equator. Divide the quadrants A B, B C, C D, D A, each into 90 degrees; and to find the arches of the meridians and parallels, proceed thus. Divide the equator into its degrees, *viz.* 180 (as being indeed only half the equator); through these several divisions, and the two poles, describe arches of circles, representing meridians, as B 1 D, B 2 D, &c.—How to find centres for describing those arches, see under the word CIRCLE. Indeed, the operation will be both more easy and accurate, if performed by a canon of tangents.

To describe the parallels, the meridian B D must be in like manner divided into 180 degrees; then through each of these divisions, and the corresponding divisions of the quadrants A B, B C, C D, D A, describe arches of circles. Thus shall we have parallels of all degrees, with tropics, polars, and meridians.

The ecliptic may be designed two ways; for its situation over the earth may either be such, as that its intersection with the equator may be over the place A; in which case, the projection of its semicircles, from the first degree of Cancer, to the first of Capricorn, will be a straight line, to be determined by numbering 23° 30' from A towards B, and from the extreme of that numeration drawing a diameter through E; which line will be half the ecliptic in this situation, and may be divided, as before, into degrees, to which the numbers, signs, &c. are to be affixed.—But if the ecliptic be so placed, as that its intersection with the equator is over the place A, in the first meridian, its projection in that case will be a segment of an ellipse; whereof two of the points are A, C; a third that wherein the meridian 90 cuts the tropic of Cancer.—The other points must be determined in the manner laid down above, *viz.* by taking the declinations and right ascensions of 15° of Aries, 10° of Taurus, 15° of Gemini, &c. For where the parallels, according to their several degrees of declination, cut the meridians, taken according to the several right ascensions; those points of intersection are the points of the 15° of Aries, &c. A curve line therefore being drawn, these will give the projection of the ecliptic.

Nothing then remains to complete the Map, but to take the longitudes and latitudes of places from a table; and to set them off on the Map, as was directed under the former method.

In this projection the whole surface of the earth may be represented in one Map; if instead of the plane of the first meridian, some other plane parallel to it, but very near the eye, be taken; for by this means the intire parallels and meridians will be described.—But as this distorts the face of the earth too much, it is seldom used; and we rather make the two hemispheres in two distinct tables.

One great advantage in this projection is, that it represents the longitudes and latitudes of places, their distance from the pole and from the equator, almost the same as they really are on the earth.—Its inconveniences are, that it makes the degrees of the equator unequal; being the greater as they are nearer the first meridian D A B, or its opposite B C D; and for this reason equal tracts of the earth are represented unequal; which defect may be in some measure remedied, by removing the eye far from the earth. And, lastly, the distances of places, and situation with regard to each other, cannot be well determined in Maps of this projection.

Construction of MAPS on the plane of the horizon, or wherein any given place shall be the centre, or middle.—Suppose, for instance, it is desired to have London the centre of the Map.

Its latitude we will suppose to be 51 degrees, 32 minutes. The eye is placed in the nadir. The transparent table is the plane of the horizon, or some other plane, if it is desired to represent more than a hemisphere.—Take then the point E (fig. 4.) for London; and from this, as a centre, describe the circle ABCD to represent the horizon, which you are then to divide into four quadrants, and each of these into 90 degrees. Let the diameter BD be the meridian, B the northern quarter, D the southern; the line of equinoctial east and west shews the first vertical, A the west, C the east, or a place 90 degrees from the zenith in the first vertical. All the verticals are represented by right lines drawn from the centre E to the several degrees of the horizon. Divide BD into 180 degrees, as in the former methods; the point in EB representing 51 deg. 32 min. of the arch BC, will be the projection of the north pole, which note with the letter P. The point in ED representing 51 deg. 32 min. of the arch DC (reckoning from C towards D), will be the projection of the intersection of the equator and meridian of London; which note with the letter Q; and from this, towards P, write the numbers of the degrees, 1, 2, 3, &c. As also from Q towards D, and from B towards P, viz. 51, 52, 53, &c.

Then taking the corresponding points of equal degrees, viz. 99 and 99, 88 and 88, &c. about those, as diameters, describe circles, which will represent parallels, or circles of latitude, with the equator, tropics, and polar circles. For the meridians, first describe a circle through the three points A, P, C. This will represent the meridian 90 degrees from London. Let its centre be M in BD (continued to the point N, which represents the south pole), PN being the diameter; through M draw a parallel to AC, viz. FH, continued each way to K and L. Divide the circle PHNF into 360 degrees, and from the point P draw right lines to the several degrees, cutting K F H L; through the several points of intersection, and the two poles P, N, as through three given points, describe circles representing all the meridians. The centres for describing the arches will be in the same KL, as being the same that are found by the former intersection; but are to be taken with this caution, that for the meridian next BDN towards A, the most remote centre towards L, be taken for the second, the second from this, &c.—The circles of longitude and latitude thus drawn, insert the places from a table as has been before directed.

Construction of MAPS on the plane of the meridian.—This projection is taught by Ptolemy, and recommended by him as proper for that part of the earth then known. In this, the equator and parallels are arches of circles, and the meridians arches of ellipses; the eye hanging over the plane of that meridian which passes over the middle of the inhabited world.—But in regard the description of these ellipses is somewhat perplexing, and because this method seems calculated only for a part of the earth, it is not now used.

There is a second method something a-kind to it, which represents the circles of latitude by right lines, and the meridians by arches of ellipses; as must be the case, if lines be conceived to fall from the several points of each hemisphere, perpendicularly on the plane of the first meridian, and the eye be supposed at an infinite distance from the earth; so that all the rays emitted from the places of the earth to it, may be accounted parallel, as well as perpendiculars to the plane of the first meridian.

Rectilinear MAPS are those wherein both the meridians and parallels are represented by right lines, which by the laws of perspective is impossible; in regard there can no such position be assigned the eye and the plane, as that the circles both of longitude and latitude shall be right lines.

In the first method above laid down, the meridians are right lines, but the parallels are circles: in the fifth, the parallels are right lines, and the meridians ellipses. In all other perspective methods, both kinds of circles are curve: one method indeed must be excepted, wherein the meridians are right lines, and the parallels hyperbola's; as when the eye is placed in the centre of the earth, and the plane, through which it is viewed, is parallel to the first meridian: but this method is rather pretty than useful.

Rectilinear Maps are chiefly used in navigation, to facilitate the estimation of the ship's way. See CHART.

Construction of particular MAPS.—Particular Maps of large tracts, as Europe, Asia, Africa, and America, are projected after the same manner as general ones; only let it be observed, that for different parts, different methods may be chosen. Africa and America, for instance, in regard the equator passes through them, cannot be conveniently projected by the first method, but much better by the second. Europe and Asia are most conveniently represented by the third; and the polar parts, or the frigid zones, by the first.

To begin then, draw a right line on your plane or paper, for the meridian of the plane over which the eye is conceived to hang, and divide it into degrees, as before, which will be degrees of latitude. Then from the tables take the latitude of the two parallels, which terminate each extreme. The degrees of these latitudes are to be noted in the meridian; and through

them draw perpendiculars, bounding the Map towards north and south. This done, meridians and parallels are to be drawn to the several degrees, and the places to be inserted, till the Map is complete.

For particular MAPS of less extent.—In Maps of smaller portions of the earth, the geographers take another method. First, a transverse line is drawn at the bottom of the plane, to represent the latitude, wherein the southernmost part of the country to be exhibited terminates. In this line, so many equal parts are taken, as that country is extended in longitude. On the middle of this same line erect a perpendicular, having so many parts as there are degrees of latitude between the northern and southern limits of the country. How big these parts are to be, may be determined by the proportion of a degree of a great circle to a degree of the parallel represented by the transverse line at bottom. Through the other extreme of this perpendicular, draw another perpendicular, or a parallel to the line at bottom, in which are to be seen as many degrees of longitude, as in the lower line, and these too, equal to those other, unless the latitudes happen to be remote from each other, or from the equator. But if the lowest parallel be at a considerable distance from the equinoctial, or if the latitude of the northern limit go much beyond that of the southern; the parts or degrees of the upper line must not be equal to those of the lower, but less, and that according to the proportion which a degree of the more northern parallel has to a degree of the more southern.

After parts have been thus determined, both on the upper and lower line, for the degrees of longitude; right lines must be drawn through the beginning and end of the same number, which lines represent meridians: then, through the several degrees of the perpendicular erected on the middle of the first transverse line, draw lines parallel to that transverse line. These will represent parallels of latitude. Lastly, at the points wherein the meridians of longitude and the parallels of latitude concur, insert the places from a table, as before directed.

For MAPS of provinces, or small tracts, as parishes, manors, &c. we use another method, more sure and accurate than any of the former. In this, the angles of position, or the bearings of the several places, with regard to one another, are determined by proper instruments, and transferred to paper.—This constitutes an art apart, called *surveying*. See SURVEYING.

The use of MAPS is obvious from their construction. The degrees of the meridians and parallels shew the longitudes and latitudes of places, and the scale of miles annexed, their distances; the situation of places, with regard to each other, as well as to the cardinal points, appears by inspection, the top of the Map being always the north, the bottom the south, the right hand the east, and the left the west; unless the compass, usually annexed, shew the contrary.

MAPPARIUS, an officer among the Romans, who in the public games, as those of the circus and of the gladiators, gave the signal for their beginning, by throwing an handkerchief (*Mappa*) which he had before received from the emperor, consul, praetor, or other supreme officer then present.

MARASMUS, ΜΑΡΑΣΜΟΣ *, in medicine; an extreme wasting, or consumption of the whole body.

* The word is Greek, being derived from the verb μαρασσιν, to waste.

A *Marasmus* is an extreme degree of atrophy; as a hectic fever is an extreme degree of *Marasmus*. See Supplement, Article MARASMUS.

MARAVEDI *, a little Spanish copper coin, worth somewhat more than a French denier, or half a farthing English.

* The word is Arabic, and took its rise from the *Almoravides*, a dynasty of Moors, who passing out of Africa into Spain, imposed their own name on this coin, which by corruption was afterwards changed into *Maravedi*.—Mention is made of it in the decretals, as well as other Latin writers, under the name of *Marabittini*.

The Spaniards always count by *Maravedis*, both in commerce, and in their finances, though the coin itself is no longer current among them.—Sixty-three *Maravedis* are equivalent to a rial of silver: so that the pialter, or piece of eight rials, contains five hundred and four; and the pialote of four pieces of eight, two thousand and sixteen *Maravedis*.

This smallness of the coin produces vast numbers in the Spanish accounts and calculation; inasmuch that a stranger or correspondent would think himself indebted several millions for a commodity that costs but a few pounds.

In the laws of Spain, we meet with several kinds of *Maravedis*; Alphonine *Maravedis*, white *Maravedis*, *Maravedis* of good money, *Maravedis* Combrenos, black *Maravedis*, and old *Maravedis*.—When we find *Maravedis* alone, and without any addition, it is to be understood of those mentioned above. The rest were different in value, fineness of metal, time, &c. Mariana asserts, that this coin is older than the Moors; that it came from the Goths; that it was antiently equal to a third part of the rial, and consequently of twelve times the value of the present *Maravedi*. Under Alphonius XI. the *Maravedi* was seventeen times, under Henry II. ten times, and under Henry III. five times, and under John II. two times and a half the value of the present *Maravedi*.

MARBLE,

MARBLE, MARMOR*, a precious kind of stone found in great masses, and dug out of pits or quarries; being of a constitution so hard and compact, and a grain so fine, as readily to take a beautiful polish: much used in ornaments of buildings, as columns, statues, altars, tombs, chimney-pieces, tables, and the like.

* The word comes from the French *Marbre*, and that from the Latin *Marmor*, of the Greek *μαρμαριον*, to shine, or glitter.

There are an infinite number of different kinds of *Marble*, and they are usually denominated either from their colour, their age, their country, their grain, their degree of hardness, their weight, or their defects: some are of one simple colour, as white or black, others streaked or variegated with stains, clouds, waves, veins, &c. but almost all are opaque, excepting the white, which, when cut into thin slices, becomes transparent.

Some, under the genus of *Marble*, comprehend also porphyry, serpentine, granite, alabaster, &c.

Antient MARBLES are those, whose quarries are lost, or inaccessible to us, and whereof we have only some wrought pieces remaining.

Modern MARBLES are those, whose quarries are still open, and out of which blocks continue to be dug.

African MARBLE is usually either of a reddish brown, streaked with veins of white; or of a carnation, with veins of green.

English white MARBLE is often veined with red.

Darbyshire MARBLE is variously clouded and diversified with white and brown, and has entrochi in it, &c.

MARBLE of *Auvergne* in France, is of a pale red, mingled with violet, green, and yellow.

MARBLE of *Brabant* in Hainault, is black, veined with white.

MARBLE of *Brescia* in Italy, is yellow, with spots of white.

Brocatella MARBLE is mingled with little shades of Isabella, yellow, pale, and grey. It comes from Tortosa in Spain, where it is dug out of an antient quarry. There is also another kind of antient *Brocatella* dug near Adrianople.

MARBLE of *Carrara*, on the coasts of Genoa, is very white, and the fittest of all others for works of sculpture.

MARBLE of *Champagne*, resembles the *Brocatella*, being mixed with blue, in round stains like partridges eyes.

Cipollino, or *Cipollin* MARBLE, the true Egyptian *Marble*, is of a sea-green colour, mixed with large waves or clouds of white or pale green.—Scamozzi takes this to be the same with that which the antients called *Augustus* & *Tiberium marmor*; because discovered in Egypt in the times of Augustus and Tiberius.

MARBLE of *Dinan*, near Liege, is of a pure black, very beautiful, and very common.

MARBLE of *Guichenot*, near Dinan, is of a reddish brown, with white spots and veins.

MARBLE of *Languedoc*, is of a vivid red, with large white veins or stains, and is very common; there is some, whose white which borders pretty much on the blue, but this is of less value.

Lumachella MARBLE, is so called, because mingled with spots, brown, black, and white, formed of periwinkle shells petrified in it.—This is antient, and its quarry is lost.

MARBLE of *Margosia*, in the Milanese, has a white ground with brownish veins, resembling the colour of iron-rust. This is very common, and extremely hard.

MARBLE of *Lauze*, in Maine, has a black ground, with little narrow veins of white; there is another kind of it red, with veins of a dirty white.

MARBLE of *Namur* is black, like that of Dinan, but less beautiful, as inclining a little to the blue, and traversed with little streaks of grey.—This is very common, and is frequently used in paving.

Parian MARBLE is antient, and much celebrated in authors; it is of a beautiful white: the greatest part of the Grecian statues were made of it. Varro calls it *Lychnites*, because the workmen dug it out of the quarry by lamp light.

MARBLE of *Porta Santa*, at Rome called *Serna*, is mingled with large clouds and veins of red, yellow, and grey.

Portor MARBLE has a black ground, with clouds and veins of yellow. It is dug out of the foot of the Alps towards Carrara.

MARBLE of *Rance*, in Hainault, is of a dirty red, mixed with blue and white clouds and veins: this is pretty common, but is different in degree of beauty.

MARBLE of *Savoy* is of a deep red, mixed with other colours; each piece whereof seems cemented on to the rest.

MARBLE of *Sicily* is a brownish red, stained with oblong squares of white and Isabella, like striped taffaty. The antient has very vivid colours, and the modern comes pretty near it.

MARBLE of *Signam*, in the Pyreneans, is ordinarily of a greenish brown, with red stains; though this is somewhat various in its colours.

MARBLE of *Thou*, near Namur in Liege, is a pure black, soft, kind, and easy to work, and receives a more beautiful polish than those of Namur and Dinan.

MARBLE *Bigio Nero*, or black grey, is antient.

White-veined MARBLE has large veins, with grey and blue stains on a white ground. It comes from Carrara.

White MARBLE, that dug out of the Pyreneans on the side of Bayonne, is inferior to that of Carrara, its grain being coarser.

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and shining, like a kind of salt. It is something like the antient white Greek *Marble*, whereof their statues were made; but is not so hard or beautiful.

Antient black and white MARBLE is now very rare, its quarries being intirely lost; it is divided between a pure white and a bright black in laminae.

Blue Turquin MARBLE is mixed with a dirty kind of white, and comes from the coast of Genoa.

MARBLE *Fior di Persia*, comes from Italy. It consists of red and white stains, somewhat yellowish.

Yellow MARBLE is a kind of yellow Isabella without veins; it is antient, and now very rare.

Black Antique MARBLE is of a pure black, without stains; and softer than the modern black. There was some of it brought from Greece, called *Marmor Luculleum*; but this was not so much prized as that which the Egyptians brought from *Aethiopia*, approaching to an iron colour, and called *Basalter*, or the touch-stone, because it served them for the trial of metals. See *BASALTES*.

White and black MARBLE has a pure black ground, with some very white veins.

MARBLE called *Ochio di pavone*, or peacock's eye, is mingled with red, white, and bluish clouds, somewhat resembling the eyes at the end of a peacock's tail.

Green MARBLE *antique*, is a mixture of grass-green, and black, in clouds of unequal forms and bignesses; and is very rare, the quarries being lost.

Common Modern Green MARBLE, improperly called Egyptian, is brought from Carrara, on the coast of Genoa; it is of a deep green spotted with grey.

Rigid MARBLE, is that which, being too hard, works with difficulty, and is liable to splinter, as the black of Namur.

Fibrous MARBLE, is that full of threads or filaments.

Brittle MARBLE, is that which crumbles under the instrument, as the white Greek *Marble*, and that of the Pyreneans, &c.

Terracy MARBLE, that which has lost places in it, which must be filled up with cement, as that of Languedoc.

There are two defects frequent in *Marbles*, which augment the difficulty in cutting and polishing them. The one, what they sometimes call *nails*, answering to the knots in wood; the other, called *emiril*, is a mixture of mundick or other minerals, forming black stains in the *Marble*. The knots are common to all *Marbles*: the emiril is peculiar to the white.

Artificial MARBLES.—The stucco whereof they make statues, busts, basso-relievo's, and other ornaments of architecture, ought to be *Marble* pulverized, mixed in a certain proportion with plaster; the whole well sifted, worked up with water, and used like common plaster. See *STUCCO*.

There is also a kind of artificial *Marble* made of the flaky felinites, or a transparent stone, resembling plaster; which becomes very hard, receives a tolerable polish, and may deceive a good eye. This kind of felinites resembles Muscovy talc.

There is another sort of artificial *Marble* formed by corrosive tinctures, which, penetrating into white *Marble*, to the depth of a line, or more, imitate the various colours of other dearer *Marbles*.

Polished MARBLE is that which, being well rubbed with free-stone, and afterwards with pumice-stone, is at last polished with emery, if the *Marble* be of several colours, and with calcined tin, if it be white. In Italy they polish with a piece of lead and emery.

There are various ways of polishing *Marble*. Some lay three or four blocks in a row, and with another, fixed to a broad beetle, and an handle fixed at oblique angles, with sand and water between, work the upper stone backwards and forwards on the lower ones, till the strokes of the saw are worn off; after which they polish them with emery and putty.

Father Kircher shews the manner of applying colours on *Marble*, so as to make them penetrate its whole substance; inasmuch that if the *Marble* be slit into several parallel tables or slabs, the same figure will be found on each, that was painted on the first.

Spots of oil stain white *Marble*, so as they cannot be taken out. See *Supplement, Article MARMOR*.

Arundel MARBLES, MARMORA *Arundeliana*, or the *Oxford* MARBLES, are antient stones, whereon is inscribed a chronicle of the city of Athens, engraven in capital letters in the island of Paros one of the Cyclades, 263 years before Jesus Christ.

They take the name from Thomas earl of Arundel, who procured them out of the east, or from Henry his grandson, who presented them to the university of Oxford.—An account of all their inscriptions was published in 1676, by Dr. Prideaux.

MARBL'ED, something veined, or clouded, resembling marble.

Marbled paper is a paper stained with various clouds and shades, resembling, in some measure, the divers veins of marble; the method of making which, see under *PAPER*.

MARBLING, the art or act of painting or disposing colours in such a manner, as that they may represent *Marble*.—Thus we marble books, paper, wood, &c. See *PAPER*.

MARBLING of books, among binders, denotes the sprinkling over the cover of a book with black, by means of a black pencil

struck gently against the finger, or on a flick held for that purpose.

Marbling is not used, except for books bound in calf; after it is finished, the cover is glazed over with beaten whites of eggs, and then smoothed with a polishing-iron.

They also *marble* books on the edges; but in this *Marbling* there is no black used; but, in lieu thereof, red, blue, &c. See BOOK-BINDING.

MARCASITE, MARCASITA, a sort of metallic mineral, supposed by many to be the seed or first matter of metals.

On this principle, there should be as many different *Marcasites* as metals; which is also said to be true in effect, the name being applied by some to every mineral body that has metallic particles in its composition; though not enough to make it worth working: in which case it would be called *ore*.

There are only three kinds in the shops, which are called, *Marcasite* of gold, of silver, and of copper; though some repute the loadstone to be a *Marcasite* of iron; bismuth, *Marcasite* of tin; and zink, or spelter, *Marcasite* of lead: but this we leave to the chymists.

Marcasite of gold is found in little balls or nodules about the bigness of nuts, nearly round, heavy, of a brown colour without. *Marcasite* of silver is like that of gold, only paler coloured: within the colour differs much, the one having a gold colour, and the other a silver colour, both shining and brilliant. The *Marcasite* of copper is about the bigness of a small apple, round or oblong, brown without, yellow and striated within, brilliant and shining.

Marcasites are found in mines of metals; they all contain sulphur, and a vitriolic salt, especially that of copper: some of them also contain antimony and bismuth. See Supplement, Article MARCASITA.

MARCELLIANISM, the doctrines and opinions of the *Marcellians*, a sect of ancient heretics; so called from *Marcellus* of Ancyra, their leader, who was accused of reviving the errors of Sabellius.

Some, however, are of opinion, that *Marcellus* was orthodox, and that it was his enemies the Arians, who fathered their errors upon him.—St. Epiphanius observes, that there was a great deal of dispute with regard to the real tenets of *Marcellus*; but that as to his followers, it is evident they did not own the three hypostases: so that *Marcellianism* is no imaginary heresy.

MARGRAVE, or MARGRAVE *, a kind of dignity in Germany, answering to our marquis.

* The word is derived from the German *Marche*, or *Marche*, which signifies a frontier; and *Graffe*, count, governor; *Margraves* being originally governors of cities lying on the frontiers of a country or state.

MARCH, MARTIUS, the third month of the year, according to the common way of computing.

Among the Romans, *March* was the first month; and, in some ecclesiastical computations, that order is still preserved; as particularly in reckoning the number of years from the incarnation of our Saviour; which is done from the 25th of *March*.

In England, *March*, properly speaking, is the first month in order; the new year commencing from the 25th; though, in compliance to the customs of our neighbours, we usually rank it as the third; but, in this respect, we speak one way, and write another.

Till the year 1564, the French reckoned the beginning of their year from Easter; so that there were two months of *March* in one year, one of which they called *March before Easter*, and the other *March after Easter*. And, when *Easter* fell within the month of *March*, the beginning of the month was in one year, and the end in another.

It was Romulus who divided the year into months; to the first of which he gave the name of his supposed father *Mars*. Ovid, however, observes, that the people of Italy had the month of *March* before Romulus's time; but that they placed it very differently, some making it the third, some the fourth, some the fifth, and others the tenth month of the year.

In this month it was that the Romans sacrificed to Anna Perenna; that they began their comitia; that they adjudged their public farms and leases; that the mistresses served the slaves and servants at table, as the masters did in the Saturnalia; and that the vestals renewed the sacred fire.

The month of *March* was always under the protection of Minerva, and always consisted of thirty-one days.—The ancients held it an unhappy month for marriage, as well as the month of May.

MARCHET, or MARCHETTA, a pecuniary fine antiently paid by the tenant to his lord, for the marriage of one of the tenant's daughters.

This custom obtained, with some difference, throughout all England and Wales, as also in Scotland; and it still continues to obtain in some places.—According to the custom of the manor of Dinover in Carmarthenshire, every tenant, at the marriage of his daughter, pays ten shillings to the lord; which, in the British language, is called *Gwabr-Merched*, i. e. *Maid's Fee*. See AMABYR.

In Scotland, and the north parts of England, the custom was, for the lord to lie the first night with the bride of his tenant: but this usage was abrogated by king Malcolm III. at the instance of his queen; and, instead thereof, a mark was paid by the bridegroom to the lord. Whence it is called *Marcbeta mulieris*.

MARCIONITES, or MARCIONISTS, MARCIONISTÆ, a very antient and popular sect of heretics, who, in the time of St. Epiphanius, were spread over Italy, Egypt, Palestine, Syria, Arabia, Persia, and other countries; they were thus denominated from their author *Marcion*.

Marcion was of Pontus, the son of a bishop, and at first made profession of the monastical life; but, having had a criminal affair with a maid, he was excommunicated by his own father, who would never admit him again into the communion of the church, not even on his repentance. On this he abandoned his own country, and retired to Rome, where he began to broach his doctrines.

He laid down two principles, the one good, the other evil: he denied the real birth, incarnation, and passion of Jesus Christ, and held them to be all apparent only. He taught two Christs: one who had been sent by an unknown God for the salvation of all the world; another, whom the Creator would one day send to re-establish the Jews. He denied the resurrection of the body; and allowed none to be baptized, but those who preserved their continence; but these he granted might be baptized three times.

In many things he followed the sentiments of the heretic Cerdon, and rejected the law and the prophets. He pretended, the gospel had been corrupted by false prophets, and allowed none of the evangelists but St. Luke, whom also he altered in many places, as well as the epistles of St. Paul, a great many things in which he threw out. In his own copy of St. Luke, he threw out the two first chapters intire.

MARCITES, MARCITÆ, a sect of heretics in the second century, who also called themselves the *Perfetti*, and made profession of doing every thing with a great deal of liberty, and without any fear.

This doctrine they borrowed from Simon Magus, who, however, was not their chief; for they were called *Marcites* from one *Marcus*, who conferred the priesthood, and the administration of the sacraments, on women.

MARCOSIANS, an antient sect in the church; making a branch of the Gnostics. See Gnostic.

St. Irenæus speaks at large of the leader of this sect, *Marcus*, who, it seems, was reputed a great magician. He relates several things touching the prayers and invocation of the antient Gnostics and *Marcosians*; wherein we find the traces of the antient Jewish cabala on the letters of the alphabet, and their properties, as well as on the mysteries of numbers, which the Jews and Gnostics had borrowed from the philosophy of Plato and Pythagoras.

Marcus was an Egyptian, and there it was that he became acquainted with magic: To impose more easily on his followers, he made use of certain Hebrew, or rather Chaldee words, much used by the incanters of those times.

The *Marcosians* had a great number of apocryphal books, which they held for canonical, and of the same authority with ours. Out of these they picked several idle fables, touching the infancy of Jesus Christ, which they put off for true histories. Many of these fables are still in use and credit among the Greek monks.

MARGARITÆ. See the article PEARLS.

MARK, in matters of commerce and manufacture, a certain character struck, or impressed on various kinds of commodities, either to shew the place where they were made, and the persons who made them; or to witness they have been viewed and examined by the officers or magistrates charged with the inspection of that manufacture; or lastly, to shew the duties imposed thereon have been regularly acquitted.

Thus are cloths, leathers, cutlery-ware, paper, plate, weights, measures, &c. to be marked.

MARK, in horsemanship.

MARK, is also a particular sign or character, known only to the trader who pitches on it; whereby, being fixed to any commodity, he recollects the price it cost him.

These *Marks*, otherwise called *numeros*, are taken according to the fancy of those who use them; but ordinarily, they are chosen from among the letters of the alphabet, each having a relation to some particular number of figures.—They are of so much use in trade, that the reader will not take it amiss, if we insert a little table, to serve as a model for their construction.

A	B	C	D	E	F	G	H	I	K	L	M
0	1	2	3	4	5	6	7	8	9	10	20

One example will give the whole use of this table. Suppose, *v. g.* I would put on a piece of stuff, that it cost 37 s. 6 d. per ell. I put an M for 20 s. an L for 10 s. an H for 7 s. and a G for 6 d. So that the several letters wrote after each other (observing always to separate shillings from pounds, and from pence,

pence, by points) will make this *Mark* M. L. H. G. equal to 37 s. 6 d.

Note, the *Mark* may be diversified infinitely, by adding other figures to the letters in lieu of these.

Letters of MARK. See the article **MARQUE**.

MARK, in a monastic sense.—*Canons of St. MARK*, a congregation of regular canons, founded at Mantua by Albert Spinola a priest, towards the end of the twelfth century.

Spinola made a rule for them, which was approved, corrected, and confirmed by several succeeding popes. About the year 1450, they were reformed, and followed only the rule of St. Augustin.

This congregation, which at first consisted of eighteen or twenty houses of men, and of some for women, situate in Lombardy and the state of Venice, having flourished for the space of four hundred years, it declined by little and little, and was at length reduced to two convents; and, in 1584, that of St. *Mark* at Mantua, which was the chief, was given, with the consent of pope Gregory XIII. to the Camaldulians; and so the congregation became extinct. See **CAMALDULIAN**.

Knights of St. MARK, an order of knighthood in the republic of Venice, under the protection of St. *Mark* the evangelist.

The arms of the order are, a lion winged gules, with this device, *Pax tibi, Marce evangelista*. This order is never conferred but on those who have done signal services to the commonwealth.

MARK, or **MARC**, also denotes a weight used in several states of Europe, and for several commodities, especially gold and silver in France.

The *Mark* is divided into eight ounces, or sixty-four drachms, or an hundred and ninety-two deniers or penny-weights, or an hundred and sixty eferlins, or three hundred mailles, or six hundred and forty felins, or four thousand six hundred and eight grains.

In Holland, the *Marc* weight is also called troy-weight, and is equal to that of France.—When gold and silver are sold by the *Marc*, it is divided into twenty-four carats, the carat into eight penny-weights, the penny-weight into twenty-four grains, and the grain into twenty-four primes. See **CARACT**.

MARK is also used among us for a money of account; and in some other countries for a coin.

The English *Mark* is two-thirds of a pound sterling, or 13 s. 4 d. and Matthew Paris observes, it was of the same value in 1194. The ancient Saxons called the *Marc*, *Mancus*, or *Mancusa*, and *Maere*; among them it was equivalent to thirty pence, i. e. to seven shillings and six-pence of our money.

The *Mark-Lubs*, or *Lubek Mark*, used at Hambourg, is also a money of account, equal to one-third of the rixdollar, or to the French livre.—Each *Mark* is divided into sixteen sols-lubs.

Mark-Lubs, or *dansch*, is also a Danish coin, equal to sixteen sols-lubs, or twenty French sols.

Lastly, *Mark* is a copper-coin in Sweden, equal to two-pence farthing sterling. It is divided into eight roustiks, and each roustik into two alleveures.

The Swedish silver *Mark* is a money of account, equal to three copper *Marks*; though some make it a real coin.

MARKET *, a public place in a city or town, where provisions are exposed to sale.

* The word is formed from the French *Marché*, which signifies the same.

MARKET is also used for a liberty or privilege, either by grant or prescription, whereby a town is enabled to keep a *Market*. Bracon observes, that one *Market* ought to be distant from all others at least six miles and an half, and a third of an half.

In former times, it was customary to have most fairs and *Markets* kept on Sundays, and in the church-yard; so that matters of business and devotion were transacted all under one; which custom, though prohibited by several kings, was yet held up till the reign of king Henry the sixth, when it was effectually suppressed.—In many places they are still kept in the church-yard.

MARLE *, **MARGA**, a kind of dry, soft, fossile earth, harsh to the touch, used to be cast on land, to make it more fruitful.

* The word comes from the ancient Celtic *Marga*, mentioned by Pliny: it was afterwards called *Margila*.

There are several sorts of *Marle*, of different colours and qualities; the principal are *white* and *red*. Too much *Marle* thrown on the earth, is found to burn it: *Marle* is also of use in making lime, and is burnt like other stone. See **Supplement**, Article **MARGA** and **MARLE**.

MARMALADE, a confection made of the juice or pulp of some fruit, as plums, apricots, quinces, &c. boiled with sugar into a consistence.

The *Marmalade* of quinces is the most frequent: it is sub-astringent, and grateful to the stomach.

MARONITES, a sect of eastern Christians, who follow the Syrian rite, and are subject to the pope; their principal habitation being on mount Libanus.

The learned are divided about their origin and founder. Morin and cardinal Bona take *Maronite* for the name of a sect, as well

as Nestorian and Jacobite. But the *Maronites* themselves pretend, they are descended from one *Maron*, an orthodox, who lived in the beginning of the fifth century, and whose life is written by Theodoret. And the Jesuit Sacchini is of the same opinion: he thinks, that they never separated from the catholic church; and adds, that what has given occasion to their being judged in a schism, is their re-union with the Romish church, which some take for a return to the catholic faith.

The former opinion is founded on the testimonies of Eutychius, James de Vitri, and several others, who expressly assert the *Maronites* to have been formerly a part of the Monothelite Jacobites. According to their account, *Maron*, whom the *Maronites* qualify a saint, was in truth an heretic. Towards the year 1182, Aimeri, third Latin patriarch of Antioch, united the *Maronites* to that church. From that time they have used the mitre, ring, crozier, and other of the Latin episcopalia; but their service is still performed in the Chaldee language.

Faustus Nairon, a *Maronite* settled at Rome, has published an apology for *Maron*, and the rest of his nation. His tenet is, that they really took their name from the *Maron* who lived about the year 400, and of whom mention is made in Chrysostom, Theodoret, and the Menologium of the Greeks. He adds, that the disciples of this *Maron* spread themselves throughout all Syria; that they built several monasteries, and, among others, one that bore the name of their leader; that all the Syrians, who were not tainted with heresy, took refuge among them; and that, for this reason, the heretics of those times called them *Maronites*.

The *Maronites* have a patriarch, who resides in the monastery of Cannubin on mount Libanus, and assumes the title of patriarch of Antioch. He is elected by the clergy and the people, according to the ancient custom; but, since their re-union with the church of Rome, he is obliged to have a bull of confirmation from the pope.—He keeps a perpetual celibate, as well as the rest of the bishops his suffragans: for the rest of the ecclesiastics, they are allowed to marry before ordination; and yet the monastic life is in great esteem among them.—Their monks are of the order of St. Antony, and live in the most obscure places in the mountains, far from the commerce of the world.

As to their faith, they agree in the main with the rest of the Eastern church. Their priests do not say mass singly; but all say it together, standing round the altar. They communicate in unleavened bread; and the laity have hitherto partook in both kinds, though the practice of communicating in one has of late been getting footing, having been introduced by little and little.—In Lent they eat nothing, unless it be two or three hours before sun-rising: their other fastings are very numerous.

MAROTIC Style, in the French poetry, denotes a peculiarly gay, pleasant, yet simple and natural manner of writing, introduced by Clement *Marot*, and since imitated by other authors, but with most success by Voiture and De la Fontaine.

The difference between the *Marotic* and the burlesque style is thus assigned: the *Marotic* makes a choice; the burlesque admits of all. The first is the most simple; but its simplicity has its nobleness; and, where its own age will not furnish natural expressions, it borrows them from former times.—The latter is low and grovelling, and borrows false and full ornaments from the croud, which people of taste despise. The one resigns itself to nature; but examines first of all, whether the objects she presents be fit for its paintings, and takes nothing but what carries with it somewhat of delicacy and mirth; the other runs headlong into buffoonry, and affects every thing that is extravagant and grotesque. See **BURLESQUE**.

MARQUE.—*Letters of MARQUE* *, are letters of reprisal granted by a king or parliament, whereby the subjects of one country are licensed to make reprisals on those of another; by reason application has been made for redress to the government whereto the aggressor belongs, three times without effect.

* They are so called from the German *Marcke*, limit, frontier; as being *jus concessum in alterius principis marchas seu limites transgredi, sibi que jus facendi*; as being a right of passing the limits or frontiers of another prince, and doing one's self justice. See **REPRISALS**.

MARQUETRY, *In-laid work*; a curious kind of work, composed of pieces of hard fine wood of different colours, fastened, in thin slices, on a ground, and sometimes enriched with other matters, as tortoise-shell, ivory, tin, and brass.

There is another kind of *Marquetry* made, instead of wood, of glasses of various colours; and a third, where nothing but precious stones, and the richest marbles, are used: but these are more properly called mosaic work. See **MOSAIC**.

The art of inlaying is very ancient, and is supposed to have passed from the East to the West, as one of the spoils brought by the Romans from Asia. Indeed it was then but a simple thing: nor did it arrive at any tolerable perfection, till the fifteenth century, among the Italians. It seems, finally, to have arrived at its height, in the seventeenth century, among the French.

Till John of Verona, a cotemporary with Raphael, the finest works

works of this kind were only black and white, which are what we now call *Morce's*; but that religious, who had a genius for painting, stained his woods with dyes, or boiled oils, which penetrated them. But he went no further than the representing buildings and perspectives, which require no great variety of colours. Those who succeeded him, not only improved on the invention of dying the woods, by a secret which they found of burning them without consuming, which served exceedingly well for the shadows; but they had also the advantage of a number of fine new woods of naturally bright colours, by the discovery of America.—With these assistances, the art is now capable of imitating any thing; whence some call it the *art of painting in wood*.

The ground whereon the pieces are to be arranged and glued, is ordinarily of oak or fir well dried; and, to prevent warping, it is composed of several pieces glued together. The wood to be used, being reduced into leaves of the thickness of a line, is either stained with some colour, or made black for shadow; which some effect by putting it in sand extremely heated over the fire; others by steeping it in lime-water and sublimate; and others, in oil of sulphur.—Thus coloured, the contours of the pieces are formed, according to the parts of the design they are to represent.

The last is the most difficult part of *Marquetry*, and that wherein most patience and attention are required. The two chief instruments used herein are the saw and the vice; the one to hold the matters to be formed; the other to take off from the extremes, according to occasion.—The vice is of wood, having one of its chaps fixed, the other moveable, and is opened and shut by the foot, by means of a cord fastened to a treadle. Its structure is very ingenious, yet simple enough, and will be easily conceived from the figure. *Tab. Miscellaneous, fig. 1.* The leaves to be formed (for there are frequently three or four of the same kind formed together) are put within the chaps of the vice, after being glued on the outermost part of the design, whose profile they are to follow; then the workman, pressing the treadle, and thus holding fast the piece, with his saw runs over all the out-lines of the design.—By thus joining and forming three or four pieces together, they not only gain time, but the matter is likewise the better enabled to sustain the effort of the saw; which, how delicate soever it may be, and how lightly soever the workman may conduct it, without such a precaution, would be apt to raise splinters, to the ruin of the beauty of the work.

When the work is to consist of one single kind of wood, or of tortoise-shell, on a copper or tin ground, or *vice versa*, they only form two leaves on one another, *i. e.* a leaf of metal, and a leaf of wood or shell: this they call sawing in counter-parts; for, by filling the vacuities of one of the leaves by the pieces coming out of the other, the metal may serve as a ground to the wood, and the wood to the metal.

All the pieces, thus formed with the saw, are marked, to know them again; and the shadow being given in the manner already mentioned, they veneer or fasten each in its place on the common ground; using for that purpose the best English glue. The whole is then put in a press to dry, planed over, and polished with the skin of the sea-dog, wax, and shave-grass, as in simple *Veneering*; with this difference, however, that, in *Marquetry*, the fine branches, and several of the more delicate parts of the figures, are touched up and finished with a graver.

It is the cabinet-makers, joiners, and toy-men, among us, who work in *Marquetry*; and it is the enamellers and stone-cutters, who deal in mosaic work: the instruments used in the former are mostly the same with those used by the ebonists. See **EBONY**.

MARQUIS, or **MARQUESS***, **MARCHIO**, a title given to a person in possession of a considerable demesne erected into a *Marquisate* by letters patent; holding a middle place between the dignity of a duke, and that of an earl or count.

* The word, according to some authors, comes from the *Marcomanni*, an antient people, who inhabited the marches of Brandenburg. Others derive it from the German *Marche*, limit; and

others from *Marisia*, which, in the Celtic language, signified a wing of cavalry. Nicod derives it from the corrupt Greek *ποταμια*, province. Alciat and Fauchet bring it from *Mark*, horse, taking a *Marquis* to be properly an officer of horse. Menage derives it from *Marca*, frontier; and Selden, Krantzius, and Hottoman, do the same. Lastly, Palquier fetches *Marquis* from the old French *Marche*, limit, or from *Marchir*, to confine; the guard of the frontiers being committed to them.

Marqueffes were antiently governors of frontier cities or provinces, called *Marches*.—In Germany they are called *Marckgraves*.

Marquis is originally a French title: the Romans were unacquainted with it. In the *Notitia Imperii* they are called *Comites limitani*. The first time we hear of *Marqueffes*, *Marchiones*, is under Charlemagne, who created governors in Gascony under this denomination.

Alciat has started a question, Whether a *Marquis* or count should have the precedence? To decide it, he goes back to the antient function of counts; and observes, that counts, who are governors of provinces, are above *Marqueffes*, who are only governors of frontiers; and that *Marqueffes*, who are governors of frontier-cities, are above those counts, who are governors of small towns. He adds, that, in consequence of this distinction, the book of fiefs sometimes places *Marqueffes* above counts, and sometimes counts above *Marqueffes*.

Froissart observes, that the *Marquisate* of Juliers was erected into a county: but now-a-days, neither *Marqueffes* nor counts are any longer governors; and, as they are mere titles of honour, the counts make no scruple of resigning the precedence.

King Richard the second was the first who introduced the dignity of *Marquis* among us, by creating Robert de Vere earl of Oxford, *Marquis* of Dublin: but this was a title without office; the frontiers being governed by lords marchers.

MARRIAGE, a civil and religious contract, whereby a man is joined and united to a woman, for the ends of procreation.

The essence of *Marriage* consists in the mutual consent of the parties. *Marriage* is part of the law of nations, and is in use among all people. The Romanists account it a sacrament.

The woman, with all her moveable goods, immediately upon *Marriage*, passes wholly in *potestatem viri*, into the power and disposal of the husband.

In Germany, they have a kind of *Marriage* called *morganatic*, wherein a man of quality contracting with a woman of inferior rank, he gives her the left hand in lieu of the right, and stipulates in the contract, that the wife shall continue in her former rank or condition, and that the children born of them shall be of the same; so that they become bastards as to matters of inheritance, though they are legitimate in effect. They cannot bear the name or arms of the family.

None but princes, and great lords of Germany, are allowed this kind of *Marriage*.—The universities of Leipzig and Jena have declared against the validity of such contracts; maintaining, that they cannot prejudice the children, especially when the emperor's consent intervenes in the *Marriage*.

The Turks have three kinds of *Marriages*, and three sorts of wives; *legitimate*, *wives in kebin*, and *slaves*. They marry the first, hire the second, and buy the third.

The Roman laws speak of second *Marriages* in very hard and odious terms. *Matre jam secundo nuptiis sinefata*, L. 3. C. de sec. nuptiis. By these laws it was enacted, that the effects of the husband or wife deceased should pass over to the children, if the survivor should marry a second time. By the law *Hac edita*, Cod. de sec. nupt. the survivor, upon marrying a second time, could not give the person he married a portion more than equal to that of each of the children. In the primitive church, the respect to chastity was carried so high, that a second *Marriage* was accounted no other than a lawful whoredom, or a species of bigamy; and there are some antient canons, which forbid the ecclesiastics from being present at second *Marriages*.

For the proportions which *Marriages* bear to births, and births to burials, in several parts of Europe, Mr. Derham gives us the following table.

Names of Places.	Marriages to Births, as	Births to Burials, as
England in general - - - - -	1 to 4.63	1.12 to 1
London - - - - -	1 to 4	1 to 1.1
Hantshire, from 1569 to 1658 - - -	1 to 4	1.2 to 1
Tiverton in Devon. from 1656 to 1664	1 to 3.7	1.25 to 1
Cranbrook in Kent, 1560 to 1649 -	1 to 3.9	1.6 to 1
Aynho in Northamp. for 118 years -	1 to 6	1.6 to 1
Upminster in Essex, for 100 years - -	1 to 4.6	1.8 to 1
Frankfort on the Maine in 1695 - - -	1 to 3.7	1.2 to 1
Old, Middle, and Lower Marck, in 1698	1 to 3.7	1.9 to 1
Dominions of Elect. of Brandenb. 1698	1 to 3.7	1.5 to 1
Breslaw in Silesia, from 1687 to 91 - -	- - - - -	1.6 to 1
Paris in 1670, 1671, 1672 - - - - -	1 to 4.7	1.6 to 1

From which table it appears, that *Marriages*, one with another, do each produce about four births, both in England, and other parts of Europe. And, by Mr. King's computation, about one in an hundred and four persons *marry*; the number of people in England being estimated at five millions and an half, whereof about forty-one thousand annually *marry*.

Major Graunt and Mr. King disagree in the proportions between males and females, the latter making ten males to thirteen females in London; in other cities and towns, and in the villages and hamlets, an hundred males to ninety-nine females. But major Graunt, both from the London and country bills, computes, that there are in England fourteen males to thirteen females; whence he justly infers, that the Christian religion, prohibiting polygamy, is more agreeable to the law of nature than Mahometanism, and others that allow it.

This proportion of males to females Mr. Derham thinks pretty just, being agreeable to what he had observed himself.—In the hundred years, for instance, of his own parish register of Upminster, though the burials of males and females were nearly equal, being six hundred and thirty-three males, and six hundred and twenty-three females, in all that time; yet there were baptized seven hundred and nine males, and but six hundred and seventy-five females, which is 13 females to 12.7 males. From which inequality it appears, that one man ought to have but one wife; and yet that every woman, without polygamy, may have an husband; this surplussage of males above females being spent in the supplies of war, the seas, &c. from which the women are exempt.

That this is a work of providence, and not of chance, is well made out by the very laws of chance, by Dr. Arbuthnot, who supposes Thomas to lay against John, that, for eighty-two years running, more males shall be born than females; and, giving all allowances in the computation to Thomas's side, he makes the odds against Thomas, that it does not so happen, to be near five millions of millions of millions of millions to one; but for ages of ages, according to the world's age, to be near an infinite number to one.

MARRIAGE, **MARITAGIUM**, in law, signifies not only the lawful joining of man and wife, but also the right of bestowing a ward, or a widow, in *Marriage*; as well as the land given in *Marriage*.

Duty of MARRIAGE is a term used in some antient customs, signifying an obligation on women to *marry*.

To understand this, it must be observed, that old maids, and widows about sixty, who held fees in body, or were charged with any personal or military services, were antiently obliged to *marry*, to render those services to the lord by their husbands, or to indemnify the lord for what they could not do in person.—And this was called *Duty or Service of Marriage*.

MARROQUIN, vulgarly *MOROCCO-Leather*. See **MOROCCO**. **MARROW**, a soft oleaginous substance contained in the cavities of the bones.

All the bones of the body, which have any considerable thickness, have either a large cavity, or else they are spongy, and full of little cells; in both the one and the other is an oleaginous substance, called *Marrow*, contained in proper vesicles or membranes, which open into one another.

In the larger bones, this fine oil, by the gentle heat of the body, is exhaled through the pores of its small bladders, and enters some narrow passages, which lead to certain fine canals excavated in the substance of the bone, according to its length; and from these other cross passages (not directly opposite to the former, lest they should weaken the bone too much in one place) carry the *Marrow* still farther into more longitudinal canals placed nearer the surface of the bone. All this contrivance is, that the *Marrow* may, in all parts, supply the fibres of the bones, and render them less apt to break.

The antients imagined, that *Marrow* served for nourishment to the bones; but later observations have found blood-vessels in the bones: so that it appears the bones are nourished in the same manner as the other parts of the body. Besides, we find many bones which grow, and yet have no *Marrow* in them; witness the horns of deer, lobsters claws, &c.

MARS, in astronomy, one of the five planets, and of the three superior ones; its place being between the Sun and Jupiter.

Its character is ♂. Its mean distance from the sun is 1524 of those parts, whereof the distance of the earth from the sun is 1000; its excentricity 141. The inclination of its orbit, that is, the angle formed by the plane of its orbit with the plane of the ecliptic, 1 degree 52 minutes. The periodical time, in which it makes its revolution round the sun, is 686 days, 23 hours; and its revolution about its own axis is performed in 24 hours, 40 minutes.

For the diameter of *Mars*, see **DIAMETER**, and **SEMI-DIAMETER**.—For its density, see **DENSITY**.—For the force of gravity on its surface, see **GRAVITY**. Its parallax, according to Dr. Hook and Mr. Flamsteed, is scarce 30 seconds.

In the acronical rising of this planet, that is, when it is in opposition to the sun, it is found twice as near the earth as the

sun; which is a phenomenon that extremely discredited the Ptolemaic hypothesis.

Dr. Hook, in 1665, observed several spots in *Mars*, which having a motion, he concluded the planet to turn round its centre. In 1666, M. Caffini observed several spots in the two faces or hemispheres of *Mars*, which, by continuing his different observations very diligently, he found to move by little and little from east to west, and to return, in the space of 24 hours, 40 minutes, to their former situation.—Whence both the motion and period, or natural day, of that planet, were determined.

Mars always appears with a ruddy, troubled light; whence we conclude it is incompassed with a thick, cloudy atmosphere, which, by disturbing the rays of light in their passage and re-passage through it, occasion that appearance.

Mars, having his light from the sun, and revolving round it, has an increase and decrease like the moon. It may also be observed almost bisected, when in its quadratures with the sun, or in his perigæon; but never is seen cornicated or falcated, as the inferior planets.

This planet's distance from the sun is to the distance of the earth and sun, as $1\frac{1}{2}$ to 1: so that a man, placed in *Mars*, would see the sun's diameter less by one third than it appears to us, and consequently the degree of light and heat, which *Mars* receives from the sun, is less by one third than that received by the earth.—This proportion, however, will admit of a sensible variation, on account of the great excentricity of this planet.

Though the period or year of this planet, as has been already observed, is nearly twice as long as ours, and his natural day, or the time in which the sun appears above his horizon (setting aside the consideration of twilight) is almost every-where equal to his night; yet it appears, that, in one and the same place on his surface, there will be but very little variety of seasons, or scarce any difference of summer and winter: and the reason is, that the axis of his diurnal rotation is nearly at right angles with the plane of his orbit. It will be found, notwithstanding, that places situate in different latitudes, that is, at different distances from his equator, will have very different degrees of heat, on account of the different inclination of the sun's rays to the horizon; as it is with us, when the sun is in the equinoxes.

From this consideration, Dr. Gregory endeavours to account for the appearance of the fascia in *Mars*; which are certain swathes or fillets seen in this planet, and posited parallel to his equator: for, as among us, the same climate has, at different seasons, very unequal degrees of heat; but, as in *Mars* it is otherwise, the same parallel having always a pretty equable degree of heat, it follows, that these spots may probably be formed in *Mars*, or in his atmosphere, as snow and clouds are in ours; viz. by the constant different intentions of heat and cold in the different parallels; and so come to be extended in circles or belts parallel to his equator, or the circle of his diurnal revolution. And this same principle may, perhaps, solve the phenomenon of Jupiter's belts; that planet, like *Mars*, having a perpetual equinox.

Besides the ruddy colour of *Mars*, we have another argument of his being incompassed with an atmosphere; and it is this: that, when any of the fixed stars are seen near his body, they appear extremely obscured, and almost extinct. If this be the case, an eye placed in *Mars* would scarce ever see Mercury, unless, perhaps, in the sun at the time of conjunction, when Mercury passes over his disk, as he sometimes appears to us in form of a spot. A spectator in *Mars* will see Venus about the same distance from the sun, as Mercury appears to us; and the earth about the same distance from the sun, that to us Venus appears. And, when the earth is found in conjunction with, and very near, the sun, he will see in *Mars* the earth appear horned or falcated, and its attendant the moon of the same figure, and, at its utmost distance from the earth, not above 15 minutes of a degree.

MARS, among chymists, signifies iron; because imagined to be under the influence of that planet. See **IRON**.

Physical writers hold iron preferable, for all medicinal purposes, to steel, which is only a more hardened, compact iron, made so by art; whereby it is rendered more unfit to yield those principles or parts in preparation, which the physician requires to be drawn out. See **STEEL**.

CROCUS MARTIS, rust of iron. See **CROCUS MARTIS**. **Crystals of MARS**. See the article **CRYSTAL**. **Tree of MARS**, *arbor Martis*. See **ARBOR**.

Games of MARS were combats instituted at Rome in honour of the god *Mars*.

They were held twice in the year; once in the Circus, on the 4th of the ides of May; and a second time on the 1st of August. These latter were established some time after the other, in memory of the dedication of the temple of *Mars* on that day. These games consisted in courses of horses, and combats with wild beasts. Germanicus is said to have killed two hundred lions in the circus on these occasions. See **FIELD of Mars**.

MARSHAL*, or **MARESCHAL**, **MARESCALLUS**, primarily denotes an officer, who has the care or the command of horses.

* Nicod derives the word from *Polemarchus*, master of the camp: Matthew Paris from *Martini Senescallus*. In the old Gaulish language, *March* signified horse; whence *Marchal* might signify him who commanded the cavalry. Spelman, Skinner, and Menage, derive it from the German *Maer*, *Marre*, a mare, or even an horse, and *Schal*, servant: which makes some imagine the title was first given to farriers, or those who shod and bled horses, and that, in succession of time, it passed to those who commanded them. Pasquier makes four several derivations for the four several kinds of *Marshals* in use among the French; viz. *Marshals* of France, *Marshals de camp*, *Marshals de logis*, or quarter-masters, and farriers, who are also called by the name of *Marshals*. The third he derives from *Marbe* or *Marchir*, to mark, limit; and the last from *Maire*, master, and *Chal*, horse.

Earl-MARSHAL of England is one of the great officers of the crown, who takes cognizance of all matters touching honour and arms, determines contracts relating to deeds of arms out of the realm upon land, and matters concerning war within the realm, which cannot be determined by common law, in which he usually proceeds according to the civil law. This office is hereditary, having been for many ages in the house of Norfolk. It is discharged by deputy, on account of the religion of the duke of Norfolk, hereditary *Earl-Marshal*, which renders him incapable of administering it in person. See **EARL**.

The *Earl-Marshal* had antiently several courts under him; but he hath now only the *Marshalsea*, where he may sit in judgment against criminals offending within the verge of the court.

Knight-MARSHAL, or **MARSHAL of the king's house**, is an officer, whose business, according to Fleta, is to execute the commands and decrees of the lord-steward, and to have the custody of prisoners committed by the court of verge.—Under him are six *Marshals*'s men, who are properly the king's bayliffs, and arrest in the verge of the court, when a warrant is backed by the board of green-cloth. The court where causes of this kind, between man and man, are tried, is called the *Marshalsea*, and is under the *Knight-Marshal*.

There are some other inferior officers of this name; as

MARSHAL of the justices in eyre;

MARSHAL of the king's bench, who has custody of the prison called the *king's bench* in Southwark.

In Fleta mention is also made of a *Marshal of the Exchequer*; to whom the court commits the custody of the king's debtors, &c.

MARSHAL, or **MARESCHAL**, of France, is the highest dignity or prefelement in the French armies. The dignity of *Marshal* is now for life, though, at its first institution, it was otherwise. They were then only the king's first escuyers under the constable, but in time they became the constable's lieutenants in the command of the army, the constable himself being then become captain-general. At first they were but two in number, and their allowance was but 500 livres *per annum* in time of war, and nothing in time of peace. But, in the reign of Francis the first, their number was increased to five. Since him it has been various: the late king increased it at pleasure; and it is now eleven. Their office at first was to *marshal* the army under the constable, and to command in his absence.

They did then what the *Marshals de camp* do now; to which last they have given their title, and the least considerable part of their authority.

The first *Marshal* does the office of constable in an assembly of the *Marshals*.

Arch-MARSHAL.

Clerk-MARSHAL.

Provost-MARSHAL.

} See the article { **ARCH.**
 { **CLERK.**
 { **PROVOST.**

MARSHALLING a coat, in heraldry, signifies the due and proper joining of several coats of arms belonging to distinct families in one and the same shield or escutcheon; together with their ornaments, parts, and appurtenances.

MART—Letters of **MART**. See **LETTERS**.

MARTIAL is sometimes used to express preparations of iron, or such as are impregnated therewith; as the *Martial* regulus of antimony, &c.

MARTIALE Bezoardicum. See **BEZOARDICUM**.

MARTIAL Law is the law of war, depending upon the arbitrary but just power and pleasure of the king, or his lieutenants. The king, though in times of peace he makes no laws, but by common consent in parliament; yet, in war, he uses absolute power over the soldiery:—though even this power hath been vested, of late years, in the king, or his generals of the army, by act of parliament, and under particular restrictions too.

MARTII Campus. See the articles **CAMPUS**, and **FIELD**.

MARTINGALE, a thong of leather fastened at one end to the girths under the belly of an horse, and at the other end to the noseband, to hinder him from rearing, or tossing up his head.

MARTINS—*St. MARTIN's cope*. See **COPE**.

MARTLET, in heraldry, a little bird represented without feet, and properly also without a beak.

It is used as a difference or mark of distinction of a younger

brother; some say, more peculiarly of the fourth brother, or family.

MARTYR*, a person who suffers torments, and even death, in defence of the truth of the gospel.

* The word is Greek, *μαρτυρ*, and properly signifies a witness. It is applied, by way of eminence, to those who suffer in witness of the truth of the gospel.

Antiently those, who were banished for the faith, were called *Martyrs*, and also those who perished in the holy wars. In the time of St. Augustin, the title of *Martyr* was given to confessors, or those who were tortured for the faith, without losing their lives.—It is Tertullian's thought in his apologetic; *Plures efficitur, quoties metimur; semen ecclesiae est sanguis Christianus*.

St. Stephen is called the *Proto-Martyr*, or first *Martyr*.—Nineteen thousand seven hundred are computed to have suffered *Martyrdom* with St. Irenaeus at Lyons, under the empire of Severus. Six thousand six hundred and sixty-six soldiers of the Theban legion are said to have been *martyred* in Gaul. Father Papebroch reckons fifteen thousand Abyssinian *Martyrs*, and an hundred and fifty thousand others under Dioclesian alone.

Mr. Dodwell endeavours to prove, in a dissertation express, that the number of *Martyrs* who suffered under the Roman emperors, was very moderate; alleging, that those we have accounts of in the fathers, come within a very small compass; and that, excepting Nero and Domitian, the rest of the emperors made scarce any.—F. Ruinart, on the contrary, endeavours to prove, that the catalogue of *Martyrs* is not at all swelled; that the carnage was immense under the first emperors, and especially in the time of Dioclesian.—F. Papebroch, in his *Acta sanctorum*, also makes the number of *Martyrs* infinite. Scarce any faith or religion but pretends to its *Martyrs*. Mahometans, heathens, idolaters, &c. all have their *Martyrs*.

In the antient church, the acts, sufferings, and deaths, of the *Martyrs*, were preserved with a world of care; and yet, notwithstanding all this diligence, we have but very little left of them. Eusebius indeed composed a martyrology; but it never reached down to us; and those since compiled are extremely suspected.

Æra of MARTYRS is an æra followed in Egypt and Abyssinia, and which even the Mahometans, since their becoming masters of Egypt, frequently observe. It is fixed to the beginning of the persecution of Dioclesian, *A. D.* 302 or 303.

The æra of *Martyrs* is also called the æra of Dioclesian.

MARTYROLOGY*, a register or catalogue of martyrs. See **MARTYR**.

* The word comes from the Greek *μαρτυρ*, witness, and *λογος*, discourse, I speak, or *λεγω*, colligo, I gather.

A *Martyrology*, properly speaking, should contain no more than the name, place, and day of martyrdom, of each saint; but the term is frequently extended to the histories of martyrs. The custom of collecting *Martyrologies* is borrowed from the heathens, who inscribed the names of their heroes into their *Fasts*, to preserve to posterity the memory and example of their noble actions. Baronius gives pope Clement the credit of being the first who introduced the custom of collecting the acts of the martyrs.

The *Martyrology* of Eusebius of Cæsarea was the most celebrated in the antient church: it was translated into Latin by St. Jerom; but the learned agree, that it is not now extant.—

That attributed to Beda in the eighth century is of very doubtful authority; the names of several saints being there found, who did not live till after the time of Beda.—The ninth century was very fertile in *Martyrologies*. Then appeared that of Florus, sub-deacon of the church at Lyons, who, however, only filled up the chafms in Beda. This was published about the year 830; and was followed by that of Waldenburtus, monk of the diocese of Treves, written in verse about the year 848; and this by that of Uffard, a French monk, and written by command of Charles the Bald, in 875; which last is the *Martyrology* now ordinarily used in the Romish church. That of Rabanus Maurus is an improvement on Beda and Florus, written about the year 845: that of Notker, monk of St. Gal, was written about the year 894.

The *Martyrology* of Ado, monk of Ferrieres in the diocese of Treves, afterwards archbishop of Vienne, is a descendent of the Roman, if we may so call it; for Du Sollier gives its genealogy thus: the *Martyrology* of St. Jerom is the great Roman *Martyrology*; from this was made the little Roman one printed by Rosweyde. Of this little Roman *Martyrology* was formed that of Beda, augmented by Florus. Ado compiled his in the year 858. The *Martyrology* of Nevelon, monk of Corbie, written about the year 1089, is little more than an abridgement of that of Ado. Father Kircher also makes mention of a Coptic *Martyrology*, preserved by the Maronites at Rome.

We have also several protestant *Martyrologies*, containing the sufferings of the reformed under the papists; viz. an English *Martyrology*, by J. Fox; with others by Clark, Bray, &c.

MARTYROLOGY is also used in the Romish church for a roll or register kept in the vestry of each church, containing the names of all the saints and martyrs, both of the universal

universal church, and of the particular ones of that city, or monastery.

MARTYROLOGY, is also applied to the painted or written catalogues in the Romish churches, containing the foundations, obits, prayers, and masses, to be said each day.

MARY.—*Knights of St. Mary*, is a name by which several orders of knighthood are distinguished.—*As, St. Mary of the thistle*. See **THISTLE**. *St. Mary of the conception*. See **CONCEPTION**. *St. Mary of the elephant*. See **ELEPHANT**. *St. Mary and Jesus*. *St. Mary of Loretto*. *St. Mary of mount Carmel*. See **CARMEL**. *St. Mary of the Teutonic*. See **TEUTONIC**, &c.

MASBOTHÆI*, or **MESBOTHÆI**, the name of a sect, or rather of two sects; for Eusebius, or rather Hegesippus, whom he cites, makes mention of two different sects of *Masbothæans*. The first was one of the seven sects that arose out of Judaism, and proved very troublesome to the church: the other was one of the seven Jewish sects before the coming of Jesus Christ.

* The word is derived from the Hebrew שבט *Sebat*, to rest or repose, and signifies idle, easy, indolent people. Eusebius speaks of them, as if they had been so called from one *Masbothæus*, their chief; but it is much more probable, that their name is Hebrew, or at least Chaldaic, signifying the same thing with a Sabbatarian in our language, that is, one who makes profession of keeping sabbath.

Valefius will not allow the two sects to be confounded together: the last being a sect of Jews before, or at least cotemporary with Christ; and the former a sect of heretics descended from them. Rufinus distinguishes them in their names: the Jewish sect he calls *Masbuthæi*, and the heretics *Masbuthæani*.—The *Masbuthæans* were a branch of the Simonians.

MASCLE, or **MACLE**, in heraldry, a bearing in form of a lozenge, and voided of the field, that is, its inner part being cut out.—See *Tab. Herald.* fig. 34.

He bears gules a chevron ermin between three *Mascles* argent by the name of *Belgrave*.

According to Guillim, the *Mascle* represents the mesh of a net, and is an honourable bearing. It only differs from a lozenge, by being voided.

MASCLINE, something belonging to the male, or the stronger of the two sexes.

MASCLINE, is more ordinarily used in grammar to signify the first and worthiest of the genders of nouns.

The *Masculine* gender is that which belongs to the male kind, or something analogous to it.

Most substantives are ranged under the heads of *Masculine* or feminine.—This, in some cases, is done with a shew of reason, but in others it is merely arbitrary; and, for that reason, is found to vary according to the languages, and even according to the words introduced from one language into another.

—Thus the names of trees are generally feminine in Latin, and *Masculine* in the French.

Farther, the genders of the same word are sometimes varied in the same language. Thus *alvus*, according to Priscian, was antiently *Masculine*, but is now become feminine. And *navire*, a ship, in French, was antiently feminine, but is now *Masculine*.

MASCLINE rime, in the French poetry, is that made with a word which has a strong, open, and accented pronunciation; as all words have, excepting those which have an *e* feminine in their last syllable.

For instance, *amour* and *jour*, *mort* and *fort*, are *Masculine* rimes;—and *pere* and *mere*, *gloire* and *memoire*, are feminine. Hence also verses ending with a *Masculine* rime, are called *Masculine* verses, and those ending with a feminine rime, feminine verses.

It is now a rule established among the French poets, never to use above two *Masculine*, or two feminine verses successively, except in the looser kinds of poetry. Marot was the first who introduced this mixture of *Masculine* and feminine verses; and Ronfard was the first who practised it with success. The *Masculine* verses, in French, should always have a syllable less than the feminine ones.

MASCLINE Signs.—Astrologists divide the signs, &c. into *Masculine* and feminine; by reason of their qualities, which are either active and hot, or cold, accounted *Masculine*; or passive, dry, and moist, which are feminine.

On this principle they call the Sun, Jupiter, Saturn, and Mars, *Masculine*; and the Moon and Venus, feminine. Mercury, they suppose, partakes of the two. Among the signs, Aries, Libra, Gemini, Leo, Sagittarius, and Aquarius, are said to be *Masculine*; Cancer, Capricornus, Taurus, Virgo, Scorpio, and Pisces, are feminine.

MASK, or **MASQUE**. See the article **MASQUE**.

MASON*, a person employed usually under the direction of an architect, in the raising of a stone-building.

* The word comes from the French *Maçon*, which signifies the same. Some derive this further from the barbarous Latin *Machia*, a machinist, in regard these artificers are obliged to use machines for raising walls. Du Cange derives it from *Maceria*, a name given to the long fence-walls which inclose vineyards, &c. in which *Masons* are supposed to have been first employed: *Mason est Maceriarum constructor*. M. Huet derives it from *Mas*, an old word,

signifying house; hence *Mason* is a person who makes *Mas's*, that is, houses. In the corrupt Latin, a *Mason* was called *magister comacinus*, which Lindenbroeck derives from Comacina, an island in Romania, where, in the time of the Lombards, the best architects were found.

The chief business of a *Mason* is to prepare the mortar, raise the walls from the foundation to the top, with the necessary retreats and perpendiculars, form the vaults, and employ the stones as delivered to him.

When the stones are large, the business of hewing or cutting them belongs to the stone cutters; though these are frequently confounded with the *Masons*.—The ornaments of sculpture are performed by carvers in stone, or sculptors.—The tools or implements principally used by *Masons* are, the square, level, plumb-line, bevel, compass, hammer, chissel, mallet, saw, trowel, &c.

Besides the common instruments used in the hand, they have likewise machines for the raising of great burdens, the conducting of large stones, &c. The principal of these are the lever, wheel, pully, &c.

Free, or Accepted MASONS, a very antient society, or body of men, so called either from some extraordinary knowledge of masonry or building, which they are supposed to be masters of, or because the first founders of the society were persons of that profession.

They are now very considerable both for numbers and character; being found in every country in Europe, and consisting principally of persons of merit and consideration. As to antiquity, they lay claim to a standing of some thousand years; and, it is said, can trace up their original as early as the building of Solomon's temple.

What the end of their institution is, seems still, in some measure, a secret; though so much of it as is known appears laudable enough, as it tends to promote friendship, society, mutual assistance, and good fellowship.

The brothers of this family are said to be possessed of a great number of secrets, which have been religiously observed from age to age.—Be their other virtues therefore what they will, it is plain they are masters of one in a very great degree, viz. secrecy.

MASONRY, a branch of architecture, consisting in the art of hewing or squaring stones, and cutting them level, and perpendicular, for the uses of building.

MASONRY, in a more limited sense of the word, is the art of assembling and joining stones together with mortar.

Hence there arise as many different kinds of *Masonry*, as there are different forms and manners of laying or joining the stones. Vitruvius makes mention of seven kinds of *Masonry* used among the antients; three of hewed stone, viz. that in form of a net, that in binding, and that called the Greek *Masonry*; and three of unhewed stones, viz. that of an equal course, that of an unequal course, and that filled up in the middle. The seventh was a composition of all the rest.—See *Tab. Architect.* fig. 13. to 19.

Net MASONRY, called by Vitruvius, *reticulatum*, from its resemblance of the meshes of a net, consists of stones squared in their courses, and so disposed, as that their joints go obliquely, and the diagonals are, the one perpendicular, and the other level. This is the most agreeable *Masonry* to the eye; but it is very apt to crack.—See fig. 13.

Bound MASONRY, *inserta*, is that wherein the stones were placed one over another, like tiles; the joints of the beds being level, and the mounters perpendicular. So that the joint that mounts and separates two stones, always falls directly over the middle of the stone below.—This is less beautiful than the net-work; but it is more solid and durable.—See fig. 15.

Greek MASONRY, according to Vitruvius, is that where, after we have laid two stones, each of which makes a course, another is laid at the end, which makes two courses; and the same order is observed throughout the building.—This may be called *double binding*, in regard the binding is not only of stones of the same course with one another, but likewise of one course with another course.—See fig. 14.

MASONRY by equal courses, by the antients called *isodotum*, differs in nothing from the bound *Masonry*, but only in this, that its stones are not hewn.—See fig. 16.

MASONRY by unequal courses, called *pseudisodotum*, is also made of unhewed stones, and laid in bound work: but then they are not of the same thickness, nor is there any equality observed, excepting in the several courses; the courses themselves being unequal to each other.—See fig. 17.

MASONRY filled up in the middle, called by the antients *empletion*, is likewise made of unhewed stone, and by courses; but the stones are only set in order as to the courses, the middle being filled up with stones thrown in at random among the mortar.—See fig. 18.

Compound MASONRY is of Vitruvius's propounding; so called, as being formed of all the rest. In this, the courses are of hewed stone, and the middle, being left void, is filled up with mortar and pebbles thrown in together. After this, the stones of one course are bound to those of another course, with cramp-irons fastened with melted lead.—See fig. 19.

All the kinds of *Masonry* now in use may be reduced to these five, viz. *Bound Masonry*; that of *Brick-work*, where the bodies and projections of the stones inclose square spaces or pannels, &c. set with bricks: That of *maillon*, or of small work, where the courses are equal, well squared, and their edges or beds ruficated: and That where the *courses* are unequal; and that filled up in the middle with little stones and mortar.

MASONRY, is sometimes also used in a more general and unlimited sense; for as, besides proper *Masonry*, to include the hewing or fawing of larger stones to fit them for building, properly called *Stone-cutting*; and the carving of the ornaments on the members and mouldings, properly called *sculpture*.

MASQUE, or **MASK**, a cover for the face, contrived with apertures for the eyes and mouth; originally worn chiefly by women of condition, either to preserve their complexion from the weather, or out of modesty, to prevent their being known.

Poppæa, wife of Nero, is said to be the first inventor of the *Masque*; which she did to guard her complexion from the sun and weather, as being the most delicate woman, with regard to her person, that has been known.—Brantome observes, that the common use of *Masques* was not introduced till towards the end of the sixteenth century.

MASQUE, is also used to signify any thing used to cover the face, and prevent a person's being known.

The penitents of Lions and Avignon hide their faces with large white veils, which serve them for *Masques*.

MASQUE, in architecture, is applied to certain pieces of sculpture, representing some hideous forms, grotesque, or satyr's faces, &c. used to fill up and adorn vacant places, as in freezes, the pannels of doors, keys of arches, &c. but particularly in grottoes.

MASQUERADE*, or **MASCARADE**, an assembly of persons masked, or disguised; meeting to dance, and divert themselves. This is now much in use with us, and has been long a very common practice abroad, especially in carnival time.

* The word comes from the Italian *Mascherata*, and that from the Arabic *Maschara*, which signifies rallery, buffoonry.

MASS, **MASSA**, in mechanics, the matter of any body cohering with it, i. e. moving and gravitating along with it.

In this sense, *Mass* is distinguished from bulk, or volume, which is the expansion of a body in length, breadth, and thickness.

The *Mass* of any body is rightly estimated by its weight. And the *Masses* of two bodies of the same weight are in a reciprocal ratio of their bulks. See **MATTER**.

MASS*, or **MESSE**, **MISSA**, in a religious sense, denotes the office, or public prayers made in the Romish church, at the celebration of the eucharist.

* Nicod, after Baronius, observes, that the word comes from the Hebrew, *Misfach*, oblatum; or from the Latin *Missa*, *Misforum*; because, in the former times, the catechumens and excommunicated were sent out of the church, when the deacon said, *Ite, missa est*, after sermon, and the reading of the epistle and gospel; they not being allowed to assist at the consecration. Menage derives the word from *Misio*, dismissing: others from *Missa*, mission, sending; because, in the *Mass*, the prayers of men on earth are sent up to heaven.

Romish divines define the *Mass*, an oblation made to God, wherein, by the change of a sensible object by virtue of a divine institution, the sovereign dominion of God over all things is acknowledged.

This they esteem the greatest and most august ceremony in use in the church; as being the sacrifice of the new law, wherein the body and blood of Jesus Christ are offered up to God.

They are divided about the question, Whether or no it be proper or allowable for the same person to celebrate *Mass* several times in one day? having the authority of pope Leo in his letter to Dioscorus for the affirmative side of the question, and that of several of the councils for the negative.

There are a great variety of *Masses* in the Romish church; the thing acquiring new titles, and appellations, according to the different rites, intentions, and manners, in which it is performed, as well as other circumstances.—Thus they have an

Ambrosian Mass, celebrated according to the rite of St. *Ambrose*; particularly used in Milan.

English Mass, was the form which antiently obtained in England.

Gallican Mass, is the rite that formerly obtained in the churches of France.

Greek Mass, is that rehearsed according to the *Greek* rites, in the *Greek* language, and by *Greek* priests.

Latin Mass, is that used in the *Latin* church, in the *Latin* tongue, and according to the rites of the *Latin* church.

High Mass, called also *Grand Mass*, is that sung by the choir, and celebrated with the assistance of a deacon and subdeacon.

Low Mass, is that wherein the prayers are all barely rehearsed without any singing, and performed without much ceremony, or the assistance of any deacon and subdeacon.

Mass of the Beata, or *our lady*, is that offered to God by the means, and through the intercession, of the *virgin*.

Beau Mass, is a *Mass* rehearsed every day, at which the ladies

and *Beau-monde* of the place attend.—This is also called the *perfumed Mass*.

Common Mass, or *Mass of the community*, in a monastery, is that celebrated at certain hours, whereat the whole body assits.

Mass of the Holy Ghost, is that celebrated at the beginning of any solemnity, or church-assembly, commencing with an invocation of the *Holy Ghost*.

Holiday Mass, is that wherein certain prayers, or lessons, are read suitable to the day.

Mass of Judgment, was that wherein a person cleared himself of any calumny, by some proof agreed upon.

Mass for the death of our enemies, was a form that obtained a long time in Spain; but it was at length abolished, as inconsistent with Christian charity.

Mass of the dead, or *requiem*, is that performed at the request of the deceased: the introit whereof begins with *Requiem*.—

In the thirteenth century it was the custom, before criminals were carried out to execution, to make them attend at a *Mass of the dead*, rehearsed for the repose of their souls.

Parish Mass, or *Great Mass*, is that which the parson is obliged to rehearse to his parishioners on Sundays and holidays.

Little Mass is that said at private altars with less ceremony.

The first *Mass* is that said at break of day.

Mass of a saint, is that wherein God is invoked by the intercession of some saint.

Thus there are also *Masses* of apostles, martyrs, pontiffs, virgins, &c.

Mass of scrutiny, was formerly rehearsed at the examination of catechumens, when inquiry was made as to their disposition for baptism.

Dry Mass, is that where there is no consecration; as that, according to Durandus, where the priest cannot consecrate, by reason of his having said *Mass* before on the same day: or it is that used by the candidates of the priesthood, in order to their becoming acquainted with the ceremonies; as Eckius will have it.

Private Mass, is an extraordinary *Mass*, besides that of the day, rehearsed on some extraordinary occasion.

Candle-Mass. } See the article } *CANDLE-mass*.
Childer-Mass. } *CHILDER-mass*.
Christ-Mass. } *CHRIST-mass*.

MASSSES, in painting, denote those parts of a picture which contain great lights, or great shadows. See **CLAIROSCURE**.

When it is almost dark, we only see the *Masses* of a picture; i. e. the places of the greatest lights and shadows.

MASSALIANS, **MASSALIANI**, certain sectaries, so called from a Hebrew word signifying prayer; it being their distinguishing tenet, that a man is to be continually in prayer.

The Greeks call them *Euchitæ*, *ευχισταί*, which in their language signified the same thing.

St. Epiphanius distinguishes two kinds of *Massalians*, the *antient* and the *later*.

The *antient*, according to him, were neither Jews, Christians, nor Samaritans, but pure Gentiles; who, owing several gods, adored only one, whom they called Almighty. They had oratories like our churches, where they used to meet, to pray, and sing hymns in honour of God; their oratories being finely illuminated with lamps and flambeaux.—This description of St. Epiphanius comes to near the practice of the Esseni, that Scaliger thinks the two sects ought not by any means to be distinguished.

For the *later Massalians*, who were by profession Christians, their rite was not till about the time of St. Epiphanius. Their doctrine was, that prayer alone was sufficient to salvation.—Many monks, who loved a life of laziness, and were averse to labour, at times, joined these *Massalians*.

MASSETER, in anatomy, a triangular two-headed muscle, which surrounds the lower jaw, and helps to pull it upwards in eating. See **MAXILLA**.

The *Masseter* is thick and short, arising from the Zygoma, and from the first bone of the upper jaw; and is inserted into the lower edge of the lower jaw, from its external angle to its middle. Its fibres run in three directions; those from the Zygoma obliquely to the middle of the jaw, and those from the upper bone of the first jaw cross the former, and run to the angle of the lower jaw; and the fibres that are in its middle, run perpendicularly from their origin to their insertion.—See *Tab. anat. (myol.) fig. 1. n. 11. fig. 6. n. 6. fig. 7. n. 3.*

MASSIVE, something heavy and solid; a term used in opposition to tenderness and delicacy.

Thus we say, a building is too *massive*, that is, its walls are too thick; a wall is *massive*, that is, the lights and openings are too small in proportion.

Massive column, is that which is too short for the order whose capital it bears.

MASSORA, a term in the Jewish theology, signifying a work on the bible, performed by several learned rabbins, to secure it from any alterations which might otherwise happen; and to serve, according to their expression, as a *hedge to the law*.

Buxtorf defines the *Massora* a critic on the Hebrew text, contrived by the antient Jewish doctors, in which they have numbered the verses, words, and letters of the text, and marked all the variations of it.

The text of the sacred books, it is to be observed, was originally written without any breaks, or divisions into chapters or verses, or even into words: so that a whole book, in the ancient manner, was but one continued word; of this kind we have still several ancient manuscripts both Greek and Latin. In regard therefore the sacred writings had undergone an infinite number of alterations, whence various readings had arisen; and the original was become much mangled, and disguised; the Jews had recourse to a canon, which they judge infallible, to fix and ascertain the reading of the Hebrew text: and this rule they call *Massora*, tradition; as if this critique were nothing but a tradition, which they had received from their forefathers.

According to Elias Levita, they were the Jews of a famous school at Tiberias, who composed, or at least began the *Massora*, whence they are called *Massorettes*, and *Massoretic doctors*. Aben Ezra makes them the authors of the points and accents in the Hebrew text, as we now find it, and which serve for vowels.

The Arabs have done the same thing by their alcoran, that the *Massorettes* have done to the bible: nor do the Jews deny their having borrowed this expedient from the Arabs, who first put it in practice in the seventh century.

There is a *great*, and a *little Massora*, printed at Venice, and at Basil, with the Hebrew text in a different character.—Buxtorf has written a *Massoretic* commentary, which he calls *Tiberias*.

MASSORETES, Jewish doctors, authors of the *Massora*. See *MASSORA*.

MAST of a forest, the fruit of that *Genus* of trees, called *Glandiferous*, or *Mast-bearing*; as beech, oak, chestnut, &c.

MAST *, in navigation, a large pole, or long piece of round wood, raised in vessels, for the yards and sails to be fastened to, in order to their receiving the wind necessary for navigation.

* The word *Mast* signifies the same thing in French, High-Dutch, Flemish, and English: The Italians use the word *albero*, and the Spaniards *Mástil*.

In large vessels, the number of *Masts* is four: Their names are, the *Main Mast*, the *Fore-Mast*, the *Mizen-Mast*, and the *Boltsprit*. To which some add a fifth, viz. a *Counter-Mizen*.

Main-Mast is the chief *Mast*, standing upright in the middle, or waist of the vessel; it bears the main-yard and main-sail.

Fore-Mast is between the *Main-Mast* and the head.

Mizen-Mast is between the *Main-Mast* and the stern.

The *Boltsprit* lies under the beak, in the prow, or head of the ship.

The *Counter-Mizen*, in large vessels and galleons, is in the stern.—See *Tab. Ship*, fig. 1. n. 1, 19, 38, 81.

We also use the word *Mast* to signify those divisions, or additional pieces in the *Masts*, placed over one another. The *Main-Mast*, and *Fore-Mast*, have each of them two, viz. the *Main-Mast*, *Main-Top-Mast*, *Main-Gallant-Mast*; the *Fore-Mast*, *Fore-Top-Mast*, *Fore-Top-Gallant-Mast*. And the *Mizen-Mast* has one, viz. the *Mizen-Top-Mast*.

For the proportion of *Masts*, Sir H. Manwaring gives these rules: Whatever the breadth of a ship be in feet, multiply $\frac{1}{2}$ of that breadth by 3, the product is the length of her main-*Mast* in feet. Thus if a ship be 30 feet at the midship-beam, $\frac{1}{2}$ of 30 is 15; therefore that ship's *Main-Mast* must be 24 yards, or 72 feet in length. Then for its bigness, he allows an inch to every yard in length, and therefore this *Mast* must be 24 inches through, or thick. The *Fore-Mast* of a ship must be $\frac{2}{3}$ of the length of the *Main-Mast*, that is, in this case, 16 yards $\frac{2}{3}$, and thick or through it must be near 20 inches.

The *Boltsprit* is always the same length and bigness with the *Fore-Mast*; and the *Mizen-Mast* must be just half the length of the *Main-Mast*, and half as thick.

Heel of a *MAST*.

Jury-*MAST*.

Spring a *MAST*.

MAST, a title given to several officers, and persons of authority; and command particularly, to the chiefs of the orders of knighthood, &c.

Thus we say, the grand *Master* of Malta, of St. Lazarus, of the golden fleece, of the free masons, &c.

MAST, *MAGISTER*, was a title frequent among the Romans: They had their *Master* of the people, *Magister populi*, who was the dictator.—*Master* of the cavalry, *Magister equitum*, who held the second post in an army after the dictator.—Under the later emperors, there were also *Masters* of the infantry, *Magistri peditum*.—A *Master* of the census, *Magister census*, who had nothing of the charge of a censor, or subcensor, as the name seems to intimate; but was the same with the *Præpositus frumentarium*.

MAST of the militia, *Magister militie*, was an officer in the lower empire, created, as it is said, by Dioclesian, who had the inspection and government of all the forces, with power to punish, &c. somewhat like a constable of France.

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At first there were two of these officers instituted; the one for the infantry, and the other for the cavalry: but the two were united into one under Constantine. Afterwards, as their power was increased, so was their number also; and there was one appointed for the court, another for Thrace, another for the East, and another for Illyria. They were afterwards called *Comites*, counts, and *Clavissimi*. Their power was only a branch of that of the *Præfictus prætorii*, who by that means became a civil officer.

MASTER of arms, *Magister armorum*, was an officer or comptroller under the *Master* of the militia.

MASTER of the offices, *Magister officiorum*, had the superintendence of all the officers of the court. He was also called *Magister officii palatini*, simply *Magister*, and his post *Magisteria*.

This officer was the same in the western empire with the *Curopolates* in the eastern.

MASTER, in fine, in the Roman history and laws, is used for every officer, who is the chief of his kind; and has others of the same species, or that have the same functions, under him.—In Latin, *Magister*, and sometimes *Procurator*, or *Primicerius*. See *PRIMICERIVS*.

MASTER of the armory is an officer who has the care and oversight of his majesty's arms, and armory. See *ARMS*, and *ARMORY*.

MASTER of Arts, the first degree taken up in foreign universities, but the second in ours; candidates not being admitted to it till they have studied in the university seven years. See *DEGREE*.

MASTER of the Ceremonies, is an officer instituted by king James the first, for the more solemn and honourable reception of ambassadors, and strangers of quality, whom he introduces into the presence.

The badge of his office is a gold chain and medal, having on one side an emblem of peace, with king James's motto; and on the reverse the emblem of war, with *Dieu & mon droit*. He is always supposed to be a person of good address, and a master of languages: He is constantly attending at court, and hath under him an assistant *Master*, or deputy, who holds his place during the king's pleasure.

There is also a third officer, called *Marshal of the Ceremonies*, whose business is to receive and distribute the *Masters*'s orders, or the deputy's, for the service; but without their order he can do nothing.—This is in the king's gift.

MASTERS of Chancery are usually chosen out of the barristers of the common law, and sit in chancery, or at the rolls, as assistants to the lord chancellor, and master of the rolls.

To them is also committed interlocutory reports, stating of accounts, taxing costs, &c. And sometimes, by way of reference, they are empowered to make a final determination of causes.

They have, time out of mind, had the honour to sit in the lords house, though they have neither write, nor patent to empower them; but they are received as assistants to the lord chancellor, and master of the rolls. They had antiently the care of inspecting all writs of summons, which is now performed by the clerk of the petty-bag. When any message is sent from the lords to the commons, it is carried by the *Masters of Chancery*. Before them also affidavits are made, and deeds and recognizances acknowledged.

Besides these, who may be called *Masters of Chancery ordinary* (being twelve in number, whereof the master of the rolls is reputed the chief), there are also *Masters of Chancery extraordinary*, appointed to act in the several counties of England beyond ten miles distance from London, by taking affidavits, recognizances, &c. for the ease of the suitors of the court.

MASTER of the court of Wards and Liveries was the chief officer and judge of that court, who kept the seal of it, and was named and assigned by the king.

But this court, and all its officers, members, power, and appurtenances, are taken away by a statute made 12 Car. II. c. 24. See *WARD*.

MASTER of the Faculties, an officer under the archbishop of Canterbury, who grants licences and dispensations: he is mentioned in the statute 22, 23 Car. II. See the article *FACULTY*.

MASTER-Gunner of England. See the article *GUNNER*.

MASTER of the Horse, a great officer of the crown, to whom is committed the charge of ordering and disposing all matters relating to the king's stables, races, and breed of horses, as he had antiently of all the posts in England.

He hath a power of commanding the equerries, and all the other officers and tradesmen employed in the king's stables; to all which he gives, by his warrant to the avener, the oath of allegiance, &c. for the faithful discharge of their duty. He has the peculiar privilege of making use of any horses, pages, or footmen, belonging to the king's stables; so that his coaches, horses, and attendants, are the king's, and have the king's arms and liveries.

MASTER of the Household is an officer under the lord-steward of the

the household, and in the king's gift: His business is to survey the accounts of the household.

Antiently the lord-steward himself was called *Grand Master of the Household*.

MASTER of the Jewel house is an officer of the king's household, who has charge of all the gold and silver plate used at the king's table, or at that of any officer attending the court; and of all plate remaining in the tower of London; as also of chains and loose jewels, not fixed to any garment.

MASTER of the Mint, was antiently the title of him who is now called *Mint*; whose office is to receive the silver and bullion, which comes to the mint to be coined, and to take care thereof. See *MINT*.

MASTER of the Ordnance, a great officer, to whose care all the king's ordnance and artillery is committed.

MASTER of the Revels, an officer, whose business is to order all things relating to the performance of plays, masks, balls, &c. at court. Formerly he had also a jurisdiction of granting licences to all who travel to act plays, puppet-shows, or the like diversions: neither could any new play be acted at either of the two houses, till it had passed his perusal and licence. But these powers were afterwards much abridged, not to say annihilated, by a statute for regulating play-houses, till the licensing plays by the lord-chamberlain was lately established.

MASTER of the Robes. See the article *ROBES*.

MASTER of the Rolls, a patent officer for life; who has the custody of the roll and patents which pass the great seal, and of the records of the chancery.

In the absence of the lord chancellor, or keeper, he also sits as judge in the court of chancery; and is, by Sir Edward Coke, called his *officiant*.

At other times he hears causes in the rolls chapel, and makes orders and decrees.—He is also the first of the matters of chancery, and hath their assistance at the rolls: but all hearings before him are appealable to the lord-chancellor.

He hath also his writ of summons to parliament, and sits next to the lord chief justice of England, on the second woolpack. He hath the keeping of the parliament-rolls, and has the rolls house for his habitation; as also the custody of all charters, patents, commissions, deeds, and recognizances, which, being made of rolls of parchment, gave rise to the name. Antiently he was called *Clerk of the Rolls*.

In his gift are the six clerks in chancery, the examiners, three clerks of the petty-bag, and the six clerks of the rolls chapel, where the rolls are kept. See *ROLLS*, *CLERK*, &c.

MASTER of a Ship, an officer, to whom is committed the direction of a merchant-vessel; who commands it in chief, and is charged with the merchandizes aboard.

In the Mediterranean, the *Master* is frequently called *Patron*, and in long voyages *Captain*.

It is the proprietor of the vessel that appoints the *Master*; and it is the *Master* who provides the equipage, hire, the pilots, sailors, &c.—The *master* is obliged to keep a register of the seamen and officers, the terms of their contract, the receipts and payments, and, in general, of every thing relating to his commission.

MASTER of the Temple.—The founder of the order of the Templars, and all his successors, were called *Magni Templi Magistri*; and ever since the dissolution of the order, the spiritual guide and director of the house is called by that name. See *TEMPLE*, *TEMPLAR*.

MASTER of the Wardrobe, an office in the lord-chamberlain's district, who has the direction of all the royal robes; as those of the coronation, St. George's feast, and the parliament-robes: as well as of the wearing apparel, collar of SS's, George and garter, &c.

He has also the charge and custody of all former kings and queens robes, remaining in the Tower; all hangings, bedding, &c. for the king's house; and the charge and delivery of velvet and scarlet allowed for liveries.

He has under him a clerk of the robes, and wardrobe-keeper, a yeoman, &c. See *WARDROBE*.

Burgher-MASTER. } See the article { **BURCHER.**
Fire MASTER. } **FIRE.**
Quarter-MASTER. } **QUARTER.**

MASTER-Arch. See the article *ARCH*.

MASTER-Vault. See the article *VAULT*.

MASTER-PIECE, an exquisite, or extraordinary work or performance, in any art or science.

MASTER-PIECE, *Chof d'œuvre*, is particularly used among the French, for a work, which those who aspire to be admitted master in any art or trade, are to perform in presence of the masters or jurands of that company, by way of specimen of their capacity.

The *Master-piece* of a carpenter, is a rampant curve of a staircase, the spiral well adjusted with the descent: That of a joiner, a flat-bottom chest, or a door-case, or a mantle-tree: That of a tiler, a luthern well conducted in the fourchette, with a ridge: That of a plumber, a little cistern *cul de lampe*: That of a glazier, a pair of compartments of glasses of several colours, hollowed, incrustated: That of paviours, a rose in a free-stone

or flint-pavement: That of a cordwainer, a turn-up shoe, &c. **MASTIC***, or **MASTICK**, *MAETIKH*, a clear and sweet resinous gum, issuing from the trunk and large branches of the *Mastic-tree*, or *lentiscus*, either without, or with, incision.

* It has its name *Mastic* from *masticeo*, to chew, by reason of its being continually chewed by the Turks, especially the women.

Mastic is temperate in heat, and of a dry, binding quality; so that it strengthens the stomach, stays vomiting, stops fluxes of blood, and tickling coughs and catarrhs. It strengthens the reins, and is a good cleanser, and is for that reason prescribed in femal weakneses.

The jewellers mix *Mastic* with turpentine and ivory black, and lay it under their diamonds, to give them a lustre.

Mastic is chiefly the product of Chio: The trees that yield it are there cultivated with as much care as the vines. It brings in a revenue of eighty thousand ducats *per annum* to the grand signior.—There is also a kind of *Mastic* brought from Egypt, which serves to sophisticate camphor. The gum *Mastic* is in small granules, and white, if good; though age makes it turn yellowish.

MASTICATION, **MASTICATIO**, in medicine, the action of chewing; or of agitating the solid parts of our food between the teeth, by means of the motion of the jaws, the tongue, and the lips; whereby it is broken into small pieces, impregnated with saliva, and so fitted for deglutition, and a more easy digestion in the stomach.

The mixture of saliva with the food is of absolute necessity; for the saliva, imbibed within the parts of it, dissolves the salts hid in them; and, by so doing, prepares the food for fermentation in the stomach. The food therefore has the beginning of its digestion from the saliva, and its conclusion from the ferment in the stomach.

MASTICATORIES, **MASTICATORIA**, in medicine, are such remedies as are taken in at the mouth, and chewed; in order to promote the evacuation of the salival humour: as tobacco, ginger, pepper, sage, rosemary, thyme, mastic, &c.

MASTOIDES*, *MASTOEIDHES*, in anatomy, the same with *Mammillaris*.

* The word comes from the Greek *μασ*, nipple, dug, and *ειδ*, image, figure.

MASTOIDES is applied to such processes in the body, as have the appearance of breasts or dugs; arising from a broad basis, and terminating in an obtuse top.

MASTOIDES is sometimes also applied to those muscles which stoop the head; proceeding from the neck-bone and breast-bone, and terminating in the process mammiformis.

MATCH, a kind of rope slightly twisted, and prepared to retain fire, for the uses of artillery, mines, fire-works, &c.

It is made of hempen tow, spun on the wheel like cord, but very slack; and is composed of three twists, which are afterwards again covered with tow; so that the twists do not appear: lastly, it is boiled in lees of old wines; whence its colour.—This, when once lighted at the end, burns on gradually and regularly, without ever going out, till the whole be consumed.

Since fuses have been introduced in lieu of *Match-lock* muskets, the consumption of *Match* has been much less considerable than before.

MATER Tenuis, or *PiaMATER*. See *MENINGES*, and *PIA*.

MATER Dura. See also *MENINGES*, and *DURA*.

MATERIA, **MATTER**. See the article *MATTER*.

MATERIA subtilis denotes a fine subtle matter, which the Cartesians suppose to pervade and penetrate, freely, the pores of all bodies, and to fill up all their pores, so as not to leave the least vacuity or interstice between them.

This machine they have recourse to, to support the doctrine of an absolute plenum, and to make it consistent with the phenomena of motion, &c. and accordingly they make it act and move at pleasure; but in vain: for were there any such matter, in order for it to be able to fill up the vacuities of other bodies, it must, itself, be entirely void of any, i. e. it must be perfectly solid, vastly more solid than gold, and therefore more ponderous, and resist vastly more: which is inconsistent with phenomena. See *VACUUM* and *PLENUM*. Yet Sir Isaac Newton allows of the existence of a *subtile Matter*, or medium, vastly finer than air, penetrating the closest bodies, and contributing to the production of many of the phenomena of nature.—The existence of such a matter he argues from the experiment of two thermometers, which being inclosed in glass vessels, one of them exhausted of its air, and both carried from a cold to a warm place, the thermometer in *vacuo* grows warm, and rises, almost as soon as that in the air; and if returned into the cold place, both cool and fall about the same.—Hence, says he, is not the heat of the warm room conveyed through the vacuum by the vibrations of a much subtiler medium than air, which remained in *vacuo*, after the exhaustion of the air? And is not this medium the same with that whereby light is refracted, reflected, &c.?

MATERIAL denotes something composed of matter. See *MATTER*.

In which sense the word stands opposed to immaterial. See IMMATERIAL.

The Epicureans, Spinofists, &c. own no other but *material* substances: See SUBSTANCE. Among causes, some are *material*, others are formal: See CAUSE.

Material causes, having no understanding or liberty, must always act in the same manner, when under the same circumstances. Philosophers and divines dispute, whether or no there be any *material* forms really distinct from matter? See FORM. The Valentinians formerly applied the term *material* to all people but those of their own sect; asserting, that their souls perished with their bodies.—Thus also the Stoics maintained, that none but the souls of their wife men survived the body.

MATERIAL Circle. See the article CIRCLE.

MATERIAL Object. See the article OBJECT.

MATERIALISTS, a sect in the ancient church, composed of persons, who, being prepossessed with that maxim in the ancient philosophy, *Ex nihilo nihil fit*, *Out of nothing nothing can arise*, had recourse to an eternal matter, on which they supposed God wrought in the creation; instead of admitting God alone as the sole cause of the existence of all things.

Tertullian vigorously opposes the doctrine of the *Materialists*, in his treatise against Hermogenes, who was one of their number.

MATHEMATICAL Points. See the article POINT.

MATHEMATICS*, the science of quantity; or a science that considers magnitudes either as computable, or measurable.

* The word in its original, *μαθητις*, signifies *discipline*, or *science*, in the general; and seems to have been applied to the doctrine of quantity, either by way of eminence, or by reason, this having the start of all other sciences, the rest took their common name therefrom:

For the origin of the *Mathematics*, Josephus dates it before the flood, and makes the sons of Seth observers of the course and order of the heavenly bodies: he adds, that to perpetuate their discoveries, and secure them from the injuries either of a deluge, or a conflagration, they had them engraven on two pillars, the one of stone, the other of brick; the former of which, he says, was standing in Syria in his days.

The first who cultivated *Mathematics* after the flood, were the Assyrians and Chaldeans; from whom, the same Josephus adds, they were carried by Abraham to the Egyptians; who proved such notable proficient, that Aristotle makes no scruple to fix the first rise of *Mathematics* among them. From Egypt, five hundred eighty-four years before Christ, they passed into Greece through the hands of Thales, who, having learnt geometry of the Egyptian priests, taught it in his own country. After Thales, comes Pythagoras; who among other mathematical arts, paid a peculiar regard to arithmetic; fetching the greatest part of his philosophy from numbers: He was the first, as Laertius tells us, who abstracted geometry from matter; and to him we owe the doctrine of incommensurable magnitude, and the five regular bodies, besides the first principles of music and astronomy. Pythagoras was succeeded by Anaxagoras, Oenopides, Briso, Antipho, and Hippocrates de Scio; who all applied themselves particularly to the quadrature of the circle, the duplicature of the cube, &c. but the last with most success: This last is also mentioned by Proclus, as the first who compiled elements of *Mathematics*.

Democritus excelled in *Mathematics* as well as physics; though none of his works in either kind are extant: the destruction of which some authors lay at Aristotle's door. The next in order is Plato, who not only improved geometry, but introduced it into physics, and so laid the foundation of a solid philosophy.—Out of his school proceeded a croud of *Mathematicians*. Proclus mentions thirteen of note; among whom was Leodamus, who improved the analysis first invented by Plato; Theætetus, who wrote elements; and Archytas, who has the credit of being the first who applied *Mathematics* to real use in life. These were succeeded by Neocles and Theon, the last of whom contributed to the elements. Eudoxus excelled in arithmetic and geometry, and was the first founder of a system of astronomy. Menecmus invented the conic sections, and Theudius and Hermotimus improved the elements.

For Aristotle, his works are so stored with *Mathematics*, that Blancanus compiled a whole book of them: Out of his school came Eudemus and Theophrastus; the first of whom wrote of numbers, geometry, and invisible lines; the latter a mathematical history. To Aristotle, Ildorus, and Hypicles, we owe the books of solids; which, with the other books of elements, were improved, collected and methodized by Euclid, who died 284 years before Christ.

An hundred years after Euclid, came Eratosthenes and Archimedes. Cotemporary with the latter was Conon, a geometrical and astronomer. Soon after came Apollonius Pergensis; whose conics are still extant. To him are like-

wise ascribed the fourteenth and fifteenth books of Euclid, which are said to have been contracted from Hypicles. Hipparchus and Menelaus wrote on the sines in a circle, the latter also on spherical triangles: Theodosius's three books of spherics are still extant. All these, Menelaus excepted, lived before Christ.

A. D. 70. Ptolemy of Alexandria was born; the prince of astronomers, and no mean geometrician: he was succeeded by the philosopher Plutarch, of whom we have still extant some mathematical problems. After him came Eutocius, who commented on Archimedes, and occasionally mentions the inventions of Philo, Diocles, Nicomedes, Sporus, and Heron, on the duplicature of the cube. To Ctesibius of Alexandria we owe our pumps; and Geminus, who came soon after, is preferred by Proclus to Euclid himself.

Diophantus of Alexandria was a great master of numbers, and the first inventor of algebra: and among others of the antients, Nicomachus is celebrated for his arithmetical, geometrical, and musical works; Serenus, for his books on the section of the cylinder; Proclus, for his comments on Euclid; and Theon has the credit among some, of being author of the books of *Elements* ascribed to Euclid. The last to be named among the antients, is Pappus of Alexandria, who flourished A. D. 400. and is celebrated for his books of *mathematical* collections still extant.

See the progress of each branch of *Mathematics*, with the authors who have wrote on it, under the respective heads; as GEOMETRY, ALGEBRA, ASTRONOMY, &c.

Mathematics are distinguished, with regard to their end, into *Speculative MATHEMATICS*, which rest in the bare contemplation of the properties of things; and

Practical MATHEMATICS, which apply the knowledge of those properties to some uses in life.

With regard to their object, *Mathematics* are divided into *pure* or *abstract*; and *mixed*.

Pure MATHEMATICS consider quantity abstractedly, and without any relation to matter or bodies.

Mixed MATHEMATICS consider quantity, as subsisting in material being:—*e. gr.* length in a road, breadth in a river, height in a star, or the like.

Pure Mathematics, again, either consider quantity as discrete, and so computable, as arithmetic; or as concrete, or continued, and so measurable, as geometry and trigonometry.

Mixed Mathematics are very extensive, and are distinguished by various names, as the subjects they consider, and the views wherein people take them, vary; it being sufficient to determine an art to be a branch of *mixed Mathematics*, that *pure Mathematics* are applicable thereto, *i. e.* that it may be explained and demonstrated from the principles of arithmetic and geometry. Such are

Mechanics, which consider motion, or the laws of moving bodies. Hydrostatics, which consider the laws of fluids, or of bodies gravitating in fluids.—Pneumatics, the air, with regard to the laws and mensuration thereof.—Hydraulics, the motion of fluids.—Optic, direct light or vision.—Catoptrics, reflected vision.—Dioptrics, refracted vision.—Perspective, the images of objects, in order to delineate or represent them.—Astronomy, the universe, and the phenomena of the heavens.—Geography, the earth, both as in itself, and in its affections.—Hydrography, the sea, principally as navigable.—Chronology, time, with regard to the measuring and distinguishing thereof.—Gnomonics, or Dialling, shadows, in order for determining the hour of the day.—Pyrotechny, artificial fires, with regard both to diversion, and to the uses of war.—Military architecture, the strength of places, with regard to their defence against an enemy.—Civil architecture (now become a branch of *Mathematics*) or buildings.—Music, sounds, and their effects on the ear.

For the elements of each of these, see the respective heads: and for an accurate system of all the parts above-mentioned (Music alone excepted) orderly digested, and clearly demonstrated, see the excellent Wolfius's *Elementa mathematicae universae*.

MATHURINS. See the article TRINITARIANS.

MATRASS, **MATRACIUM**, or **BOLT-HEAD**, a glass vessel, used by chymists in digestions and other operations.

The *Matrasi* is made in form of a bottle, somewhat bellied in the middle, with a long narrow neck: it is coated with earth, when it is to be placed on a very hot fire. And when it is required it should be stopped very close, they seal it hermetically.

MATRICE, or **MATRIX.** See the article MATRIX.

MATRICE, or **MATRIX**, in dyeing, is applied to the five simple colours, whence all the rest are derived or composed. These are, the black, white, blue, red, and yellow or root colour. See DYING.

MATRICES, or **MATRIX's**, used by the letter-founders, are those little pieces of copper or brass, at one end whereof are engraven, dent-wise, or *en creux*, the several characters used in the composing of books.

Each character, virgula, and even each point, in a discourse, has

has its several *Matrix*, and of consequence its several puncheon to strike it. They are the engravers on metal that cut or grave the *Matrices*.

When types are to be cast, the *Matrice* is fastened to the end of a mould, so disposed, as that when the metal is poured on it, it may fall into the creux or cavity of the *Matrice*, and take the figure and impression thereof. See *Letter-Foundry*.

MATRICES, used in coinage, are pieces of steel in form of dyes: wherein are engraven the several figures, arms, characters, legends, &c. wherewith the species are to be stamped.

The engraving is performed with several puncheons, which, being formed in relief, or prominent, when struck on the metal, make an indented impression, which the French call *en creux*. See the manner hereof under *ENGRAVING on steel*. See also *COINING*.

MATRICULA, a register kept of the admission of officers, and persons entered into any body, or society, whereof a list is made.

Among ecclesiastical authors, we find mention made of two kinds of *Matricula*: the one containing a list of the ecclesiastics, called *Matricula clericorum*: the other of the poor subsisted at the expence of the church, called *Matricula pauperum*.

MATRICULA was also applied to a kind of alms-house, where the poor were provided for. It had certain revenues appropriated to it, and was usually built near the church; whence the name was also frequently given to the church itself.

MATRICA*, in anatomy, the *womb*; or that part of the female of any kind, wherein the fetus is conceived, and nourished till the time of its delivery.

* The ancient Greeks called the *Matrix*, *μητηρ*, from *ματι*, mother: whence disorders of the womb are still frequently called *jae* of the *mother*. They also called it *κορη*, as being the last of the entrails, by its situation. Sometimes they also called it *σπυρι*, or *natura*; and *σουλτα*, from *σολω*, to fold or envelope, or from *σουλτα*, doors.

Plato and Pythagoras took the *Matrix* for a distinct animal within another. P. Aegineta observes, that the *Matrix* may be taken away from a woman, without her death; and that there have been instances of people, who have lived a long time after the loss of the *Matrix*. Rhafis and Paræus observe, that some persons have been cured of diseases, by having the *Matrix* extirpated. In 1669, a child was produced at the French academy, which had been conceived out of the *Matrix*, and which nevertheless had grown to the length of six inches; and many instances of a like kind have been met with since. The Fallopian tube, in these cases, is usually the place where the fetus is lodged.

The *Matrix* in women is situate in the pelvis, or capacity of the hypogastrium, between the urinary bladder and the intestinum rectum, and reaches as far as the flanks: it is surrounded and defended by very strong bones; before, by the os pubis; behind, by the sacrum; on each side, by the ilium and ischium. It is in figure somewhat like a flat flask, or dried pear. In women with child it expands, and receives different forms, according to the different times and circumstances of gestation. It has several coats, arteries, veins, nerves, and ligaments; and is interwoven with several different kinds of fibres.

Anatomists divide the *Matrix* into the *fundus*, and *cervix*; a broad part, and a neck. It is in extent, from the extremity of the one to that of the other, about three inches in length; its breadth at the fundus is about two and a half, and its thickness two. It has but one cavity, unless we distinguish between the cavity of the uterus, and that of its neck. This is very small, scarce sufficient to contain a garden-bean. At the bottom or neck, towards the fundus, it grows very narrow in virgins; the extremity of it is called the *osculum internum*. In pregnant women it opens, more especially towards the time of delivery. The other and lower orifice of the neck, towards the vagina, called *osculum externum*, is a little prominent, resembling, in some measure, the glans of the virile organ.—See *Tab. anat. (splanc.) fig. 9*.

The substance of the *Matrix* is membranous and carnosus: it consists of three tunics; or according to some, who deny that name to the middle substance, of two only. The external tunic, called also *communis*, is derived from the peritonæum, and consists of two lamellæ; the exterior of which is pretty smooth, the interior rugged and uneven: This membrane invests the whole *Matrix*, and connects it to the intestinum rectum, bladder, &c. The middle tunic is very thick, and composed of strong fibres variously disposed: some think it contributes to the exclusion of the fetus. though others imagine, it serves only to recover the tone of the part, after any violent distention. The inner tunic is nervous.

The *Matrix* is connected by its neck to the vagina; behind, by its outward common membrane; and before, by the same to the bladder: its sides are tied to other parts; but the fundus is left loose, that it may expand and dilate more freely. Its ligaments are four, two of which are called *broad*, and two *round*, from their figure. The broad ligaments are membranous, loose, and soft; whence they have been compared by some to the wings of bats, and called *ala vespertilionum*. The

round ligaments are of a firmer texture, and consist of a double membrane, wrapped up in its arteries, veins, nerves, and lympheducts. The blood-vessels, both in these and the round ligaments, make a great part of what is called their *substance*. These, as well as the others, serve to keep the womb in a right position; and are very liable to be injured by unskilful midwives.

On each side of the fundus of the womb, arises a duct, which opens into the womb with a small orifice; but in its progress enlarges, and towards the end is contracted again: at the end next the ovary, which is at liberty, it expands again into a kind of foliage fringed round; which expansion Fallopius, the first discoverer, imagined like the end of a trumpet; whence he called the whole duct, *tuba*. It consists of a double membrane. Both veins and arteries are very numerous in these tubes, especially the latter, which, by various ramifications and contortions, make the main substance of them. Dr. Wharton gives them valves; but the other anatomists disallow that. See *FALLOPIAN Tube*.

Suffocation of the MATRIX. See *SUFFOCATION*.

Speculum MATRICIS. See the article *SPECULUM*.

MATRIX is also applied to places proper for the generation of vegetables, minerals, and metals.

Thus the earth is the *Matrix* wherein seeds sprout; and marcasites are by many considered as the *Matrices* of metals.

MATRIX is also applied figuratively to several things, wherein there appears a kind of generation; and where certain things seem to acquire a new being, or at least a new manner of being. Of which kind are the moulds wherein the printers types or letters are cast, and those used in striking money and medals in coining.

MATRON, **MATRONA**, among the Romans, signified a married woman, and sometimes also the mother of a family.

There was, however, some difference between *Matrona*, and *mater-familias*. Servius says, that some imagined the difference to lie in this, that *Matrona* was a woman who had one child, and *mater-familias*, she that had several. But others, particularly Aulus Gellius, take the name *Matrona* to belong to a married woman, whether she had any children or no; the hope and expectation of having them, being enough to warrant the title of mother, *Matrona*: and for this reason it is, that marriage is called *matrimony*. This opinion is supported by Nonius.

MATRONALIA, feasts of the Roman ladies, or rather *matrons*, celebrated on the calends of March, in honour of the god Mars.

No men living in celibate were allowed to assist at the feast.

MATROSSES, soldiers in the train of artillery, next below the gunners; their duty is to assist the gunners in travelling, spunging, loading, and firing of guns, &c. See *ARTILLERY*, &c. They carry fire-locks, and march along with the store-waggons, both as a guard, and to help in case a waggon should break down.

MATTADORE. See the article *OMBRE*.

MATTER, **MATERIA**, *Body*; or an extended, solid, divisible, moveable, and passive substance, the first principle of all natural things, from the various arrangements and combinations whereof all bodies are formed.

Aristotle makes three principles, *Matter*, form, and privation: which last the Cartesians throw out of the number; and others, the two last.

The properties of *Matter* we are pretty well acquainted with, and can reason about its divisibility, solidity, &c. (See *DIVISIBILITY*, &c.) But the essence thereof, or the subject wherein these properties reside, or their substratum, is still a mystery. Aristotle speaks very darkly on the subject, defining *Matter* to be *neq quid, neq quantum, neq quale*, nor any certain determinate thing at all; which many of his followers interpret so, as to believe, that *Matter* does not at all exist. The Cartesians make the essence of *Matter* to consist in extension; arguing, that since the properties above-mentioned are all that are essential to *Matter*, some of them must constitute its essence: and since extension is conceived prior to all the rest, and is that, without which none of the rest can be conceived, extension is that which constitutes the essence of *Matter*.—But the conclusion, here, is unjust; for on this principle, the existence of *Matter*, according to Dr. Clarke, would have the fairest title to constitute its essence, the *existere* being conceived prior to all properties, and even to extension.

Since then the word extension appears to go further, and to be more general than *Matter*; that impenetrable solidity, which is essential to all *Matter*, and to *Matter* alone, and from which all its properties manifestly flow, may, with more propriety, be called the *essence of Matter*.

Again, if extension were the essence of *Matter*, and so *Matter* and space the same thing; it would follow, that *Matter* is infinite and eternal, that it is a necessary being, and could neither be created nor annihilated; which is absurd. Besides, it appears both from the nature of gravity, the motions of comets, the vibrations of pendulums, &c. that space is not *Matter*; and therefore it is not extensive, but solid, impenetrable extension, which has a power of resisting, that constitutes *Matter*.

Many among the old philosophers maintained the eternity of *Matter*, out of which they supposed all things to be formed by the hands of nature; as being unable to conceive how any thing should be formed out of nothing. Plato maintained, that *Matter* had existed eternally, and concurred with God in the production of all things, as a passive principle, or a kind of collateral cause.

Matter and form, the two simple and original principles of all things, according to the antients, composed some simple natures, which they called *elements*; out of the various combinations whereof all natural things were afterwards composed.

Dr. Woodward seems of an opinion not very unlike this; viz. That *Matter* is originally and really very different, being at its first creation divided into several ranks, sets, or kinds, of corpufcles, differing in substance, gravity, hardness, flexibility, figure, size, &c. from the various composures and combinations of which, he thinks, arise all the varieties in bodies, as to colour, hardness, gravity, tastes, &c. — But Sir Isaac Newton takes all those differences to result from the various arrangements of the same *Matter*; which he judges to be homogeneous and uniform in all bodies.

Besides the properties of *Matter* hitherto known, Sir Isaac Newton has discovered a new one; viz. 'That of attraction, or that every particle of *Matter* has an attractive power, or a tendency towards every other particle; which power is strongest in the point of contact, and suddenly decreases, in so much that it acts no more at the least sensible distance, and, at a greater distance, is converted into a repellent force, whereby the parts fly from each other.' On this principle of attraction, he accounts for the cohesion of the particles of bodies, which is otherwise inexplicable.

For he takes occasion to observe, 'That all bodies seem to be compounded of hard particles, even light itself, and all other the most volatile of fluids; inasmuch as hardness may be esteemed a property of all uncompounded *Matters*; at least, the hardness of *Matter* stands on as good a footing as that of its impenetrability; all the bodies we know of being either hard themselves, or capable of being hardened. Now, if compound bodies be so hard, as we find some of them, and yet if they are very porous, and consist of parts which are only laid together, the simple particles, which are void of pores, and were never yet divided, must be much harder. Now, such hard particles, being heaped together, can scarce touch one another in more than a few points; and therefore they must be separable with much less force than is requisite to break a solid particle, whose parts touch in all the space, without any pores or interfaces to weaken their cohesion. How then should such very hard particles, only laid together, and touching only in a few points, stick together, and that so firmly as they do, without the assistance of something that causes them to be attracted or pressed towards each other?' The same great author observes further, 'That the smallest particles may cohere by the strongest attractions, and compose bigger particles of weaker virtue; and many of these may cohere, and compose still bigger particles, whose virtue is still weaker, and so on for divers successions, until the progression end in the biggest particles; on which the operations in chymistry, and the colours of natural bodies, depend, and which, by cohering, compose bodies of a sensible magnitude. If the body is compact, and bends or yields inward to pressure, without any sliding of its parts, it is *hard*, and *elastic*; returning to its figure with a force arising from the mutual attraction of its parts. If the parts slide from one another, the body is *malleable* or *soft*. If they slip easily, and are of a fit size to be agitated by heat, and the natural heat is great enough to keep them in agitation, the body is *fluid*; and, if it be apt to stick to things, it is *humid*. And the drops of every fluid affect a round figure by the mutual attraction of their parts, as the globe of the earth and sea affects a round figure, by the mutual attraction of gravity of its parts.'

Again, 'Since metals, dissolved in acids, attract but a small quantity of the acid, their attractive force reaches but to a small distance. Now, as in algebra, where affirmative quantities cease, there negative ones begin; so in mechanics, where attraction ceases, there a repulsive virtue must succeed. That there really is such a virtue, seems to follow from the reflexions and inflexions of the rays of light; the rays being repelled by bodies in both these cases, without the immediate contact of the reflecting or inflecting body. The same thing seems also to follow from the emission of light; a ray, as soon as shaken off from a shining body by the vibrating motion of the parts of the body, and got beyond the reach of attraction, being driven away with exceeding great velocity: for that force, which is sufficient to turn it back in reflexion, may be sufficient to emit it. It seems also to follow from the production of air and vapour; the particles, when they are shaken off from the body by heat or fermentation, so soon as they are beyond the reach of the attraction of the body, receding from it, and also from one another, with

great strength, and keeping at a distance, so as sometimes to take up above a million of times more space than they did before in the form of a dense body. Which vast contraction and expansion seems unintelligible, by feigning the particles of air to be springy and ramous, or rolled up like hoops, or by any other means than a repulsive power. The particles of fluids, which do not cohere too strongly, and are of such a smallness, as renders them most susceptible of those agitations which keep liquors in a fluor, are more easily separated and rarefied into vapour, i. e. in the language of the chymists, they are *volatile*; rarefying with an easy heat, and condensing again with cold. But those which are grosser, and so are less susceptible of agitation, or which cohere by a stronger attraction, are not separated without a stronger heat, or perhaps not without fermentation. And these last are the bodies which chymists call *fixed*; and yet these, being rarefied by fermentation, become true permanent air; those particles receding with the greatest force, and being most difficultly brought together, which, upon contact, cohere the most strongly. And because the particles of permanent air are grosser, and arise from denser substances, than those of vapours; thence it is, that true air is more ponderous than vapour; and that a moist atmosphere is lighter than a dry one, quantity for quantity. From the same repelling power it seems to be, that flies walk upon the water without wetting their feet; and that the object-glasses of long telescopes lie upon one another without touching; and that dry powders are difficultly made to touch one another so as to stick together, unless by melting them, or wetting them with water, which, by exhaling, may bring them together; and that two polished marbles, which by immediate contact stick together, are yet difficultly brought to close together, as to stick.' He further observes, 'That, all things considered, it seems probable, God, in the beginning, formed *Matter* in solid, massy, hard, impenetrable, moveable particles, of such sizes, figures, and with such other properties, and in such proportion to space, as most conduced to the end for which he formed them; and that these primitive particles, being solid, are incomparably harder than any porous bodies composed of them; even so very hard, as never to wear, and break in pieces: no ordinary power being able to divide, what God himself made one in the first creation. While the particles continue intire, they may compose bodies of one and the same nature and texture in all ages; but should they wear away, or break in pieces, the nature of things depending on them would be changed. Water and earth, composed of old worn particles, and fragments of particles, would not be of the same nature and texture now, with water and earth composed of intire particles in the beginning. And therefore, that nature may be lasting, the changes of corporeal things are to be placed only in the various separations, and new associations and motions of these permanent particles; compound bodies being apt to break, not in the midst of solid particles, but where those particles are laid together, and touch in a few points.'

It seems farther, 'That these particles have not only a *vis inertiae*, accompanied with such passive laws of motion as naturally result from that force, but also that they are moved by certain active principles, such as is that of gravity, and that which causeth fermentation, and the cohesion of bodies. These principles are to be considered not as occult qualities, supposed to result from the specific forms of things, but as general laws of nature, by which the things themselves are formed; their truth appearing to us by phenomena, though their causes are not yet discovered.'

Hobbes, Spinoza, &c. maintain all the beings in the universe to be *material*, and their differences to arise from their different modifications, motions, &c. Thus *Matter* extremely subtil, and in a brisk motion, they conceive, may think; and so they exclude all spirits out of the world.

Dr. Berkley, on the contrary, argues against the existence of *Matter* itself, and endeavours to prove, that it is a mere ens rationis; and has no existence out of the mind: 'Thus, says he, that neither our thoughts, passions, nor ideas, formed by the imagination, exist without the mind, is evident; nor is it less evident, that the various sensations or ideas imprinted on the sense, however blended or combined together (that is, whatever objects they compose), cannot exist otherwise, than as in a mind perceiving them. This no man can doubt of, that attends to what is meant by the term *exist*, when applied to sensible things. Thus I say, the table I write on exists, i. e. I see and feel it; and if I were out of my study, I should say it existed; meaning thereby, that, if I were in my former situation, I should see and feel it as before. Again, I say there was odour, i. e. I smelt it; a sound, i. e. it was heard; a colour or touch, i. e. it was perceived by sight or touch. This is the utmost that can be meant by such expressions; for as to the absolute existence of any unthinking being, distinct from its being perceived, it is a chimera. Their *esse* is *percipi*; nor is it possible they should have any existence out of the minds that perceive them. Again, what are hills and trees, &c. but things perceived by sense; and what do we perceive,

perceive, but our own ideas or sensations; and can any one of these, or any combination of them, exist unperceived? What are light and colours, heat and cold, extension and figure, but so many sensations, ideas, or impressions on the sense? And is it possible, even in thought, to separate these from perception? It is next to self-evident therefore, that all the choir of heaven, and furniture of the earth, in a word, all the bodies that compose the system of the world, have not any subsistence out of a mind; their *esse* is nothing more than their being perceived: and therefore, as long as they do not exist in me, *i. e.* are not perceived by me, nor any other created spirit, they have no shadow of existence at all, unless, perhaps, in the mind of some eternal spirit. It appears therefore, with the light of an axiom, that there is no other substance, but spirit, &c.

Etherial MATTER.

Subtile MATTER.

Quantity of MATTER.

MATTER of Deed signifies a truth to be proved, though not by any record: by which it stands contra-distinguished from **MATTER of Record**, which is that which may be proved by some record.

If a man be sued to an exigent during the time he was in the king's wars, this is *Matter in deed*, and not *Matter of record*; and therefore he that will allege this for himself, must come before the scire facias or execution be awarded against him: for, after that, nothing will serve but *Matter of record*; that is, some error upon the process appearing upon record.

Foreign MATTER. See the article **FOREIGN**.

MATTINS*, the first part in the daily service of the Romish church.

* The word comes from the Italian *Mattina*, or the French *Matin*, morning.

Mattins are sometimes held early in the morning, sometimes at midnight, and sometimes the even before. And infirm people, even in monasteries, are dispensed from attending *Mattins*.

MATULAM.—*Hydrops ad MATULAM.* See the article **HYDROPS**.

MATURANTIA, in medicine, &c. *ripeners*; or such things as promote maturation. See **SUPPURATION**.

MATURATION, in pharmacy, a preparation of fruits, or other simples, gathered before their *Maturity*, to fit them to be eaten, or for other uses. See **FRUIT**, &c.

MAUNCH, the figure of an antient sleeve of a coat, so called by the heralds; and is borne in many gentlemen's escutcheons: as in the earl of Huntingdon's.—See *Tab. Herald. fig. 40*.

MAUNDY, or **MAUNDY Thursday**, *Dies MANDATI*, the Thursday before Easter; so called from the French *Mande*, *i. e.* *spertula*, it being a custom on that day to give a largess or bounty to certain poor men, whose feet the king formerly washed, as a mark of humility, and in obedience to the command of Christ.

MAUSOLEUM*, a magnificent tomb, or funeral monument, decorated with architecture and sculpture, and inscribed with an epitaph; erected in honour of some emperor, prince, or other illustrious person.

* The word comes from *Mausolus*, the name of a king of Caria, to whom Artemisia, his widow, erected a most stately monument, that has since been numbered among the wonders of the world; calling it, from his name, *Mausoleum*. See **MONUMENT**.

MAUSOLEUM is also used to signify the decoration of a fictitious tomb, or catafalch, in a funeral pomp.

MAW. See **AROMASUS**.

MAXILLÆ, in anatomy, the *jaws*; or those parts of an animal, wherein the teeth are set, and which serve for masticating the food.

The *Maxilla* are two in number, and are denominated, from their situation, *superior*, and *inferior*.

MAXILLA superior, or the upper jaw, is immoveable in man, and all other animals we know of; excepting parrots, crocodiles, and the acus vulgaris, or gar-fish.—Vide *Ray Synops. Pisc.* p. 109.

It consists of eleven bones, joined to each other *per harmoniam*; five disposed on each side, and one in the middle. Their names are, the zygoma, os maxillare, os unguis, os nasi, os palati, and vomer. See **ZYGOMA**, &c. In this jaw are alveoli or sockets for sixteen teeth.—See *Tab. anat. (ostiol.) fig. 1. lit. d.*

MAXILLA inferior, or the lower jaw, only consists of two bones, which unite in the middle of the chin, by the intervention of a cartilage, which hardens as the child grows; and at length, about the age of seven years, becoming bony, joins the two bones into a continued one, resembling the Greek *v*.—See *Tab. anat. (ostiol.) fig. 1. lit. e.*

It consists of two tables, betwixt which is a spongy substance, in children medullary. The fore-part is shallow, just sufficient to afford sockets for sixteen teeth. It has two processes, the corone and condyloides (which see); four holes or foramina for the passage of vessels, and five pair of proper muscles, *viz.* the crotaphytes or temporal, the masseter, biverter or digastri-

cus, pterygoideus internus, and pterygoideus externus. See each in its place.

MAXILLARY Gland, *MAXILLARIS Glandula*, a considerable gland of the conglomerate kind, situate on the inside, under the lower jaw-bone, near the musculus digastricus.

It discharges itself by several branches of ducts, which form one trunk, that passes under mylohyoideus, and meets with the *Maxillary gland* of the other side within the fore-teeth of the lower jaw, having distinct orifices, with a papilla on each side the frænum lingue. See **GLAND**, and **MOUTH**.

MAXIM denotes an established proposition or principle.

In which sense it amounts to much the same with axiom. See **AXIOM**.

Maxims are a kind of propositions, which have passed for principles of science; and which, being self-evident, have been by some supposed innate.

MAXIMUM, in mathematics, denotes the greatest quantity attainable in any given case.

By which it stands opposed to *minimum*. See **MINIMUM**.

Methodus de MAXIMIS & MINIMIS, a method so called, in use among mathematicians, whereby they arrive at the greatest or least possible quantity attainable in any case.

If the semi-ordinates of any curve continually increase or decrease to some certain term, which once passed, they begin again to increase or decrease, the method whereby their *Maxima & minima*, *i. e.* their greatest and least states are determined, is called the method *de Maximis & minimis*; which, it is true, may be used to determine other quantities that increase or decrease to any certain term; but then they must always be represented by the semi-ordinates of curves.

If a flowing quantity in an equation be proposed to be determined to any extreme value.—The rule is: having put the equation into fluxions, let the fluxion of that quantity (whose extreme value is sought) be supposed $=0$; by this means, all those members of the equation, in which it is found, will vanish, and the remaining ones will give the determination of the *Maximum* or *minimum* desired.

The reason of the rule is, that every *Maximum* or *minimum* is, in its own nature, a stable quantity: to determine therefore any flowing quantity to a *Maximum* or *minimum*, is to make it (instead of a flowing) a permanent one; but the fluxion of a permanent quantity is equal to nothing.—This we shall illustrate by an example or two.

To determine the greatest or least applicate in an algebraic curve. Since, in curves that have a *Maximum* and a *minimum*, the tangent TM (*Tab. analys. fig. 4. and fig. 26.*) degenerates at length into DE, and becomes parallel to the axis, and so the perpendicular MH coincides with the greatest or least applicate CG; in the case of *Maximum* and *minimum*, the sub-tangent TP becomes infinite, and the sub-normal PH equal to nothing: but $PH = dy : dx$. If then $dy : dx = 0$; we shall find $dy = 0$; and because of $PT = y dx : dy = \infty$ (the note of infinity) $dx = \infty$.

It is possible for the tangent HG (*fig. 5.*) to lie directly against the semi-ordinate GC; in which case, the sub-tangent PT is equal to nothing, and the sub-normal PH is infinite. But $PT = y dx : dy = 0$; therefore if $y dx : dy = 0$, we shall have $dx = 0$; or because of $PH = dy : dx = \infty$, we find $dy = \infty$. Both dx and y being, in respect of dy , infinitesimals. From the equation of the curve therefore we are to find the value of dy , which is to be made equal either to nothing, or to infinity, that we may have the value of the abscissa, to which the greatest applicate is co-ordinate.

To cut a right line AB (*fig. 6.*) in such a manner in D, that the rectangle AD and DB shall be the greatest that can possibly be thus constructed. Let $AB = a$, $AD = x$; then will $DB = a - x$; consequently $AD \cdot DB = ax - xx$ some *Maximum*; and hence its differential will be equal to nothing, as being conceived at a circle, to which

$$ax - xx = yy.$$

$$\text{Wherefore } a dx - 2x dx = 2y dy = 0$$

$$a - 2x = 0$$

$$\frac{1}{2}a = x.$$

The line AB therefore is to be cut into two equal parts; and the square is the greatest of all rectangles, whose altitudes and bases, taken together, are equal to each other.

MAY*, **MAIUS**, the fifth month in the year, reckoning from our first of January; and the third, counting the year to begin with March, as the Romans antiently did.

* It was called *Maius* by Romulus, in respect to the senators and nobles of his city, who were named *Majores*; as the following month was called *Junius*, in honour of the youth of Rome, in honour *Juniorum*, who served him in the year: though others will have it to have been thus called from *Mars*, the mother of Mercury, to whom they offered sacrifice on the first day of it; and Papias derives it from *Madus*, *eo quod tunc terra madat*.

In this month the sun enters Gemini, and the plants of the earth in general begin to flower.

The month of *May* was under the protection of Apollo; and in it also they kept the festival of Bona Dea, that of the goblins, called *Lemuria*; and the ceremony of *regifugium*, or the expulsion of the kings. See *LEMURIA*, &c.

The vulgar have a great opinion of the virtues of *May-dew*, and *May-butter*.

The month of *May* has ever been esteemed favourable to love; and yet the ancients, as well as many of the moderns, look on it as an unhappy month for marriage. The original reason may perhaps be referred to the feast of the Lemures, which was held in it. Ovid alludes to this in the fifth of his *Fasts*, when he says,

*Nec viduae latus eadem, nec virginis apta
Tempora; quae nupsit, non diuturna fuit:
Hac quoque de causa, si te proverbia tangunt,
Mense malum Maio nubere vulgus ait.*

MAYHEM. See the article **MAHIM**.

Appeal of MAYHEM. See the article **APPEAL**.

MAYL, in falconry, signifies to pinion the wings of a hawk. See **HAWK**.

MAYOR*, or **MAIOR**, the chief magistrate or governor in the cities, and most corporation-towns of England; chosen annually by his peers out of the number of the aldermen. See **ALDERMAN**.

* The word, according to *Versteegan*, comes from the antient English, *maier*, able, potent, of the verb *may*, or can.

The *Mayor* of the place is the king's lieutenant, and with the aldermen and common-council, can make laws, called *Bylaws*, for the government of the place. He has also the authority of a kind of judge, to determine matters, and to mitigate the rigour of the law.

King Richard I. A. D. 1189, first changed the bailiffs of London into *Mayors*; by whose example others were afterwards appointed.

MAYOR'S Court. See the article **COURT**.

MEAD, a wholesome, agreeable liquor, prepared of honey and water.

One of the best methods of preparing *Mead* is as follows:—Into twelve gallons of water, slip the whites of six eggs; mixing these well together, and to the mixture adding twenty pounds of honey. Let the liquor boil an hour, and, when boiled, add cinnamon, ginger, cloves, mace, and a little rosemary. As soon as it is cold, put a spoonful of yeast to it, and tun it up, keeping the vessel filled as it works; when it has done working, stop it up close; and, when fine, bottle it off for use.

MEAN, the *Middle*, between two extremes.

Thus we say, the *mean* motion of a planet; its *mean* distance, &c. meaning a motion or distance, which as far exceeds the least distance or motion, as it is exceeded by the greatest.

MEAN, in logic. See the article **MEDIUM**.

MEAN proportion. See **EXTREME proportion**.

MEAN time. See the article **TIME**.

MEAN axis, in optics. See the article **AXIS**.

MEAN diameter, in gauging. See **DIAMETER**.

MEAN, in law, refers either to time, or dignity.—Thus, in the first sense we say, his action was *mean* betwixt the dissellin made to him, and his recovery; i. e. in the interim.

In the second sense, we say, there is lord *Mean*, or *Mefne*, that is, a lord of a manor, who has tenants that hold of him, yet himself holds of the king.

MEASLES, *Morbilli*, in medicine, a cutaneous disease, consisting in a general appearance of eruptions, not tending to supuration; accompanied with a fever.

This distemper seems to bear a great affinity to the small-pox; the symptoms being in many respects the same, the cause nearly the same, and the regimen and cure not much different.

The eruptions usually appear about the fourth day, like fleabites, over the whole body; but thicker and redder, and with greater inflammation, than those of the small pox, and vanish in four or six days after appearance; being, when at the height, not larger than pins heads.

The *Measles* is a disease more troublesome than dangerous; tho' it often inclines to consumptions, by a cough which it leaves behind. See **Supplement**, Article **MORBILLI**.

MEASNE. See the article **MESNE**.

MEASURE, *MENSURA*, in geometry, denotes any certain quantity assumed as one, or unity, to which the ratio of other homogeneous or similar quantities is expressed.

This definition is somewhat more agreeable to practice than that of Euclid, who defines *Measure* a quantity, which being repeated any number of times, becomes equal to another.—Which only answers to the idea of an arithmetical *Measure*, or quota-part.

MEASURE of an angle, is an arch, described from the vertex *a* (*Tab. Geomet. fig. 10.*) in any place between its legs; as at *d f*. Hence, angles are distinguished by the ratio of the arches, described from the vertex, between the legs, to the peripheries.

Angles then are distinguished by those arches; and the arches are distinguished by their ratio to the periphery.—Thus the angle *la c* is said to be of many degrees, as there are in the arch *f d*. See **ANGLE**.

MEASURE of a figure, or plane-surface, is a square, whose side is one inch, foot, yard, or some other determinate length.

Among geometricians, it is usually a rod, called a *square rod*, divided into ten square feet, and the square feet into square digits.—Hence square *Measures*.

MEASURE of a line is any right line taken at pleasure, and considered as unity.

The modern geometricians use a decempeda, or rod, divided into ten equal parts, called *feet*. The feet they subdivide into ten digits, the digit into ten lines, &c.

This decimal division of the *Measure* was first introduced by Stevinus, probably from the example of Regiomontanus. The index or character of the decempeda he made 0, that of feet 1, of digits 2, of lines 3, &c. which, in regard the *Measure* was subdivided in a decuple ratio, were the logarithms of the division. Bayer, in lieu of these, expressed the logarithms by the Roman characters; *v. gr.* 5 perches, 4 feet, 3 digits, and 2 lines, he expressed thus; 5°, 4', 3'', 2'''. It is frequently most commodious to separate the integers, or rods, from the fractions by a point; thus, instead of 5°, 4', 3'', 2''', to write 5.432. F. Noel observes, that, among the Chinese, the decimal division obtains in their common *Measures*, and even in their weights.

Line of MEASURES. See the article **LINE**.

MEASURE of the mass, or quantity of matter, in mechanics, is its weight; it being apparent, that all the matter which coheres and moves with a body, gravitates with it: and it being found by experiment, that the gravities of homogeneous bodies are in proportion to their bulks; hence, while the mass continues the same, the weight will be the same, whatever figure it put on: its absolute weight, we mean; for, as to its specific weight, it varies as the quantity of surface varies. See **WEIGHT**.

MEASURE of a Number, in arithmetic, is such a number as divides another, without leaving any fraction; thus 9 is a *Measure* of 27.

MEASURE of a solid is a cube, whose side is one inch, foot, yard, or other determined length.

Among geometricians, it is sometimes a rod or perch, called a *cubic perch*; divided into cubic feet, digits, &c.—Hence cubic *Measures*, or *Measures* of capacity. See **CUBE**, and **TIMBER**.

MEASURE of velocity, in mechanics, is the space passed over by a moving body in any given time.

To *measure* a velocity, therefore, the space must be divided into as many equal parts, as the time is conceived to be divided into. The quantity of space answering to such an article of time is the *Measure* of the velocity.

MEASURE, in a legal, commercial, and popular sense, denotes a certain quantity or proportion of any thing bought, sold, valued, or the like.

Measures, then, are various, according to the various kinds and dimensions of the things *measured*. Hence arise

Lineal or longitudinal MEASURES for lines, or lengths:

Square MEASURES for areas, or superficies; and

Solid or cubic MEASURES for bodies, and their capacities.

All which again are very different in different countries, and in different ages, and even many of them for different commodities. Whence arise other divisions of *domestic* and *foreign Measures*, *antient* and *modern* ones, *dry* and *liquid Measures*, &c. The business of *Measures* has been so confusedly and imperfectly delivered by English writers, that the reader will not be displeased with the pains we have here taken to disentangle and supply it.—Under this head he will find enumerated the various, general, standing *Measures*, long, square, and cubic, now or heretofore in use, with their proportions and reductions: for particulars, he must be contented to be referred to the particular heads; as **FOOT**, **DIGIT**, **ELL**, **TUN**, **GALLON**, **BUSHEL**, **PERCH**, **LEAGUE**, **FURLONG**, &c.

Long MEASURES, or **MEASURES of application**.—The *English Standard Long MEASURE*, for commerce, or that whereby the quantities of things are ordinarily estimated in the way of trade, is the yard; containing three English feet; equal to three Paris feet, 1 inch $\frac{2}{3}$ of an inch; or $\frac{2}{3}$ of a Paris ell.—Its divisions are the foot, span, palm, inch, and barley-corn, which see under their respective heads. Its multiples are the pace, fathom, pole, furlong, and mile. The proportions these severally bear to each other will be expressed in a table for the purpose.—*Assay of Measures.* See **ASSAY**.

The *French Standard MEASURE*, for commerce, is the aune or ell, containing 3 Paris feet, 7 inches, 8 lines; or 1 yard, $\frac{2}{3}$ English; the Paris foot royal exceeding the English by $\frac{1}{12}$ parts, as in one of the following tables. This ell is divided two ways; viz. into halves, thirds, fixths, and twelfths; and into quarters, half-quarters, and sixteenths.

This ell holds throughout the greatest part of France; excepting at Troyes in Champagne; at Arc in the Barrois; and in some parts of Picardy and Burgundy, where the ell only contains two feet, five inches, one line; in Bretagne, where it contains four feet, two inches, eleven lines; and at St. Genoux in Berry, where it exceeds the Paris ell by eight lines. See **ELL**. But in Languedoc, particularly at Marcilles, Montpellier, Thoulouse in Provence, and in Guienne, they measure by the canna, which at Toulouse and in Guienne contains five Paris feet, five inches, and six lines; or one Paris ell and an half. But at Montpellier, and throughout the lower Languedoc, as

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also in Provence and Avignon, and even Dauphiné, the canna is six feet and nine lines; or one Paris ell and two thirds. See Canna.

The Standard Measure in Holland, Flanders, Sweden, a good part of Germany, many of the hans-towns, at Danzig, and Hamburg; and at Geneva, Frankfurt, &c. is likewise the ell: But the ell, in all these places, differs from the Paris ell. In Holland, it contains one Paris foot eleven lines, or four fifteenths of the Paris ell. The Flanders ell contains two feet, one inch, five lines, and half a line; or seven twelfths of the Paris ell. The ell of Germany, Brabant, &c. is equal to that of Flanders.

The Italian MEASURE is the braccio, brace, or fathom: this obtains in the states of Modena, Venice, Florence, Lucca, Milan, Mantua, Bologna, &c. but is of different lengths. At Venice, it contains one Paris foot, eleven inches, three lines; or eight fifteenths of the Paris ell. At Bologna, Modena, and Mantua, the brace is the same as at Venice. At Lucca, it contains one Paris foot, nine inches, ten lines; or half a Paris ell. At Florence, it contains one foot, nine inches, four lines; or forty-nine hundredths of a Paris ell. At Milan, the brace for measuring of silks is one Paris foot, seven inches, four lines; or four ninths of a Paris ell: That for woollen cloths is the same with the ell of Holland. Lastly, at Bergamo, the brace is one foot, seven inches, six lines; or five ninths of a Paris ell. The usual *Measure* at Naples, however, is the canna, containing six feet, ten inches, and two lines; or one Paris ell, and fifteen seventenths.

The *Spanish MEASURE* is the vara, or yard, in some places called the barra; containing seventeen twenty-fourths of the Paris ell.—But the *Measure* in Castile and Valencia is the pan, span, or palm; which is used, together with the canna, at Genoa.

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In Arragon, the vara is equal to a Paris ell and an half; or five feet, five inches, six lines.

The Portuguese MEASURE is the cavedos, containing two feet, eleven lines; or four sevenths of a Paris ell; and the vara, an hundred and six whereof make an hundred Paris ells.

The *Piedmontese* MEASURE is the ras, containing one Paris foot, nine inches, ten lines : or half a Paris ell.

In Sicily, their *Measure* is the canna; the same with that of Naples.

The *Muscovite* MEASURES are the cubit, equal to one Paris foot, four inches, two lines; and the arcin, two whereof are equal to three cubits.

The *Turkish* and *Levant* MEASURE are the picq, containing two feet, two inches, and two lines; or three fifths of the Paris ell.—The Chinese *Measjare*, the cobre; ten whereof are equal to three Paris ells.—In Persia, and some parts of the Indies, the guezze, whereof there are two kinds; the royal guezze, called also the *guezze monkish*, containing two Paris feet, ten inches, eleven lines, or four fifths of the Paris ell; and the shorter guezze, called *fimply guezze*, only two thirds of the former.—At Goa and Ormuz, the *Measjare* is the *vara*, the same with that of the Portuguese, having been introduced by them.—In Pegu, and some other parts of the Indies, the cando or candi, equal to the ell of Venice.—At Goa, and other parts, they use a larger cando, equal to seventeen Dutch ells; exceeding that of Babel and Baliora by $\frac{2}{3}$ per centum, and the vara by 6 $\frac{1}{2}$.—In Siam, they use the ken, short of three Paris feet by one inch. The ken contains two foks, the fok two keubs, the keub twelve niou, or inches; the niou to be equal to eight grains of rice, i. e. to about nine lines.—At Camboia, they use the hafter; in Japan, the tatam; and the span on some of the coasts of Guiney.

English Long MEASURES, or MEASURES of Application.

[illegible]

Scripture Long MEASURES.

Scripture Long MEASURES.										Engl. Feet.	Inch. Deca.	
Digit										0	0,912	
4	Palm										0	3,648
12	3	Span								0	10,944	
24	6	3	Cubit							1	9,888	
96	24	6	2	Fathom						7	3,552	
144	36	12	8	1½	Ezekiel's reed					10	11,328	
192	48	16	8	2	1½	Arabian pole				14	7,104	
1920	480	160	80	20	13½	10	Schœnus, measuring-line			145	11,04	

Grecian Long MEASURES reduced to English.

Grecian Long MEASURES reduced to English.										Engl. Paces.	Feet.	Inch.	Dec.		
Daetylus, digit										0	0	0	7554 $\frac{1}{10}$		
4	Doron, dochme									0	0	0	3,0218 $\frac{2}{5}$		
10	2 $\frac{1}{2}$	Lichas									0	0	7,5546 $\frac{7}{8}$		
11	2 $\frac{3}{4}$	Orthodoron									0	0	8,3101 $\frac{1}{10}$		
12	3	1 $\frac{1}{4}$	Spithame									0	0	9,0656 $\frac{1}{4}$	
16	4	1 $\frac{5}{8}$	1 $\frac{1}{2}$	Pous, foot									0	1	0,0875
18	4 $\frac{1}{2}$	1 $\frac{7}{8}$	1 $\frac{3}{4}$	Pygme, cubit									0	1	1,5984 $\frac{3}{8}$
20	5	2	1 $\frac{9}{10}$	1 $\frac{1}{2}$	1 $\frac{1}{2}$	1 $\frac{1}{2}$	Pygon			0	1	3,109 $\frac{3}{10}$			
24	6	2 $\frac{2}{3}$	2 $\frac{2}{3}$	2	1 $\frac{1}{2}$	1 $\frac{1}{2}$	Pecus, cubit larger			0	1	6,1312 $\frac{5}{8}$			
96	24	9 $\frac{3}{4}$	8 $\frac{8}{10}$	8	6	5 $\frac{3}{4}$	4	Orgya, pace			0	6	0,525		
9600	2400	960	872 $\frac{2}{5}$	800	600	533 $\frac{1}{3}$	480	400	100 $\frac{1}{10}$	stadium	furlong	100	4 45		
76800	19200	7680	6981 $\frac{1}{10}$	6400	4800	4266 $\frac{2}{3}$	3840	3200	800	8	Milion, mile	805	5 0		

Jewell

Ferwisch

Jewish Long or Itinerary MEASURES.

Cubit				Eng. Miles. Paces. Feet. Dec.			
400	Stadium			0	145	4,6	1,824
2000	5	Sab. day's journey		0	729	3,0	
4000	10	2 Eastern mile		1	403	1,0	
12000	30	6 3 Parasang.		4	153	3,0	
96000	240	48 24 8 a day's journey		33	172	4,0	

Roman Long MEASURES reduced to English.

Digitus transversus				Engl. Paces. Feet. Inch. Dec.			
1 $\frac{1}{2}$	Uncia			0	0	0,725 $\frac{1}{2}$	
4	3	Palmus minor		0	0	0,967	
16	12	4 Pes		0	0	11,604	
20	15	5 1 $\frac{1}{2}$ Palmipes		0	1	2,505	
24	18	6 1 $\frac{1}{2}$ 1 $\frac{1}{2}$ Cubitus		0	1	5,406	
40	30	10 2 $\frac{1}{2}$ 2 1 $\frac{1}{2}$ Gradus		0	2	5,01	
80	60	20 5 3 $\frac{1}{2}$ 2 Passus		0	4	10,02	
10000	7500	2500 625 500 416 $\frac{2}{3}$ 250 125 Stadium	120	4	4,5		
80000	60000	20000 5000 4000 3333 $\frac{1}{3}$ 2000 1000 8 Miliare	967	0	0		

Proportions of the Long MEASURES of several Nations to the English foot, by Mr. Greaves.

The English standard foot being divided into 1000 equal parts, the other Measures will have the proportions to it, which follow:		The vara of Almeria and Gibraltar in Spain		2760
The English foot, from the standard in Guildhall	1000	The braccio of Florence		1913
The Paris royal foot, in the Châtelet	1068	The palm of Genoa		815
The Rhinland foot, of Snellius	1033	The common braccio of Sienna		1242
The Greek foot	1007 $\frac{2}{3}$	The braccio of Sienna for linen		1974
The Roman foot, on the monument of Cossutius	967	The palm of the architects at Rome, whereof X make the canna of the same architects		732
The Roman foot, on the monument of Statilius	972	The palm of the braccio of the merchants and weavers at Rome; from a marble in the capitol, with this inscription, CVRANTE LV POETO		695 $\frac{1}{2}$
The Roman foot, of Villalpandus, taken from the Congius of Vespasian	986	The large pique of the Turks at Constantinople to the small pique of the Turks at Constantinople is the larger as 31 to 32		2200
The Venetian foot	1162	The arith of Persia		3197
The ell of Antwerp	2283	The derah or cubit of the Egyptians		1824
The ell of Amsterdam	268			
The ell of Leyden	2260			
The canna of Naples	6880			

Proportions of several Long MEASURES to each other, by M. Picard.

The Rhinland or Leyden foot (12 whereof make the Rhinland perch) supposed	696	the observations of Mess. Picard and Auzout	494 $\frac{1}{2}$
The English foot	675 $\frac{1}{2}$	The Roman foot in the capitol, examined by Mess. Picard and Auzout	653 or 653 $\frac{1}{2}$
The Paris foot	720	From the vineyard Mattei	652
The Amsterdam foot, from that of Leyden, by Snellius	629	From the palm	657 $\frac{1}{2}$
The Danish foot (two whereof make the Danish ell)	701 $\frac{2}{3}$	From the pavement of the Pantheon, supposed to contain 10 Roman feet	658 $\frac{1}{2}$
The Swedish foot	658 $\frac{1}{2}$	From a slip of marble in the same pavement, supposed to contain 3 Roman feet	650
The Brussels foot	609 $\frac{1}{2}$	From the pyramid of Cestius, supposed to contain 95 Roman feet	653 $\frac{1}{2}$
The Dantzic foot, from Hevelius's Selenographia	636	From the diameters of the columns in the arch of Septimius Severus	653 $\frac{1}{2}$
The Lyons foot, by M. Auzout	757 $\frac{2}{3}$	From a slip of porphyry in the pavement of the Pantheon	653 $\frac{1}{2}$
The Bologna foot, by the same	843		
The braccio of Florence, by the same, and father Merfenne	1290		
The palm of the architects at Rome, according to			

Square or superficial MEASURES.—English square or superficial Measures are raised from the yard of 36 inches, multiplied into itself; and this producing 1296 square inches in the square yard, the divisions of this are square feet and inches; and the

multiples, poles, rods, and acres; as in the table.
French square Measures are regulated by 12 square lines in the inch square; 12 inches in the foot, 22 feet in the perch, and 100 perches in the arpent or acre.

English Square MEASURES.

Inches	Feet	Yards	Paces	Poles	Road	Acres
144	9	27	10,89	40	4	1
1296	25	27	10,89	40	4	1
3600	272 $\frac{1}{2}$	30 $\frac{1}{2}$	435,6	160	4	1
39204	272 $\frac{1}{2}$	30 $\frac{1}{2}$	435,6	160	4	1
1568160	10890	1210	1743,6	160	4	1
6272640	43560	4840	1743,6	160	4	1

Grecian square Measures were the plethron, or acre, by some said to contain 1444, by others 10,000 square feet; and

aroura, the half of the plethron. The aroura of the Egyptians was the square of 100 cubits.

Roman Square-MEASURES reduced to English.

The integer was a jugerum or acre, which they divided like the libra, or as : Thus

	Jugerum contained					
	Square Feet.	Scruples.	Engl. Roods.	Sq. Poles.	Sq. Feet.	
As—	28800	288	2	18	250,05	
Deunx—	26400	264	2	10	183,85	
Dextans—	24000	240	2	2	117,64	
Dodrans—	21600	216	1	34	51,42	
Bes—	19200	192	1	25	257,46	
Septunx—	16800	168	1	17	191,25	
Semis—	14400	144	1	09	125,03	
Quincunx—	12000	120	1	01	58,82	
Triens—	9600	96	0	32	264,85	
Quadrans—	7200	72	0	24	198,64	
Sextans—	4800	48	0	16	132,43	
Uncia—	2400	24	0	08	66,21	

Cubical MEASURES, or MEASURES of capacity for liquids.—English liquid Measures, were originally raised from troy-weight; it being enacted by several statutes, that eight pounds troy of wheat, gathered from the middle of the ear, and well dried, should weigh a gallon of wine-Measure: the divisions and multiples whereof were to form the other Measures: At the same time it was also ordered, that there should be but one liquid Measure in the kingdom: yet custom has prevailed, and there having been introduced a new weight, viz. the avoirdupois, we have now a second standard gallon adjusted thereto, and therefore exceeding the former in the proportion of the avoirdupois-weight to troy-weight.—From this latter standard are raised two several Measures, the one for ale, the other for beer.

The sealed gallon at Guildhall, which is the standard for wines, spirits, oils, &c. is supposed to contain 231 cubic inches; and on this supposition, the other Measures raised therefrom, will contain as in the following tables; yet, by actual experiment made in 1688, before the lord mayor and the commissioners of excise, this gallon was only found to contain 224 cubic inches: It was however agreed to continue the common supposed contents of 231 cubic inches; so that all computations stand on their old footing.—Hence, as 12 is to 231, so is 14 $\frac{1}{2}$ to 281 $\frac{1}{2}$, the cubic inches in the ale gallon: but in effect the ale quart contains 70 $\frac{1}{2}$ cubic inches; on which principle, the ale and beer gallon will be 282 cubic inches.

The several divisions and multiples of these Measures, and their proportions, are exhibited in the tables underneath.

French Liquid MEASURES. At Paris, and in a great part of the kingdom, the Measures, to begin with the smallest, are, the pottle, which contains six cubic inches; two pottles make the demi-septier; two demi-septiers, the septier or chopine; two chopines, a pint; two pints, the quart or pot; four quarts, the gallon, or septier of estimation, and thirty-six septiers, the muid, which is subdivided into two demi-muids, four quarter-muids, and eight half-quarter-muids. From the quart are likewise raised the Measures used in other parts, as the queue used in Orleans, Blois, &c. containing a Paris muid and an half, or four hundred and twenty pints; the tun used at Bayonne and Bourdeaux, consisting of four barriques, and equal to three Paris muids; at Orleans, to two: so that the first tun contains eight hundred and sixty-four pints, and the second five hundred and seventy-six. See TUN. The demi-queue, used in Champagne, ninety-six quarts; the pipe, used in Anjou and Poitou, containing two buffards, equal to two demi-queues of Orleans, &c. or a muid and an half of Paris, or four hundred and thirty-two pints. The millerolle used in Provence, containing sixty-six Paris pints; and the poincon used at Nantes, in Touraine, and the Blesois, equal to half the Orleans tun. The poincon used at Paris is the same with the demi-queue.

Dutch Liquid MEASURES. At Amsterdam, their Measures, to begin with the diminutions, are, mingles, or bottles, equal to French pots, and containing two pounds, four ounces, marc, of an ordinary liquor. The mingle is divided into two pints, four half-pints, eight musses, sixteen half-musses, &c. Seven hundred and seventy mingles make their tun. The vertel, or quarter, consists of five mingles, and one sixth of a mingle. The wine vertel is just six mingles. The stekan, or stekaimen, contains sixteen mingles. The anker contains two stekans; and four ankers, the awn. For oils they use the tun, which contains six awns, or ahms; equal to sixteen hundred Paris pints.

Spanish Liquid MEASURES are, the bota, containing between thirty-six and thirty-seven Dutch stekans, holding about a thousand weight. The bota consists of thirty arrobas, each

weighing twenty-eight pounds. Each arroba is again divided into eight azumbres, and the azumbre into four quarts. The pipe consists of eighteen arrobas.

Portuguese Liquid MEASURES are botas, almudes, cavadas, quartas; and for oil, alqueirs or cantars. The Portuguese bota is somewhat smaller than the Spanish; the latter being equal to thirty-six or thirty-seven stekans, and the former only to twenty-five or twenty-six. The quartas is one fourth of the cavadas. The cavadas, or cavado, is the same with the Dutch mingle. Six cavadas make an alquier, and two alqueirs one almude, or almoud; twenty-six almudes, a bota.

Italian liquid MEASURES; at Rome, are the boccale, or pot, containing a little more than a Paris pint. Seven boccales and a half make the rubbo; and thirteen rubbos and a half, the brenta; so that the brenta contains ninety-six boccales.—At Florence, the staro or faio, containing three bariles, and the barile twenty-six fiascos or flasks, which are nearly equal to Paris pints.—At Verona, they use the bafia, sixteen whereof make a brenta; the brenta contains ninety-six boccales, or thirteen rubbos and a half.—At Venice, the amphora, containing two botte; the botte, four bigoncios; the bigoncio, four quarts; the quart, four tischauers. The Venetian botte is again divided into mostachios, seventy-six whereof make the amphora.—At Ferrara, the mastillo, containing eight scchios.—In Istria, scchios; six whereof make the urna. In Calabria, and Apulia, pignatolis, equal to French pints; thirty-two pignatolis make the staro or stio; and ten staros, the salma.

German liquid MEASURES. The fuder is used almost throughout all Germany, but with some difference in its length, as well as its subdivisions. The fuder is supposed the load of a cart with two horses. Two fuders and a half make the roeder; six awns, the fuder; twenty fertels, the awm; and four malsens, or malsies, the fertel: so that the roeder contains one thousand two hundred malsies, the fuder four hundred and eighty, the awm eighty, and the fertel forty-one.—At Nuremberg, the division of the fuder is into twelve heemers, and the heemer into thirty-four malsies.—At Vienna, they divide the fuder into sixty-two heemers, the heemer into thirty-two achtelings, and the achteling into four felitins. The awm, there, is eighty malsies; the fertel, called also schreue, four malsies; and the driclinck twenty-four heemers.—At Aulbourg, the fuder is divided into eight jez; the jez into two muids, or twelve belons; the befion into eight malsies, which makes seven hundred sixty-eight malsies in the fuder, as in that of Nuremberg.—At Heidelberg, the fuder is divided into ten awms; the awn into twelve vertels; and the vertel into four malsies.—In Wirtemberg, the fuder is divided into six awms; the awm into sixteen yunes; the yune into ten malsies.

Liquid MEASURES on the coasts of Barbary. At Tripoli, &c. they use the rotolo, or rotoli; thirty-two whereof make the matuli.—At Tunis, forty-two of the rotoli of Tripoli make a matara, or mataro; and the other places on the same coast use nearly the same Measures.—It may be here observed, that most, if not all the eastern nations, with whom the Europeans traffick, have not any such thing as Measures of capacity, whether for things liquid or dry; but that they sell every thing, even liquors, by the weight. We may, however, rank among the number of liquid Measures, the cocos and canan of Siam. The first are the cocos-shells cleared of their kernel. And since these are not all of the same capacity, they measure them with cauris, or little shells found in the Maldives; which also serve for money in some states of the Indies. Some cocos hold a thousand cauris, and some only five hundred. Above the cocos is the canan, a little Measure used in the same country, and called by the Portuguese, chop; holding about a Paris quart.

M E A

Wine-MEASURE.

Solid inches

28 $\frac{7}{8}$	Pint								
231	8	Gallon							
4158	144	18	Rundlet						
7276 $\frac{1}{2}$	252	31 $\frac{1}{2}$	1 $\frac{1}{4}$	Barrel					
9702	336	42	2 $\frac{1}{2}$	1 $\frac{1}{2}$	Tierce				
14553	504	63	3 $\frac{1}{2}$	2	1 $\frac{1}{2}$	Hoghead			
19279	672	84	4 $\frac{3}{4}$	2 $\frac{2}{3}$	2	1 $\frac{1}{3}$	Punchion		
29106	1008	126	7	4	3	2	1 $\frac{1}{3}$	Butt.	
58212	2016	252	14	8	6	4	3	2	Tun

Beer-MEASURE.

8	Gall.			
64	8	Fir.		
128	16	2	Kild.	
256	32	4	2	Barrel
512	64	8	4	2 Hoghead

8	Gall.				
72	9	Fir.			
144	18	2	Kild.		
288	36	4	2	Barrel	
576	72	8	4	2	Hoghead

Attic MEASURES of capacity for liquids, reduced to the English wine-Measure.

Cochilarion								Gall.	Pints.	Sol.	Inch.	Dec.
2	Cheme							0	$\frac{1}{2} \frac{1}{8}$	0,0356	$1 \frac{1}{2}$	
2 $\frac{1}{2}$	1 $\frac{1}{4}$	Myftron						0	$\frac{1}{16} \frac{3}{4}$	0,0712	$\frac{1}{5}$	
5	2 $\frac{1}{2}$	2	Concha					0	$\frac{1}{4} \frac{3}{4}$	0,089	$\frac{1}{3}$	
10	5	4	2	Cyathus				0	$1 \frac{1}{2} \frac{1}{4}$	0,178	$1 \frac{1}{4}$	
15	7 $\frac{1}{2}$	6	3	1 $\frac{1}{2}$	Oxubaphon			0	$\frac{1}{2} \frac{1}{2}$	0,356	$\frac{1}{2} \frac{1}{2}$	
60	30	24	12	6	4	Cotyle		0	$\frac{2}{3}$	0,535	$\frac{1}{2}$	
120	60	48	24	12	8	2	Xestes, sextary	0	1	4,283		
720	360	288	144	72	48	12	6	Chos, congius	0	6	23,698	
8640	4320	3456	1728	864	576	144	72	12 Metretes, amphora	10	2	19,626	

Roman MEASURES of capacity for liquids, reduced to the English wine-Measure.

Ligula										Gall.	Pints.	Sol.	Inch.	Dec.
4	Cyathus									0	0 $\frac{1}{3}$		0,117,1 $\frac{1}{2}$	
6	1 $\frac{1}{2}$	Acetabulum								0	0 $\frac{1}{2}$		0,469 $\frac{3}{4}$	
12	3	2	Quartarius							0	0 $\frac{1}{2}$		0,704 $\frac{1}{2}$	
24	6	4	2	Hemina						0	0 $\frac{1}{2}$		1,409	
48	12	8	4	2	Sextarius								2,818	
288	72	24	48	12	6	Congius							5,636	
1152	288	96	192	48	24	4	Urna						4,942	
2304	576	192	384	96	48	8	2	Amphora					5,33	
46080	11520	7680	3840	1920	960	160	40	20	Culcus	143	3		11,095	

Jewish MEASURES of capacity for liquids, reduced to the English wine-Measure.

Caph				Gall.	Pints.	Sol.	Inch.		
1½	Log			0	0½		0,177		
5¼	4	Cab		0	0½		0,211		
16	12	3	Hin	0	3½		0,844		
32	24	6	2	Seah	1	2	2,533		
96	72	18	6	3	Bath, epha	2	4	5,067	
660	720	180	60	30	10	Coron, chomar	7	4	15,2
							75	5	9,625

Cubica

Cubica

Cubical MEASURES of capacity for things dry.—*English dry or corn MEASURES* are rated from the Winchester gallon; which contains 272 solid inches, and is to hold of pure running or rain-water, nine pounds thirteen ounces. This seems to stand on the foot of the old wine gallon, of 224 cubic inches; 12 being to 144, as 224 to 272. Yet by an act of parliament, made 1697, it is decreed, that a round bushel, eighteen inches and an half wide, and eight deep, is a legal Winchester bushel. But such a vessel will only hold 2150 42 cubic inches; consequently the gallon will contain 268 2/3 cubic inches. The divisions and multiples are as in the table following.

French dry MEASURES are the litron, bushel, minot, mine, septier, muid, and tun. The litron is divided into two demilitrons, and four quarter litrons, and contains thirty-six cubic inches of Paris. By ordonnance, the litron is to be three inches and an half high; and three inches ten lines broad. The litron for salt is larger, and is divided into two halves, four quarters, eight demi-quarters, and sixteen meurettes. The French bushel is different in different jurisdictions. At Paris it is divided into demi-bushels; each demi-bushel into two quarts; the quart into two half-quarts; and the half quart into two litrons: so that the bushel contains sixteen litrons. By ordonnance, the Paris bushel is to be eight inches, two lines and an half high; and ten inches broad, or in diameter, within-side. The minot consists of three bushels; the mine of two minots, or six bushels; the septier of two mines, or twelve bushels; and the muid of twelve septiers, or an hundred forty-four bushels. The bushel for oats is estimated double that of any other grain; so that there go twenty-four bushels to make the septier, and two hundred eighty-eight to make the muid. It is divided into four picotins; the picotin containing two quarts, or four litrons. The bushel for salt is divided into two half-bushels, four quarters, eight half-quarters, and sixteen litrons; four bushels make a minot, sixteen a septier, and an hundred ninety-two a muid. The bushel for wood is divided into halves, quarters, and half-quarters. Eight bushels make the minot, sixteen a mine; twenty mines, or three hundred and twenty bushels, the muid. For *pluister*, twelve bushels make a sac, and thirty-six sacs a muid. For *lime*, three bushels make a minot, and forty-eight minots a muid.—The minot is, by ordonnance, to be eleven inches nine lines high; and fourteen inches eight lines in diameter. The minot is composed of three bushels, or sixteen litrons; four minots make a septier, and forty-eight a muid.—The French mine is no real vessel, but an estimation of several others. At Paris, the mine contains six bushels, and twenty-four make the muid. At Rouen, the mine is four bushels; and at Dieppe, eighteen mines make a Paris muid. See **MUID**.—The septier differs in different places: At Paris it contains two mines, or eight bushels; and twelve septiers the muid. At Rouen, the septier contains two mines, or twelve bushels. Twelve septiers make a muid at Rouen, as well as at Paris; but twelve of the latter are equal to fourteen of the former. At Toulon, the septier contains a mine and an half; three of which mines make the septier of Paris. See **SEPTIER**.—The muid, or muid, of Paris, consists of twelve septiers; and is divided into mines, minots, bushels, &c. That for oats is double

that for other grain; i. e. contains twice the number of bushels. At Orleans, the muid is divided into mines; but these mines only contain two Paris septiers and an half. In some places they use the tun in lieu of the muid; particularly at Nantes, where it contains ten septiers of sixteen bushels each, and weighs about three thousand three hundred pounds. Three of these tuns make twenty-eight Paris septiers. At Rochel, &c. the tun contains forty-two bushels, and weighs two *per cent* less than that of Nantes. At Breft, it contains twenty bushels, is equal to ten Paris septiers, and weighs about two thousand two hundred and forty pounds. See **TUN**.

Dutch, Swedish, Polish, Prussian, and Muscovite dry MEASURES. In these places they estimate their dry things on the foot of the *last*, *left*, *leth*, or *lecht*; so called, according to the various pronunciations of the people who use it.—In Holland, the last is equal to nineteen Paris septiers, or thirty-eight Bourdeaux bushels, and weighs about four thousand five hundred sixty pounds; the last they divide into twenty-seven mudes, and the mude into four scheepels.—In Poland, the last is forty Bourdeaux bushels, and weighs about four thousand eight hundred Paris pounds.—In Prussia, the last is an hundred thirty-three Paris septiers.—In Sweden and Muscovy, they measure by the great and little last; the first containing twelve barrels, and the second half as many. See **LAST**.—In Muscovy, they likewise use the chefford, which is different in various places: that of Archangel is equal to three Rouen bushels.

Italian dry MEASURES. At Venice, Leghorn, and Lucca, they estimate their dry things on the foot of the *staro* or *stio*; the *staro* of Leghorn weighs fifty-four pounds: an hundred and twelve *staros*, and seven-eighths, are equal to the Amsterdam last.—At Lucca, an hundred and nineteen *staros* make the last of Amsterdam.—The Venetian *staro* weighs an hundred twenty-eight Paris pounds: the *staro* is divided into four quarters. Thirty-five *staros*, and one-fifth, or an hundred and forty quarters, and four-fifths, make the last of Amsterdam.—At Naples, and other parts, they use the *tomolo*, or *tomalo*, equal to one-third of the Paris septier. Thirty-six *tomoli* and an half make the *carro*; and a *carro* and an half, or fifty-four *tomoli*, make the last of Amsterdam.—At Palermo, sixteen *tomoli* make the *salma*; and four *mondili*, the *tomolo*. Ten *salmas* and three sevenths, or an hundred and seventy one *tomoli* and three-sevenths, make the last of Amsterdam.

Flemish dry MEASURES. At Antwerp, &c. they measure by the *viertel*; thirty-two and an half whereof make nineteen Paris septiers.—At Hambourgh, the *scheffel*, ninety whereof make nineteen Paris septiers.

Spanish and Portuguese dry MEASURES. At Cadiz, Bilbao, and St. Sebastian, they use the *fanega*, twenty-three whereof make the Nantes, or Rochel tun, or nine Paris septiers and an half; tho' the Bilbao *fanega* is somewhat larger, inasmuch that twenty-one *fanegas* make a Nantes tun.—At Seville, &c. they use the *anagras*, containing a little more than the Paris mine; thirty-six *anagras* make nineteen Paris septiers.—At Bayonne, &c. the *concha*; thirty whereof are equal to nine Paris septiers and an half.—At Lisbon, the *alqueir*, a very small *measure*, two hundred and forty whereof make nineteen Paris septiers, sixty the Lisbon muid.

English dry or corn MEASURES.

Solid inches									
34 1/2	Pint								
272 1/4	8	Gallon							
544 1/2	16	2	Peck						
2178	64	8	4	Bushel					
17424	128	16	8	2	Strike				
	256	32	16	4	2	Carnock or coom			
	512	64	32	8	4	2	Seam or quarter		
	3072	384	192	48	24	12	6	Way	
	5120	640	320	80	40	20	10	12	Last

Jewish dry MEASURES reduced to English.

Gachal									Pecks.	Gall.	Pints.	Sol. Inch.
20	Cab								0	0	0 1/2	0,031
36	1 1/2	Gomor							0	0	2 1/2	0,073
120	6	3 1/2	Seah						0	0	5 1/2	1,211
360	18	10	3	Epha					1	0	1	4,036
1800	90	50	15	5	Letteeh				3	0	3	12,107
3600	180	100	30	10	2	Chomer, coron			16	0	0	26,500
									32	0	1	18,969

Attic dry MEASURES reduced to English.

Cochliarion						Pecks.	Gall.	Pints.	Sol.	Inch.
10	Cyathus	—	—	—	—	0	0	$\frac{1}{128}$	0,276 $\frac{7}{8}$	
15	$1\frac{1}{2}$ Oxubaphon	—	—	—	—	0	0	$\frac{1}{2}$	2,763 $\frac{1}{2}$	
16	6 4 Cotyle	—	—	—	—	0	0	$\frac{1}{2}$	4,144 $\frac{3}{4}$	
120	12 8 2 Xestes, sextary	—	—	—	—	0	0	1	16,579	
180	18 12 3 $1\frac{1}{2}$ Choinix	—	—	—	—	0	0	$1\frac{1}{2}$	33,158	
8640	864 576 144 72 48 Medimnus	—	—	—	—	4	0	1	15,705 $\frac{1}{2}$	
									3,501	

Roman dry MEASURES reduced to English.

Ligula						Pecks.	Gall.	Pints.	Sol.	Inch.	Dec.
4	Cyathus	—	—	—	—	0	0	$\frac{1}{32}$	0,01		
6	$1\frac{1}{2}$ Acetabulum	—	—	—	—	0	0	$\frac{1}{16}$	0,04		
24	6 4 Hemina	—	—	—	—	0	0	$\frac{1}{4}$	0,24		
48	12 8 2 Sextarius	—	—	—	—	0	0	1	0,48		
384	96 64 16 8 Semimod.	—	—	—	—	0	1	0	3,84		
768	192 128 32 16 2 Modius	—	—	—	—	1	0	0	7,68		

The usual MEASURE of wood for firing is the cord; four feet high, as many broad, and eight long; this is divided into two half cords, called *ways*, and by the French, *membrures*, from the pieces stuck upright to bound them; or *voyes*, as being supposed half a waggon load.

The MEASURE for horses is the hand, or handful; which by the statute contains four inches.

MEASURE is also used to signify the cadence and time observed in poetry, dancing, and music, to render them regular and agreeable.

The different Measures or metres, in poetry, are the different manners of ordering and combining the quantities, or the long and short syllables. Thus hexameter, pentameter, iambic, sapphic verses, &c. consist of different Measures.

In English verses, the Measures are extremely various and arbitrary, every poet being at liberty to introduce any new form that he pleases.—The most usual are, the heroic, generally consisting of five long, and five short syllables; and verses of four feet; and of three feet, and a cæura or single syllable.

The antients, by variously combining and transposing their quantities, made a vast variety of different Measures. Of words, or rather feet, of two syllables, they formed a pœndee, consisting of two long syllables; a pyrrhic, of two short syllables; a trochee, of a long and a short syllable; and an iambic, of a short and a long syllable.

Of their feet of three syllables, they formed a molossus, consisting of three long syllables; a tribach, of three short syllables; a dactyl, of one long, and two short syllables; and an anapaest, of two short and one long syllable.

The Greek poets contrived a hundred and twenty-four different combinations or Measures, under as many different names, from feet of two syllables to those of six.

MEASURE, in music, the interval, or space of time, which the person who beats time takes between the raising and falling of his hand or foot, in order to conduct the movement, sometimes quicker, and sometimes slower, according to the kind of music, or the subject that is sung or played.

The Measure is that which regulates the time we are to dwell on each note.

The ordinary or common Measure is one second, or sixtieth part of a minute, which is nearly the space between the beats of the pulse or heart; the systole, or contraction of the heart, answering to the elevation of the hand; and its diastole, or dilatation, to the letting it fall. The Measure usually takes up the space that a pendulum, of two feet and an half long, employs in making a swing or vibration. The Measure is regulated according to the different quality or value of the notes in the piece; by which the time that each note is to take up, is expressed. The semi-breve, for instance, holds one rife, and one fall; and this is called the Measure, or whole Measure; sometimes the Measure-note or time-note; the minim, one rife, or one fall; and the crotchett, half a rife, or half a fall, there being four crotchets in a full Measure.

Binary or double MEASURE is that wherein the rise and fall of the hand are equal.

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Ternary or triple MEASURE is that wherein the fall is double to the rise; or where two minims are played during a fall, and but one in a rise. To this purpose, the number 3 is placed at the beginning of the lines, when the Measure is intended to be triple; and a C, when the Measure is to be common or double. This rising and falling of the hands was called by the Greeks *opsis* and *thesis*. St. Augustine calls it *plausus*, and the Spaniards *compas*. See ARSIS and THESIS.

MEASURING, MENSURATION, defined geometrically, is the assuming any certain quantity, and expressing the proportion of other similar quantities to the same.

MEASURING, defined popularly, is the using a certain known measure, and determining thereby the precise extent, quantity, or capacity of anything.

Measuring, in the general, makes the practical part of geometry; see GEOMETRY. From the various subjects wherein it is employed, it acquires various names, and constitutes various arts. Thus

MEASURING of lines, or quantities of one dimension, we call Longimetry (See LONGIMETRY)—and when those lines are not extended parallel to the horizon, altimetry (See ALTIMETRY).—When the different altitudes of the two extremes of the line are alone regarded, we call it leveling.

MEASURING of superficies, or quantities of two dimensions, is variously denominated, according to its subjects: when conversant about lands, it is called *geodesia*, or *surveying*: in other cases, it is called simply *Measuring*.

The instruments used are the ten-foot rod, chain, compass, circumferentor, &c.

MEASURING of solids, or quantities of three dimensions, we call Stereometry; where it is conversant about the capacities of vessels, or the liquors they contain particularly, *gauging*. The instruments for this are the gauging-rod, sliding-rule, &c.

From the definition of Measuring, where the Measure is expressed to be similar or homogeneous to, i. e. of the same kind with the thing measured; it is evident, that in the first case, or in quantities of one dimension, the Measure must be a line; in the second, a superficies; and in the third, a solid.—For a line, *v. gr.* cannot measure a surface; to measure, being no more than to apply the known quantity to the unknown, till the two become equal. Now a surface has breadth, and a line has none: and if one line have no breadth, two or an hundred have none. A line, therefore, can never be applied so often to a surface, as to be equal to it, i. e. to measure it.—And from the like reasoning it is evident, a superficies, which has no depth, cannot become equal to, i. e. cannot measure, a solid, which has.

While a line continues such, it may be measured by any part of itself: but when the line begins to flow, and to generate a new dimension, the Measure must keep pace, and flow too; i. e. as the one commences superficies, the other must do so too. Thus we come to have *square Measures*, and *cubic Measures*.

6 L

Hence

Hence we see why the *Measure of a circle* is an arch, or part of the circle; for a right line can only touch a circle in one point, but the periphery of a circle consists of infinite points. The right line therefore, to measure the circle, must be applied infinite times, which is impossible.—Again, the right line only touches the circle in a mathematical point; which has no parts or dimensions, and has consequently no magnitude; but a thing that has no magnitude or dimensions, bears no proportion to another, that has; and cannot therefore measure it.—Hence we see the reason of the division of circles into 360 parts or arches, called *degrees*. See ARCH, CIRCLE, and DEGREE.

MEASURING of triangles, or from three given sides or angles, to determine all the rest, is called *trigonometry*. See TRIGONOMETRY.

MEASURING of the air, its pressure, spring, &c. is called *aerometry* or *pneumatics*. See AEROMETRY, &c.

MEAT, *Cibus*.
Dressing of MEATS. } See the articles { FOOD.
Dry MEATS. } { DRESSING.
White MEATS, } { XEROPHAGIA.
 } { WHITE.

MEATUS auditorius, the entrance of the ear; this is a cartilaginous substance, irregularly divided with fleshy membranous interpositions in several parts of it, not unlike the bronchi in the lungs, only that the fleshy fibres are here thicker. The inner part, or that next the brain, is bony. It is lined throughout with a thin membrane, derived from the skin, which is continued on the membrana tympani, where it becomes thinner.—See *Tab. Anat. (osteol.) fig. 13. lit. f.*

From the beginning of the Meatus, almost half-way, arise a great number of small hairs, at whose roots flows the ear-wax, which is entangled in those hairs, the better to break the impetus of the external air, and prevent its too suddenly rushing in on the membrana tympani.

MEATUS cylicus, a biliary duct, about the bigness of a goose-quill, which, at about two inches distance from the gall-bladder, is joined to the meatus hepaticus; and these together form the ductus communis. See BILE.

MEATUS urinarius, or urinary passage, in women, is very short, lined internally with a very thin membrane; next to which is a coat of a white substance. Through this coat, from some lacune in it, pass several ducts, which convey a limpid glutinous matter, serving to anoint the extremity of the urethra.—See *Tab. Anat. (splanch.) fig. 9. lit. r. fig. 11. lit. k.*

MECHANICS, MECHANICA, ΜΗΧΑΝΙΚΗ, a mixed mathematical science, which considers motion and moving powers, their nature and laws, with the effects thereof, in machines, &c. That part of *Mechanics* which considers the motion of bodies arising from gravity, is by some called *statics*—in distinction from that part which considers the mechanical powers, and their application, and which is properly called *Mechanics*. See MECHANIC POWERS.

MECHANICAL, something that relates to *Mechanics*, or is regulated by the nature and laws of motion.

In which sense we say, mechanical powers, mechanical properties or affections, mechanical principles, reasoning, knowledge, &c.

MECHANICAL affections are such properties in matter, as result from their figure, bulk, and motion.

MECHANICAL causes are those founded on such affections.

MECHANICAL solutions are accounts of things on the same principles.

MECHANICAL philosophy is the same with what we otherwise call the *corpuscular philosophy*; viz. that which explains the phenomena of nature, and the operations of corporeal things, on the principles of *Mechanics*, viz. the motion, gravity, figure, arrangement, disposition, greatness or smallness of the parts which compose natural bodies. See CORPUSCLE.

MECHANICAL powers, denote the six simple machines; and to which all others, how complex soever, are reducible, and of the assemblage whereof they are all compounded.

The *Mechanical powers* are the balance, lever, wheel, pulley, wedge, and screw; which see under their proper heads.

They may, however, be all reduced to one, viz. the *Lever*.

The principle whereon they depend, is the same in all, and may be conceived from what follows.

The momentum, impetus, or quantity of motion of any body, is the factum of its velocity (or the space it moves in a given time) multiplied into its mass. Hence it follows, that two unequal bodies will have equal moments, if the lines they describe be in a reciprocal ratio of their masses.—Thus, if two bodies, fastened to the extremities of a balance or lever, be in a reciprocal ratio of their distances from the fixed point; when they move, the lines they describe will be in a reciprocal ratio of their masses.

E. g. If the body A (*Tab. Mechanics, fig. 6.*) be triple the body B, and each of them be so fixed to the extremities of a lever AB, whose fulcrum, or fixed point is C, as that the distance of BC be triple the distance CA; the lever cannot be inclined on either side, but the space BE, passed over by the less body, will be triple the space AD, passed over by the great one. So that their motions or moments will be equal, and the two bodies in equilibrium.

Hence that noble challenge of Archimedes, *datis viribus, datum pondus movere*; for as the distance CB may be increased infinitely, the power or moment of A may be increased infinitely.—So that the whole of *Mechanics* is reduced to the following problem.

Any body, as A, with its velocity C, and also any other body, as B, being given; to find the velocity necessary to make the moment, or quantity of motion, in B, equal to the moment of A, the given body.—Here, since the moment of any body is equal to the rectangle under the velocity, and the quantity of matter; as B : A :: C : to a fourth term, which will be c, the celerity proper to B, to make its moment equal to that of A. Wherefore in any machine or engine, if the velocity of the power be made to the velocity of the weight, reciprocally as the weight is to the power; such power will always sustain, or, if the power be a little increased, it will move the weight.

Let, for instance, AB be a lever, whose fulcrum is at C, and let it be moved into the position A C B.—Here, the velocity of any point in the lever is as the distance from the centre. For let the point A describe the arch A a, and the point B the arch B b; then these arches will be the spaces described by the two motions; but since the motions are both made in the same time, the spaces will be as the velocities. But it is plain, the arches A a and B b will be to one another, as their radii AC and BC, because the sectors A C a, and B C b, are similar: wherefore the velocities of the points A and B are as their distances from the centre C.

Now, if any powers be applied to the ends of the lever A and B, in order to raise its arms up and down; their force will be expounded by the perpendiculars S a, and b N; which, being as the right lines of the former arches, b B and a A, will be to one another also as the radii AC and BC; wherefore the velocities of the powers are also as their distances from the centre. And since the moment of any body is as its weight, or gravitating force, and its velocity, conjunctly; if different powers or weights be applied to the lever, their moments will always be as the weights and the distances from the centre conjunctly.—Wherefore, if to the same lever there be two powers or weights applied reciprocally proportional to their distances from the centre, their moments will be equal; and if they act contrarily, as in the case of a stillard, the lever will remain in an horizontal position, or the balance will be in equilibrium.—And thus it is easy to conceive how the weight of one pound may be made to equi-balance a thousand, &c.

Hence also it is plain, that the force of the power is not at all increased by engines; only the velocity of the weight in either lifting or drawing is so diminished by the application of the instrument, as that the moment of the weight is not greater than the force of the power.—Thus, for instance; if any force can raise a pound weight with a given velocity, it is impossible by any engine to effect, that the same power shall raise two pound weight, with the same velocity: but by an engine it may be made to raise two pound weight, with half the velocity; or 10000 times the weight with $\frac{1}{10000}$ of the former velocity.

MECHANICAL is also applied to a kind of reasoning, which of late has got great ground, both in physics and medicine; thus denominated, as being conformable to what is used in the contrivance, and accounting for the properties and operations of machines.

This manner of thinking and arguing, Dr. Quincy insists, is the result of rightly studying the powers of an human mind, and the ways by which it is only fitted to get acquaintance with material beings: for considering an animal body as a composition out of the same matter, from which all other bodies are formed, and to have all those properties which concern a physician's regard, only by virtue of its peculiar make and construction; it naturally leads a person to consider the several parts, according to their figures, contexture, and use; either as wheels, pulleys, wedges, levers, screws, chords, canals, cisterns, frainers, or the like; and throughout the whole of such inquiries, to keep the mind close in view of the figures, magnitudes, and mechanical powers of every part or movement; just in the same manner, as is used in inquiring into the motions and properties of any other machine. For which purpose it is frequently found helpful to design, or picture out in diagrams, whatsoever is under consideration, as it is customary in common geometrical demonstrations.

The knowledge obtained by this procedure is called *Mechanical knowledge*.

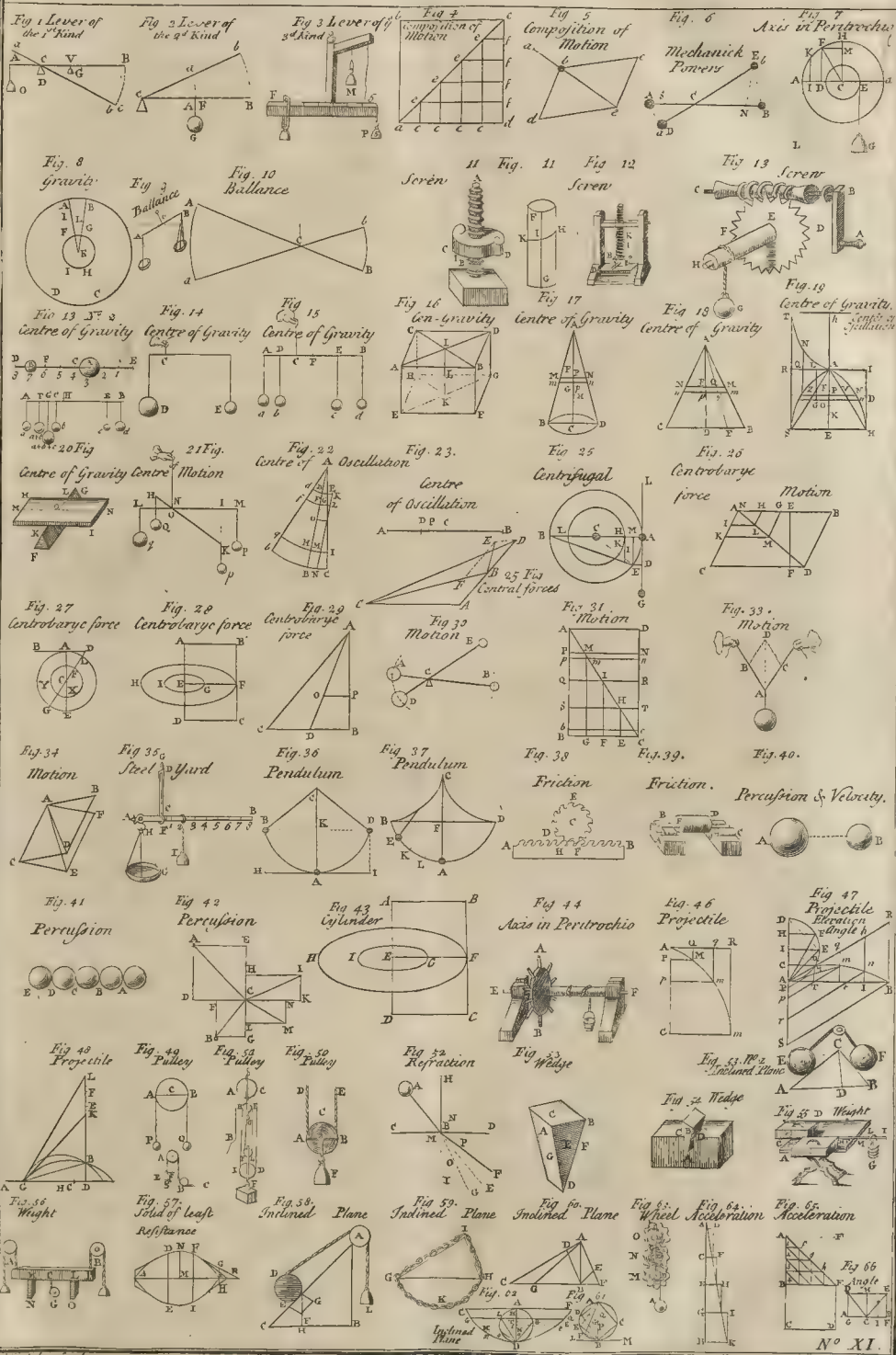
MECHANICAL is also used in mathematics, to signify a construction or proof of some problem, not done in an accurate and geometrical manner, but coarsely and unartfully, or by the assistance of instruments; as are most problems relating to the duplicature of the cube, and the quadrature of the circle.

MECHANICAL arts. See the article ARTS.

MECHANICAL curve, a term used by Des Cartes for a curve which cannot be defined by any algebraic equation.—By which it stands contradistinguished from algebraic or geometrical curves.

M Leibnitz and some others, in lieu of mechanical curves, call them *transcendental curves*, and dissent from Des Cartes, in excluding

TAB: MECHANICKS.



cluding them out of geometry. Leibnitz has even found a new kind of transcendental equations, whereby these curves are defined: they are of an indefinite nature; that is, they do not continue constantly the same in all points of the curve; in opposition to algebraic curves which do. See TRANSCENDENTAL, and CURVE.

MECHANISM of the barometer. See the article BAROMETER. **MECHANISM of the double microscope, &c.** See MICROSCOPE.

MECHOACAN, MECHOACANNA, called also *white jalap, white rhubarb,* and *American scammony*; a medicinal root, taking its name from a province of New Spain, from whence it is brought.

Mechoacan was known and used as a purgative before jalap, though the latter is now in more general use, as being found more efficacious. Yet *Mechoacan* is the milder and more gentle of the two, and on that account is preferable.

The feat of its action is chiefly in the extreme parts, for which reason it is accounted good in arthritic pains. It has the advantage of needing no preparation or corrective; and of purging in its own proper substance, as it grows.

M. Boulduc found by analysing it, that it contains twelve times as much salt as resin; but neither the saline nor refinous extract purge so freely as the substance, even though taken in larger doses; nor do they even purge so easily.

In the choice of *Mechoacan*, prefer those pieces which are the brownest within, and whose substance is the closest, and most compact.

MECONIUM *, **MEKONION**, in pharmacy, is the juice of the poppy, drawn by incision, and dried.

* The word comes from the Greek *mecon*, poppy.

Meconium differs from opium, in that this first oozes out spontaneously after an incision made in the heads of the poppies, whereas the other is drawn by violence both from the heads and leaves, and even from the whole plant bruised and pressed together.

MECONIUM is also a black thick excrement, gathered in the intestines of a child during the time of gestation.

In colour and consistence, it resembles pulp of cassia. It is also thought to resemble *meconium*, or juice of poppy, whence it takes its name.

MEDAL *, **MEDALIA**, a small figure, or piece of metal, in form of a coin, destined to preserve to posterity the portrait of some great man, or the memory of some illustrious action.

* Scaliger derives the word from the Arabic, *Meibalia*, a coin wherein is impress'd the figure of a human head. Menage and Voisius rather derive it from *Metalum*. Du Cange observes, that the obolus was antiently called *Medalia*, quasi *Medietas nummi*, as being half of another coin.

The parts of a **MEDAL** are the two sides; one whereof is called the face, or head; the other the reverse.

On each side is the area or field, which makes the middle of the *Medal*; the rim or border; and the exergum, which is beneath the ground whereon the figures represented are placed.

On the two sides are distinguished the type, and the inscription or legend. The type or device is the figure represented; the legend is the writing, especially that around the *Medal*; though, in the Greek *Medals*, the inscription is frequently in the area. What we find in the exergum, is frequently no more than some initial letters, whose meaning we are usually unacquainted withal; though sometimes, too, they contain epochs, or words that may be accounted an inscription.

Some authors imagine, that the antient *Medals* were used for money. M. Patin has a chapter express to prove, that they had all a fixed regular price in payments; not excepting even the medallions. F. Joubert is of the same opinion. Others, on the contrary, maintain, that we have no real money of the antients; and that the *Medals* we now have, never had any course as coins. Between these two extremes, there is a medium, which appears by much more reasonable than either of them. See MONEY.

MEDALS are divided into *antient* and *modern*.

Antient MEDALS are either of the higher or lower antiquity.—The former class consists of such as were struck before the end of the third century. The latter of such as were struck between the third and ninth centuries.

Modern MEDALS are those struck within these few hundred years. See COIN.

Among the antient *Medals* some are Greek, others Roman.

—The Greek *Medals* are the most antient. That people struck *Medals* in all the three metals with such exquisite art, as the Romans could never come up to. The Greek *Medals* have a design, accuracy, force, and a delicacy that expresses even the muscles and veins; and it must be own'd, goes infinitely beyond any thing of the Romans.

There are also Hebrew *Medals*, and Punic, Gothic, and Arabic *Medals*; which make new classes in the antient and modern ones.

Confular MEDALS are so called, to distinguish them from the imperial; not that they were struck by order of the consuls, but because in those times the republic was governed by consuls. Of these, father Joubert reckons about fifty or sixty of gold;

two hundred and fifty of copper; and near a thousand of silver.—Goltzius has described them in a chronological order, according to the Fasti consulares; and Urfinus has disposed them genealogically, according to the order of the Roman families. M. Patin has collected an intire series of them, in the same order with Urfinus; and only computes one thousand thirty-seven consulars, which relate to one hundred seventy-eight Roman families. M. Vaillant, and M. Morel, each promised a new edition of the consular *Medals*. M. Vaillant kept his word, and his book was printed before he died, in three volumes, folio.

The consular *Medals* are certainly the most antient *Medals* of the Romans: and yet those of copper and silver do not go beyond the four hundred eighty-fourth year of Rome; nor those of gold beyond the year five hundred forty-sixth. If any are produced of an older date, they are condemned as spurious.

Among the Imperial *MEDALS*, we distinguish between the *upper* and the *lower empire*: the upper empire commenced under Julius Cæsar, and ended about the year of Jesus Christ two hundred and sixty: The lower empire comprehends near one thousand two hundred years, viz. till the taking of Constantinople.—It is the custom, however, to account all the imperial *Medals*, till the time of the Palæologi, among the antique; and yet we have no imperial *Medals*, of any considerable beauty, later than the time of Heraclius, who died in 641.

After the time of Phocas and Heraclius, Italy became a prey to the Barbarians; so that the monuments we have remaining of those two emperors, finish the set or series of imperial *Medals*.—To these are added the *Medals* of the lower empire, and of the Greek emperors; whereof a series may be made as low as our time, taking in the modern ones.—M. Patin has made an ample collection of the imperial *Medals* till the time of Heraclius.

The Gothic *MEDALS* make part of the imperial ones: they are so called, as having been struck in the times of the Goths, and in the declension of the empire; and favouring of the ignorance, and barbarity of the age.

As to modern *MEDALS*, they are such as have been struck in Europe, since the usurpation of the Goths has been extinct; and sculpture and engraving have begun to re-flourish.—The first was that of the famous reformer John Huf in 1415. If any pretend to be more antient, they are spurious.—In France, there were none struck with the king's effigy before the reign of Charles VII.

The study of modern *Medals* is so much the more useful, as they afford more light than the antient, and mark the times and consequences of events more precisely; whereas the inscriptions of the antient *Medals* are very short and simple, and generally they are without any date.—Add to this, that the antient *Medals* are extremely liable to be counterfeited, by reason of the considerable price they bear. But in the modern, there is not near that danger of being imposed upon.

There are few true Hebrew *Medals*: those which we see of the heads of Moses, and Jesus Christ, are spurious and modern. We have a few shekels of copper and silver, with Hebrew or Samaritan legends; but none of gold; though there is mention made of one in the king of Denmark's cabinet.—F. Soucié has a dissertation on the Hebrew *Medals*, commonly called *Samaritan Medals*, where he distinguishes accurately between the genuine and the spurious, and shews, that they are true Hebrew coins struck by the Jews, but on the model of the antients; and that they were current before the Babylonish captivity.

Singular MEDALS, in the popular sense, are such as are not found in the cabinets of the curious, and are only met with by chance; but in the stricter sense they are such, whereof there is not above one of a kind extant.—The Otho in large copper is a singular *Medal*. When a *Medal* exceeds the value of ten or twelve pistoles, it is worth what the owner pleases. The Pescennius Niger, and Pertinax, are very rare in all metals. The Didius Julianus is hardly found any where, but in large copper. Carteron, a Dutchman, and some others, have made mills on purpose to strike *Medals* that never were, as those of Cicero, Virgil, Priam, &c.

Greek *MEDALS* are such as have either the heads of Greek emperors, or Greek inscriptions.

False or spurious MEDALS are those counterfeited, and put off for antique, when they are not.

Mutilated MEDALS, are those that are not intire, or are much defaced.

Redintegrated MEDALS, are those wherein we find the letters *Rest*, which shew that they have been restored by the emperors.

Dipt MEDALS, are struck of pure copper, and afterwards silver'd.

—This is a contrivance that the curious have frequent recourse to, in order to compleat their silver sets.

Covered or plated MEDALS, are those which have only a thin silver leaf over the copper, but which are struck so artfully, that the cheat does not appear, without cutting them: these are the least suspected.

Grained or indented MEDALS, are those, whose edges are cut or notched like teeth, which is a sign of purity and antiquity. They are common among the consulars, but we have none later than Augustus.

Augustus. There are several of them, however, among those of the kings of Syria.

MEDALS countermarked are those which have marks cut either on the side of the head, or of the reverse.—These countermarks serve to denote the change of their value; and this kind is much inquired for by the curious. There are also

Caff MEDALS, are those which are not struck, but cast in a mould.

MEDALS without reverse. See the article **REVERSE**.

Medals have been struck in three kinds of metals, which make three several sets, or series's in the cabinets of the curious. That of gold is the least numerous, as not consisting of above one thousand, or twelve hundred, of the imperial; that of silver may contain about three thousand imperial; and that of brass or copper, of the three several sizes, viz. the great, the middle, and the small, consists of six or seven thousand, all imperial.

It is not either the metal, or the size, which makes a *Medal* valuable; but the scarcity of the head, or of the reverse, or the legend.—Some *Medals* are common in gold, which yet are very rare in copper; and others very rare in silver, which in copper and gold are very common. The reverse is sometimes common, where the head is singular; and some heads are common, whose reverses are very scarce.

There are also *Medals* very scarce in some sets, and yet very common in others: for instance, there is no Antonia in the sets of large copper, and the middle copper is forced to supply its place. The *Otho* is very rare in all the copper sets, and yet common in the silver ones. *Otho's*, of the large copper, are held at an immense price; and those of the middle copper at forty or fifty pistoles. And the Gordians *Afric* are rated near as high. Singular *Medals* are invaluable.

M. Vaillant has collected all the *Medals* struck by the Roman colonies; F. Hardouin those of the Greek and Latin cities; F. Noris those of Syria.—M. Morel also undertook an universal history of *Medals*, and promised cuts of twenty-five thousand. He ranges them under four classes: the first contains the *Medals* of kings, cities, and people, which have neither the name nor image of the Roman emperors: the second contains the consular *Medals*; the third the imperial *Medals*; and the fourth, the Hebrew, Punic, Parthian, French, Spanish, Gothic, and Arabic.—He begins with the imperial, and brings them down as low as Heraclius. He places the Latin, in order, before the Greek.

Ad. Occo, a German physician, and count Mezzabarba, have endeavoured to range the *Medals* in a chronological order; but that is impracticable. For in many of the imperial *Medals* there is no mark either of the consulate, or of the year of the reign; and since Gallienus, there are few of the Roman imperial *Medals* that bear the least footsteps of chronology.

The most noted *Medalists*, or authors on *Medals*, are Antonius Augustinus, Wolf, Lazius, Ful. Ursinus, a learned antiquary, Eneas Vicus, Huber Goltzius, a famous graver, Oelilius, Seguin, Occo, Trifan, Sirmond, Vaillant, Patin, Noris, Spanheim, Hardouin, Morel, Joubert, Mezzabarba, Beger, &c. For the manner of striking *Medals*, see the article **COINING**.

Academy of MEDALS. See the article **ACADEMY**.

Repairing a MEDAL. See the article **REPAIR**.

Restitution of MEDALS. See the article **RESTITUTION**.

Votive MEDALS. See the article **VOTIVE**.

MEDALLION *, or **MEDALION**, a *Medal* of extraordinary bigness.

* The word is formed from the French *Medaillon*, or Italian *Medaglione* which signify the same, and which were originally formed from *Metallicones*, a name by which these pieces are frequently called in ancient Latin writers.

Medallions are ordinarily a kind of *Medals* which princes use to present, as a token of honour or esteem; for which reason the Romans called them *missilia*.

Medallions were never any current coins, as medals probably were: they were struck purely to serve as public monuments, or to make presents of.

There cannot be any set made of them, even though the metals and sizes should be joined promiscuously. The best cabinets do not contain above four or five hundred; though M. Morel judges them to be above a thousand.

Authors vary about the time when they first began to be struck. Some antiquaries will have it under the empire of Theodosius: but this must be a mistake; for there were some struck even in the upper empire: witness a Nero, a Trajan, and an Alexander Severus, still extant.—*Medallions* of gold are very rare, as also those of a large copper.

Medallions are distinguished from medals by the volume, that is, by the thickness, and compass; as well as by the largeness and relieve of the head.

MEDIAL alligation. See **ALLIGATION**.

MEDIANA, the name of a vein, or little vessel, made by the union of the cephalic and basilic, in the bend of the elbow.

It is not a particular vein, or a third vein of the arm, as some authors imagine; but merely a branch of the basilic; which, running into the inner part of the elbow, unites with the cephalica, and forms a common vein, called *Mediana*; and by

the Arabs, the *black vein*.—See *Tab. Anat. (angiol.) fig. 6. lit. p.*

MEDIANA linea, a line or seam running down the middle of the tongue, and dividing it into two equal parts; though not so effectually, but that the blood-vessels of the one side communicate with those of the other. See **TONGUE**.

Columnæ MEDIANÆ, in Vitruvius, are the columns in the middle of a portico; whose intercolumnation is to be larger than those of the angular columns.

MEDIASTINA, the name of a vein of the mediastinum.

MEDIASTINUM, in anatomy, a double membrane, formed by a duplicature of the pleura; serving to divide the thorax, and the lungs, into two parts; and to sustain the viscera, and prevent their falling from one side of the thorax to the other. See **THORAX**.

It proceeds from the sternum, and, passing straight down through the middle of the thorax to the vertebrae, divides its cavity into two. It contains the heart between its two lamellæ, and it affords a passage to the vena cava, the œsophagus, and the stomachic nerves. The membranes of the *Mediastinum* are finer and thinner than the pleura, and have a little fat. It receives branches of veins and nerves from the mamillary and diaphragmatic, particularly, one called *Mediastina*: its nerves come from the stomachic: it has also some lymphatics, which open into the thoracic duct.

The *Mediastinum* divides the thorax longitudinally into two parts; and by means of it one lobe of the lungs may officiate, if the other be hindered by a wound on the other side. Sometimes there is a matter contained betwixt its membranes, immediately under the sternum, which may occasion the tapping of this place.

MEDIASTINUM cerebri, the same with *septum transversum*. See **SEPTUM**.

MEDIATE, or **INTERMEDIATE**, a term of relation to two extremes, applied to a third, which is in the middle between them. See **MEAN**, and **MEDIUM**.

Substance is a genus with regard to man; but between the two there are other *mediate* genus's, as body and animal.

Mediate stands opposed to *immediate*. Thus when we say, that God and man concur to the production of man; God is the *Mediate* cause, man the *immediate*.—It is a popular question in theology, whether the Holy Ghost convert a sinner *mediately* or *immediately*?

MEDIATE modes.

MEDICAMENTOSUS lapis } See the article } **MODES.**

MEDICINAL lapis, } **LAPIS.**

MEDICINAL hours, are those parts of the day supposed most proper to take medicines in.

Of which there are usually reckoned four viz. in the morning fasting, about an hour before dinner, about four hours after dinner, and going to bed; but, in acute cases, the times are to be governed by the symptoms and aggravation of the distemper: without regard to any *Medicinal hours*.

MEDICINAL waters. See the article **WATER**.

MEDICINALIS facculus. See the article **SACculus**.

MEDICINE, MEDICINA, the art of healing.

Medicine, popularly called *physic*, consists, according to Boerhaave, in the knowledge of those things, by whose application life is either preserved found and healthy, or, when disordered, is again restored to its pristine healthiness.

Galen defines *Medicine*, the art of preserving present health, and of retrieving it when lost; Hippocrates, the addition of what is wanting, and the retrenchment of what is redundant: and Herophilus, the knowledge of things good, indifferent, and ill, with regard to health.

Medicine must have been nearly coeval with the world. The injuries and vicissitudes of the air, the nature and qualities of foods, the violence of external bodies, the actions of life, and lastly, the fabric of the human compages, must have rendered diseases almost as old as mankind: and the presence of a disease, as it brings with it a painful sensation, or the loss perhaps of the use of a limb, does, by a necessary mechanical impulse, both in brutes and men, compel the diseased to seek for help, and to apply remedies, either by mere experiment, or by instinct, and spontaneous appetite.—Hence arose the art of *Medicine*; which, in this sense, has been always, everywhere, among mankind.

Antient histories and fables tell us, that, in a little time from the flood, medicine was so well cultivated by the Assyrians, Babylonians, Chaldeans, and Magi, that they were able to remove present diseases, and prevent future ones.—Hence it passed into Egypt, Libya Cyrenaica, and Crotona; and thence into Greece, where it flourished, principally in the islands of Cnidus, Rhodes, and Cos, and in Epidaurus.

The first foundations of the art were laid by chance, natural instinct, and events unforeseen: these were improved by the memory of the success of former experiments; by writing down diseases, their remedies, and events, on columns, paintings, and the walls of their temples; by exposing the sick in the markets and public ways, that those who passed by, might inquire into the disease, and communicate a remedy, if they knew any; and lastly, by analogy, or reasoning, from a comparison

comparison of things already observed, with things present and things to come.

The art at length received a much greater degree of perfection, by the appointing of physicians; some for the cure of particular diseases, and others for diseases in general; by an accurate observation of the disease, and its symptoms; and by an exact description of the remedy, and its use: immediately, upon which, it got among the priests, and at length was confined to particular families; descending, by way of inheritance, from father to son: which, again, proved a great bar to its progress. The extirpation, or inspecting the entrails of beasts, used by the priests; the custom of embalming dead carcases, and even butchery itself, promoted the knowledge of the human fabric, and of the causes both of health, diseases, and death.

Lastly the dissecting of live animals for philosophical purposes, distinct narratives of the cause, rise, increase, crisis, declension, end, and effect of diseases, and the knowledge of *Medicines*, their choice, preparation, application, powers, and events, seemed to have almost brought the art to its perfection.

Hippocrates, who was cotemporary with Democritus, and perfectly acquainted with every thing then discovered, and be sides, furnished with a great number of observations of his own; collecting into one all that was valuable and useful; compiled a body of Greek *Medicine*; and was the first who deserved the title of a true physician: for, being a master of the *æternæ*, experience, as well as of analogy and reason, and withal well versed in a pure philosophy, he, first, made physic rational; and laid the foundation of the dogmatical *Medicine*, which has ever since obtained.

What Hippocrates had done, continued a long time sacred and unaltered, and was the standing practice of many ages; at length Aretæus the Cappadocian digested it into a more orderly body: whence, in various places, at various times, and by various hands, particularly the Alexandrian school, it was further altered and improved, till at length it came into the hands of Claud. Galen; who, collecting the scattered parts, digesting those which were confused, and explaining every thing by the rigid doctrines of the peripatetics, did both a great deal of service, and a great deal of injury, to the noble art; he being the first who introduced the doctrine of the elements, the cardinal qualities, and their degrees, the four humours, &c. into *Medicine*: and on these he made the whole art to depend.

After the sixth century, the arts were not only extinguished, almost all memory of them was lost, till the ninth; from which, to the thirteenth, *Medicine* was vigorously cultivated by the Arabs in Asia, Africa, and Spain: who, applying themselves particularly to the study of the materia medica, and its preparations, and to the operations of chirurgery, rendered both more just and more copious at the same time. And yet Galen's errors became now more predominant than ever.

At length, however, they were purged out and exploded by two different means; principally indeed by the restoration of the pure discipline of Hippocrates in France; and then also by the experiments and discoveries of chymists and anatomists; till at length the immortal Harvey, overturning, by his demonstrations, the whole theory of the antients, laid a new and certain basis of the science. Since his time, *Medicine* is become free from the tyranny of any sect, and is improved by sure discoveries in anatomy, chymistry, physics, botany, mechanics, &c.

Hence it appears, that the art originally consisted solely in the faithful collecting of observations; and that, a long time after, they began to inquire, and dispute, and form theories: the first part has ever continued the same; but the latter has been always mutable.

For the several sects that have arose in *Medicine*, see EMPIRIC, DOGMATIC, GALENIST, CHYMIC, PARACELSIST, and HERMETICAL.

Medicine is divided into five principal branches. The first considers the human body, its parts and fabric, life and health, and the effects following from them: this is called *physiology*, the doctrine of the animal æconomy, or of the use of the parts: and its objects, now enumerated, are called *res naturales*, or things according to nature.

The second branch considers the diseases of the human body, their differences, causes, and effects; and is called *Pathology*, as it considers the diseases; *Ætiology*, as it inquires into their causes; *Nosology*, when it examines their differences; and lastly, *Symptomatology*, when it explains their effects.—The objects of this part are called *res præternaturales*, or beyond nature.

The third branch considers the signs or symptoms, and how to apply them to use; so as to judge, both in a sound and a diseased body, what will be the degree, order, and effect, of the health, or the disease: This is called *Semiotica*.—Its objects are things both natural, non-natural, and præternatural.

The fourth branch considers the remedies, and their use, whereby life may be preserved; whence it is called *Hygiene*. Its objects are what we strictly call *Non-natural*.

Lastly, The fifth furnishes the materia medica, its preparation, and manner of exhibition, so as to restore health, and remove diseases; and is called *Therapeutica*, comprehending the *Dietetica*, *Pharmaceutica*, *Chirurgica*, and *Jatrica*.

Clinical MEDICINE, *Medicina clinica*. See CLINICA.

Characters in MEDICINE. } See the article } CHARACTERS.

Pandects of MEDICINE. } See the article } PANDECT.

MEDICINES, or MEDICAMENTS, denote any natural substances, applied to a human body, in order to answer some intention of cure.

Medicines are distinguished, with regard to the manner of their application, into *internal* and *external*.

Internal MEDICINES are those taken in at the mouth.

External, or topical MEDICINES are those applied outwardly to any particular part.

With regard to the different manner of their operation, *Medicines* are distinguished into *agglutinants*, *alterants*, *stomatics*, *astringents*, *evacuants*, *incarnatives*, *specifics*, &c.

A general idea of the manner wherein *Medicines* operate on a human body, as explained by the sect of mechanical physicians, may be conceived from what follows.

A few different sorts of particles, variously combined, will produce a great variety of fluids; some may have one sort, some two, some three or more. If we suppose only five different sorts of particles in the blood, and call them *a*, *b*, *c*, *d*, *e*; their several combinations, without varying the proportions in which they are mixed, will be these following: but whether more or less, need not be determined.

ab : ac : ad : ae :

bc : bd : be : cd :

ce : de : abc : acd :

abd : abc : ace : ade :

bdc : bde : bec : dec :

abcd : abce : acde : abde : bcde : abcde.

No theory of secretion has hitherto been able to give any tolerable account of the operation of such *Medicines*, as promote an evacuation. For if the humours be equally mixed with the blood, that is, if the blood be in every part of the body the same, and its particles be not more apt to form certain humours in some certain parts of the body, than in others; or if they be not forced, by the power of some *Medicine*, to form such humours; then the quantities of humour, separated in equal times, will always be as the velocity of the blood; but the velocity of the blood is seldom doubled by any *Medicine*, and never tripled by the most acute fever. The quantity of the humour, however, drawn off by evacuating *Medicines*, is often twenty times greater than the natural quantity; and therefore, upon supposition that the humours are every-where equally mixed with the blood, the operation of evacuating *Medicines* can never be accounted for.

Though this argument have the strength of a demonstration, yet there are some who explain the operation of purgative, and other evacuating *Medicines*, by a stimulating faculty; whereby the sluggish juices are not only forced out, but the obstructed canals opened, and the motion of the blood quickened. But though such a power be allowed, it would remain to be explained, why certain *Medicines* do only stimulate certain glands? For it is evident, that evacuating *Medicines* have some other power, besides the squeezing out stagnant juices; because, when they are all squeezed out, they still evacuate as much, if they be repeated, as they did before: as is plain, by continuing a salivation for many days. 20. We cannot suppose, that all bodies have every where, and at all times, juices stagnating; but these *Medicines* constantly produce their effects, more or less, at all times. 30. If the vessels be supposed to be obstructed, an evacuating *Medicine* could but double the quantity that was evacuated, before it was taken. 40. If these *Medicines* operate only these ways, then in a healthful body, where there were no obstructions, they would have no effect at all. 50. If the removing obstructions were the cause of a greater quantity evacuated, then the evacuation should still continue in a greater degree than before the obstruction was removed; whereas, in fact, we constantly find it less, as the *Medicine* works off. 60. Though a *Medicine*, by stimulating a vessel, may quicken the motion of the fluid in that vessel; yet it can never increase the quantity of fluid running through it, in equal spaces of time; because it quickens the motion of the fluid, only by contracting the vessel: and therefore the faster the fluid is made to run through the vessel, the less fluid does the orifice of the vessel admit; and consequently, after the vessel is contracted by the stimulating *Medicine*, the secretion will be less, instead of being greater.

That a stimulus causes the part on which it acts, to contract, is matter of fact; and also that purgative *Medicines* do stimulate the bowels; but it may perhaps be likewise said, they stimulate the heart and arteries, and increase their force, because they not only quicken, but raise the pulse: so that a greater quantity of blood is sent to the glands of the guts. This may be granted;

granted; but not that it is the principal action of purgative *Medicines*; because that, by the same force, a greater quantity of blood is sent to all the other glands of the body, whose fluids are not, however, sensibly increased; and the glands of the intestines receive a less quantity, in proportion, than any others, because they cannot be so much dilated by the greater force of the blood, as others, which are not so much stimulated by the *Medicine*.

There are others, who will have evacuating *Medicines* endowed with an attenuating quality, by which they dissolve all the cohesions of the particles of the blood, and so set the several humours at liberty, to pass through their proper glands: but if these *Medicines* have a power universally to dissolve all the cohesions of the blood, then every evacuating *Medicine* would equally and indifferently increase the quantity of every secretion. Mercury would as constantly purge as salivate, and nitre promote perspiration, as well as urine; but this is repugnant to experience. If they have a power to dissolve certain cohesions, and not others; this is but setting certain particles at liberty, to pass through their proper glands, which were not so before; and is a preparing the humours, in order to increase the quantity of secretion. Evacuating *Medicines* must therefore have a power to affect some particles, and not others; that is, to repel some, and attract, retain, and alter others; and this is what may be affirmed to be in all *Medicines*, and is what a thousand chymical experiments demonstrate.

The several humours then being formed, by the different cohesion of the particles of blood, the quantity of an humour secreted by any gland must be in a proportion compounded of the proportion that the number of the particles cohering in such a manner as is proper to constitute the humour which passes through the gland, bears to the mass of blood; and of the proportion of the quantity of blood that arrives at the gland. And hence it follows, that where there is a determinate quantity of a certain humour to be separated, the number of particles that are proper to compose the secreted liquor, must be reciprocally proportional to the quantity of the blood that arrives at the gland: and therefore, if the quantity of the secretion is to be increased, the number of particles must be increased; if the secretion is to be lessened, the number of particles, proper for such a secretion, must be lessened in the same proportion.

Medicines, therefore, which can alter the cohesions and combinations of the particles, may either increase or diminish the quantity of any secretion. Thus, suppose the humour, which passes through the glands of the intestines, to be composed of three or four several sorts of particles; that *Medicine*, which will easily cohere to those particles, and, by cohering, increase their mutual attractions, so as they may unite in greater numbers at, or before they arrive at the intestines, than they would have done, if the *Medicine* had not been given, must necessarily increase the quantity of humour which passes through the glands of the intestines; if the quantity of blood which arrives at the glands, be not diminished in the same proportion, as the number of particles is increased.—After the same manner do diuretics, sudorifics, and *Medicines* which promote all other secretions, operate.

Why increasing the quantity of some secretions should diminish that of others, is not easy to explain on any other foot: for if the blood be equally mixed, in every part of the body, with all the humours which are separated from it; that is, if the mixture of the blood be every-where alike, so that every humour bears the same proportion to the rest of the arterial blood, in one part of the body, that it does in another; and if every humour has its own proper gland, through which it is separated: then what is separated by one gland, is not subtracted from another; and consequently does not diminish the quantity of humour which flows to this other, but does indeed rather increase the quantity of this other secretion: for the more any one humour is carried off, the greater proportion any other remaining in the blood, bears to the remaining blood: And therefore the more any one secretion is increased, the more all the rest should be increased likewise. But if all the humours be composed by a combination of a few different sorts of particles, then the more apt these particles are to run into any one sort of combination, the less all other combinations must be so; and consequently the increasing any one secretion must necessarily diminish the quantity of all others; but most especially of that, which has the most of the same sort of particles.

See SECRETION, HUMOUR, &c.

Capital Medicines. See the article CAPITAL.

Chalastic Medicines. See the article CHALASTIC.

Hypochondriacal Medicines. See HYPOCHONDRICAL.

Hysterical Medicines. See the article HYSTERIC.

Medietas lingue, an ineffectual impediment, wherof the one half consists of natives or denizens, the other of aliens.

It is used in pleas, wherein the one party is a stranger, and the other a denizen.—Solomon de Stamford, a Jew, in the time of Edward I. had a cause tried before the sheriff of Norwich, by a jury of *sex probi et legales homines, & sex legales Judæus de civitate Norwici.* See JURY.

MEDITATION, an act by which we consider any thing closely, or wherein the soul is employed in the search or consideration of any truth.

In our religion, it is used to signify a consideration of the mysteries, and grand truths, of the Christian faith.

Mythic divines make a great difference between *Meditation* and *contemplation*: The former consists in discursive acts of the soul, considering methodically, and with attention, the mysteries of faith, and the precepts of morality; and is performed by reflections and reasonings, which leave behind them manifest impressions in the brain.—The pure contemplative have no need of *Meditation*, as seeing all things in God at a glance, and without any reflection.

When a man, therefore, has once quitted *Meditation*, and is arrived at contemplation, he returns no more; and, according to Alvarez, never resumes the oar of *Meditation*, except when the wind of contemplation is too weak to fill his sails.

MEDITERRANEAN, something inclosed within land; or that is remote from the ocean.

MEDITERRANEAN is more particularly used to signify that large sea, which flows between the continents of Europe and Africa; entering by the straits of Gionaltar, and reaching into Asia, as far as the Euxine sea, and the Palus Meotis.

The Mediterranean was antiently called the *Grecian Sea*, and the *Great Sea*. It is now cantoned out into several divisions, which bear several names. To the west of Italy it is called the *Ligytic* or *Tuscan Sea*; near Venice, the *Adriatic*; towards Greece, the *Ionian* and *Aegean*; between the Hellespont and the Bosphorus, the *White Sea*, as being very late; and beyond, the *Black Sea*, its navigation being dangerous.—The Arabs call the *Mediterranean Sea* the *chamber-pot*, by reason, it seems, of its resembling the figure of such a vessel.

MEDULLUM is used by anatomists for that spongy substance between the two plates of the cranium, and in the interstices of all laminated bones.

MEDIUM, a Latin term, signifying *middle*, or *mean*. See MEAN.

MEDIUM, in logic, or *Medium* of a *syllogism*, called also the *mean*, or *middle term*, by the Italians, *mezzo termine*; is an argument, reason, or consideration, for which we affirm, or deny any thing: Or it is the cause, why the greater extreme is attributed to, or denied of the less, in the conclusion.

Thus, in the syllogism, 'Every good thing is to be desired; but all virtue is good; therefore all virtue is to be desired.' The term *good* is the *medium*; *virtue* the less extreme, and *to be desired* the greater.

It is called *medium*, as being a kind of mediator between the subject and predicate; or by reason the extremes are so disposed as to affirm, or deny, by means hereof.—Some call it *argumentum tertium*, a third argument; and others simply *argumentum*, as being the cause why we assent to the conclusion.

Mediums, or *middle terms*, are the things principally sought for, in discoursing; so that the invention of *Mediums* makes the most essential part of logic. But the rules commonly given by logicians for that purpose, are mere impertinencies.—In effect, no such rules can be given: Nor have we any way of coming at such *mediums* or reasons, but by a close attention to clear ideas.

MEDIUM, in arithmetic, or an *arithmetical Medium*, or *mean*, called in the schools *Medium rei*, is that which is equally distant from each extreme; or which exceeds the lesser extreme, as much as it is exceeded by the greater, in respect of quantity, not of proportion.

Thus, nine is a *Medium* between six and twelve.

Geometrical MEDIUM, or *mean*, called in the schools *Medium personæ*, is that where the same ratio is preserved between the first and second, as between the second and third terms; or that which exceeds in the same ratio, or quota of itself, as it is exceeded.

Thus six is a geometrical *Medium* between four and nine. See GEOMETRICAL PROPORTION.

This is the *Medium* which virtue is supposed to observe; whence some call it *Medium quadrum*, as, having a view to circumstances, times, places, persons, &c. Distributive justice observes a geometrical *Medium*; commutative justice, an arithmetical one.

MEDIUM participationis, in the schools, is that said to be compounded of the two extremes.—Thus, man, who is partly body, partly mind, is a *Medium* by participation of the two extremes; so, is warmth the *Medium* of heat and cold, &c.

MEDIUM negationis, or *remotionis*, is that, from which both extremes are derived; or, it is a subject capable of receiving both extremes, and yet not necessarily possessed of either.

In which latter sense, the will is a *mean* with respect to virtue and vice; and the understanding, with respect to knowledge and ignorance.

MEDIUM quod, or *Medium suppositi*, is somewhat between the agent and patient, which receives the action of the one, ere it arrive at the other.

In this sense, air is a *Medium* between the fire, and the hand heated thereby.

MEDIUM quo, is the form, or faculty, whereby an agent produces an effect: in which sense, heat is said to be the *Medium* or *mean*, whereby fire acts on the hand.

MEDIUM sub quo, is that which renders the power to act, complete, in general; without determining it to any particular object: in which sense, light is the *Medium* under which the eye perceives any colour.

MEDIUM in quo, is that, by inspection whereof, a power is produced in any thing, of knowing or perceiving another: Such is a speculum, as it shews an object; an image, as it represents the reality, &c.

MEDIUM, in mechanical philosophy, is that space or region, through which a body passes in its motion towards any point.

Thus æther is supposed to be the *Medium*, wherein the heavenly bodies move. Air the *Medium* wherein bodies move near our earth. And water is the *Medium* in which fishes live and move. And glass is also a *Medium* of light, as it affords it a free passage.

That density or consistence in the parts of the *Medium*, whereby the motion of bodies in it is retarded, is called the *resistance* of the *Medium*; which, together with the force of gravity, is the cause of the cessation of motion of projectiles.

Subtile or æthereal MEDIUM.—Sir I. Newton makes it probable, that, beside the particular æreal *Medium*, wherein we live and breathe, there is another more universal one, which he calls an *æthereal Medium*; vastly more rare, *subtile*, elastic, and active, than air; and by that means freely permeating the pores and interstices of all other *Mediums*, and diffusing itself through the whole creation: and by the intervention hereof he thinks it is, that most of the great phenomena of nature are effected.

This *Medium* he seems to have recourse to, as the first and most rem to physical spring; and the ultimate of all natural causes. By the vibrations of this *Medium*, he takes heat to be propagated from lucid bodies; and the intenseness of heat increased and preserved in hot bodies, and from them communicated to cold ones.

By this *Medium* he takes light to be reflected, inflected, refracted, and put alternately in fits of easy reflection and transmission; which effects he also elsewhere ascribes to the power of attraction: so that this *Medium* appears the source and cause even of attraction.

Again, this *Medium* being much rarer within the heavenly bodies, than in the heavenly spaces; and growing denser, as it recedes further from them; he supposes the cause of the gravitation of these bodies towards each other, and of the parts towards the bodies.

Again, from the vibrations of this same *Medium*, excited in the bottom of the eye by the rays of light, and thence propagated through the capillaments of the optic nerves into the sensory, he takes vision to be performed; and so hearing, from the vibrations of this or some other *Medium*, excited in the auditory nerves by the tremors of the air, and propagated through the capillaments of those nerves into the sensory: and thus of the other senses.

And again, he conceives muscular motion to be performed by the vibrations of the same *Medium*, excited in the brain at the command of the will, and thence propagated through the capillaments of the nerves into the muscles; and thus contracting and dilating them.

The elastic force of this *Medium*, he shews, must be prodigious. Light moves at the rate of 70,000,000 miles in about seven minutes: yet the vibrations and pulses of this *Medium*, to cause the fits of easy reflexion, and easy transmission, must be swifter than light, which is yet 700,000 times swifter than sound. The elastic force of this *Medium*, therefore, in proportion to its density, must be above 490,000,000,000 times greater than the elastic force of the air, in proportion to its density; the velocities and pulses of the elastic *Mediums* being in a sub-duplicate ratio of the elasticities, and the rarities of the *Mediums*, taken together. And thus may the vibrations of this *Medium* be conceived as the cause also of the elasticity of bodies.

Further, the particles of this *Medium* being supposed infinitely small, even smaller than those of light; if they be likewise supposed, like our air, to have a repelling power, whereby they recede from each other, the smallness of the particles may exceedingly contribute to the increase of the repelling power, and consequently to that of the elasticity and rarity of the *Medium*, and to fit it for the free transmission of light, and the free motions of the heavenly bodies.—In this *Medium* may the planets and comets roll without any considerable resistance. If it be 700,000 times more elastic, and as many times rarer than air; its resistance will be above 600,000,000 times less than that of water: a resistance that would make no sensible alteration in the motion of the planets in ten thousand years.

And is not such a *Medium* better disposed for the heavenly mo-

tions, than that of the Cartesians, which fills all space adequately, and without leaving pores; and is vastly denser than gold; and therefore must resist more?

If any ask how a *Medium* can be so rare, let him tell how the air, in the upper regions of the atmosphere, can be above an hundred thousand times rarer than gold; how an electrical body can, by friction, emit an exhalation so rare and subtile, yet so potent, as, though its emission occasions no sensible alteration in the weight of the body, yet it shall be diffused through a sphere of two foot in diameter, and carry up leaf-copper, or leaf-gold, at the distance of a foot from the electrical body; or how the effluvia of a magnet can be so subtile, as to pass a plate of glass without any resistance or diminution of force; yet so potent, as to turn a magnetic needle beyond the glass.

That the heavens are not filled with any other, but such a subtile æthereal *Medium*, is evident from phenomena: whence else are those lasting and regular motions of the planets and comets, in all manner of courses and directions? And how are such motions consistent with that resistance, which must result from that dense, fluid *Medium*, wherewith the Cartesians fill the heavens?

The resistance of fluid *Mediums* arises partly from the cohesion of the parts of the *Medium*, and partly from the vis inertiae of matter. The first, in a spherical body, is nearly as the diameter, or, at most, as the factum of the diameter, and the velocity of the body. The latter is as the square of that factum. Thus are the two kinds of resistance distinguished in any *Medium*; and, being distinguished, it will be found, that almost all the resistance of bodies, moving in ordinary fluids, arises from the vis inertiae. That part which arises from the tenacity of the *Medium*, may be diminished, by dividing the matter into smaller parts, and making those more smooth and slippery: but the other will still be proportional to the density of the matter, and cannot be diminished any other way, but by a diminution of the same.

Thus the resistance of fluid *Mediums* is nearly proportional to their densities; and thus the air we breathe, being about nine hundred times lighter than water, must resist about nine hundred times less than water: as, in effect, the same author has found it does by experiments on pendulums. Bodies moving in quick-silver, water, or air, do not appear to meet with any other resistance, but what arises from the density and tenacity of those fluids; which they must, were their pores filled with a dense and subtile fluid.

Heat, it is found, diminishes the tenacity of bodies very much; yet does it not decrease the resistance of water, sensibly. The resistance of water, therefore, arises chiefly from its vis inertiae; consequently, if the heavens were as dense as water, or as quick silver, they would not resist much less: if absolutely dense, without any vacuum, be the particles never so subtile and fluid, they would resist much more than quick-silver. A solid globe, in such a *Medium*, would lose above half its motion, while it moves thrice the length of its own diameter; and a globe not perfectly solid, such as the planets, would lose more.

To make way therefore for the lasting motions of the planets and comets, the heavens must be empty of all matter, except, perhaps, some very fine effluvia, from the atmospheres of the earth, planets, and comets; and some such æthereal *Medium* as we have described.—A dense fluid can serve for no purpose, in the heavens, but to disturb the celestial motions, and make the frame of nature languish; and in the pores of bodies, it can only serve to check the vibrating motion of their parts, wherein their heat and activity consists. Such a *Medium*, therefore, unless we had some evidence of its existence, must be given up; and that given up, the hypothesis of light's consisting in a pressure falls also to the ground.

MEDIUM septum. See the article SEPTUM.

MEDIUS venter, in anatomy, denotes the breast or thorax.

Gluteus MEDIUS. See the article GLUTEUS.

MEDLEY. See the article CHANCE medley.

MEDULLA ossium, or *Marrow of the bone*, is a soft fatty substance, placed in the cavities or pores of divers bones. See MARROW.

The *Medulla* is inclosed in a membrane; and is devoid of sense: it is red in the greater cavities, white in the less, and soft and succulent in spongy bones.

From this is secreted the medullary oil. See MEDULLARY oil.

MEDULLA cerebri and cerebelli denotes the white soft part of the brain and cerebellum, covered on the outside with the cortical substance, which is of a more dark or ashy colour.—See the origin, structure, and use thereof, under BRAIN, and CEREBELLUM.

MEDULLA oblongata is the medullary part of the brain and cerebellum, joined in one; the fore-part of it coming from the brain, and the hind-part from the cerebellum.—See Tab. anat. (osteol.) fig. 1. litt. d. d.

It lies on the basis of the skull, and is continued through the great perforation thereof into the hollow of the vertebrae of the

the neck, back, and loins: though only so much of it retains the name *oblongata*, as is included within the skull. After its exit thence, it is distinguished by the name of *Medulla spinalis*.

The substance of the *Medulla oblongata* being only an aggregate of those of the brain and cerebellum, must, like them, be purely fibrous or nervous, and only an assemblage of minute tubes for the conveyance of the animal spirits. It arises, as it were, from four roots; whereof the two largest spring from the brain, and are called *crura*: the two lesser from the cerebellum, which Dr. Willis calls *pedunculi*.

Upon inverting it, the first thing that appears upon its trunk, is a protuberance, somewhat like a ring, and for that reason called *protuberantia annularis*. Then follow ten pair of nerves, which have their origin here, and are hence sent to the several parts of the body. Immediately under the first pair, or the olfactory, appear two small arteries, or branches of the carotides. The second pair, or optics, being cut off, there appears the infundibulum, which ends in the glandula pituitaria, and on each side, the carotid arteries enter the skull. In the lateral ventricles of the *Medulla* are two prominences on each side, the one pair called *corpora striata*, from the appearance of stripes, or nervous fibres, within them; their outer substance being cortical or glandulous, like the rest of the surface of the brain, though not so deep. Betwixt the *corpora striata* is a broad thin production of the *Medulla*, called *fornix*; and underneath them lie two other prominences, called *thalami nervorum opticorum*. On either side of these is a plexus of blood-vessels, called *plexus choroides*. And under the *fornix* a narrow aperture, called the *rima*, which lets into the infundibulum; which is a passage from the third ventricle to the glandula pituitaria, through the *Medulla* of the brain; being lined with the pia mater. Under this, in the sinus called *fella equina*, or *turcica*, upon the os cribrosum, is the glandula pituitaria; which is surrounded with a plexus of vessels, called *rete mirabile*, only visible in brutes. On the hind-part of the third ventricle is a small foramen, called *anar*, leading to the fourth ventricle of the cerebellum: at the orifice of this is seated a small gland, which, from its fancied resemblance to a pine-apple, is called *conarium*, or *glandula pinealis*; where Des Cartes and his followers, imagine the seat of the soul to be. On the back-side of the *Medulla oblongata*, near the cerebellum, are four protuberances, whereof the upper and larger are called *nates*, the under and lesser *testes*. Between these and the processes of the cerebellum, is the fourth ventricle, from its figure called *calamus scriptorius*. On the *Medulla oblongata*, near its extremity, are four other prominences, two on each side; called *corpora pyramidalia*, and *olivaria*. See OLIVARIA.

MEDULLA spinalis, or the *spinal Marrow*, is a continuation of the *Medulla oblongata*, or medullary part of the brain, without the skull.

It consists, as the brain does, of two parts, a white or medullary, and a cineritious or glandulous one; the former without, and the other within. The substance of the exterior part is much the same with that of the corpus callosum, only somewhat tougher, and more fibrous: which difference becomes the more apparent, as it descends the lower: by reason of the streightness of the cavity, which growing gradually more narrow, presses the medullary fibres closer together, and renders them more compact, and gathers them into more distinct fasciculi, till having descended the whole tract of the spina, they end in the cauda equina. It is the origin of most of the nerves of the trunk of the body: it sends out thirty pair on each side to the limbs, the great cavities, and other parts; which are nothing but fasciculi of medullary fibres, covered with their proper membranes.

The *spinal Marrow* is generally said to be covered with four coats: The first, or external one, is a strong nervous ligament, which ties the vertebrae together, to the inside of which it firmly adheres. The second is a production of the dura mater; it is exceedingly strong, and serves to defend the *spinal Marrow* from any hurt from the flexures of the vertebrae.

The third is a production of the arachnoides, and is a thin pellucid membrane, lying between the dura and pia mater, or the second and fourth membranes of the *Medulla*. This membrane gives a coat to the nerves that go out of the spina, which is the inner membrane of the nerves, as the dura mater gives the outer. The fourth coat is a continuation of the pia mater, and is an extremely thin, fine, transparent membrane; strictly embracing the whole substance of the *Medulla*, dividing it in the middle into two tracts, and making, as it were, two columns of it.—See *Tab. Anat. (osteol.) fig. 6.*

MEDULLARY oil is no more than the finer and more subtle parts of the *Medulla*, or marrow of the bones. See MARROW, and OIL.

This, Dr. Havers observes, passes not into the bones through ducts, but by small pores formed into vesicles or glandules, which are conglomerated into distinct lobules, contained in

several membranes investing the whole marrow; all which vesicles or bags are propagated from the outward coat of the arteries; and by these it passes from one to another, till it arrives at the sides, or extreme parts of the bone. That part of it which is supplied to the interstices of the joints, goes into them by passages, penetrating through the bone into those cavities, and formed for that end. The use of this oil is either common to all the bones, whose temper it preserves, and keeps from being too brittle; or more peculiarly to the joints, where it is very serviceable, 1°. To lubricate the bones at their extremities, that they may move more easily and free. 2°. To keep the ends of the articulated bones from growing hot with motion. 3°. To preserve the joints from wearing by attrition, and rubbing one against another. And 4°. To preserve the ligaments of the joints from dryness and rigidity, and to lubricate those parts which slide upon the bones, and keep the cartilages which are joined to them, flexible.

MEETER. See the article **METRE**.

MEGADOMESTICUS. See **DOMESTIC**.

MEGALENSIA *, or **MEGALESIA**, in antiquity, solemn feasts celebrated among the Romans on the 12th of April, in honour of the great mother of the gods, that is, Cybele or Rhea; wherein were sports or combats held before the temple of that goddess.

* They were called *Megalesia*, from the Greek μέγας, great; Cybele being accounted the great goddess.

MEI miserere. See the article **MISERERE**.

MEINOUR. See the article **MAINOUR**.

MELA, a chirurgion's instrument, called also *speculum*, and by the vulgar, a *probe*. See **PROBE**.

Its use is to probe ulcers, or draw a stone out of the penis: its form is various, according to the use it is intended for. See **SPECULUM**.

MELANCHOLY *, in medicine, a low kind of delirium, without a fever; usually attended with fear, heaviness, and sorrow, without an apparent occasion.

* The word is Greek, μελαγχολία, formed from μέλας, black; and χολή, bile.

The ancients attributed this disease to black and cloudy spirits, arising as vapours from a redundant atrabiliary humour.

Some of the moderns ascribe it to the irregular motion of the spirits, and their acid constitution; and others, who seem to know it better, to too heavy and viscid a blood, which permits not a sufficiency of spirits to be separated in the brain, to animate and invigorate the nerves and muscles: lastly, others attribute it to a dryness of the meninges of the brain.

This disease is varied an infinite number of ways, according to the temperament and ideas of the person affected with it. It is a species of madness, and only differs from a downright mania in degree. See **MANIA**.

MELANOGOQUES *, **MEANOGATA**, are such *Medicines* as are supposed particularly to purge off atra bilis or black choler.

* The word is formed from μέλας, niger, black; and ἀγε, duco, to lead, or draw.

But there is no such species of choler now regarded, and consequently this distinction of evacuants is but little used.

MELASSES. See the article **MOLOSSUS**.

MELCHITES, a religious sect in the Levant, who scarce differ from the Greeks in any thing relating either to faith, or worship; only that they do not speak the Greek language.

The word, in the original Syriac, signifies *royalists*, and was formerly applied by the catholics to the heretics who refused to submit to the decisions of the council of Chalcedon: intimating by this appellation, that they were of the religion of the emperor.

Those now called *Melchites* are such people, as, inhabiting among the Syrians, Coptæ, or Egyptians, and other Levantine nations, follow the opinions of the Greeks, though no Greeks themselves: and it is for this reason that Gabriel Sionita calls them indifferently by the names of *Greeks*, and *Melchites*.

The same author observes, that they are spread through all the Levant; that they deny purgatory; and are declared enemies to the pope and his primacy.—For the rest, they fall in with the Greeks, both as to articles of faith, and discipline.

They have translated the Greek euchologium, and other books of that kind, into Arabic; and have the canons of councils in the same language. To those of the council of Nice they have added new canons, commonly called the *Arabic canons*; which are likewise received by the Jacobites and Maronites: though most of the learned look on them as spurious.

MELCHIZEDECHIANS, or **MELCHISEDEKIANS**, antient sectaries, so called, because they raised *Melchizedec* above all creatures, and even above Jesus Christ.

The author of this sect was one Theodotus : whence the *Melchizedechians* became more commonly known by the name of *Theodotians*; all the difference between those, and the strict *Theodotians*, consisting in that particular article relating to *Melchizedech*; who, according to them, was the great and supreme Virtue.

MELICERIS, ΜΕΛΙΚΡΙΣ, a tumour or abscess inclosed in a cystis; consisting of matter not unlike honey: whence its name. The *Meliceris* is otherwise called *atheroma*.—It gathers without pain, and gives way upon pressure, but returns again: it is to be cured by warm discutients. See **ATHEROMA**.

MELISMATICO *Styl.* See the article **STYLE**.

MELITITES, ΜΕΛΙΤΗΣ, a greyish stone, which, when pulverized, yields with water a milky liquor, of a taste somewhat like honey: whence it takes its name.

It is found in mines of metals, and seems to partake pretty much of the nature of lead; having a sweetness somewhat like that of the fal saturni, but much fainter.

It only differs from the galactite, in that it is milder to the taste. See **GALACTITES**. The antients used it in inflammations of the eyes, and to dry ulcers. See *Supplement*, Article **MELITITES**.

MELIUS inquirendum, a writ which lieth for a second inquiry to be made of what lands and tenements a man died seized, where partiality is suspected upon the writ called *Diem clausit extremum*.

MELODY*, ΜΕΛΩΔΙΑ, in music, is the agreeable effect of different musical sounds, ranged or disposed in a proper succession.

* The word is compounded of the Greek *μελν*, honey; and *ωδν*, singing.

Melody is the effect only of one single part, voice, or instrument; by which it is distinguished from *harmony*: though, in common speech, these two are frequently confounded. Harmony is properly the agreeable result of the union of two or more concurring musical sounds heard in consonance, *i. e.* at one and the same time; so that harmony is the effect of two parts at least: As therefore a continued succession of musical sounds produces *Melody*, so does a continued combination of these produce harmony.

Though the term *Melody* be chiefly applicable to the treble, as the treble is chiefly distinguished by its air; yet so far as the bass may be made airy, and to sing well, it may be also properly said to be *melodious*. Of the twelve harmonical intervals of musical sounds, distinguished by the names of *second lesser*, *second greater*; *third lesser*, *third greater*; *fourth*; *fifth*; *fifth*; *sixth lesser*, *sixth greater*; *seventh lesser*, *seventh greater*; and *Octave*; all *Melody* as well as harmony, are composed: for the octaves of each of these are but replications of the same sound; and whatever is said of any or all of these sounds, is to be understood also of their octaves.

For the rules of *MELODY*, see the article **COMPOSITION**.

MELT. See the article **MILT**.

MELTING-fire. } See the article } **FIRE**.

Surveyor of **MELTING**. } See the article } **MELTING**.

MEMBERS, in anatomy, the exterior parts, arising from the trunk or body of an animal, like the boughs from the trunk of a tree.

In which sense, *Members*, *membra*, amount to much the same with *limbs*, *artus*: Though some make a difference between the two; restraining *Members* more immediately to the fleshy parts which cover the limbs, and *artus* to the bones and nerves. Physicians divide the body into three regions or venters; the head, the breast, and the lower ventricle; and the extremities, which are the *Members*.

Each *Member* and portion of the body was antiently devoted to some divinity: the head to Jupiter, the breast to Neptune, the navel to Mars, the ear to Memory, the forehead to the Genius, the right-hand to Faith or Fidelity, the knees to Mercy, the eye-brows, again, to Jupiter, the eyes to Cupid, or, according to others, to Minerva, the hind-part of the right ear to Nemesis, the back to Pluto, the reins to Venus, the feet to Mercury, the heels and soles of the feet to Thetis, and the fingers to Minerva.

MEMBER, in architecture, denotes any part of a building; as a frieze, cornich, or the like.

MEMBER is sometimes also used for moulding. See **MOULDING**.

MEMBER, in grammar, is applied to the parts of a period, or sentence.

MEMBERED, or **MEMBERED**, in heraldry, is where the legs or feet of an eagle, griffin, or other bird, are of a different colour from the rest of the body.

MEMBRANA, in anatomy.

MEMBRANA communis muscularum. } See { **MEMBRANE**.

MEMBRANA propria muscularum. }

MEMBRANA communis vascularum. }

MEMBRANA adiposa. }

MEMBRANA carnea. }

MEMBRANA nictitans. }

MEMBRANA tympani. }

MEMBRANA urinaria. }

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MEMBRANE, **MEMBRANA**, in anatomy, a similar part of an animal body; being a thin, white, flexible, expanded skin, formed of several sorts of fibres interwoven together, and serving to cover or wrap up certain parts of the body.

The *Membranes* of the body are various; and variously denominated:—Such are the pericosteum, pleura, pericardium, peritoneum, &c. which see under their proper articles. Such also are the *Adiposa*, *Carnosa*, and *Nictitans*.

Those *Membranes* which serve as integuments or covers of vessels, are called *coats* or *tunics*; and those which cover the brain, are, by a peculiar name, called *meninges*.

The fibres of *Membranes* give them an elasticity, whereby they can contract, and closely grasp the parts they contain; and their nervous fibres give them also an exquisite sense, which is the cause of their contractions. They can therefore scarcely suffer the sharpness of medicines, and they are difficultly united, when wounded. In their texture, there is a number of small glands, which separate an humour, fit for moistening the parts they contain. By reason of the thinness and transparency of the *Membranes*, the ramifications of the blood-vessels are more apparently seen in them, than in any other part of the body: here the innumerable divisions, windings and turnings, serpentine progressions, and frequent inosculations, not only of veins and arteries together, but also of veins with veins, and arteries with arteries, make a most agreeable embroidery, and delicate net-work, covering the whole *Membrane*.

The use of the *Membranes* is to cover and wrap up the parts, and strengthen them; to save them from external injuries; to preserve the natural heat; to join one part to another; to sustain small vessels, and the nerves which run through their duplicatures; to stop the returning of the humours in their vessels, as the valves stop the returning of the blood in the veins and heart; of the chyle in the thoracic duct; and of the lymph in the lymphatic vessels.

Anatomists generally assert, that there is a *Membrana communis muscularum*, or *Membrane* common to all the Muscles; being led into that mistake by the aponeurosis of several; whereas, upon stricter observation, there is no such thing to be found.

The *Membrana propria muscularum* is that which immediately covers all and every one of the fibres of a muscle, and is closely tacked to them. There is another common *Membrane*, called *Membrana communis vascularum*; which is a thin *Membrane*, accompanying almost all the vessels of the body.

All these *Membranes* receive veins, arteries, and nerves, from the parts which are nearest to them.

MEMBRANES of the eyes. } See the article { **EYE**.

MEMBRANOSA *armilla*. } See the article { **ARMILLA**.

MEMBRANOSUS, in anatomy, a muscle of the leg, so called, from its large *membranous* expansion inclosing all the muscles of the tibia and the tarsus; whence it is also called *fascia lata*.—See *Tab. Anat. (Myol.) fig. 2. n. 34. fig. 1. n. 48. fig. 6. n. 34.*

It hath a sharp fleshy beginning from the fore-part of the spine of the os ilium; but it soon becomes *membranous*, and covers almost all the muscles of the thigh and leg, down to the foot, where it joins with the ligamentum annulare; and in its action turns the leg outwards.

MEMBRED. See the article **MEMBERED**.

MEME.—*Que est MEME*. See the article **QUE**.

MEMOIRS, or **MEMORIALS**, a term now much in use for histories composed by persons who had some share or concern in the transactions they relate, or who were eye-witnesses of them; answering to what the Latins called *commentarii*.

The French are great dealers in this way of writing, and have an infinite number of books of *Memoirs*, containing, for the generality, the lives, actions, intrigues, amours, &c. of the writers.

MEMOIRS is also used for a journal of the acts and proceedings of a society; or a collection of the matters debated, transacted, &c. therein.—Such are the *Memoirs* of the royal academy of sciences, &c.

MEMORY, ΜΝΗΜΗ, a power, or faculty of the mind, whereby it retains or recollects the simple ideas or images of things we have seen, imagined, understood, &c. See **SOUL**, **POWER**, **FACULTY**, &c.

Of all the faculties, there is none harder to account for, or that has perplexed philosophers more, than the *Memory*. Some will have it a mere organ, as the eye, ear, &c.—Dr. Hook, in an *Essay towards a mechanical account of Memory*, makes it to consist in a stock of ideas or images, formed occasionally by the mind, out of the fine parts of the brain, and disposed or laid by in order.

Des Cartes and his followers maintain, That the animal spirits, exciting a motion in the most delicate fibres of the brain, leave a kind of traces or footsteps, which occasion our *remembrance*. Hence it happens, that, by passing several times

over the same things, the spirits, becoming accustomed to the same passages, leave them open, and to make their way without any effort or labour; and in this consists the ease wherewith we recollect such ideas. Thus wine is found to sharpen the *Memory*, in regard the spirits of the wine put the animal spirits in motion, and agitate the fibres of the brain more briskly.

Father Malebranche expresses his notion of *Memory* thus: 'It being granted, that all our different perceptions are owing to changes happening in the fibres of the principal part of the brain, wherein the soul more immediately resides, the nature of the *Memory* is obvious: for as the leaves of a tree, that have been folded for some time in a certain manner, preserve a facility or disposition to be folded again in the same manner; so the fibres of the brain, having once received certain impressions by the course of the animal spirits, and by the action of objects, preserve, for some time, a facility to receive the same disposition. Now it is in this facility that *Memory* consists; for we think the same things, when the brain receives the same dispositions.

Further, as the animal spirits act sometimes more briskly, and sometimes more languidly, on the substance of the brain; and as sensible objects make much deeper, and more lasting impressions, than the imagination alone; it is easy, on this scheme, to conceive why we do not remember all things alike: why a thing, for instance, seen twice, is represented more vividly to the mind, than another seen but once: and why things that have been seen, are usually remembered more distinctly, than those that have been only imagined, &c.

Old men are defective in *Memory*, and cannot learn anything without much difficulty, because they want animal spirits to make new traces, and because the fibres of the brain are become too hard to receive, or too moist to retain, such impressions. For the same reason, those who learn with the greatest ease, forget the soonest; in regard when the fibres are soft and flexible, objects make a slight impression, which the continual course of animal spirits easily wears off. On the contrary, the fibres of those who learn slowly, being less flexible, and less subject to be shaken, the traces are more deeply engraven, and last the longer.

From all which observations it follows, that the *Memory* is absolutely dependent on the body; being impaired or strengthened, according to the changes that befall the body; a fall, the transports of a fever, &c. being frequently found to erase or blot out all the traces, to bear away all the ideas, and to cause an universal forgetfulness.

The chief difficulty that clogs this doctrine of *Memory* is, to conceive how such an infinite number of things, as the head is stored withal, should be ranged in so much order in the *Memory*, as that the one should not efface the other; and how, in such a prodigious assemblage of traces impressed on the brain, the animal spirits should awake precisely those which the mind has occasion for!

Seneca says of himself, that, by the mere effort of his natural *Memory*, he was able to repeat two thousand words upon once hearing them, each in its order; though they had no dependence or connexion on each other. After which he mentions a friend of his, Portius Latro, who retained in his memory all the declamations he had ever spoken, and never found his *Memory* fail him, even in a single word. He also mentions Cynæas, ambassador to the Romans from king Pyrrhus, who, in one day, had so well learnt the names of his spectators, that the next he saluted the whole senate, and all the populace assembled, each by his name. Pliny says, that Cyrus knew every soldier in his army by name; and L. Scipio, all the people of Rome. Charmidas, or rather Carneades, when required, it is said, would repeat any volume found in the libraries, as readily as if he were reading.—Dr. Wallis tells us, that, without the assistance of pen and ink, or any thing equivalent, he was able in the dark, by mere force of *Memory*, to perform arithmetical operations, as multiplication, division, extraction of roots, &c. to sixty places. Particularly, that, in February 1671-2, at the request of a foreigner (by night, in bed) he proposed to himself a number of fifty-three places, and found its square root to twenty-seven places; and, without ever writing down the number, dictated it from his *Memory*, at his next visit, twenty days afterwards.

Local or artificial MEMORY is an art or invention, by means whereof the *Memory* is supposed to be aided, strengthened, and enlarged.

This art seems to consist in nothing else but a certain method of coupling or associating the ideas of things to be remembered, with the ideas of other things, already disposed orderly in the mind, or that are before the eyes.—It is of an old standing, having been practised by many of the ancient orators; some whereof are said to have made use of paintings, images, and emblems on this occasion: though others contented themselves with the parts, members, ornaments, furniture, and other circumstances of the place where they were to speak. Muretus tells us, that a young man of Corfica pretending to do wonders this way, Muretus put him to the trial: and upon

dictating to him two or three thousand words, some Greek, some Latin, some Barbarous; all without any relation to each other, and the greatest part without any meaning at all; the artist immediately, and without any hesitation, or trouble, stumbled or displacing, repeated them all, from first to last, in the same order wherein they had been dictated; and this done, beginning where he ended, he repeated them all backwards, from last to first. Adding, that this was but a slight essay of his *Memory*; and that he would undertake to repeat thirty-six thousand words in the same manner.

The truth is, this art seems better calculated for retaining things without any coherence or dependence on one another, as mere words or sounds, &c. than for things where reason or judgment are any way required.

Raim. Lully took so much pains with it, that it now goes by his name, being called *Lully's art*.

MEMPHITES, or lapis MEMPHITICUS, a sort of stone mentioned by Diodorides, Pliny, and other natural historians; supposed to be found in Egypt not far from the city of Cairo, the antient Memphis; whence its name.

The property it is famed for is, that, being pulverized, and smeared on any part of the body to be cut off, it deadens it so, as that the patient shall perceive no pain, they say, from the operation. See Supplement, Article MEMPHITES.

MEN.—Midshipmen.

Moat-MEN.

Port MEN.

Quest MEN.

Sides MEN.

Twelve MEN.

Vestry MEN.

See the article

MIDSHIP-MEN.

MOOT-MEN.

PORT-MEN.

QUEST-MEN.

SIDES-MEN.

TWELVE-MEN.

VESTRY-MEN.

MENANDRIANS, the most antient branch of Gnostics; thus called from Menander their chief, a disciple of Simon Magus, and himself a reputed magician.

He taught, that no person could be saved, unless he were baptized in his name: and he conferred a peculiar sort of baptism, which would render those who received it immortal in the next world. St. Irenæus represents him, as pretending to be, that First Virtue hitherto unknown to the world, and to have been sent by the angels for the salvation of all mankind.

He took upon him, says St. Epiphanius, *hæc. 2.* to be greater than his master; which contradicts Theodoret, who makes Menander a subordinate Virtue to Simon Magus, the great Virtue of all. See SIMONTANS.

MENDICANTS, beggars; a term applied to several orders of religious, who live on alms, and go a begging from door to door.

There are four antient orders, which pass principally by the name of the *four Mendicants*: these are, the Carmelites, Jacobines, Franciscans, and Augustines.

Among the number of *Mendicants* are also ranked the Capuchins, Recollects, Minims, and others, who are branches or derivations from the former.

The *Mendicants*, at their first establishment, were rendered capable of having any revenues. The multitude of *Mendicants* is now a heavy tax on the people.

MENIAN column. See the article COLUMN.

MENINGES, MENITÆ, in anatomy, the coats, or membranes, wherewith the brain is invested. See BRAIN.

The Arabs call them mothers; whence we also usually call them in Latin the *pia* and *dura mater*. See *PIA*, and *DURA MATER*.

There are two *Meninges*, external and internal; called *meninx crassa*, and *tenuis*.

Crassa MENINX, or dura mater, is the external one, and the grossest. It lies immediately under the cranium, and covers the whole substance of the brain, and the spinal marrow, and affords a coat to the trunks of the larger nerves. See NERVE, &c. It is connected on the upper part to the pericæstum by means of fibres, and on the under side to the pia mater by the branches of the sinu's, and by the arteries and nerves. It consists of two lesser coats or membranes, which some have taken for two dura maters; the exterior, hard; and the inner, more smooth, soft, and moist. It descends double between the two hemispheres of the brain, which it divides as deep as the corpus callosum; and, by reason of its curvature, occasioned by the convexity of the brain in that part, is called *fala*, from its resemblance to a fiddle. See FALX. It likewise insinuates itself between the brain and cerebellum, and so prevents the brain from lying too hard on the cerebellum. In the duplicatures thereof, are several cavities called *sinu's*, which are a sort of venous canals serving for the conveyance of the blood. Of these there are four considerable ones, viz. the longitudinales and laterales.

MENINX tenuis, or pia mater, lies under the dura mater, immediately under the brain. It is a fine thin membrane adhering so closely, and insinuating itself in such a manner into all the folds and anfractuons parts of the brain, that it is scarce to be separated from it. This membrane covers the whole brain, cerebellum, and medulla oblongata; and serves, together with the other, for the defence of the brain, and the support of its vessels.

Between the two, lies another fine transparent membrane, called

called *arachnoides*; but the best anatomists take this for no more than the external lamina of the pia mater.

MENIPPEAN, *satyra MENIPPEA*, a kind of satyr consisting of prose and verse intermixed.

It is thus called from Menippus, a Cynic philosopher, who delighted in composing satirical letters, &c.—In imitation of him, Varro also wrote satyrs under the title of *satyra Menippeæ*: whence this sort of composition is also denominated *Varronian satyr*.

Among the moderns, there is a famous piece under this title, first published in 1594, against the chiefs of the league, called also the *catholicon* of Spain. It is esteemed a master-piece for the time. See **CATHOLICON**.

MENISCUS, in optics, a glass or lens, concave on one side, and convex on the other; sometimes also called *lunula*. See **LENS**, and **OPTIC GLASS**.

In a *Meniscus*, if the diameter of the convexity be equal to that of the concavity, a ray, falling parallel to the axis, will continue parallel thereto after refraction.

Such a *Meniscus*, therefore, will neither collect nor disperse the rays; and is therefore of no use in dioptrics.

To find the focus of a *Meniscus*, the rule is, As the difference of the semi-diameters of the convexity and concavity is to the semi-diameter of the convexity; so is the diameter of the concavity to the distance of the focus from the *Meniscus*. Hence, if the semi-diameter of the concavity be triple the semi-diameter of the convexity, the distance of the focus from the *Meniscus* will be equal to the semi-diameter: and therefore the *Meniscus* will be equivalent to a lens equally convex on either side.

Again; if the semi-diameter of the concavity be double that of the convexity, the distance of the focus will be equal to the diameter: and therefore the *Meniscus* will be equivalent to a plano-convex lens.

If the semi-diameter of the concavity be quintuple that of the convexity, the *Meniscus* will be equivalent to a sphere.

The semi-diameter, therefore, of the convexity being given; that of the concavity required to remove the focus to any given distance from the *Meniscus*, is easily found.

MENNONITES, a sect in the United Provinces, in most respects the same with those in other places called *anabaptists*.

They had their rise in 1496, in a village in Friesland: their founder was one Mennon, who undertook to reform the religion of the ancient anabaptists, and to throw out all their enthusiasm touching the new kingdom of Christ, &c.

The *Mennonites* hold, that there is no original sin; that the first man was not created just; that, in speaking of the father, son, and holy ghost, we must not use the word *person*, nor that of *trinity*; that Jesus Christ did not take his flesh from the substance of his mother, but from the essence of the father; or that the word of the father became man; that he brought it from heaven; or that we do not know whence he had it, and that the union of the divine and human nature was effected, as that the divine was rendered visible, and liable to death.

The *Mennonites* teach farther, that Christians are not allowed to swear; to exercise any civil magistrature; nor to use the sword, not even for the punishment of criminals. They add, that ministers of the word are not permitted to receive any wages for their work; that they must not baptize little children; and that the souls of men, after death, rest in an unknown place till the day of judgment.

The *Mennonites* are sub-divided into divers sects; whereof the two principal are, the *Mennonites* of Friesland, and those of Flanders.

The latter exercise a very strict church-discipline, and excommunicate persons for the slightest offence; nor do they hold it lawful to have any society or communication with those excommunicated.—Those of Friesland, on the contrary, receive into their communion such as are excommunicated by the others; whence they have been called *separatarii*, and *borboristæ*. Their discipline is very remiss.

They recommend an universal toleration of religions very earnestly, and receive all kinds of persons into their assemblies, provided they be of good morals, and believe the scripture to be the word of God; however divided they may be as to the particular articles of faith.

Though the *Mennonists* usually pass for a sect of anabaptists, yet M. Herman Schin, a *Mennonite* minister, who has published their history and apology, maintains, that they are not anabaptists, either in principle, or by origin. He owns they baptize none but adults; but then, neither do they re-baptize any who had received it in their childhood. They speak with a great deal of prudence and reserve as to the extraordinary operations of the holy spirit; and are far from the fanaticism of the old anabaptists. No people are more submissive to magistrates, or carry passive obedience farther than they. Far from rebellion, they condemn even the most just war, &c.

MENOLOGY*, **MENOLOGIUM**, in the Greek church, is much the same with *martyrology*, or *calendar*, in the Latin.

* The word comes from the Greek, *μην*, month, and *λογος*, discourse.

The Greek *Menologium* is divided into the several months in the year; and contains an abridgment of the lives of the saints, with a bare commemoration of the names of such, whose lives were never written. The Greeks have various *Menologies*; and the Romans tax them with inserting divers heretics in their *Menologies* as saints. Baillet treats of them at large.

MENSÆ domesticus. See the article **DOMESTICUS**.

MENSALIA, **MENSALS**, such personages, or livings, as were formerly united to the tables of religious houses; and therefore by canonists called *mensal* benefices. See **PARSONAGE**, and **BENEFICE**.

MENSES*, **CATAMENIA**, in medicine, the monthly evacuations from the uterus of women not with child, or not giving suck.

* They are so called from *mensis*, month, the period wherein they return. They are also called *flumen*, *confluxus*, &c.

The *Menses* make one of the most curious and difficult phenomena in the whole human body; for the explanation whereof many hypotheses have been framed; though the matter is yet scarcely ascertained.

It is generally agreed by all, that the necessity women are under for some extraordinary supply to compensate the expence, and support them during the time of gestation, was the final reason why this redundancy at other times was given them. But this is all they agree in. Some, not content with this occasion alone, will have the *menstruous* blood offend in quality more than quantity; which they argue from the pain it gives many women in the evacuation. They add also, that its malignity is so great, that it exoriates the parts of men by mere contact; that the breath of a *menstruous* woman will give a permanent stain to ivory, or a looking-glass; that a little of the blood, dropped on any vegetable, blights, or renders it sterile; that, if a pregnant woman be defiled with the *Menses* of another woman, she miscarries; that, if a dog tastes them, he runs mad, and grows epileptic: all which, with many more fables of the same kind, though related by great authors, Dr. Drake rejects, as too ridiculous to need a refutation.

Others ascribe this effect to an imaginary dominion of the moon over the bodies of women.—This was formerly the prevailing opinion; though the smallest reflection would have shewn the weakness of it: for, had this purgation been owing to the influence of the moon, all women, of the same age and temperament, would have found it at the same periods and revolutions of the moon, *i. e.* at the same time; which all experience shews to be false.

There are two other opinions, which carry with them great probability, and are argued with a great deal of strength and reason. In both which, the quality of the blood is allowed to be innocent; but they still differ about the reason of its issue.

—The former is that of Dr. Bohn and Dr. Freind, who maintain this flux to be the result of a plethora, or plenitude; and to be evacuated only for relief against the quantity.

Dr. Freind, who has maintained the cause of a plethora with the greatest strength and clearness, supposes, that this plethora arises from a conservation in the blood-vessels of a superfluity of aliment, which, he thinks, remains over and above what is expended by the ordinary ways; and that women have this plethora, and not men, because their bodies are more humid, and their vessels, especially the extremities of them, more tender, and their manner of living generally more inactive, than that of men; and that these things concurring, are the occasion that women do not perspire sufficiently to carry off the superfluous alimentary parts, till they be accumulated in such quantity as to distend the vessels, and force their way through the capillary arteries of the uterus. It is supposed to happen to women more than the females of other species, which have the same parts, because of the erect posture of the former, and the vagina, and other canals, being perpendicular to the horizon; so that the pressure of the blood is directed towards their orifices: whereas, in brutes, they are parallel to the horizon, and the pressure wholly is on the sides of those vessels. The discharge, he thinks, happens in this part rather than in any other, as being more favoured by the structure of the vessels; the arteries being very numerous, and the veins sinuous and winding, and therefore more apt to retard the impetus of the blood; and consequently, in a plethoric case, to occasion the rupture of the extremities of the vessels, which may last, till, by a sufficient discharge, the vessels are eased of their overload.

This is the substance of Dr. Freind's theory; from whence he very mechanically, and very philosophically, accounts for the symptoms.

To his argument, why women have *Menses* rather than men, we may add from Boerhaave, that, in the former, the os sacrum is wider, and stands farther out, and the os coccygis farther in; the ossa innominata wider, and farther apart, and the lowest of them, as well as the lower eminences of the os pubis, farther outwards than in the latter. Hence, in women, the latitude or expansion about these bones, and the capacity of the pelvis, is vastly great in proportion to those of men; and

yet,

yet, in a woman not pregnant, there is not much to fill this expanse. Again, the fore-side of the thorax is smoother in women than in men, and the blood-vessels, lymphatics, adipose, and nervous vessels, membranes, and fibres, are much laxer in women than in men: whence all their cavities, cells, vessels, &c. are more easily replenished, and the humours aggregated in them; besides, that they are found to perspire less than men, and to arrive much sooner at their maturity, or *apex* of increase. To which he adds the consideration of the soft pulpy texture of the uterus, and the vast number of veins and arteries it is filled withal.

Hence, an healthy maid, being arrived at her growth, begins to prepare more nutriment than is required for the support of the body; which, as there is not to be any farther accretion, must, of necessity, fill the vessels, and especially those of the uterus and breasts, they being the least compressed. These will be dilated more than the others; whence the lateral vasculæ evacuating their humour into the cavity of the uterus, it will be filled, and extended. Hence a pain, heat, and heaviness, will be felt about the loins, pubes, &c. the vessels of the uterus at the same time will be so dilated, as to emit blood into the cavity of the uterus, and its mouth will be lubricated and loosened, and blood issue out. As the quantity of blood is diminished, the vessels will be less pressed, and will contract themselves again closer, so as again to retain the blood, and let pass the grosser part of the serum; till at length only the usual serum passes. Again, there are more humours prepared, which are more easily lodged in vessels once dilated; and hence the *Menses* go and return at various periods in various persons.

This hypothesis, however plausible, is opposed by Dr. Drake, who maintains, that there is no such repletion, or, at least, that it is not necessary to menstruation; arguing, that, if the *Menses* were owing to a plethora of accumulated, the symptoms would arise gradually, and the heaviness, stiffness, and inactivity, necessary symptoms of a plethora, would be felt long before the period were completed, and women would begin to be heavy and indisposed soon after evacuation, and the symptoms would increase daily: which is contrary to all experience; many women, who have them regularly and easily, having no warning, nor any other rule to prevent an indecent surprize, than the measure of the time; in which, some that have slipped, have been put to confusion and shifts, no-ways consistent with the notice a plethoric body would give. He adds, that, even in those who are difficultly purged this way, the symptoms, though very vexatious and tedious, do not make such regular approaches, as a gradual accumulation necessarily requires. If we consider what violent symptoms come on in an hour, we shall be extremely puzzled to find the mighty accession of matter, which should, in an hour or a day's time, make such great alterations. According to the hypothesis, the last hour contributes no more than the first, and, of consequence, the alteration should not be greater in the one than the other; setting aside the bare eruption.

This is the substance of what is argued against Dr. Freind's theory; which, it must be owned, notwithstanding these objections, is still the most rational and consistent that has yet been advanced.

Those who oppose it, give into the doctrine of fermentation, and maintain the evacuation of blood in those parts to be the effect of an effervescence or ebullition of the blood. This opinion has been maintained by many, particularly by Dr. Charle-ton, Bale, De Graaf, and Drake; the two first of whom suppose a ferment peculiar to the women, which produces this flux, and affects that part only, or at least principally. Dr. Graaf, less particular in his notion, only supposes an effervescence of the blood raised by some ferment, without assigning how it acts, or what it is. The sudden turgescence of the blood occasioned them all to think, that it arose from something till then extraneous to the blood, and led them to the parts principally affected to seek for an imaginary ferment, which no anatomical inquiry could ever shew, or find any receptacle for, nor any reasoning necessarily infer. Again, that heat, which frequently accompanies this turgescence, led them to think the cause more than a plethora, and that there was some extraordinary intestine motion at that time.

Dr. Drake improves on the doctrine of a ferment; and contends, not only that it is necessary there should be a ferment, but a receptacle also for this ferment; concluding, from the suddenness and violence of the symptoms, that a great quantity must be conveyed into the blood in a short time, and consequently, that it must have been ready gathered in some receptacle, where, while it was lodged, its action was restrained. But he goes farther still, and pretends to ascertain the place, &c. both of the one and the other, making the gall-bladder to be the receptacle, and the bile the ferment. This liquor he thinks well adapted to raise a fermentation in the blood, when discharged into it in a quantity; and, as it is contained in a receptacle that does not admit of a continual issue, it may be there reserved, till, in a certain period of time, the bladder becoming turgid and full, through the compression of the incumbent viscera, it emits the gall; which, by

the way of the lacteals, insinuating itself into the blood, may raise that effervescence, which occasions the aperture of the uterine arteries.

To confirm this, he alleges, that persons of a bilious constitution have the *Menses* either more plentifully, or more frequently, than others; and that distempers, manifestly bilious, are attended with symptoms resembling those of women labouring under difficult menstruation. If it be objected, that, on this foot, men should have *Menses*, as well as women, he answers, that men do not abound in bile so much as women; the pores of the former being more open, and carrying off more of the ferous part of the blood, which is the vehicle of all the other humours; and consequently a greater part of each is discharged through them than in women, wherein the superfluity must either continue to circulate with the blood, or be gathered in proper receptacles; which is the case in the bile. The same reason he gives why menstruation should not be in brutes; the pores of these being manifestly more open than those of women, as appears from the quantity of hair which they bear; for the vegetation whereof, a large cavity, and a wider aperture of the glands, is necessary, than where no such thing is produced: yet there is some difference between the males and females even among these, some of the latter having their *Menses*, though not so often, nor in the same form and quantity, as women.

He adds, that the several phenomena of the *Menses*, whether in a natural, a regular, or diseased case, flow naturally and readily from this hypothesis; and that whatever may be accounted for from a plethora, or from any particular ferment, may, without any straining, be applied to this.

The root of black heliobore, and steel, are the principal remedies for obstructions of the *Menses*: the former is almost infallible, and in many cases where the latter is not only ineffectual, but improper, as in plethoric habits; for, with such, steel will sometimes raise hysterical commotions, convulsions, and a kind of uterine tumor; whereas heliobore thins the blood, and disposes it for a discharge, without making it more impetuous; so that both provoke the *Menses*, yet they do it by different ways; steel by increasing the blood's velocity, and giving it a greater moment against the uterine arteries; and heliobore by dividing it, and rendering it more fluid. See Supplement, Article MENSES.

MENSIS.

MENSIS chymicus.

MENSIS uterinus.

See MONTH. MENSTRUUM. FENCE month.

MENSTRUUM, or MENSTRUOUS, a term in medicine, applied to the blood which flows from women in their ordinary monthly purgations.

The *menstrual blood* is the excess or redundancy of the blood in the body. It may be defined an excrement serving for the formation, as well as nutrition, of the fœtus in the womb, and which, at other times, is evacuated monthly.

Of all animals, there are none besides women, and perhaps apes, which have their regular *menstrual* purgations.—Hippocrates says, that the *menstrual* blood gnaws and tears the earth like vinegar. Pliny and Columella add, that it burns herbs, kills plants, tarnishes looking glasses; and that dogs which taste it, run mad. But this is all fabulous; it being certain, that this blood is the same with that in the veins and arteries.

By the Jewish law, a woman was unclean while the *menstrual* blood flowed: and the man who touched her, or the moveables he had touched, was declared unclean. Levit. c. xv.

MENSTRUUM epactis.

MENSTRUUM, longitude of the moon.

See SPACT. ARGUMENT. MENSTRUUM*, SOLVENT, or DISSOLVENT, in chymistry, any liquor that will dissolve, that is, separate the parts of hard bodies.

* The term takes its rise from this, that some chymists pretend the complete dissolution of a mixed body cannot be effected in less than forty days; which period they call a *philosophical month*.

Aqua regalis is a *Menstruum* for gold; aqua fortis, and spirit of nitre, for most other metals; and common water for salts, &c. *Menstruum* is properly defined a body, which, being applied to, or intermixed with another, does so dissolve it, as that all the dissolving parts float among the parts dissolved, and so divides it into its minutest parts, as that the parts of the dissolved are intermixed with those of the body dissolved.—Whence it appears, that every *Menstruum*, in dissolving a body, is likewise dissolved itself; so as, with the body it dissolves, to make up one body. A knife therefore divides bread; but is not on that account a *Menstruum*, as it does not constitute one body with the bread: but water boiled with the bread is a *Menstruum* with regard to the bread, as it only makes up one body therewith.

MENSTRUUMS may be divided into two classes; the first consists of such as are fluid; the second of such as are solid; that is, they are either actually divided, or they must be so ere they act.

Fluid MENSTRUUMS are water, dew, oils, saline and acid spirits, alkali, salts, &c.

Solid MENSTRUUMS are such as must be made fluid ere they will dissolve; such are most salts, nitre, vitriol, &c.

All *menstruums*, at the time they act as such, that is, at the time they are dissolving, act as fluids; whether such *menstruum* be a fluid, or a solid. Thus, *e. gr.* silver is a *menstruum* with regard to gold; for if you take an ounce of silver, melt it in the fire, and add a grain of gold, all the parts of the silver will intermix themselves with the parts of the gold; so as that the gold and silver, which before were separate, now make but one mass.—But gold and silver are only *menstruums* as they are dissolved by the fire; *i. e.* as they are rendered fluid.

As to the action of MENSTRUUMS, Sir Isaac Newton accounts for it from the acids wherewith they are impregnated. The particles of acids are found to be endued with a strong attractive force, wherein their activity consists, and by virtue whereof they dissolve bodies. These acids he supposes of a middle nature between water and hard bodies, and to attract both. By this attraction they gather together about the particles of bodies, whether metallic, stony, or the like, and adhere to them very close, so as scarce to be separable from them by distillation, or sublimation. Thus strongly attracted, and gathered together on all sides, they raise, disjoin, and shake asunder the particles of bodies, *i. e.* they dissolve them; and by the attractive power whereby they rush against the particles of the bodies, they move the fluid, and so excite heat, shaking some of the particles to that degree, as to convert them into air, and so generating bubbles. See ACID.

Dr. Keil gives us the theory or foundation of the action of *menstruums*, in the following propositions.

10. Two corpuscles may be placed so near each other, without touching, as that the force wherewith they attract each other, shall easily exceed that of their gravity.

20. If a corpuscle placed in a fluid be every way equally attracted by the ambient particles, the corpuscle will not be put in any motion; but if it be attracted more by some of the particles than by others, it will then tend towards that quarter where the attraction is the strongest: and the motion thus produced will be correspondent to the inequality of the attraction; that is, if the inequality be great, the motion will be so; and, if little, little.

30. Corpuscles swimming in a fluid, and attracting each other more than the interposed particles of the fluid; those particles of the fluid will be driven aside, and the corpuscles approach each other with a force equal to the excess of their mutual attraction, beyond the attraction of the particles of the fluid.

40. If a body be placed in a fluid, whose parts attract the particles of the fluid more strongly than those particles are attracted by one another, and if in the body there be several pores pervious to the particles of those fluids, the fluid will presently diffuse itself through the pores; and if the connexion of the parts in that body be not so strong, as that it may be exceeded by the impetus of the particles rushing together, the immersed body will undergo a dissolution.

Hence, for a *menstruum* to be fit to dissolve a given body, there are three things required. 10. That the parts of the body attract the particles of the *menstruum* more strongly than those are attracted by each other. 20. That the body have pores adequate and pervious to the particles of the *menstruum*. 30. That the cohesion of the parts of the body be not so strong, but that it may be torn asunder by the impetus of the particles rushing together. Hence also it follows, that the particles which constitute spirit of wine, are more strongly attracted by each other, than by those of a saline body immersed in it.

Hence we see the reasons of the different effects of different *menstruums*; why some bodies, for instance, metals, dissolve in a saline *menstruum*; others again, as resin, in a sulphureous one, &c. particularly why silver dissolves in aqua fortis, and gold only in aqua regalis; all the varieties whereof are accountable for, from the different degrees of cohesion, *i. e.* of attraction in the parts of the body to be dissolved, the different diameters and figures of its pores, the different degrees of attraction in the *menstruum*, and the different diameters and figures of its parts.

Suppose, *e. gr.* the attraction of gold to that of silver to be as a to b ; and of silver to aqua fortis as b to d ; but that of aqua fortis to aqua regia as d to e ; let f signify the magnitude of particles in aqua fortis, and r those in aqua regia; c the cohesion of gold, and g the cohesion of silver: if the diameters of the particles f be greater than the diameters of the pores of gold, they can never dissolve the gold, let their attractive force be ever so strong. But if $b-fxa$ be greater than g , then the silver will yield to the *menstruum* whose particles are f , and less than the pores of the silver; and if $b-exr$ be less than g , the silver will never dissolve in the *menstruum*, the particles whereof are r , and the attractive force e . But if $a-exr$ be greater than c , the *menstruum* made up of the particles r , and whose attractive force is e , will be able to penetrate and dissolve the gold.

How a *menstruum* may suspend bodies much heavier than itself, which very often happens, may be conceived by considering, that the parts of no fluid can be so easily separated, but they will a little resist, or retard the descent of any heavy bodies

through them; and that this resistance is, *ceteris paribus*, still proportionable to the surface of the descending bodies; but the surfaces of the bodies do by no means increase, or decrease, in the same proportion as their solidities do; for the solidity increases as the cube, but the surface only as the square of the diameter. Small bodies, therefore, will have much larger surfaces, in proportion to their solid contents, than larger bodies will; and consequently, when exceedingly diminished, may easily be buoyed up in the liquor.

MENSTRUUM, in pharmacy, chiefly denotes a body that will extract the virtues of ingredients by infusion, decoction, or the like. See EXTRACT, INFUSION, and DECOCTION.

MENSTRUUM peracutum is a name given by Mr. Boyle to a *menstruum* he extracted from bread only, that would prey on bodies more compact than many hard minerals, nay, even on glass, and do many things that aqua fortis would not do.—With this he drew tinctures not only from crude corals, but also from the lapis hematites, and granates, nay, from diamonds and rubies.

MENSURATION, the act or art of measuring. See MEASURING.

MENTAL, something that relates, or is restrained, to the operation of the understanding.

Thus, a *mental* prayer is such a one as is made merely in the mind, without pronouncing one word of it.

Mental reservations are the refuge of hypocrites. See RESERVATION.

MENTUM, in anatomy, the lower part of the face, beneath the mouth; which we otherwise distinguish by the name of chin. See FACE.

MEPHITIS, or **MEPHITICAL exhalation**, denotes a poisonous and noxious steam issuing out of the earth, and chiefly from a sulphurous principle.

The most remarkable exhalation of this kind is that in the Grotto del Cane near Puzzoli, about two miles from Naples, in Italy; the steam of which kills dogs, or other animals, when brought within its reach: a very curious account of which, and the manner of its efficacy, is given by Dr. Mead, in his essay on poisons. See Supplement, article EXHALATIONS.

MER—Ouster le MER. See the article OUSTER.

MERCATOR'S chart, or *projection*, is a sea-chart, or projection of the surface of the earth in plano, wherein the meridians, parallels, and rhumb-lines, are all represented by straight lines; the meridians being likewise parallel; though their degrees are not equal, but are continually enlarged as they approach nearer the pole, in the same proportion as the parallel circles on the globe decrease as they approach the pole; that is, in the ratio of the radius to the sine complement of the latitude.

For the construction, use, advantages, &c. hereof, see *Mercator's CHART*.

MERCATOR'S sailing is that performed loxodromically, by means of *Mercator's charts*. See *Mercator's SAILING*.

MERCHANDICE, or **MERCANTILE profession**, the function of a merchant; or the art, method, &c. of exercising a wholesale commerce.

The *mercantile* profession is esteemed noble, and independent. In France, by two arrests of Louis XIV. the one of 1669. the other of 1701. the nobility are allowed to trade, both by land and sea, without derogating from their nobility: and we have frequent instances of merchants ennobled in that country, in regard of the utility of their commerce, and the manufactures they have set up. In Bretagne, even a retail trade does not derogate from nobility.

When the nobles of that province are disposed for commerce, they let their nobility sleep; that is, they do not lose it, but only cease to enjoy the privileges of their nobles while their commerce continues, and re-assume it, on their giving over trade, without any letters or instrument of re-habilitation.

In republics trading is still more valued; but no-where more than in England, where the younger sons and brothers of the best families are frequently bred up to *merchandise*. Add to this, that many of the Italian princes are the principal merchants of their states; and think it no discredit to make their palaces serve as warehouses: and that many of the kings of Asia, and most of those of the coast of Africa and Guiney, traffick with the Europeans, sometimes by their ministers, and sometimes in person.

The principal qualifications requisite for the profession of a *merchant*, are, 1. To know how to keep books single or double, viz. journals, ledgers, and others. 2. To draw invoices, contracts, charter-parties, policies of assurance, bills of exchange, letters missive, &c. 3. To know the relation between the money, weights, and measures, of several countries. 4. To know the places where the several kinds of *merchandise* are manufactured, in what manner made, what the materials composed of, and whence; the preparation the materials require before they are wrought; and the merchandises afterwards. 5. The lengths and breadths of stuffs, as silks, wools, hairs, linens, &c. the regulations of the places where they are manufactured, and their different prices at different seasons. 6. The dying, and the ingredients for the formation of the different colours. 7. The *merchandises* that abound, or are more rare, in one country than another; their

kinds and qualities; and the manner of trafficking in them to the best advantage, whether by land, by sea, or rivers. 8. The commodities permitted or prohibited, both for the import and export of a state. 9. The price of exchange, according to the course of several places, and what it is that raises or lowers it. 10. The duties to be paid, both at the import and export of wares, according to the usage of the place, the tariffs, regulations, &c. 11. The manner of packing, bailing, and tuning *Merchandises*, to keep them either in magazines, or in voyages, &c. 12. On what terms a merchant-vessel may be freighted and insured. 13. The goodness and value of every thing requisite for the construction or refitting of vessels, the prices of woods, cordage, masts, anchors, sails, and other necessaries. 14. The wages ordinarily given captains, officers, and sailors; and the manner of contracting with them. 15. The foreign languages, which may be reduced to three principal ones, *viz.* the Spanish, used almost through all the east, particularly on the coast of Africa, from the Canaries to the Cape of Good Hope; the Italian, used throughout the coasts of the Mediterranean, and many places of the Levant; and the Teutonic or German, used throughout most countries of the north. 16. The consular jurisprudence, the laws, customs, companies, colonies, chambers of insurance, consulates in the several countries; and, in general, all the ordinances, regulations, and policies, relating to commerce.

MERCHANT, a person who carries on merchandize, or sustains the mercantile profession. See **MERCHANTICE**.

MERCHANT-ship. See **SHIP**.

Law MERCHANT.

Statute MERCHANT.

Tenant per statute MERCHANT. See **LAW**.

MERCHENLAGE, the law of the Mercians. See **LAW**.

MERCURE galant. See the article **GALANT**.

MERCURIAL, something that consists of, or bears a relation to, *Mercury*, or quick-silver.

We say also, a *mercurial* person, to denote a person of a brisk, volatile complexion; such persons being supposed by astrologers to be under the more immediate influence of the planet *Mercury*. We say, *mercurial* fumes, *mercurial* spirits, &c. with reference to the mineral *Mercury*.

MERCURIAL medicines.

MERCURIAL phosphorus.

MERCURIAL salivation.

MERCURIAL thermometer.

MERCURIAL unguents, frictions, &c.

MERCURIAL waters.

MERCURIALS, medicines composed of, or prepared, of *Mercury*, or quick-silver. See **MERCURY**.

The principle of the class of *Mercurials* are, mercurius albus, or white precipitate of mercury; sweet and corrosive sublimate of mercury; calomel; artificial cinnabar; turbit mineral; prince's powder; æthiops mineral, &c. See each under its proper article.

The medicinal efficacy of mercury depends on its extreme divisibility, and the fineness of its particles, and on their gravity, or weight. By means of the first, it finds a passage into the inmost recesses of the animal structure, and, when properly guarded, does not exert itself till it comes in the remotest scenes of action; where most other medicines either do not arrive, or at least not till their force is rebated.—This property it has in common with camphor.

By the latter, it is enabled to make still more considerable alterations in the animal economy, by rendering the fluids thinner, and breaking open the secretory passages: and this effect it has in common with chalybeats.

It may be added, that the same property whereby it becomes so powerful a deobstruent, indicates, that it is to be avoided in hæmics, and all cases where the constitution is drawn low by too profuse evacuations; in regard *Mercurials* tend to keep up or increase the excess of impetus in the fluids, and that overcapacity in the secretory orifices, wherein the defect of such a constitution seems to consist.

MERCURY, γ , in astronomy, the smallest of the inferior planets, and the nearest the sun.

The mean distance of *Mercury* from the sun is to that of our earth from the sun as 387 to 1000; its eccentricity 8 degrees.

The inclination of its orbit, that is, the angle formed by the plane of its orbit with the plane of the ecliptic, is 6 degrees 52 minutes; its diameter to that of the earth as 3 to 4: and therefore the globe of *Mercury* will be to that of the earth as 2 to 5.

According to Sir Isaac Newton, the heat and light of the sun on the surface of *Mercury* are seven times as intense as on the surface of the earth in the middle of summer: which, as he found by experiments made for that purpose by a thermometer, is sufficient to make water boil. Such a degree of heat therefore must render *Mercury* uninhabitable to creatures of our constitution. And if bodies on its surface be not inflamed, and set on fire, it must be because their degree of density is proportionably greater than that of such bodies is with us. The revolution of *Mercury* round the sun, or his year, is performed in eighty-seven days, twenty-three hours; his diurnal

revolution, or the length of his day, is not yet determined; nor is it certain whether he has such a motion round his own axis, or not.

What variety of weather or seasons it may be liable to, we are still also at a loss; as not knowing the inclination of his axis to the plane of his orbit. The force of gravity on the surface of *Mercury* is seven times as strong as on the surface of the earth. Its density, and consequently the gravitation of bodies towards the centre, cannot be accurately determined; but no doubt it must exceed that of our earth, by reason of the excess of heat there.

Mercury changes its phases, like the moon, according to its several positions with regard to the sun and earth. It appears full, in its superior conjunctions with the sun, because we can see the whole illuminated hemisphere: but, in its lower conjunction, we only see the obscure or unilluminated hemisphere: in his approach towards the sun, his light is faltered or horned.

The situation of this planet proves evidently, that the hypothesis of Ptolemy is false: for *Mercury* is sometimes observed betwixt the earth and sun; and sometimes beyond the sun. But the earth is never found between *Mercury* and the sun; which however must happen, if the spheres of all the planets incompassed the earth, as a centre, according to the Ptolemaic scheme.

The diameter of the sun, viewed from *Mercury*, would appear three times as big as it appears on our earth; that planet being thrice as near him as we are; and therefore the sun's disk would appear seven times as large as to us.

Mercury's greatest distance from the sun, with regard to us, never exceeds twenty-eight degrees; whence it is seldom visible, being commonly either lost in the sun's light, or, when the most remote from the sun, in the crepusculum. The best observations of this planet are those made when it is seen on the sun's disk; for, in its lower conjunction, it passes before the sun like a little spot, eclipsing a small part of his body, only observable with a telescope. The first observation of this kind was that of Cassendi in 1632. See **TRANSIT**.

To an inhabitant of *Mercury*, the solar spots will appear to traverse his disk sometimes in a right line from east to west, and sometimes elliptically. As the other five planets are above *Mercury*, their phenomena will be nearly the same there, as with us. Venus and the earth, when in opposition to the sun, will shine with full orbs, and afford a noble light to that planet.

MERCURY, in chymistry and natural history, denotes a fluid, mineral matter, perfectly resembling silver in fusion. See **MINERAL**.

Mercury is known under a great number of denominations: the common name among the ancients was *hydrargyrum*, q. d. water of silver. The moderns commonly call it *Mercury*, from some supposed relation it bears to the planet of that name. In English it is popularly called *quick-silver*, from its appearance. Many of the chymists call it *Proteus*, from the variety of forms, colours, &c. it passes through in their preparations.

Naturalists are divided what class of fossils to range *Mercury* under: some make it a metal; others a semi-metal; and others an imperfect metal.

Boerhaave observes, that it is very improperly called a *metal*, inasmuch as it has not all the characters of such a body; nor scarce any-thing in common with the other metals, except weight, and similarity of parts: thus, for example, it is neither dissolvable by fire, nor malleable, nor fixed. In effect, it seems to constitute a peculiar class of fossils; and is rather the mother or basis of all metals, than a metal itself.

Perfect metals, according to M. Homberg, &c. are nothing but pure *Mercury*, whose little particles are penetrated on all sides, and filled with the matter of light, which unites and binds them together into a mass, so that the parts of fluid *Mercury*, which are supposed to be little solid globes, in their metallification are rendered rough and uneven, being pierced on all sides, and having their pores or perforations filled with the matter of light. By such means they lose their first conformation, and the politure or smoothness of their surfaces, which is one of the principal causes of the fluidity of *Mercury*.

The chymists make *Mercury* one of their hypostatical principles: not, as M. Homberg observes, that it answers the character of a principle, which is that, whose substance cannot be analysed, or reduced into matters more simple; but because the analysis has not yet been discovered: though it is possible it may hereafter, there being little doubt but that *Mercury* is a compound. This is the more probable, in regard *Mercury* may be destroyed; which never happens to simple bodies. The manner of destroying *Mercury* is, first, by changing it into a perfect metal, by introducing a sufficient quantity of light within its substance; and then exposing this metal to a burning-glass, where, in a little time, it evaporates almost wholly into smoke, leaving nothing behind but a light earthy dust.

Characters or properties of MERCURY are, first, That of all bodies it is the heaviest, after gold; and still the purer it is, the heavier: nay, some of the philosophers even hold, that *Mercury*, well purged of all its sulphur, would be heavier than gold.

gold itself. The ordinary proportion between them is that of fourteen to nineteen. If any *Mercury* be found to weigh more than according to this ratio, it may be safely concluded to have gold in it.

The second character of *Mercury* is, To be of all bodies the most fluid; that is, its parts separate, and recede from each other, by the smallest force.—Consequently, of all bodies it is that whose parts cohere the least, or are the least tenacious; and therefore of all others it is the least ductile and malleable. The parts of water do not divide so readily as those of quick-silver; and the parts of oil much less: there is a certain tenacity even in the parts of spirit of wine, which resists separation; but there is scarce any cohesion at all in the parts of *Mercury*.

The third property of *Mercury*, which, indeed, depends on the second, is, That of all bodies it is divisible into the minutest parts.—Thus, being exposed to the fire, it resolves into a fume scarce perceivable to the eye; but, in whatever manner it be divided, it still retains its nature, and is the same specific fluid. For the vapours of distilled or volatilized *Mercury*, received in water, or on moist leather, or the like, become pure *Mercury*; and if *Mercury* be mixed with other bodies, in order to fix it (for it is scarce fixable of itself), it is easily separable from them again by fire, and reducible into pure *Mercury* as before.

The fourth character is, To be extremely volatile, being convertible into a fume even by a sand-heat. In effect, it does not sustain the fire long enough either to boil, or to ignite. Though it must be added, if the fire be at first very gentle, and increase by easy degrees, it may be retained therein a pretty long time, and be fixed so at length as to become ignited in the crucible, as we learn from some very tedious experiments made at Paris.

The gilders are but too well acquainted with the vapours of *Mercury*, which frequently render them epileptic and paralytic, and sometimes salivate them; being of so penetrating a nature as to take away any feirrhous tumours, though very apt to reach and destroy the nobler parts.

The fifth property of *Mercury* is, that it easily enters, and intimately adheres to gold, less easily to other metals, with difficulty to copper, and scarce at all to iron. See AMALGAMATION.

Indeed we have heard much among the adepts about making an amalgam with *Mercury* and iron; but the experiment would never succeed with that industrious chymist Dr. Boerhaave. It is possible there may be some way of binding those two bodies together; and no doubt an amalgam might be made, if a large quantity of gold were added to the iron; but then, if the compound were beaten into dust in water, the iron would wash away, and the gold remain. On this account it is, that such as have occasion to handle quick-silver, always make choice of iron instruments for that purpose. We have known women, in a salivation, to have their ear-rings grow white and soft with the effluvia of the *Mercury*; and hence the gilders, to lay gold on any other body, dissolve it in hot *Mercury*; which done, they apply the solution on the body to be gilt, suppose silver; then setting it over the coals, the *Mercury* flies away, and leaves the gold adhering like a crust to the silver. Lastly, rubbing this crust with lapis haematites, the silver is gilt. The sixth character is, That, of all fluids, it is the coldest, and the hottest, supposing the circumstances the same.

Boerhaave shews, that fire is equally diffused through all bodies; and that there is in reality the same degree thereof in *Mercury*, as in spirit of wine; and yet, if you try with your finger, *Mercury* in the cold is much colder, and over the same fire considerably hotter, than this spirit. This property depends on the great weight of *Mercury*: for the heat and cold of all bodies is, *ceteris paribus*, as their weights. Now, *Mercury* being fourteen times heavier than water; if both of them be exposed in a winter's night to the same cold, the *Mercury* must be so much colder than water, as it is heavier. So, also, if they be both applied to the same degree of heat, while the water becomes warm, the *Mercury* will be hot enough to burn the hands.

The seventh property is, That it is dissoluble by almost all acids, and unites itself with them; at least with all fossil acids. Thus it is dissolved in oil of vitriol, spirit of sulphur per campanam, spirit of nitre, and aqua regia.

It is prepared with oil of vitriol, into turbith mineral; with spirit of sulphur, into cinnabar; and with aqua regia, or spirit of sea-salt or sal-gemma, into corrosive sublimate.

Only vinegar does not dissolve it; and hence we are furnished with a method of detecting the frauds of druggists, &c. who make a practice of sophisticating quick-silver with lead. Do but take a mortar, and rub the *Mercury*, with vinegar therein; if the vinegar grow sweetish, it is a proof there is a mixture of lead: if copper have been mixed with the *Mercury*, it will turn greenish, or bluish; if there be no adulteration, the *Mercury* and vinegar will both remain as before.

The eighth property is, That it is the most simple of all bodies, next after gold: accordingly, we find it the same in all its parts, so far as our observation goes. If a single grain of *Mercury* be dissolved in spirit of nitre, a proportionable part of the

grain will be distributed into every minute particle of the menstruum; and by diluting the whole with an ounce of aqua fytia, the whole grain of *Mercury* will be revived. Had we the *Mercury* of the philosophers, called also *vital Mercury*, *Mercury of metals*, &c. so much talked of; it is asserted, it would be still vastly simpler than gold: for from gold we can sometimes separate *Mercury*, and sometimes sulphur; but, from pure *Mercury*, nothing beside itself can be obtained.

The ninth property of *Mercury* is, Not to be in any measure acrid in its native state; for it shews no acrimony to the taste, nor does it corrode any body; and if a carcass were to be buried in quick-silver, it might doubtless remain there without being any way hurt.

The extraordinary effects, however, it produces in the body, have given people a notion of its being acrid. But the case is, that, when received into the blood, it acts by its weight and velocity; whence it tears and destroys the vessels, and thus occasions those great alterations, which lead the chymists into their mistakes.

In effect, all its medicinal operations are to be accounted for from the properties already enumerated.

Mines of Mercury.—The chief are those of Hungary, Spain, Friuli, and Peru. The greatest part of our quick-silver is brought us from Friuli, where there are abundance of mines belonging to the emperor, tho' now mortgaged to the Dutch. It is found under three several forms. 1. In ruddy gleebs or clods, called *cinnabar*. 2. In hard stony gleebs, or a mineral substance of a salfion, and sometimes a blackish colour. 3. It is also found pure: for, upon opening holes in the beds of stones, &c. there sometimes gushes a vein or stream of pure *Mercury*, called *virgin Mercury*.

This last sort is most valued: Paracelsus and Basil Valentine prefer it far to any other sort, for chymical operations. Dr. Brown assures us, in his travels, that, inquiring of one of the directors of the quick-silver mines, wherein the difference between this and common *Mercury* consisted; he was answered, that *virgin Mercury*, mixed and amalgamated with gold, renders the sulphur of the gold volatile: but this has been several times tried without success.

Method of procuring or separating Mercury from the ore or earth.

—They first grind the mineral glebe into powder; so done, they pour a great quantity of water upon it, stirring and working the whole briskly about till the water become exceeding thick and turbid. This water having stood till it be settled, they pour it off, and supply its place with fresh, which they stir and work as before. This they repeat, and continue to do, till the water at length comes away perfectly clear; then, all remaining at the bottom of the vessel is *Mercury*, and other metalline matter.

To this *Mercury*, &c. they add the scoria of iron, putting the whole in large iron retorts, and so distilling it; by which means all the heterogeneous, metallic, and stony part, is separated therefrom; and the *Mercury* procured pure.

As to the *Mercury* in cinnabar, they do not find it worth while to distil, and get it out; cinnabar selling at too high a price alone.

The miserable people, condemned or hired to work in these mines, all die in a little time. They are first affected with tremors, and proceed to salivate; then their teeth drop out, and they are seized with pains all over, especially in their bones, which the *Mercury* penetrates: and thus they die.

In Spain, the melting and exhaling of the mineral is performed with more care, and with an engine contrived for that purpose. As to the stony matter wherewith the *Mercury* is mixed, that of Spain is red, and speckled with black and white; and so hard, that it is not to be broken up without gunpowder. In Hungary it is frequently also an hard stone, but ordinarily a reddish earth. In Friuli, there is a soft earth, where the *virgin quick-silver* is found; and a hard stone, which yields also the common *Mercury*.

The ore of the mine of Idica, one of those belonging to Friuli, is so rich, that it yields always half quick-silver, sometimes two thirds.

The ore of the mine of Juan Cabelaca, in Peru, is still more considerable; the earth is of a whitish red, like bricks half-burnt; it is first broken, then exposed to the fire, by spreading it on a layer of common earth, wherewith the grate of an earthen surface is covered; under which is lighted a little fire of an herb, called by the Spaniards *icho*: which is of that necessity in these works, that the cutting it is prohibited for the space of twenty leagues round. In proportion as the mineral heats, the *Mercury* rises volatilized into smoke; which smoke, finding no vent thro' the capital of the furnace, which is exactly luted, escapes thro' a hole made for that purpose, communicating with several earthen cucurbites fitted within one another. The water at the bottom of each cucurbit condensing the smoke, the quick-silver precipitates, and is taken out, when the operation is over. In this process, there are three things remarkable. The first, that the further the cucurbites are from the furnace, the more they are filled with quick-silver. The second, that they all grow so hot, that they would break, were they not sprinkled from time to time with water. Thirdly, that the work-

workmen employed never hold it long, but become paralytic, and die hectic. A common precaution they use, is to hold a piece of gold in the mouth, to imbibe the effluvia, and intercept their passage into the body. Dr. Pope tells us of one he saw in the mines of Friuli, who in half a year's time was so impregnated with the metal, that on putting a piece of brags in his mouth, or even rubbing it in his fingers, it would turn white as silver.

The method of purifying MERCURY is, by washing it several times in vinegar, wherein common salt hath been dissolved; or by passing and repassing it frequently through a chamois skin. Am. Paræus tells us, that the best way is to make a dog swallow a pound at a time, and afterwards to separate it from the excrements, and wash it in vinegar.

The uses of MERCURY are very considerable, as in gilding, making looking-glasses, in refining gold, &c. See each under its head.

But especially in medicine, and particularly for the cure of the venereal disease, raising salivations, and on other occasions.

The preparations of MERCURY are very various; this metal making one of the most considerable articles in the chymical pharmacy. The most common preparations are,

White precipitate of MERCURY, MERCURIUS præcipitatus albus.

This is compounded of crude *Mercury* driven over from sea-salt in a retort, or revived from common cinnabar, and dissolved in aqua fortis; then a brine prepared of spring-water and sea-salt is filtered through a cap-paper, and the solution of *Mercury* dropped gradually into this brine, whence there is a white powder precipitated, which is to be washed from all its acrimony with some simple distilled water, or warm spring-water, and afterwards dried.

This is the common precipitate of the shops, usually called *white precipitate*.—Its operation is mostly by stool, sometimes by vomit; and it will salivate, if ordered accordingly. It is frequently mixed with pomatums for the itch, and other foulnesses of the skin; for which purpose, it is necessary at the same time to keep the body laxative, and to take something inwardly to take hold of the mercurial principles, and prevent their raising a salivation, which they may otherwise do.

Corrosive sublimate of MERCURY, MERCURIUS sublimatus corrosivus, is a composition of vitriol calcined to a redness, common salt, and purified nitre, with crude *Mercury* cleansed by straining through a leather, all rubbed together in a mortar, till the salts are reduced into powder, and then the least globule of *Mercury* appears. The mixture is then put into a matras, and that set in a furnace with a sand-heat, under which a fire being kept to its greatest height for twelve or fifteen hours, the *Mercury* will be sublimed, and stick to the top of the vessel.

This sublimate is a violent escharotic, and eats away proud flesh; half a dram of it, dissolved in a pound of lime-water, turns it yellow, which is then called *phagedenic water*; it is used to wash ulcers, and tetters eruptions.

Sweet sublimate of MERCURY, MERCURIUS sublimatus dulcis, or aqua alba, is a composition of the preceding corrosive sublimate with crude *Mercury*, ground together till no *Mercury* appears, and then put into a bolt-head, well-stopped, and set in a sand-heat, with a gentle fire, for the space of two hours; which heat is to be then increased for three hours longer, and, lastly, made very strong, for as much more. When this is cold, the glass is broken, and the sublimate separated from the light flowers at top, and the dust at bottom.—This is then powdered afresh, and the operation repeated in the same manner three times.

If it be further repeated, to a sixth time, it is called *calomel*.

Fixing of MERCURY. See FIXATION, and PHILOSOPHER'S stone.

MERCURY, or MERCURY of bodies, is also used by chymists to denote the third of the principles; or elements of natural bodies, called also *spirit*.

In this sense, *Mercury* is defined the most subtle, light, volatile, penetrating, and active part of all bodies. See SPIRIT.

MERCURY of metals, or of the philosophers, is a pure, fluid substance in form of common running *Mercury*, said to be found in all metals, and capable of being extracted from the same.

The notion of *Mercury* of metals is founded on the common system of the chymists, That *Mercury* or quick-silver is the basis or matter of all metals; and that metals are only *Mercury* fixed by a certain sulphur.

Mr. Boyle assures us, he had a way of drawing a true running *Mercury*, or quick-silver, from antimony.

Animated MERCURY is quick-silver impregnated with some subtle and spirituous particles; so as to render it capable of growing hot, when mingled with gold.

MERCURY also serves as a title for books, and papers of news; so called from the heathen deity *Mercury*, supposed the messenger of the gods.

Thus we have monthly *Mercuries*; and the French have a *galant Mercury*, &c.

In a like sense, *Mercury* is also figuratively applied to persons who make it their business to collect news, or to run about and distribute it.

MERCURY, in heraldry, denotes the purple colour in the coats of sovereign princes.

MERCURY is sometimes also used for the Torricellian experiment, or barometer.

Though *Mercury* be not ordinarily sustained in a tube above the height of twenty-eight or twenty-nine inches; yet M. Huygens has found, that *Mercury* well purged, and in a close still place, will be sustained to the height of seventy-two inches; which is a phenomenon the philosophers are all at a loss to account for.

MERIDIAN, in astronomy, a great circle of the sphere, passing through the zenith, nadir, and poles of the world; and dividing the sphere into two hemispheres, the one eastern, and the other western.

Or, the *meridian* is a vertical circle, as A Z B N (*tab. astron. fig. 6.*) passing through the poles of the world, P and Q.

It is called *meridian*, from the Latin *meridies*, noon, or mid-day, by reason when the sun is in this circle, it is noon in those places situate under it.

MERIDIAN, in geography, is a great circle, as P A Q D (*tab. geography, fig. 7.*) passing through the poles of the earth P and Q; and any given place at Z. So that the plane of the terrestrial *meridian* is in the plane of the celestial one.

Hence, 1. As the *meridian* invests the whole earth, there are several places situated under the same *meridian*. And, 2. As it is noon-tide whenever the centre of the sun is in the *meridian* of the heavens; and as the *meridian* of the earth is in the plane of the former; it follows, that it is noon, at the same time, in all places situate under the same *meridian*. 3. There are as many *meridians* on the earth, as there are points conceived in the equator. In effect, the *meridians* always change, as you change the longitude of the place; and may be said to be infinite; each several place from east to west having its several *meridian*.

First MERIDIAN is that from which the rest are accounted, reckoning from west to east.—The first *meridian* is the beginning of longitude.

The fixing of a first *meridian* is a matter merely arbitrary; and hence different persons, nations, and ages, have fixed it differently; whence some confusion has arisen in geography. The rule among the ancients was to make it pass through the place farthest to the west that was known. But the moderns knowing, that there is no such place in the earth as can be esteemed the most westerly, the way of computing the longitudes of places from one fixed point is much laid aside.

Ptolemy assumed the *meridian* that passes through the farthest of the Canary Islands as his first *meridian*; that being the most western place of the world then known. After him, as more countries were discovered in that quarter, the first *meridian* was removed farther off. Some fixed it to the island of St. Nicolas, near Cape Verd; Hondius to the isle of St. James; others to the island Del Corvo, one of the Azores. The latest geographers, particularly the Dutch, have pitched on the Pike of Teneriff; others on the isle of Palm, another of the Canaries; and, lastly, the French, by command of their king, on the island of Ferro, another of the Canaries.

But, without much regard to any of these rules, our geographers and map-makers frequently assume the *meridian* of the place where they live, or the capital of their country, for a first *meridian*; and thence reckon the longitudes of their places.

The astronomers in their calculations usually chuse the *meridian* of the place where their observations are made, for their first *meridian*; as Ptolemy at Alexandria; Tycho Brahe at Uranibourg; Riccioli at Bologna; Mr. Flamsteed at the royal observatory at Greenwich; and the French at the observatory at Paris.

In the *Philosophical Transactions*, there is a suggestion, that the *meridians* vary, in time.—This seems very probable, from the old *meridian-line* in the church of St. Petronio at Bologna, which is found to vary no less than eight degrees from the true *meridian* of the place at this time; and from that of Tycho at Uranibourg, which M. Picart observes, varies eighteen minutes from the modern *meridian*. If there be any thing of truth in this hint, Dr. Wallis says, the change must arise from a change of the terrestrial poles (here on earth, of the earth's diurnal motion), not of their pointing to this or that of the fixed stars: for if the poles of the diurnal motion remain fixed to the same place on the earth, the *meridians*, which pass through these poles, must remain the same.

But the notion of the changes of the *meridian* seems overthrown by an observation of M. Chazelles, of the French academy of sciences, who, when in Egypt, found that the four sides of a pyramid built three thousand years ago still looked very exactly to the four cardinal points. A position which can never be looked upon as fortuitous!

MERIDIAN of a globe, or sphere, is the brazen circle, in which the globe hangs and turns. See GLOBE.

It is divided into four nineties, or three hundred and sixty degrees,

grees, beginning at the equinoctial: on it, each way, from the equinoctial, on the celestial globes, is counted the south and north declination of the sun or stars: and on the terrestrial globe, the latitude of places north or south. There are two points on this circle, called the *poles*; and a diameter, continued from thence through the centre of either globe, is called the *axis*; of the earth or heavens, on which they are supposed to turn round.

On the terrestrial globes there are usually thirty-six *meridians* drawn; one through every tenth degree of the equator, or through every tenth degree of longitude.

The uses of this circle are, to set the globes to any particular latitude; to shew the sun's or a star's declination, right ascension, greatest altitude, &c.

MERIDIAN line, an arch, or part, of the meridian of a place; terminated, each way, by the horizon.

Or, a *meridian line* is the intersection of the plane of the meridian of the place, with the plane of the horizon; vulgarly called a *north and south line*, because its direction is from one pole towards the other.

The use of a *meridian line* in astronomy, geography, dialling, &c. is very great; and on its exactness all depends: whence infinite pains have been taken by divers astronomers to have it to the last precision.—M. Cassini has distinguished himself by a *meridian line* drawn on the pavement in the church of St. Petronio at Bologna, the largest and most accurate in the world. In the roof of this church, a thousand inches above the pavement, is a little hole, through which the sun's image, when in the *meridian*, falling upon the line, marks his progress all the year. When finished, M. Cassini, by a public writing, informed the mathematicians of Europe, of a new oracle of Apollo, or the sun, established in a temple, which might be consulted with more confidence as to all difficulties in astronomy.

To draw a MERIDIAN line.—Knowing the south quarter pretty nearly, observe the altitude PE (*Tab. Astronomy, fig. 8.*) of some star on the eastern side thereof not far from the *meridian* $HZRN$. Then, keeping the quadrant firm on its axis, so as the plummet may fall cut the same degree, only directing it to the western side of the *meridian*, wait till you find the star has the same altitude as before, *sc.* Lastly, Bisect the angle ECE formed by the intersection of the two planes wherein the quadrant is placed at the time of the two observations, by the right line HR . This HR is a *meridian line*.

Or thus; On an horizontal plane, from the same centre C (*Fig. 9.*) describe several arches of circles $BA, ba, \&c.$ And on the same centre C erect a style or gnomon perpendicular to the plane ACB , a foot or half a foot long. About the twenty-first of June, between the hours of nine and eleven in the morning, and between one and three afternoon, observe the points $B, b, \&c.$ $A, a, \&c.$ wherein the shadow of the style terminates. Bisect the arches $AB, ab, \&c.$ in $D, d, \&c.$ If then the same right line DE bisect all the arches $AB, a b, \&c.$ it will be the *meridian line* sought.

In regard the extremity of the shadow is somewhat hard to determine, it is best to have the style flat a top, and to drill a little hole, noting the lucid spot projected by it on the arches AB and ab , instead of the extremity of the shadow. Otherwise, the circles may be made with yellow, instead of black, &c.

Several authors have invented particular instruments and methods for the describing of *meridian lines*, or rather for determining equal altitudes of the sun in the eastern and western parts of the heavens; as Mr. Grey, Mr. Derham, &c. in the *Philosophical transactions*. But as the former of the methods above delivered suffices for astronomical observations, and the latter for more ordinary occasions, we shall forbear to give any descriptions thereof.

From what has been shewn, it is evident, that whenever the shadow of the style covers the *meridian line*, the centre of the sun is in the meridian; and therefore it is then noon.—And hence the use of a *meridian line* in adjusting the motion of clocks, &c. to the sun.

Hence also, if the *meridian line* be bisected by a right line OV , drawn perpendicularly through the point C ; OV will be the intersection of the meridian, and first vertical; and, consequently, O will shew the east point, and V the west.

Lastly, if a style be erected perpendicularly in any other horizontal plane, and a signal be given when the shadow of the style covers the *meridian line* drawn in another plane, noting the apex or extremity of the shadow projected by the style, a line drawn from that point through that wherein the style is raised will be a *meridian line*. See **MERIDIAN altitude**.

MERIDIAN line, on a dial, is a right line arising from the intersection of the meridian of the place with the plane of the dial.

This is the line of twelve o' clock; and from hence the division of the hour-line begins.

Magnetic MERIDIAN, is a great circle passing through or by the magnetic poles; to which the magnetic needle, or needle

of the mariners compass, if not otherwise hindered, conforms itself.

MERIDIAN altitude of the sun or stars, is, their altitude when in the meridian of the place where they are observed. See **ALTITUDE**.

The *meridian altitude* may be defined an arch of a great circle perpendicular to the horizon, and comprehended between the horizon and the star then in the meridian of the place.

To take the MERIDIAN altitude of the stars.—Astronomers make two principal kinds of observations of the stars; the one when they are in the meridian, and the other when in vertical circles.

For *meridian observations*; there are two instruments principally used, the quadrant and gnomon.

To take the meridian altitude with a quadrant: if the position of the meridian be known, and the plane of an astronomical quadrant be placed in the meridian line by means of the plumb-line suspended at the centre; the meridian altitudes of the stars, which are the principal observations whereon the whole art of astronomy is founded, may easily be determined.

The meridian altitude of a star may likewise be had by means of a pendulum-clock, if the exact time of the star's passage by the meridian be known. Now it must be observed, that stars have the same altitude for a minute before and after their passage by the meridian, if they be not in or near the zenith. But if they be, their altitudes must be taken every minute when they are near the meridian; and then their greatest altitudes will be the meridian altitudes sought.

As to the manner of observing, it is found very difficult to place the vane of the quadrant in the meridian exactly enough to take the meridian altitude of a star; for unless there be a convenient place, and a wall where the quadrant may be firmly fastened in the plane of the meridian, which is not easily had, we shall not have the true position of the meridian proper to observe the stars. It will be much easier therefore, on several accounts, to use the portable quadrant, by which the altitude of the stars may be observed a little before its passage over the meridian every minute till its greatest altitude be found. Here though we have not the true position of the meridian by this means, yet we have the apparent meridian altitude of the star.

Though this method, in the general, be very good, and free of any sensible error, yet in case a star passes by the meridian near the zenith, it proves somewhat defective: for in these kind of observations, the inconvenient situation of the observer, the variation of the star's azimuth several degrees in a little time, the alteration of the instrument, and the difficulty of replacing it vertically, will prevent the observations from being made oftener than in every four minutes. But in each minute the altitude varies about fifteen minutes of a degree, so that there will be the difference of a degree in the star's altitude between each observation. In such cases, therefore, it will be better to have the true position of the meridian, or the exact time wherein the star passes the meridian, in order either to place the instrument in the meridian, or to observe the altitude of the star the moment it passes the meridian.

To find the MERIDIAN altitude of the sun, &c.—by a gnomon. See **GNOMON**.—By other means, see **ALTITUDE**.

MERIDIANI *, in antiquity, is a name which the Romans gave to a kind of gladiators, who entered the arena about noon, after the bellarii, who fought in the morning against beasts, had finished. See **GLADIATOR**.

* They were thus called from *Meridies*, i. e. noon, the time when they exhibited their shews.

The *Meridiani* were a sort of artless combatants, who fought man with man, sword in hand. Hence Seneca takes occasion to observe, that the combats of the morning were full of humanity, compared with those which followed.

MERIDIONAL distance, in navigation, the same with *departure*, or easting and westing; being the difference of longitude between the meridian, under which the ship now is, and any other meridian, which she was under before.

MERIDIONAL parts, miles, or minutes, in navigation, are the parts, by which the meridians in a Mercator's chart do increase, as the parallels of latitude decrease. See **CHART**.

The co-sine of the latitude of any place being equal to the radius or semidiameter of that parallel, therefore in the true sea chart, or nautical planisphere, this radius being the radius of the equinoctial, or whole line of ninety degrees, the *meridional parts* at each degree of latitude must increase as the sines of the arch contained between that latitude and the equinoctial do decrease.

The tables therefore of *meridional parts* in books of navigation are to be made by a continual addition of secants, calculated in some books (as in Sir Jonas Moor's tables) for every degree and minute of latitude; and these will serve, either to make or graduate a Mercator's chart, or to work the Mercator's sailing.

To use them, you must enter the table, with the degree of latitude at the head, and with the minute on the first column towards the left-hand; and in the angle of meeting you will have the *meridional parts*.

Having the latitudes of two places, to find the *meridional miles*,

or *minutes* between them: consider whether the places be, one under the equinoctial, and the other w.de thereof: or the one on the one side the equinoctial, and the other on the other; or whether they both lie on the same side.

If one place lie under the equator, the *meridional minute*, next under the degree of latitude of the other place, is the *meridional* difference of latitude, or latitude enlarged.

If one be in north, and the other in south latitude; the *meridional minutes*, corresponding to the two latitudes added together, give the *meridional minutes* between them.

Both places lying towards the same pole; subtract the *meridional parts* answering to the less latitude from those of the greater: the remainder gives the *meridional minutes*.

MERIT, in theology, is used to signify the moral goodness of the actions of men, and the reward due to them.

The Romish schoolmen distinguish two kinds of *merit* towards God: the one of *congruity*, the other of *condignity*.

MERIT of *congruity* is, when there is no just proportion between the action, and the reward; but he who bestows the reward, supplies by his goodness or liberality, what was wanting in the action.—Such is the *merit* of a son towards his father: but this is only *merit* in an improper sense.

MERIT of *condignity* is, when there is an absolute equality, and a just estimation between the action, and the reward: as in the wages of a workman.

Those of the reformed religion disclaim all *merit* of *condignity* towards God: even their best works, they own, do not merit at his hands.—Hence the doctrine of *congruous merits* makes one of the great articles of controversy between the Romish and reformed churches.

MERLON *, in fortification, that part of the parapet which lies between two embrasures.

* The word comes from *merula*, or *meila*, which in the corrupt Latin was used for a battlement.

It is usually from eight to nine feet long on the side of the cannon, and six on the side of the field; and about six feet high, and eighteen thick.

MERMAID, or **MERMAN**, a sea-creature frequently talked of, and supposed half human, and half a fish.

However naturalists may doubt of the reality of *mermen*, or *mermaids*, if we might believe particular writers, there seems testimony enough to establish it. In the year 1187, as Larry informs us, such a monster was fished up in the county of Suffolk, and kept by the governor for six months. It bore to near a conformity with man, that nothing seemed wanting to it besides speech. One day it took the opportunity of making its escape, and plunging into the sea, and was never more heard of. *Hist. d'Angleterre*, P. I. p. 403.

In the year 1430, we are told that after a huge tempest, which broke down the dykes in Holland, and made way for the sea into the meadows, &c. some girls of the town of Edam in West-Friesland, going in a boat to milk their cows, perceived a *mermaid* embroiled in the mud, with a very little water. They took it into their boat, and brought it with them to Edam, dressed it in women's apparel, and taught it to spin. It fed like one of them, but could never be brought to offer at speech. Some time afterwards it was brought to Haarlem, where it lived for some years, though still showing an inclination to the water. Pausan relates, that they had given it some notion of a deity, and that it made its reverences very devoutly whenever it passed by a crucifix. *Delices d'Hollande*.

In the year 1560, near the island of Manar, on the western coast of the island of Ceylon, some fishermen are said to have brought up, at one draught of a net, seven *mermen* and *maids*; of which, several Jesuits, and among the rest, F. Hen. Henriques, and Dimas Bolques, physician to the viceroy of Goa, are said to have been witnesses. And it is added, that the physician, who examined them with a great deal of care, and made dissections thereof, asserted, that all the parts, both internal and external, were found perfectly conformable to those of men. See the *Hist. de la compagnie de Jesus*, P. II. T. IV. N°. 276, where the relation is given at length.

We have another account as well attested of a *merman*, near the great rock called Diamond, on the coast of Martinico. The persons who saw it, gave in a precise description of it before a notary. They affirmed that they saw it wipe its hand over its face, and even heard it blow its nose.

Another creature of the same species was caught in the Baltic, in the year 1531, and sent as a present to Sigismund king of Poland, with whom it lived three days, and was seen by all the court. And another very young one was taken near Rocca de Sintia, as related by Damian Goes.

The king of Portugal, and the grand master of the order of St. James, are said to have had a suit at law to determine which party these monsters belonged to. See Supplement, article SYREN.

MERO MITA. See the article EX MERO.

MERSON. See IMMERSION, and EMERSTON.

MERUIT.—Quantum MERUIT. See QUANTUM.

MESARÆUM, **MESAPAEON**, in anatomy, the same with *mesenterium*. See MESENTERY.

MESARÆUM is also used, in a more restrained sense, for a part or division of the mesentery; being that fastened to the small guts. See MESENTERY.

That part of the mesentery which is fastened to the thick guts, is called mesocolon. See MESOCOLON.

MESARÆIC vessels, in the general sense, are the same with *mesenteric*. See MESENTERIC.

In common use, *mesaræic* is more frequently applied to the veins, and *mesenteric* to the arteries, of the mesentery.

MESENTERIC, or **MESARÆIC**, an epithet given to two arteries arising from the descending aorta, and proceeding to the mesentery.

There is an upper or superior *mesenteric*, which goes to the upper part of the mesentery; and a lower or inferior *mesenteric*, which distributes itself through the lower part.—See *Tab. Anat. (Anatol.)* fig. 1. n. 43. 45.

We have also a *mesenteric vein*, composed of an infinity of veins proceeding from the mesentery; which, with the vena splenica arising from the spleen, form the vena porta.

Anatomists also reckon a *mesenteric nerve*, which arises from the intercostal, and sends several branches to the mesentery.

MESENTERIC plexus, a plexus, or piece of net-work formed by the branches or ramifications of the par vagum.

The *plexus mesentericus magnus*, or *great mesenteric plexus*, is formed out of the concurrent branches of several other plexus's, and sends its nervous fibres through the whole mesentery along with the mesaræic vessels, which, with various circumvolutions, they accompany to the intestines.

OMPHALO-MESENTERIC. See the article OMPHALO-MESENTERIC.

MESENTERY *, **MESENTERIUM**, or **MESARÆUM**, in anatomy, a fatty membranous body; thus called, as being placed in the middle of the intestines, which it connects to one another.

* The word comes from the Greek, μέσος, middle, and εντέρον, intestine.

The *mesentery* is almost of a circular figure, with a narrow production, to which the end of the colon, and the beginning of the rectum, are tied.

It is about four fingers and an half in diameter: its circumference, being full of plaits and foldings, is about three ells in length. The intestines are tied like a border on this circumference of the *mesentery*: there are three inches of the intestines thus fastened.

The *mesentery* itself is strongly tied to the three first vertebrae of the loins. It is composed of three laminae; the inner, upon which the glands and fat lie, and the veins and arteries run, is its own proper membrane; and the other two, which cover each side of the proper membrane, come from the peritonæum. Between the two external laminae of the *mesentery*, run the branches of the arteria mesenterica, superior and inferior, which bring the blood to the intestines; and the vena mesaræica, which bring branches of the porta, carry the blood back to the liver. Here the large branches of both arteries and veins, communicating with one another, march directly to the guts; where, with the nerves that form the plexus mesentericus, they divide into an infinite number of small branches, which spread themselves extremely finely upon the coats of the intestines. The vena lactæa, and lymphatic vessels, run likewise upon the *mesentery*, in which there are also several vascular glands; the biggest of which, in the middle of the *mesentery*, is called *pancreas Asellii*; these glands receive the lymph and chyle from the lactical veins. The *mesentery* has been ordinarily divided into two parts, the mesaræum, and mesocolon; the first appended to the intestina tenuia; and the latter to the crassa.—But this is a division of no great moment.

The use of the *mesentery* is, first, to gather the intestines into a narrow compass, that the course of the chyliferous vessels towards their common receptacle may be but short; next to cover and protect them, and the blood-vessels; and to connect and dispose the intestines, so as to secure them from any entanglement that might hinder their peristaltic motion.

MESN *, or **MEASNE**, a term in law signifying him who is lord of a manor, and so hath tenants holding of him; yet he himself holds of a superior lord.

* The word is properly derived from *maistre*, *quasi minor natus*, because his tenure is derived from another, from whom he holds.

MESN, also, denotes a writ, which lieth where there is lord *mesn* and tenant; and the tenant is distrained for services due from the *mesn* to the superior lord.

MESOCOLON, **MESOCOLAON**, in anatomy, that part of the mesentery connected to the great guts, especially the colon. See MESENTERY.

The *mesocolon* meets the midst of the colon, to which it is joined. Its lower part thickens to a part of the rectum.

MESOLABE, **MESOLABIUM**, a mathematical instrument invented by the ancients for finding two mean proportionals mechanically, which they could not come at geometrically. See PROPORTIONAL.

It consists of three parallelograms moving in a groove to certain intersections. Its figure is described by Eutochius in his commentary on Archimedes.

MESO-LOGARITHM, a term used by Kepler to signify the logarithms of the co-sines, and co-tangents: the former of which my lord Neper calls *anti-logarithms*, and the latter *differentials*.

These are also called *artificial signs and tangents*.
MESOPLEURII *, in anatomy, the intercostal muscles.

* The word is derived from μέσος, *medius*, middle; and πλευρά, *costa*, rib.

MESO-PLEURII is sometimes also used for the intermediate spaces between the costæ, or ribs. See RIBS.

MESSE, or MASS, MISÆ. See MASS.

MESSENGERS, in the English polity, are carriers of letters and messages; or, more particularly, certain officers chiefly employed under the direction of the secretaries of state; and always in readiness to be sent with all manner of dispatches, foreign, and domestic.

They are also employed, with the secretaries warrants, to take up persons for high treason, or other offences against the state, which do not properly fall under the cognizance of the common law, and perhaps are not proper to be divulged in the ordinary course of justice.

The prisoners they apprehend are usually kept at their own houses, for each of which they are allowed by the government 6 s. 8 d. per day. When they are dispatched abroad, they have an allowance for their journey, as stated; viz. to Paris 30 l. to Holland, 25 l. to Edinburgh, 30 l. to Ireland, 30 l. and so to other places in proportion. Part of which money is advanced to them for their journey.

They wait twenty at a time, monthly, and are distributed as follows; viz. four at court, five at one secretary's office, five at the other, and two at the third office for North Britain, three at the council-office, and one at the lord chamberlain's of the household. Their posts, if purchased, are esteemed worth 300 l. Their handling salary is 45 l. per annum.

MESSENGERS of the exchequer are officers attending the exchequer, in the nature of pursuivants. They are four in number. Their business is to attend the lord treasurer, and to carry his letters, precepts, &c.

MESSENGER of the press, a person who by order of the court searches printing-houses, bookellers shops, &c. in order to discover seditious books, &c.

MESSIAH *, a term signifying anointed or sacred; and in that sense applied to kings and priests, but, particularly, by way of eminence, to Jesus Christ, the Saviour promised by the prophets of the old law.

* The word comes from the Hebrew, *mesuach*, anointed, of the verb, *mesach*, to anoint: whence Jesus Christ claims the title on a manifold account: 1^o. As having been anointed king of kings from all ages. 2^o. As chief of the prophets. 3^o. As high-priest of the law of grace, or priest for ever after the order of Melchizedek.

The Son of God is variously denominated according to his various qualities and attributes. He is called the *Word*, as being the eternal Son of the Father, and consubstantial with him: *Christ*, χριστός, a Greek term, signifying anointed, of the same import with the Hebrew *Messiah*; *Jesus*, i. e. Saviour, of the Hebrew, *Yeshua*, by reason he saves the people from their sins. —In effect, he is called *word*, as being the son of God; *Jesus*, as man; *Christ*, as being anointed; and *Messiah*, as being both God and man.

The Jews still wait for the coming of the *Messiah*; being insatuated with the notion of a temporal *Messiah*, that is to be a mighty conqueror, and to subdue all the world.

Jesus Christ asserts himself the *Messiah*. In St. John, iv. 25. the Samaritan woman says to Jesus, *I know that when Messiah comes, you are called the Christ, he will tell us all things.* Jesus answered her, *I that speak to thee, am he.*

There are several impostors, who have endeavoured to pass for *Messiahs*. J. Lent, a Dutchman, has written an history of false *Messiahs*, *De pseudomessia*. The first he mentions was one Barcohab, who appeared under the empire of Adrian. The last was rabbi Mordecai, who began to be talked of in 1682. A little before him, viz. in 1666. appeared Sabbethai Sebi, who was taken by the Turks, and turned Mahometan.

MESSEURS, a French title of honour, or civility, lately introduced into our language; being the plural of *monseigneur*, and equivalent to the English, *sirs*.

The French lawyers always begin their pleadings and harangues with *messieurs*; which word is also frequently repeated in the course of their speeches; on which occasion it answers to our English word, *gentlemen*.

The French say, *Messieurs du parlement*; *du conseil*; *des comptes*, &c.

MESSAGE, MESSUAGIUM, in law, a dwelling-house with some land adjoining, assigned for its use.

By the name of *messuage* may a garden, shop, mill, cottage, chamber, cellar, or the like, pass.

In Scotland, MESSUAGE denotes what we call the *maner-house*; viz. the principal dwelling-house within any barony.

MESYMNIIUM, a name which the ancients gave to a part of their tragedy; or to certain verses in their tragedies.

The *mesymnium* was a kind of burden, as *Io Pæan*; *O Dithyrambe*; *Hymen*, *O Hymenæe*, or the like; which, when placed at the end of a strophe, was called *epymnium*; and when inserted in the middle of a strophe, *mesymnium*. See STROPHÆ, and CHORUS.

METACARPUS *, or METACARPUM, in anatomy, that part of the hand between the wrist and the fingers.—See *Tab. Anat. (Ofscol.) fig. 3. n. 10. fig. 7. n. 13.*

* The word comes from the Greek μέτα, *post*, behind; and καρπός, *manus*, hand. See CARPUS.

The *metacarpus* consists of four bones, which answer to the four fingers; whereof that which sustains the fore-finger is the biggest and longest. They are all round and oblong, a little convex towards the back of the hand, and concave and plain towards the palm: they are hollow in the middle, and full of marrow; they touch one another only at their extremities, leaving spaces in their middle, in which lie the muscoli interossei.

In their upper end there is a sinus, which receives the bones of the wrist; their lower extremity is round, and is received into the sinus of the first bones of the fingers.

The inner part of the *metacarpus* is called the *palm*, and the outer, the *back of the hand*.

METACHRONISM, in chronology, an error in computation of time, either on the side of defect, or excess.

METACISM, METACISMUS, in grammar, a defect in the pronunciation of the letter *M*.

Isidore represents the *metacism* as a final *m*, followed by a vowel, as *bonum aurum*, *Bethlehem erat*, &c.

METACONDYLI is used by some authors for the outmost bones, or joints of the fingers, next the nails.

METAL, METALLON, in natural history, a simple, ponderous, shining, fixt, fossil body, that fuses, and becomes fluid, by fire; and by cold coagulates and hardens into a solid mass, capable of being diffused under the hammer.

Metal is said to be simple, as it may be affirmed of every the minutest particle of a *metal*, e. gr. a grain of gold, that it is gold, or has all the properties of gold. See GOLD.—*Fusible* by fire; that is, when exposed to a great fire, it dissolves into parts which are easily moveable among themselves, or are in actual motion. See FUSION.—*Fixt*, i. e. bearing the fire without flying off in vapours: though it is only up to a certain degree that *metals* are fixt; for, by the large burning glasses of Messrs. Tschirnhausen and Villette, all *metals* are found to evaporate.

Such is the proper idea of *metals*, which is not applicable to any other body in nature: for a diamond, or other stone, though a simple body, is not fusible in the fire, nor capable of being stretched under the hammer. And salt, though dissolvable by fire, is not malleable, but breaks under the hammer.

There are indeed certain woods, which yield in some measure to the hammer; but then they fall to dust in the fire: and so of the rest.

We find but six *metals* in all nature; viz. gold, lead, silver, copper, iron, and tin. See the nature, characters, production, uses, &c. of each, under its proper article.

To these a seventh *metal* is usually added; viz. mercury, or quick-silver; but this is improper, as it has not all the characters of a *metal*, nor scarce any thing in common with the other *metals*, except weight, and similarity of parts. See MERCURY.

Thus, it is neither dissolvable by fire, malleable, nor fixt: in effect, it seems to constitute a peculiar class of fossils, and is rather the mother or basis of all *metals*, than a *metal* itself.—However, as it is usually reckoned among them, and as it is usually supposed to want nothing to render it a *metal*, but an additional sulphur to fix and connect its parts together, it may without any great error be considered under that class.

The common radical character of *metals* is, that of all known bodies they are the heaviest. By Dr. Halley's experiments, the weight of gold to that of glass is determined to be as 9 to 1; and the weight of tin, the lightest of all *metals*, to that of gold, as 7 to 10; which considerably surpasses the weight of all stones, marbles, gems, and other the most solid bodies, as appears from the tables of specific gravities. Nor is there any body in nature but a *metal*, that is one third of the weight of gold. See SPECIFIC gravity.

The Royal Society furnish us with various experiments of this kind. The weights of the several *metals*, and other solids, they have examined hydrostatically, by weighing them in air, and in water; and the weights of the fluids by weighing an equal portion of each. By such experiments they find, that, taking the same weights of water and gold, the bulk or magnitude of the former is to the latter as 19636 to 1000; consequently, that the weight of gold is to water nearly as 19 to 1.

The

The specific weight of the several *metals* by this means determined stand thus:

Gold	19636	Iron	7852
Quick silver	14019	Tin	7321
Lead	11345	Granite	3978
Silver	10535	Water	1000
Copper	8843	Air	$\frac{1}{11}$

The cube inch of	Ounces.	Drams.	Grains.
Gold	12	2	52
Quick silver	8	6	8
Lead	7	3	30
Silver	6	5	28
Copper	5	6	36
Iron	5	1	24
Tin	4	6	17

As to the origin and formation of *METALS*, various are the sentiments of philosophers, ancient and modern.—M. Tournefort is of opinion, that *metals*, as well as all other minerals, have their origin from seeds, like plants; and that they have vessels with juices circulating in them, &c.

Plato will have the cause of *metals* to be an humid vapour, inclosed in the bowels of the earth, which, being variously intermixed with parts of the earth, produces various *metals*. Ptolemy maintains sulphur to be the father of *metals*; and an oleaginous viscous humour, the mother. Liddat endeavours to prove all *metals* generated by a subterranean fire; urging, among other reasons, that many *metals*, when taken out of the earth, are exceedingly hot. Du Hamel shews, that *metals* do not take their rise either from any vaporous exhalation, or from water, or from earth; but are generated of mercury, sulphur, and salt. He adds, that *metals* take their matter and weight from the mercury they contain, and their tincture and form from the sulphur.

The same author owns the first rudiment of a *metal* to be a saline substance swimming in water, which water is by little and little carried off. By how much the terrestrial parts are more exquisitely mixed with the aqueous or humid, by so much is the *metal* more heavy and firm, as having fewer and smaller pores. Hence its ductility: for its parts, being extremely small, dense, and complicated, may be drawn out into a very spacious surface: on which account it is, that gold exceeds all other *metals* both in weight and ductility. Hence also its fixity, its parts being too close and dense to be exhaled. The water defends the earth from being burnt, and the earth the water from flying off; neither forsakes the other, but each is bound in an undissolvable knot. The moisture gives ductility, the earth solidity. Where the mixture is less perfect, whether the earth or the water prevail, the *metal* will neither have so much weight, as having larger pores; nor will it bear the fire so well. For if the earth prevail, as in iron, or the water, as in lead; heat will set the one at liberty from the other; the moisture evaporates, and the earth is reduced into scoria, &c.

Dr. Woodward maintains, that all *metals* now found in the strata of the earth owe their present condition to the deluge; when he also imagines the present strata of stone, earth, marble, &c. were formed.

The metallic and mineral matter now found in the perpendicular intervals or fissures of the several strata, whereof the earth is composed, was, according to him, at the time of the deluge, lodged in the bodies of those strata; and has been brought thence, and transmitted into these intervals since that time; the intervals themselves not existing, till the strata were formed and broke again, to let the water from the earth.

Now the water, which, he imagines, is constantly ascending from the great abyss towards the surface of the earth, continually pervading the strata, detaches out of their pores and interstices such *metals*, and mineral corpuscles as it finds loose in its way, carrying them along with it to the perpendicular intervals, where having a freer passage than before, it deposits them, and leaves them in these intervals. And this he takes to be the way in which all *metals*, now found in those places, were brought thither, and still continue to increase.

Those in the strata, however, he observes, do not nor can increase; but, on the contrary, are continually lessened and diminished, by so much as has been conveyed into the perpendicular intervals, and brought forth of the surface of the earth by springs and exhalations from the abyss, &c.

The same ingenious author complains of the great uncertainty and inconstancy in the mineral and metallic kingdom; neither colour, figure, nor situation in the earth, being to be depended on, for so to make any positive judgment from them.—A pyrites or marcasite, for instance, shall have the colour and brightness of gold, or of silver, and yet afford nothing but a little vitriol and sulphur; while what is but a pebble in appearance shall have a mixture of a valuable *metal* in it. It is common too to find the same *metal* thence into a great number of different forms, as well as to find different kinds of *metal* of the same form. And as to their place in the earth, there is the same uncertainty; they being sometimes found in the perpendicular fissures or intervals of the strata, sometimes interspersed in the bodies of the strata, and sometimes

in both. The same *metals* are also placed indifferently in all kinds of terrestrial matter, or in strata of very different natures. They are frequently intermixed with each other, so that it is a rare thing to find any of them pure and simple; but copper and iron shall often be in the same mass, as also gold and copper, silver and lead, tin and lead; nay, sometimes all fix together in the same lump.

The French chymists have been very curious in their inquiries into the nature and production of *metals*.—M. Geoffroy, from a mixture of sulphur with a vitriolic salt, and an argillous earth, brought an iron, which he maintained to be a new production, or a composition resulting from the assemblage of certain principles which existed separately in the ingredients that formed the *metal*; in a word, that it was an artificial iron. And, observing that there were parcels of this *metal* in the coloured ashes of plants, and of most other inflammable substances, he concluded that it might be formed there also by the union of the same three principles.

This was opposed by M. Lemery the younger, who maintained that the iron contained in the ashes of plants was not so formed there by calcination, but was really existent in the plants themselves; being raised in their vessels along with the juices of the earth; and further, that all the ingredients whereof M. Geoffroy's artificial iron was formed, do really contain iron in themselves, either in smaller or larger quantities: not the argilla only, where the iron is easily discovered by an animated knife; nor the oil of vitriol, which is drawn from a mineral, the ground whereof is iron; but also linseed oil, whereof M. Geoffroy's sulphur was made; and even that of turpentine, sweet almonds, &c. relating withal the operations whereby each of those oils may be reduced to an earth wherein is iron.

To this it was answered, that in what manner soever iron be procured from the several ingredients a parasite, there will be still found infinitely less in them, than when mixed; and that, of consequence, the mixture produces iron: that, as for oils, it is evident they are not simple substances, but are composed of an earth, an acid, and a sulphurous or inflammable part; which are the three precise principles required for the formation of iron; so that, according to all appearances, it is of an assemblage of those sulphurs, salts, and earth, in the oil, that the iron is formed by calcination; and therefore that the means used to the iron in the ingredients, are the very same with those by which it is composed.

Hence also it appears, that vegetable matters contain the principles of minerals. But M. Geoffroy goes further; and to support his doctrine of the production of *metals*, he undertakes to prove, that the principles of vegetables, and those of minerals, are essentially the same; and that one may readily, and with ease, decompose minerals by separating their principles, and compound them again by substituting principles taken from vegetables in lieu of those taken away.

To clear this point, he examines and compares the principles of mineral and vegetable salts. The principal in the mineral class are nitre, sea-salt, and vitriol: an which suits we find in plants. The essential salt of the parietaria is wholly nitrous, and melts on the coals like salt petre. The nat. salt of the carduus benedictus, asbisthium, kali, &c. contain a great deal of sea-salt, which crystallizes in cubes, and decapitates on the coals. Acid, that the greatest part of the fixt salts of plants, calcined to a certain degree, yield a strong smell of sulphur; which can proceed from nothing but a vitriolic salt, rarefied and volatilized by the oil of the plant. By these facts we may be able to judge of all the other facts of plants; for the volatile salts are nothing else but fixt salts decomposed from the grosser part of their earth, and joined with parts of oil.

Further, there is scarce any reason to doubt, that the acid juices drawn from vegetables are of the same nature with the mineral acids; with this only difference, that the acids of plants have been extremely rarefied by fermentation, and united so closely with sulphurs, that it is not without a great deal of difficulty that they are separated.

Thus, distilled vinegar, which we make no scruple of ranking among the vitriolic acids; does only differ from spirit of sulphur, spirit of vitriol, or even the caustic oil of vitriol, in that the acids in the vinegar are diffused among a great deal of phlegm, and strongly united to a great deal of oil, which yet may be separated. By dissolving copper in the acid of vinegar, separated as much as possible from its oil, there are formed crystals, like in figure to those of blue vitriol. From all which it appears, that the salts of plants do not differ essentially from those of minerals.

As for sulphurs, the inflammable or sulphurous principle is the same in vegetables as in minerals. And M. Geoffroy even shews, that the principle of inflammability in common sulphur is the same with that which renders the fat of animals, the oils and resins of plants, and the bitumens of the earth, inflammable. To which he adds, that this same sulphurous principle is not only likewise found in metallic substances, but that it is this which gives them their fusibility, ductility, and metalline forms. Thus antimony, which is a substance approaching the nearest

of any to a *metal*, is little else but a burning sulphur. By exhaling this, it loses its *metallic* form, and turns to a kind of grey ashes, which being melted, instead of *metal* become glass. And by melting this over again, and adding to it some inflammable matter, again it returns into a regulus.

As to the species of METALS, there are four which, the chymists call *imperfect*, because their principles are not bound so fast together, but that the force of a common fire destroys them; these are, iron, copper, lead, and tin: the others, which are proof against common fire, are gold and silver, these therefore are called *perfect metals*.

In the four first it is easy to see the principle of inflammability: They become all fusible by the addition of salt-petre, either in a greater or less degree. Iron is that wherein this is the most visible; next, tin; then copper and lead.—But the principle is more conspicuous still, in the dust or small filings of the *metals*, let fall in the flame of a candle, than in the lump.

In gold and silver, the sulphurous principle is not so obvious. No heat but that of the sun collected into a focus, is able to decompose them. But no doubt even these have the same principles with the other *metals*, though they are not so easily seen.—In gold, as well as in the imperfect *metals*, the basis is an earth capable of vitrification, as appears by the glass remaining after the calcination of gold in a burning-glass; and there is reason to believe, that the greatest part of what is exhaled in smoke during the operation, is the sulphurous principle mixed with salts.

As to silver, there is something in it extremely various. When purified with antimony, it vitrifies by the burning-glass; but if purified with lead, it leaves nothing behind it but grey ashes.—The basis of this *metal* is doubtless an earth capable of vitrification; and what exhales in smoke, is apparently a mixture of sulphur, salts, and a little earth volatilized by the fire.

From all this, and many more observations of the same kind, M. Geoffroy ventures to draw the following conclusions. That the substances whereof *metals* are composed, do not differ essentially from those which compose vegetables.—That the imperfect *metals* are composed of a sulphur, vitriolic salt, and vitrifiable earth.—That this sulphurous principle is more or less strongly joined with the other principles; very strongly in gold and in silver, less in antimony, and very little in mineral sulphur.—That the principle of inflammability may be separated from *metallic* substances, either by culinary fire, or by the sun.—That the *metal* thus despoiled of its principle, is converted into ashes; and that these ashes, purified farther with a violent fire, vitrify; and that such ashes or glasses, by the application of some inflammable matter, again resume the *metallic* form they had lost.—That it is by this means linseed-oil turns clay into iron.—That if we knew all the other *metallic* earths, they might likewise be immediately converted into *metals*, by the projection of some proper inflammable matter.—That it is the saline and earthy parts, found in proper vitriol, that furnish the earthy vitrifiable part which makes the basis or ground of iron, and that it receives the *metallic* form from the sulphurous principle of the oil.—That the iron found in the ashes of plants, was produced there in the same manner: and, that it is a composition of the vitrifiable earth of the plants, the acid of those plants, and their oily or inflammable principle.

The same author, the better to ascertain the constituent parts of *metals*, made a great number of experiments on them with the duke of Orleans's large burning-glass; the result whereof falls in with, and confirms the doctrine laid down above.—From those experiments, he gathers, that the four *metals* which we call *imperfect*, viz. iron, copper, tin, and lead, are composed of a sulphur or oily substance, capable of burning, and a *metallic* earth, capable of vitrification.—That from this sulphur proceed the opacity, brightness, and malleability of a *metal*.—That this *metallic* sulphur does not appear at all different from the oil or sulphur of vegetables, or even that of animals; and that it is the same in mercury as in the four imperfect *metals*.—That these four *metals* have for their basis an earth susceptible of vitrification; that this earth is different in each of the four *metals*, in that it vitrifies differently in each; and that on this difference in vitrifying, depends the difference of *metals*.

The learned Boerhaave, after an accurate survey of the several *metals*, their characters, properties, preparations, uses, &c. draws the following corollaries concerning the general nature of *metals*. 1^o. That which distinguishes *metals* from all other bodies, as well as from each other, is their heaviness: though every *metal* has its peculiar weight; which no art is able to imitate, and which depends, as Helmont and the chymists express it, on the anatic homogeneity of their parts. Now, the later philosophers have proved, that all corporeal magnitude has just so much reality in it, as it has weight; and therefore if you have found the heaviness of any *metal*, you have at the same time found its corporeity. Sir Isaac Newton treating of gravity, and Huygens of the pendulum, shew that weight and reality are correspondent.

2^o. The *metals* appear to be simple, yet they are really compounds. Their component principles, according to the antients, are sulphur and mercury; to which some of the moderns have

added salt: but it is certain salt is no constituent part, or ingredient of *metals*, but rather something external adhering to them. All *metals* consist of two parts or principles; mercury as the basis or matter; and sulphur, as the binder or cement: the first, the substratum, or *metallic* matter; and the second, that which renders it fixed and malleable. The mercury, it is to be noted, is the same with our quick-silver, only defecate, and clear of any heterogeneous matter; whereas the common quick-silver is always mixed. As to the sulphur, it is not the vulgar fossil sulphur, but a peculiar sort of matter specifically denominated *sulphur of metals*, concluded by some of our late, and best chymists, particularly M. Homberg, to be fire; which being mixed with the mercury, fixes it, and, according to the different degrees of its union and cohesion therewith, produces different *metals*.

This doctrine of the composition of *metals* is confirmed by an experiment of Mr. Boyle, who tells us, that after having retained mercury a long time in a moderate fire, he took a piece of gold out of it, which it was apparent was not in the mercury before it was exposed to the fire. M. Homberg also has an experiment to the same effect; from which he concludes, that gold consists of a sulphurous igneous part, and a heavy mercurial part fixed thereby; and that upon taking away the sulphurous or fiery part, the gold must be converted into fluid mercury.

3^o. All *metals* must first be mercury, ere they be gold; and the thing superadded to common mercury, whereby it is prevented from becoming gold, is a sharp volatile body, which, when heated, becomes corrosive, and emits fumes; which are the true properties of the fossil sulphur.

4^o. If any *metal*, or other body, could be found that only differed from gold in its wanting weight, it were impossible ever to make gold of it; and, on the contrary, if a body could be had that is as heavy as gold, all the other properties, as colour, fixity, ductility, &c. might easily be added. And hence the more knowing among the alchymists hold the primary matter of gold to be quick-silver; which, say they, is gold at heart, as coming nearest to gold in point of specific gravity. Only there is a corrosive body, i. e. sulphur, adhering to it, which, if it were separated, you would have gold; or if it were only inverted, silver.

And accordingly, on such principles whoever would make gold out of any other foreign matter, must remember, that the more his matter differs from mercury in weight, &c. the less gold it will make.

5^o. Therefore *metals* are transmutable into one another: for if mercury be the common matter of all *metals*, and if all the difference lie in the fixing spirit or sulphur, which, as it is less or more subtle or pure, constitutes this or that *metal*; it is no way improbable that they should be transmuted by a purer fixing sulphur taking place of a corrosive one, and fixing the matter into a more perfect *metal*.

6^o. The purest *metals* result of the purest and most defecate mercury, and the smallest quantity of the subtlest sulphur. Hence, mercury of gold is heavier than common mercury, and has always some impure part that is lighter than gold; and could that be taken away, and the fixing spirit be added, it would become heavier than gold.

7^o. The imperfect *metals* consist of impure mercury and imperfect sulphur, with some other variable heterogeneous matter in it: this, fused by the fire, emits a fume which whitens copper, after which the sulphur exhales yet further. The reality of such a third matter is evinced hence, that all these baser *metals* are resolvable not only into mercury and sulphur, but also into scoria or fordes, which are lighter and more earthy than either of the other, and accordingly swim therein.

8^o. Upon the whole it appears, that in the three nobler *metals*, gold, mercury, and silver, it is principally the greater or less proportion of the sulphur to the mercury, that determines them to be gold, mercury, or silver: that it is by this proportion those several *metals* are defined and denominated; and that from this difference of proportion, flow all the specific differences of colour, weight, fixity, ductility, volatility, fusibility, solubility, salubrity, &c.

9^o. That in the other baser *metals*, besides this different proportion of the two principles, there intervenes another cause of diversity, viz. a third principle, or matter of an earthy kind, and very different from either of the rest; which adhering to the pure elemental sulphur, corrupts and adulterates, and variously modifies it: and from the different circumstances of this third principle, considered along with those of the sulphur itself, result the specific differences of the more imperfect *metals* as to weight, colour, and their other qualities.

Bath METAL, called also *Prince's METAL*, is a kind of saccharine *metal*, composed of the finest and purest copper mixed with zinc; whereby it becomes of a fine yellow, and more disposed to receive a polish, lustre, &c. as also fitter to be gilt. 'Tis said to have been invented by prince Rupert, whence its name.

Bell METAL is a composition of copper and tin melted together. See **BELL**.

The ordinary proportion is twenty-two or twenty-three pounds
6 Q of

of tin to an hundred weight of copper. — Some add lead and brass to the composition.

Bluing of METALS. See the article **BLUING**.

Painting on METALS. See the article **PAINTING**.

Rust of METALS. See the article **RUST**.

Line of METALS.—On Gunter's sector, are sometimes two lines thus called, and noted with the characters of the seven metals, \odot , Δ , \square , γ , ρ , δ , and Ψ ; their use is to give the proportions between the several metals as to their magnitudes and weights.

To be laid under METAL, in gunnery, is when the mouth of a gun lies lower than her breech.

METAL, in heraldry.—There are two metals used in heraldry, by way of colours, viz. gold and silver; in blazon, called *or*, and *argent*.

In the common painting of arms, these metals are represented by white and yellow, which are the natural colour of those metals.

In engraving, gold is expressed by dotting the coat, &c. all over; and silver, by leaving it quite blank.

It is a general rule in heraldry, never to place metal upon metal, nor colour on colour: so that if the field be one of the metals, the bearing must be of some colour, and vice versa; otherwise the arms are false: though this rule admits of some exceptions.

METALLIC, or **METALLINE**, an adjective applied to any thing that bears a relation to metals.

Painting in enamel is performed with metallic colours, that is, with such as come from metals, or are made with metals; no other being able to endure the fire.

F. Romani has published a metallic history of the popes, or their history collected from coins. 'La France Metallique' is a book of medals mostly imaginary, pretended to be taken from the cabinets of the curio's, where they never were, by Jacques de Bie, engraver. M. Bzot has also published the metallic history of Holland.

METALLIC mines. See the article **MINE**.

METALLIC vitriol. See the article **VITRIOL**.

METALLORUM crocus. See the article **CROCUS**.

Sulphur METALLORUM. See the article **SULPHUR**.

METALLURGIA, the art of metals, that is, of preparing and working metals, from the glebe or ore, to the utensil.

Metallurgia includes what relates to the finding of the metallic glebe or ore in the mine; the judging of its kind and richness, or the proportion of metal therein; the digging or separating it from the earth, and other matters; and the purifying and disposing it into a complete, pure, malleable metal.

Boerhaave divides *metallurgia* into four parts. The first teaches how metals grow in the mine, how they are discovered, and how procured out of the same. The second how to separate the metallic from the other matter of the ore. The third, how to reduce the separated matter to its simplicity and ductility. The fourth, to work, gild, polish, and imitate the finer metals in the coarser.

METAMORPHISTS, a sect of heretics in the XVIth century, whose distinguishing tenet was, That the body of Jesus Christ was, upon his ascension into heaven, changed, and metamorphosed into God.

METAMORPHOSIS, * *transformation*; the change of a person or thing into another form.

* The word is Greek, *Μεταμορφωσις*; formed of *μετα*, change, or removal from one place or state to another; and *μορφη*, form, figure.

The antients held two kinds of *metamorphoses*: the one real, the other apparent. The *metamorphosis* of Jupiter into a bull, and of Minerva into an old woman, were only apparent. That of Lycaon into a wolf, and of Arachne into a spider and the like, they say were of the real kind.

Most of the ancient *metamorphoses* include some allegorical meaning, relating either to physics or morality.—Ovid's *metamorphoses* is a collection of histories of such transformations, poetically related.—Some authors are of opinion, that a great part of the ancient philosophy is couched under them; and Dr. Hooke has made an attempt to unriddle, and lay open the hidden meanings of several of them.

METAPHOR, **METAPHORA**, in rhetoric, a figure of speech whereby a word is transferred from its proper signification, to another: or, whereby the proper denomination of one thing is applied to another; which other thing is more elegantly explained by this tralatitious or foreign name, than by that which naturally belongs to it.

* The word comes from the Greek *μεταφορα*, translation, or displacing; of *μετα*, trans, and *φερε*, I bear, or carry.

As, when we say, the light of the understanding; to burn with zeal; to float between hope and despair, &c.

The metaphor is the most common of all the figures of speech; and is that usually meant when we say a thing is spoken figuratively.

The metaphor is a short simile; an image being thereby called from its proper subject to give the resemblance of another.—An allegory is no more than a continued metaphor.

The sources or places whence metaphors are drawn, are innumerable: they may be fetched from divine matters; thus Cicero calls Plato our God, *Deus ille noster Plato*. From the elements; as a torrent of eloquence. From plants; as where virtue has taken root. From artificial things; as where Apollonius is called the *gymnal* of the world; Longinus, a living library; Pertinax, fortune's foot-ball, &c.

Quintilian distinguishes metaphors into four kinds: the first, when a word is transferred from one animal to another; as when Livy says that Cato used to bark at Scipio: or, when our Saviour calls Herod, *fox*. The second, when the word is transferred from one inanimate to another; as *bridle*, for *louis*. The third, when inanimates are applied to animates; as the *flower* of youth. And the last, when animates are applied to inanimates; as the river *disdained* its bounds.

As the metaphor is intended to set things before the eyes; it becomes so much the more perfect, as it shews them the more vividly, by representing them in motion and action. A metaphor should have nothing in it either coarse or shocking, or that may raise it above the simplicity of nature: nor should it appear a metaphor to any but those who view it very closely. A metaphor should never be carried too far; for in that case, it degenerates into puerility.—Metaphors should always be followed in the same kind; they become unnatural, when different images are introduced.—In all metaphorical dictions, there should be a kind of unity, so that the different words used, may have a kind of suitableness to each other: different ideas are always absurd; as in this instance; The church was besieged with a deluge of troubles: where the two images, *fuge* and *deluge*, have no relation.

There is nothing young writers are more faulty in, than the indelicate use of metaphors: those who affect the merveilleux, are eternally on the metaphorical strain; nor know any bounds or restraint. They who understand them best, use them with the greatest reserve. Mr. Addison proposes it as a rule for writers, to imagine their metaphors actually painted before them, and to view and examine the justness of their application and assemblage under those circumstances; throwing every thing out of the writing, but what might be retained in the picture. Card. Perron prescribes this general rule for metaphors; that they must always defend from the genus to the species; and never go backwards from the species to the genus: thus we say figuratively, the bonds of society; and not the human cords which tie us together: bond being a genus, and cord a species.

METAPHRAST, **METAPHRASTES**, a translator, or person who renders an author into another form or another language, word for word.

A *metaphrase*, *μεταφρασις*, usually signifies something more than either a paraphrase, or a translation: according to Baillet, a *metaphrase* implies a translator, glossator, and interpolator, all at once.

METAPHYSICS*, **METAPHYSICA**, *transnaturalis*; a branch of science, about whole nature and ideas, there is some difference among authors.

* The word is formed of the preposition *μετα*, trans, beyond, or above; and *φυσικη*, nature, or *φυσικη*, natural.

Some define *metaphysics*, that part of science which considers spirits, and immaterial beings; which others chuse to distinguish by the name of *pneumatics*.

Others, keeping closer to the etymology of the word, explain *metaphysics*, by *trans-natural*, or *præter-natural*, or even *post-natural philosophy*.

Others, with more propriety, conceive *metaphysics* to be what some others call *ontology*, or *ontology*, i. e. the doctrine of *ente*, or of being, *quatenus*, being.

In the same view, some philosophers call this science by the name *philosophia*, or *scientia generalis*, as being the foundation, or, as it were, the flamen or root from whence all the other parts of philosophy arise, and wherein they all meet; its object being being in the abstract, or general, not restrained to this or that species of beings; not to spirit any more than body: so that the doctrines of *metaphysics*, are applicable to all beings whatever.

Philosophers again, are divided as to the notion of a science *de ente* in general. Some hold it real, precise, and solid enough to be demonstrated; but others judge it too obscure, faint, and confused to be admitted into philosophy.

Being, abstracted from every fort or species of being, is certainly a very vague term; and does not seem to give footing enough for a science: we do not see how it can affect the mind as an object. Add, that the common *metaphysics* cannot demonstrate any part of its subject, but assumes the whole: there are no principles, or axioms whereon to demonstrate *metaphysics*, which contain the principles of all other sciences. The first who wrote professedly on the subject of *metaphysics* is Aristotle. Indeed he is the first who uses the word: *Μεταφυσικα*.

purica, is the title of one of his books, but this some of his commentators will have to signify no more than *after the books of physics*. M. du Hamel, taking the preposition *μετα* in the sense of *post*, is even of opinion that the word was coined by Aristotle's followers; and that it was unknown to Aristotle himself.

Aristotle's *metaphysics* seem to have been intended for a kind of natural theology. F. Malebranche and Mr. Locke have wrote much more clearly and consistently of *metaphysics*, than any of the ancients.

METAPHYSICAL, something belonging to *metaphysics*. See **METAPHYSICS**.

The word is also used to denote something subtle, abstract, and refined.—In which sense we say, Such a reasoning, such a proof, is too *metaphysical*, &c.

A *metaphysical* case is an imaginary or chimerical case, which can scarce ever happen, or not without much difficulty; and which ought not to be laid down as a rule for common occasions.

METAPHYSICAL certitude. See **CERTITUDE**.

METAPHYSICAL distinction. See **DISTINCTION**.

METAPHYSICAL evidence. See **EVIDENCE**.

METAPHYSICAL form. See **FORM**.

METAPHYSICAL perfection. See **PERFECTION**.

METAPHYSICAL possible. See **POSSIBLE**.

METAPHYSICAL universality. See **UNIVERSALITY**.

METAPLASM*, **METAPLASMUS**, in grammar, a transmutation, or change made in a word, by adding, retrenching or altering a letter or syllable thereof.

* The word comes from the Greek, *μεταπλασμος*, which signifies the same; compounded of *μετα* and *πλασσω*, *form*.

METASTASIS, **ΜΕΤΑΣΤΑΣΙΣ**, in medicine, the removal of a morbid humour from one part to another; frequently observed in nervous cases.

A *metastasis*, or translocation, is sometimes also found in the grosser humours; the refluent blood taking up digested matter from one part, and disposing it upon another.

METATARSUS*, in anatomy, that part of the human skeleton, containing the middle of the foot.—See *Tab. Anat. (Osteol.)* fig. 3. n. 30. fig. 7. lit. e. e.

* The word comes from *μετα*, *trans*, beyond; and *ταρος*, *the tarsus*.

The *metatarsus* consists of five bones, reaching from the heel to the toes; whereof that which sustains the great toe, is the thickest; and that which sustains the next toe, the longest. The rest grow, each shorter than other. They are longer than the bones of the metacarpus; in other things they are like them, and are articulated to the toes, as these are to the fingers.

METATHESIS*, *transposition*; a grammatical figure, whereby letters or syllables of a word are transposed, or shifted out of the natural situation,—as, *Evandre* for *Evander*; *I præ* for *præi*.

* The word is Greek, *μεταθεσις*, formed of *μετα*, *trans*; and *θεσις*, *position*.

METEMPSYCHI, antient heretics, who, in imitation of Pythagoras, held the *metempsychosis*, or transmigration of souls.

METEMPSYCHOSIS*, **ΜΕΤΕΜΨΥΧΩΣΙΣ**, in the antient philosophy, the passage or transmigration of the soul of a man, after death, into the body of some other animal.

* The word is Greek, formed of *μετα*, beyond; and *μεψυχω*, I animate or enliven.

Pythagoras and his followers held, that after death mens souls passed into other bodies, of this or that kind, according to the manner of life they had led. If they had been vicious, they were imprisoned in the bodies of miserable beasts, there to do penance for several ages; at the expiration whereof, they returned afresh to animate men.—But if they had lived virtuously, some happier brute, or even a human creature, was to be their lot.

What led Pythagoras into this opinion, was, the persuasion he had, that the soul was not of a perishable nature: whence he concluded, that it must remove into some other body, upon its abandoning this. Lucan treats this doctrine as a kind of officious lie, contrived to mitigate the apprehension of death, by persuading men that they only changed their lodging; and only ceased to live, to begin a new life.

Reuchlin denies this doctrine; and maintains, that the *metempsychosis* of Pythagoras implied nothing more than a similitude of manners, desires, and studies formerly existing in some person deceased, and now revived in another alive.—Thus, when it was said that Euphorbus was revived in Pythagoras, no more was meant than that the martial virtue, which had shone in Euphorbus at the time of the Trojan war, was now in some measure revived in Pythagoras, by reason of the great respect he bore the Athlete. For those people wondering how a philosopher should be so much taken with men of the sword, he palliated the matter, by saying that the soul of Euphorbus, i. e. his genius, disposition and inclinations, were revived in him.

And this gave occasion to the report that Euphorbus's soul, who perished in the Trojan war, had transmigrated into Pythagoras. Ficinus asserts, That what Plato speaks of the migration of a human soul into a brute, is intended allegorically, and is to be understood only of the manners, affections, and habits degenerating into a beastly nature by vice.—Serranus, though he allows some force to this interpretation, yet inclines rather to understand the *metempsychosis* of a resurrection.

Pythagoras is said to have borrowed the notion of a *metempsychosis* from the Egyptians, others say from the antient Brachmans. It is still retained among the Banians and other idolaters of India and China; and makes the principal foundation of their religion. So extremely are they bigotted to it, that they not only forbear eating any thing that has life, but many of them even refuse to defend themselves from wild beasts. They burn no wood, lest some little animalcule should be in it; and are so very charitable, that they will redeem from the hands of strangers, any animals that they find ready to be killed.

METEMPTOSIS*, a term in chronology, expressing the solar equation, necessary to prevent the new moon from happening a day too late.

* The word comes from the Greek, *μετα*, *post*, and *πνυτα*, *causo*, I fall.

By which it stands contradistinguished from *preemptosis*, which signifies the lunar equation, necessary to prevent the new moon from happening a day too soon.

The new moons running a little backwards, that is, coming a day too soon at the end of three hundred and twelve years and a half; by the *preemptosis*, a day is added every three hundred years, and another every two thousand four hundred years: on the other hand, by the *metemptosis*, a bissextile is suppressed each one hundred thirty-four years, that is, three times in four hundred years.—These alterations are never made, but at the end of each century; that period being very remarkable, and rendering the practice of the calendar easy.

There are three rules for making this addition, or suppression of the bissextile-day, and by consequence for charging the index of the epacts. 1^o. When there is a *metemptosis* without a *preemptosis*, the next following, or lower index, must be taken. 2^o. When there is a *preemptosis* without a *metemptosis*, the next preceding, or superior index, is to be taken. 3^o. When there is both a *metemptosis* and a *preemptosis*, or when there is neither the one nor the other, the same index is preserved. Thus in 1600 we had D; in 1700, by reason of the *metemptosis*, C was taken; in 1800 there will be both a *preemptosis* and a *metemptosis*; so the same index will be retained. In 1900 there will be a *metemptosis* again, when B will be taken, which will be preserved in 2000; because there will then be neither the one nor the other.—This is as far as we need compute for it; but Clavius has calculated a cycle of 301800 years; at the end of which period, the same indices return in the same order.

METEOR*, in physiology, a changeable, moveable, imperfect mixt body, or resemblance of a body, appearing in the atmosphere, and formed out of the matter of the common elements, altered a little by the action of the heavenly bodies, but not transformed.

* The Greeks call them *μετεωροι*, q. d. *sublimia*, or high raised; the Latins, *impressurae*, as making signs or impressions in the air.

Meteors are of three kinds:

Igneous, or **fiery METEORS** consist of a fat sulphurous smoke set on fire; such are lightning, thunder, ignis fatuus, draco, volans, falling stars, and other fiery phenomena appearing in the air.

Aereal or **airy METEORS** consist of flatulent and spirituous exhalations; such are winds, whirlwinds, and hurricanes.

Aqueous or **watery METEORS** are composed of vapours, or watery particles variously separated, and condensed by heat and cold; such are clouds, rainbows, hail, snow, rain, dew, and the like. The formation of *meteors* is explained pretty largely by Des Cartes, in a treatise express. Aristotle and Gassendus have also handled the same subject. Dr. Woodward's opinion is, That the matter of many *meteors* is in great measure of a mineral nature; that the mineral particles contained in the strata of the earth, are raised by the subterraneous heat, together with the vapours ascending from the abyss, and pervading those strata; especially at such times as the sun's heat is sufficient to penetrate the exterior parts of the earth, and to make room for their escape into the atmosphere. These sulphurous, nitrous, and other active, and volatile mineral particles, form various *meteors*, according to the various fate they meet with in the air.

METEOROLOGY, the doctrine of meteors; explaining their origin, formation, kinds, phenomena, &c.

METEOROSCOPE*, a name which the antient mathematicians gave to such instruments as they used for observing, and determining the distances, magnitudes and places of the heavenly bodies.

* From the Greek *μετεωρος*, high; and *σκοπος* of *σκοπεωμαι*, I view, observe.

METHEGLIN *, a drink prepared of honey; one of the most pleasant and general drinks the northern parts of Europe afford; and much used among the antient inhabitants.

* The word is *Welsh*, *meddyglin*, where it signifies the same.

There are divers ways of making it: one of the best whereof follows. Put as much new honey naturally running from the comb, into spring-water, as that when the honey is thoroughly dissolved, an egg will not sink to the bottom, but be just suspended in it: boil this liquor for an hour, or more, till such time as the egg swim above the liquor about the breadth of a groat; when very cool, next morning, it may be barreled up; adding to each fifteen gallons an ounce of ginger, as much of mace and cloves, and half as much cinnamon, all grossly pounded: a spoonful of yeast may be also added at the bung-hole, to promote the fermenting. When it has done working, it may be closely stopp'd up, and after it has stood a month, it should be drawn off into bottles.

METHOD *, **METHODUS**, the art, or rule of disposing things in such a manner, as they may be easily comprehended; either in order to discover the truth, which we ourselves are ignorant of; or to shew and demonstrate it to others when known. See **TRUTH** and **ERROR**.

* The word comes from the Greek *metodos*, which signifies the same.

The schools have a long time disputed, whether logic be an art, a science, or *method*.

Cassendus distributes *method* with regard to its object, into three kinds, or branches; viz. *Inventionis*, the method of invention, or discovering a truth unknown.

Methodus iudicii, the method of judging, or determining of a truth, or proposition proposed.

And *methodus demonstrationis*, or method of demonstration; that is, of exhibiting it to another.

Method, with regard to the order of procedure, is usually divided into two kinds; the one of *resolution*, which is that we generally use in our enquiry after truth.—The other of *composition*, by which the truth once found, is taught or imparted to others.

In the *method of resolution*, called also by geometers the *analytic method*, we proceed from some general known truths, to others which belong to some particular or singular thing.

In the *method of composition*, called also the *synthetic method*, we propose some certain general truths, from which we produce particular truths.

If in the *method of resolution* we lay down any axioms; it is not immediately in the beginning, and all together; but as they are found necessary in the disquisition: on the contrary, in the *method of composition*, they are proposed all together in the beginning, before there is any absolute need of them.

The two *methods* differ from each other, as the *methods* of searching out a genealogy, either by descending from the ancestors to their posterity, or by ascending from the posterity to the ancestors: both of them have this in common, that their progression is from a thing known, to another unknown. Those things that are known, in each, are set in the front, or first place; that by them we may be able to arrive at those which are not known.

The following things are required in both *methods*, that error may be avoided.—1^o. That no proposition be admitted as true, to which a man can, with a good conscience, deny his assent; or which is not evident. 2^o. That the connection of the following proposition with the foregoing, in every step of the progression, be likewise evident or necessary. To these may be added two other prudential maxims, that hold good in each *method*: as, that we ought to reason on those things only, of which we have clear and perspicuous ideas; or of obscure things only, so far as we know them: and that we should always begin from the simple and easy, and dwell on them a-while, before we proceed to things compounded, and more difficult.

Locus peculiaris to the *analytic method* are, 1^o. That we must clearly and perfectly understand the state of the question proposed.

2^o. That with some energy or effort of the mind, one or more intermediate ideas be discovered; which are to be a common measure or standard, by whose help the relations between the ideas to be compared are to be found out. 3^o. That we cut off all that has no necessary relation to the truth sought after, from the thing which is to be the subject of our consideration. 4^o. That a compounded question be divided into parts, and those separately considered in such order, as that we begin with those which consist of the more simple ideas, and never proceed to the more compounded, till we distinctly know the more simple, and by reflection have rendered them obvious to the understanding. 5^o. That certain signs of our ideas comprehended in obvious and established figures, or in the fewest words possible, be imprinted in the memory, or marked on paper, lest the mind have any further trouble about them.

6^o. These things done, that the ideas (according to the second law) be then compared with each other, either by reflection alone, or express words. 7^o. If after we have com-

pared all the ideas, we cannot find out what we seek, we are then, by the third law, to cut off all the propositions, which, after a full examination, we find of no use to the solution of the question, and begin a-fresh. If after this method has been repeated as often as is necessary, nothing of what we have observed seems to conduce to the solution of the question, we ought to give it over as out of our reach.

The *synthetic method* is only practicable in things, whose principles we perfectly know; as in geometry, which is wholly employed in the consideration of abstract modes; of which our mind has clear and adequate ideas.—When the enquiry is into substances, as in physics, we cannot make use of the *method of composition*, by reason their kinds, and intimate essences are unknown to us.

This *method* has not been by any so justly and accurately observed, as by the mathematicians, whose principles are perfectly known; its laws therefore will be best drawn from their practice. As 1^o. To offer nothing but what is couched in words or terms perfectly understood; for which reason they always define the words they make use of. 2^o. To build only on evident and clear principles, such as cannot be contradicted by any who understand them; for which reason they first propound their maxims or axioms, which they demand to be granted them, as being self-evident, and needing no proof. 3^o. To prove demonstratively all their consequences; for which reason they use nothing in their arguments or proofs, but definitions that have been laid down, axioms that have been granted, and propositions that have been already proved; which become principles to things that follow them.

METHOD, *methodus*, is more peculiarly used in mathematics for divers particular processes for solving problems.—In this sense we say

METHOD of *exhaustions*. See **EXHAUSTIONS**.

METHOD of *fluxions*. See the article **FLUXIONS**.

METHOD de *maximis & minimis*, &c. See **MAXIMUM**.

METHOD of *tangents*. See the article **TANGENTS**.

Differential METHOD, &c. See **DIFFERENTIAL**.

Exponential METHOD, &c. See **EXPONENTIAL**.

Poristic METHOD. See the article **PORISTIC**.

METHODISTS, **METHODOICI**, a sect of antient physicians, who reduced the whole healing art to a few common principles or appearances.

The *Methodists* were the followers of Theophilus, whence they were also called *Theophilici*.—They were strenuously opposed by Galen in several of his writings; who scrupled not to assert, that the *methodical* bereft every thing that was good in the art.

Quincy mistakenly uses *methodists*, *methodici*, for those physicians who adhere to the doctrine of Galen, and the schools; and who cure with bleedings, purges, &c. duly applied according to the symptoms, circumstances, &c. in opposition to empirics and chymists, who use violent medicines, and pretended secrets or nostrums. The same term has been used to express a sect of religion.

METOCHE, **METOKH**, in the antient architecture, a term used by Vitruvius, to signify the space or interval between the dentils.—See *Tab. Archit.* fig. 30. lit. c. c. See also **DENTICLE**.

Baldus observes, that in an antient MS. copy of that author, the word *metateme* is found for *metache*. Hence Daviler takes occasion to suspect that the common text of Vitruvius is corrupted; and concludes, that it should not be *metache*, but *metateme*, q. d. section.

METONIC cycle, in chronology, the lunar cycle, or period of nineteen years; thus called from its inventor Meton, an antient Athenian.

When the *metonic* cycle is completed, the lunations, or the new and full moons, return on the same day of the month; so that on whatever days the new and full moons happen this year, nineteen years hence they are to fall precisely on the very same day of the month, as Meton and the primitive fathers thought.

For this reason, at the time of the council of Nice, when the manner of settling the time for observing Easter was established, the numbers of the *metonic* cycle were inserted in the calendar in letters of gold, on account of their great use; and the year of the cycle for that year was called the *golden number* of that year. See **GOLDEN NUMBER**.

METONYMY *, **METONYMIA**, a rhetorical trope, consisting in a transmutation or change of names; or a putting of the effect for the cause, or the subject for the adjunct; and *vice-versa*.

* The word comes from the Greek *meton*, *trans*, and *onyma*, *names*, name.

The *metonymy* is the most extensive of all the tropes. It is sometimes also called *transnominatio*, and differs not much from the *hypallage*. See **HYALLAGE**.

There are four kinds of *metonymies* in principal use: the first, when we put the inventor for the thing invented; as Bacchus for wine, Ceres for bread. The second, when we put the thing containing for the thing contained; as a glass for the wine within it. The third, when the effect is put for the cause; as the captain for his soldiers, Greece for the Greeks, the author

for his works. The fourth, when the sign is put for the thing signified; as the gown for the priesthood, &c.

METOPÆ*, or **ΜΕΤΟΠΑ**, in architecture, the square space or interval between the triglyphs, in the Doric frieze.—See *Tab. Archit. fig. 28. lit. R.*

• The word, in the original Greek, signifies the distance between one aperture or hole and another, or between one triglyph and another; the triglyphs being supposed to be folives or joists that fill the apertures. It is derived from *μέτα*, *inter*, between, and *van foramen*.

The antients used to adorn these parts with carved works, or paintings, representing the heads of oxen, vessels, basons, and other utensils of the heathen sacrifices.

As there is found some difficulty in disposing the triglyphs and metopes in that just symmetry which the Doric order requires; some architects make it a rule, never to use this order but in temples.

Semi-Metopæ is a space somewhat less than half a metopæ, in the corner of a Doric frieze.

METOPOSCOPY*, **ΜΕΤΟΠΟΣΚΟΠΙΑ**, the art of discovering the temperament, inclinations, and manners of persons, by inspecting their features, and the lines in their faces, and especially of their foreheads.

• The word comes from the Greek *μετωπον*, *front*, forehead; and *σκοπια*, inspection, of *σκοπεωμαι*, I view.

Metoposcopy is no more than a branch of physiognomy; the latter taking its conjectures from all parts of the body: but both the body, and the branch, are extremely precarious, not to say vain.

Ciro Spontoni, who has wrote on the subject of *metoposcopy*, observes, that there are seven principal lines to be considered in the forehead; each of which has its peculiar planet. The first is the line of Saturn, the second of Jupiter, &c.

METRE, or **METER**, **ΜΕΤΡΟΝ**, in poetry, denotes a system of feet of a just length. Aristides defines *metre*, a system of feet composed of dissimilar syllables, of a just extent.

In which sense *metre* amounts to much the same with genus carminis, or the fort of verse, and differs from rhythm.

METRICAL verses are those consisting of a determinate number of long and short syllables; as those of the Greek and Latin poets.

Capellus observes, that the genius of the Hebrew language is incompatible with *metrical* poetry.

METRICE, or **METRICA**, among the antients, was that part of poetry employed about the quantities of syllables, feet, sorts of metre, or verse, &c.

METROCOMIA*, a term in the antient church history, signifying a borough, or village, that had other villages under its jurisdiction.

• The word comes from the Greek *μητηρ*, mother, and *κομη*, town, village.

What a metropolis was among cities, that a *metrocomia* was among country towns. The antient *metrocomie* had each its chorepiscopus or rural-dean, and here was his see or residence. See **METROPOLITAN**, and **CHOREPISCOPI**.

METROPOLIS*, **ΜΗΤΡΟΠΟΛΙΣ**, the capital of a country, or province; or the principal city, and, as it were, mother of all the rest.

• The word comes from the Greek, *μητηρ*, mother, and *πολις*, city; as who should say, the mother-city, &c.

METROPOLIS is also applied to archiepiscopal churches, and sometimes to the principal or mother church of a city.

METROPOLITAN, is indifferently applied to an archbishop, and to his cathedral church.

The Roman empire having been divided into thirteen dioceses, and one hundred and twenty provinces, each diocese and each province had its metropolis, or capital city, where the proconsul, or the vicar of the empire, had his residence.

To this civil division the ecclesiastical was afterwards adapted, and the bishop of the capital city had the direction of affairs, and the pre-eminence over all the bishops of the province. His residence in the metropolis gave him the title of *metropolitan*.

This erection of *metropolitans* is referred to the end of the third century, and was confirmed by the council of Nice.—Indeed archbishop Usher, and De Marca, maintain it to be an establishment of the apostles; but in vain: for it is next to certain, that the ecclesiastical government was regulated on the foot of the civil, and that it was hence the name and authority of *metropolitans* was given to the bishops of the capital cities of the empire, or the provinces that composed it.—This is so true, that, in the contest between the bishop of Arles and the bishop of Vienne, each of whom laid claim to the *metropolitan-ship* of the province of Vienne; the council of Turin appointed, that whichever of them could prove his city to be the civil metropolis, should enjoy the title and rights of ecclesiastical *metropolitan*.

Though the ecclesiastical government, however, was modelled on the political; yet, in Gaul, and some other countries, the

distinctions of *metropolitan* and *primate* were not observed till very late. As the præfectus Gallie resided by turns at Tre-voux, Vienne, Arles, and Lyons, he communicated the rank and dignity of *metropolitan* and *primate* to each of them in their turn; and yet none of the Gallican bishops assumed to themselves the rights, nor even the precedence of *metropolitans*. The episcopate levelled them all, and they had no regard but to the privileges of seniority.—This equality lasted till the fifth century, when the contest between the bishops of Vienne and Arles was set on foot.

M. Du Pin observes, that in the provinces of Africa, excepting those whereof Carthage was the *metropolis*, the place where the most aged bishop resided became the *metropolis*: the reason of which, without doubt, was this; that neither the proconsul, nor præfectus, ever fixed their residence any-where.

The same author observes also, that, in Asia, there were *metropolis*'s merely nominal; that is, which had no suffragan, nor any rights of *metropolitans*. The bishops of Nice, Chalcedon, and Berytus, had the precedence of the other bishops, and the title of *metropolitans*, but this without any other prerogative besides the honour of the appellation; they themselves being subject to their *metropolitans*.

A *metropolitan* has the privilege of ordaining his suffragans; and appeals from sentences passed by the suffragans are preferred to the *metropolitan*.

MEZANINE, or **MEZZANINE**, a term used by some architects to signify an attic, or little story contrived occasionally over the first story, for the convenience of a wardrobe, or the like.

The word is borrowed from the Italians, who call *mezzanini* those little windows, less in height than breadth, which serve to illuminate an attic, or entresole.

MEZZO-TINTO, in sculpture, a particular manner of engraving figures on copper.

Mezzo-tinto is said to have been first invented by prince Rupert; and Mr. Evelyn, in his history of chalcography, gives us a head, performed by that prince, in this way.

It is very different from the common way of engraving. To perform it, they rake, hatch, or punch the surface of the plate all over with a knife, or instrument made for the purpose, first one way, then the other, across, &c. till the face of the plate be thus intirely furrowed with lines or furrows, close, and, as it were, contiguous to each other; so that, if an impression were then taken from it, it would be one uniform blot, or smut.

This done, the design is drawn, or marked, on the same face; after which, they proceed, with burnishers, scrapers, &c. to expunge and take out the dents, or furrows, in all the parts where the lights of the piece are to be; and that more or less, as the lights are to be stronger or fainter; leaving those parts black, which are to represent the shadows, or deepenings of the draught.

MIASMA, **ΜΙΑΣΜΑ**, is used to signify such particles, or atoms, as are supposed to arise from disordered, putrefying, or poisonous bodies; and to affect people at a distance.

MICHAELMAS, the feast of St. Michael the archangel; held on the 29th of September.

MICHAEL'S wing. See the article **WING**.

MICROCOSM*, **ΜΙΚΡΟΚΟΣΜΟΣ**, a Greek term, literally signifying *little world*; chiefly understood of *man*, who is so called by way of eminence, as being an epitome of all that is wonderful in the great world, or macrocosm.

• The word is formed from the Greek, *μικρος*, *parvus*, little; and *κοσμος*, *mundus*, world.

MICROGRAPHIA* **MICROGRAPHY**, a description of the parts and proportions of objects that are too small to be viewed without the assistance of a microscope.

• The word is compounded of *μικρος*, *parvus*, and *γραφειν*, *scribitis*, description.

MICROMETER*, an astronomical machine, which, by means of a very fine screw, serves to measure extremely small distances in the heavens; as the apparent diameters of the planets, &c. to a great degree of accuracy.

• The word comes from the Greek, *μικρος*, *parvus*, and *μετρον*, *mensura*; in regard a small length, *e. gr.* an inch, is hereby divided into a vast number of parts, *e. gr.* in some, 2800; and in others, more.

There is some controversy about the invention of the *micrometer*. Mess. Auzout and Picard have the credit of it in common fame, as being the first who published it in the year 1666. but Mr. Townley, in the *Philosophical transactions*, reclaims it for one of our own countrymen, Mr. Gascoyne. He relates, that, from some scattered papers and letters of this gentleman, he had learnt, that, before our civil wars, he had invented a *micrometer*, of as much effect as that since made by M. Auzout, and had made use of it for some years, not only in taking the diameters of the planets, and distances upon land, but in determining other matters of nice importance in the heavens; as the moon's distance, &c.

Monf. De la Hire, in a discourse on the æra of the inventions of the micrometer, pendulum clock, and telescope, read before the royal academy of sciences, in 1717, makes M. Huygens the inventor of the micrometer. That author, he observes, in his *observations on Saturn's ring*, &c. published in 1659, gives a method of finding the diameters of the planets by means of a telescope, viz. by putting an object, which he calls *virgula*, of a proper bigness to take in the distance to be measured, in the focus of the convex object-glass: in this case, says he, the smallest object will be seen very distinctly, in that place of the glass. By such means, he adds, he measured the diameters of the planets, as he there delivers them.

This micrometer, M. De la Hire observes, is so very little different from that published by the marquis De Malvasia, in his *ephemerides*, three years after, that they ought to be esteemed the same: and the micrometer of the marquis differed yet less from that published four years after his by Auzout and Picard. Hence M. De la Hire concludes, that it is to M. Huygens the world is indebted for the invention of the micrometer; without taking any notice of the claim of our countryman, Mr. Gascoyne, which, however, is prior by many years to any of them.

Construction and use of the MICROMETER.—Wolfius describes a micrometer of a very easy and simple structure, first contrived by Kirchius, thus:

In the focus of a telescope fit a brass or iron ring A B (*tab. Astron. fig. 11.*) with female screws diametrically opposite to each other; into these insert male screws C E and F B, of such length, as that they may be turned in the tube, so as to touch each other: and with this instrument very small spaces in the heavens may be accurately measured.

For when any objects, viewed through a tube, appear contiguous to the screws, if these be turned till they just touch two opposite points, whose distance is to be measured, it will be evident how many threads of the screw they are apart. To determine how many seconds answer to each thread; applying the tube towards the heavens, turn the screws, till they touch two points, whose distance is already accurately known; and observe the number of threads corresponding to that interval: thus, by the rule of three, a table may be made of the seconds corresponding to the several threads; by means whereof, without more ado, the distances of any points may be determined. The structure of the micrometer now chiefly in use, with the manner of fitting it to a telescope, and applying it, is as follows:

ABCg (*Tab. Astron. fig. 12.*) is a rectangular brass frame, the side AB being about three inches long, and the side BC, as likewise the opposite side Ag, about six inches; and each of the three sides about eight tenths of an inch deep: the two opposite sides of this frame are screwed to the circular plate, to be mentioned hereafter.

The screw P, which has exactly forty threads in an inch, being turned round, moves the plate GDEF along two grooves made near the tops of the two opposite sides of the frame; and the screw Q having the same number of threads in an inch as P, moves the plate RNMY along two grooves, made near the bottom of the said frame, in the same direction as the former plate moves, but with only half the velocity of that other: these screws are turned both at once, and so the plates are moved along the same way, by means of a handle turning the endless screw S, whose threads fall in between the teeth of the pinions on the screws P and Q. And note, that two half revolutions of the endless screw S carry the screw P exactly once round.

The screw P turns the hand a, fastened thereto, over a hundred equal divisions, made round the limb of a circular plate, to which the above-named two opposite sides of the frame are screwed at right angles: the teeth of the pinion on the screw P, whose number is 5, take into the teeth of a wheel on the back-side of the circular plate, whose number is 25. Again, on the axis of this wheel is a pinion of two, which takes into the teeth of another wheel, moving about the center of the circular plate, on the outside thereof, and having 50 teeth; this last wheel moves the lesser hand b once round the above-mentioned circular plate, in the $\frac{1}{25}$ part of the time the hand a is moving round: for because the number of teeth in the pinion on the screw P are 5, and the number of teeth of the wheel this pinion moves, are 25; therefore the screw P moves four times round in the time that wheel is moving once round. Further, since there is a pinion of two which takes into the teeth of a wheel, whose number is 50; therefore this wheel with 50 teeth will move once round in the time that the wheel of 20 teeth moves 25 times round; and, consequently, the screw P, or hand a, must move a hundred times round in the same time as the wheel of 50 teeth, or the hand b, has moved once round.

Hence it follows, that if the circular plate W, which is fastened at right angles to the other circular plate, be divided into two hundred equal parts, the index x, to which the handle is fastened, will move five of those parts in the same time in which the hand a moves one of the hundred divisions round the limb of the other circular plate. Thus, by means of an in-

dex x, and plate W, every fifth part of each of the divisions round the other plate may be known.

Farther, since each of the screws P and Q have exactly forty threads in an inch; therefore the upper plate GDEF will move one inch while the hand a moves forty times round; the four thousandth part of an inch while the hand moves over one of the divisions round the limb; and the twenty thousandth part of an inch while the index x moves one part of the two hundred round the limb of the circular plate W: and the under plate RNMY will move half an inch, the two thousandth part of an inch, and the ten thousandth part of an inch, the same way, in the said respective times.

Hence, if the under plate, having a large round hole therein, be fixed to a telescope, so that the frame is moveable, together with the whole instrument, except the said lower plate; and the frait smooth edge HI, of the fixed plate ABIH; as likewise the frait smooth edge DE, of the moveable plate GDEF, be perceivable through the round hole in the under plate, in the focus of the object-glass; then, when the handle of the micrometer is turned, the edge HI, of the narrow plate ABIH, fixed to the frame, and DE, of the moveable plate, will appear through the telescope equally to approach to, or recede from each other.

By these edges we shall be able to measure the apparent diameters of the sun, moon, &c. the manner of doing which take as follows:

Suppose, in looking at the moon through the telescope, you have turned the handle till the two edges DE and HI are opened, so as just to touch or clasp the moon's edges; and that there were twenty-one revolutions of the hand a, to complete that opening: first say, As the focal length of the object-glass, which suppose ten feet, is to radius, so is one inch to the tangent of an angle subtended by one inch in the focus of the object-glass; which will be found twenty-eight minutes thirty seconds: again, because there are exactly forty threads of the screws in one inch; say, If forty revolutions of the hand a give an angle of $28' 30''$, what angle will twenty-one revolutions give? The answer will be, fifteen minutes eight seconds; and such was the moon's apparent diameter. And so may the apparent diameters of any other objects be taken.

It must be here observed, that the divisions on the top of the plate GDEF are diagonal divisions of the revolutions of the screws, with diagonal divisions of inches against them: thus, as the said plate slides along, these diagonals are cut by divisions made on the edge of the narrow plate KL, fixed to the opposite sides of the frame by means of two screws. These diagonal divisions serve for a register to count the revolutions of the screws, and to shew how many there are in an inch, or the parts of an inch.

Mr. Derham tells us, that his micrometer is not, as usually, to be put into a tube, but to measure the spectra of the sun on paper (of any radius), or to measure any part of them. By this means he can easily, and very exactly, with the help of a fine thread, take the declination of a solar spot at any time of the day; and, by his half-seconds watch, measure the distance of the spot from the sun's eastern or western limb. Beside this astronomical micrometer, the ingenious Mr. Cuff has lately contrived a very accurate one for the use of the microscope.

MICROSCOPE, ΜΙΚΡΟΣΚΟΠΙΟΝ, a dioptrical instrument, by means whereof very minute objects are represented exceedingly large, and viewed very distinctly, according to the laws of refraction.

Microscopes are properly distinguished into simple, or single; and compound, or double.

Single Microscopes are those which consist of a single lens, or a single spherule.

Compound Microscopes consist of several lenses duly combined. As optics have been improved, other varieties have been contrived, in the sorts of *microscopes*: hence *reflecting microscopes*, *water microscopes*, &c.

When, and by whom, *microscopes* were first invented, is not certainly known. Huygens tells us, that one Drebbel, a Dutchman, had the first *microscope*, in the year 1621. and that he was reputed the inventor of it: though F. Fontana, a Neapolitan, claims the invention to himself, but dates it from the same year. As a telescope inverted is a *microscope*, the discovery might easily enough have arose from thence.

Foundation and theory of single MICROSCOPES.—If an object AB (*Tab. Optics, fig. 21.*) be placed in the focus of a small convex lens, or a simple *microscope* DE, and the eye be applied close to the other side of the *microscope*, the object will be seen distinct, in an erect situation, and magnified in the ratio of the distance of the focus to the distance wherein objects are to be placed to be seen distinctly by the naked eye.

For the object AB being placed in the focus of the convex lens DE, the rays issuing from the several points thereof, after refraction, will be parallel to each other: consequently, the eye will see it distinctly, by virtue of what is proved under the word **TELESCOPE**.

Further, since one of the rays AF, proceeding from the point A, after refraction becomes parallel to the incident ray, and therefore,

therefore, setting aside the thickness of the lens, is found directly against it: and the same holds true of all the other rays carried to the eye. The rays AF and BF, to which the rest coming from A and B are parallel, will enter the eye in the same manner as if they entered without passing through the lens; and will therefore appear erect, as if the lens were away. Lastly, it is manifest, that the object AB will be seen under the same angle as if viewed by the naked eye: but since it appears very distinct, whereas to the naked eye, at the same distance, it would appear extremely confused; it is the same thing as if the object should seem removed to the distance FH, wherein it is viewed with equal distinctness, and under the same angle: the diameter of the object AB, therefore, will be to the apparent diameter IK, as FC to FH, *i.e.* as the distance of the focus of the lens to the distance wherein an object is to be placed in order to view it distinctly. See MAGNITUDE, and ANGLE.

Huygens takes it for granted, that an object, seen with the naked eye, is then in its utmost distinctness when seen at the distance of eight digits, or tenths of a foot; which agrees pretty near with the observations of others.

Laws of single MICROSCOPES.—1°. Simple *microscopes* magnify the diameter of the object AB in the ratio of the distance of the focus FC to an interval of eight digits. *v. gr.* If the semi-diameter of a lens, convex on both sides, be half a digit; AB:IK = 1:8 = 1:16; that is, the diameter of the object will be increased in a sedecuple proportion, or as sixteen to one. 2°. Since the distance FH is constant, *viz.* eight digits; by how much the distance of the focus FC is smaller, so much the smaller ratio will it have to FH: consequently, the diameter of the object will be so much the more magnified.

3°. Since, in plano-convex lenses, the distance of the focus is equal to the diameter; and, in lenses convex on both sides, to the semi-diameter: simple *microscopes* will enlarge the diameter so much the more, as they are segments of smaller spheres.

4°. If the diameter of the convexities of a plano-convex lens, and a lens convex on both sides, be the same, *viz.* = 1; the distance of the focus of the first will be 1, of the second $\frac{1}{2}$: consequently, the semi-diameter of the object AB will be to the apparent one, in the first case, as 1 to 8; in the latter, as $\frac{1}{2}$ to 8; *i.e.* as 1 to 16. A lens, therefore, convex on both sides, magnifies twice as much as a plano-convex lens.

As the whole depends on the just and steady situation of objects with regard to the lens; various methods have been contrived to that end: whence we have several different kinds of single *microscopes*. The most simple is as follows:

1°. AB, *fig.* 22. is a little tube, to one of whose bafes, BC, is fitted a plain glass, to which an object, *viz.* a gnat, wing of an insect, down, or the like, is applied; to the other bafe, AD, at a proper distance from the object, is applied a lens convex on both sides, whose semi-diameter is about half an inch: the plain glass is turned to the sun, or the light of a candle, and the object is seen magnified; and, if the tube be made to draw out, lenses of different spheres may be used.

Again, a lens, convex on both sides, is inclosed in a cell AC, *fig.* 22. n°. 2. and by a screw H is there fastened across; through the pedestal CD passes a long screw, by means whereof, and the female screw I, a style or needle, fixed perpendicular to its extreme, is kept firm at any distance from the lens: in E is a little tube, on which, and on the point G, the various objects are to be disposed: thus there may be lenses of various spheres applied.

2°. But the *microscope* which is found to answer the end best, is as follows: AB, *fig.* 23. is a round brass tube, whose exterior surface is formed into a screw of a length somewhat less than the distance of the focus of a glass convex on both sides, used here for illuminating the object, and fitted to its bafe AC by a ring with a screw in it DE.

FG is another brass tube, somewhat wider than the first, and open each way, for an object to be applied to the *microscope*: to its upper bafe GH is fastened a spring of steel wire, twisted into a spiral I, whereby an object, placed between two round plates, or slices, K and L, in the manner hereafter mentioned, is, by means of the screw BC, brought to the *microscopical* lens (or magnifying glass, whereof there are several), and kept firm in its place. To the bafe HG, which has a female screw M, are fitted cells N, with a male screw O, wherein lenses of various spheres, guarded by ferrils, are included. In P is a female screw, by which an ivory handle PQ is fastened to the *microscope*.

In the ivory slice T are round holes, in which are fitted little circles of Muscovy talc, for objects, especially small and pellucid ones, as little insects, or the wings, scales, &c. of larger, to be fastened to.

When live insects are to be viewed, they are covered with the brass slice Y, which is put in a little square brass bed, perforated with holes X; and the same slice, whether alone, or inclosed in the bed, being laid between the round plates K and L, is brought to the lens by means of the screw AB, till the object may be distinctly viewed.

If other pellucid oblong objects are to be viewed, as down, &c. instead of the slice above, is used the instrument mentioned

above, for viewing wings of flies; whose structure is manifest from inspection.

There are other instruments in the apparatus of the *microscope*, as little tongs, &c. for taking up small objects; a glass tube for viewing the circulation of the blood in filices, &c. which need no description.

What has been said hitherto, is to be understood of *lenticular microscopes*; for *spherical* ones, their doctrine will be understood from what follows.

If an object AB, *fig.* 21. n°. 2. be placed in the focus of a glass spherule F, and the eye be behind it, *v. gr.* in the focus G; the object will be seen distinct, in an erect situation, and magnified, as to its diameter, in a ratio of $\frac{1}{2}$ of the diameter EL, to the distance at which objects are to be placed to be seen distinctly with the naked eye.

The first part of the proposition is proved in the same manner of spheres, as of lenses. As, then, a good eye sees an object distinctly at the distance of eight digits, a glass spherule will enlarge the diameter of an object in a ratio of $\frac{1}{2}$ of the diameter to 88 digits. Suppose, then, the diameter of the spherule EI $\frac{1}{10}$ of a digit, CE will be = $\frac{1}{2}$, and FE = $\frac{1}{2}$; and therefore FC = $\frac{1}{2} + \frac{1}{2} = 1$. Consequently, the true diameter of an object to its apparent one is in the ratio of $\frac{1}{2}$ to 8; *i.e.* as 3 to 320, or 1 to 103 nearly.

Now a lens, convex on both sides, increases the diameter in a ratio of the semi-diameter to the space of eight digits; wherefore $\frac{1}{2}$ having a less ratio to 8 than $\frac{1}{2}$, if a lens and a sphere have the same diameter, the former will magnify more than the latter: and, pretty much after the same manner, it may be shewn, that a sphere, of a less diameter, magnifies more than another of a large one.

For the methods of casting little glass spherules for MICROSCOPES, there are various.—Wolffius describes one as follows: A small piece of very fine glass, sticking to the wet point of a steel needle, is to be applied to the extreme bluish part of the flame of a lamp, or, which is better, to the flame of spirit of wine, to prevent its being blackened: being there melted, and run into a little round drop, it is to be removed from the flame, upon which it instantly ceases to be fluid; folding, then, a thin plate of brass, and making very small smooth perforations, so as not to leave any roughness on the surfaces; and, further, smoothing them over, to prevent any glaring; fit the spherule between the plates against the apertures, and put the whole in a frame, with objects convenient for observation.

Dr. Adams gives another method, thus: Take a piece of fine window-glass, and raise it, with a diamond, into as many lengths as you think needful, not exceeding an eighth of an inch in breadth; then holding one of those lengths, between the forefinger and thumb of each hand, over a very fine flame, till the glass begins to soften, draw it out till it be as fine as an hair, and break; then, applying each of the ends into the purest part of the flame, you have two spheres presently, which you may make larger, or less, at pleasure: if they stay long in the flame, they'll have spots; so they must be drawn out immediately after they are turned round. As to the stem, break it off as near the ball as possible; and, lodging the remainder of the stem between the plates, by drilling the hole exactly round, all the protuberances are buried between the plates; and the *microscope* performs to admiration.

After these manners may spheres be made much smaller than any lens; so that the best single *microscopes*, or those which magnify the most, are made thereof. For suppose the diameter of a spherule to be $\frac{1}{4}$ of a digit, the distance of its focus will be $\frac{1}{4}$; and therefore its real diameter to its apparent one, as $\frac{1}{2} + \frac{1}{4}$; that is, as $\frac{3}{4}$ to 8, or as 3 to 512; or, lastly, as 1 to 170. The surface of an object, therefore, will be increased by it in the proportion of 1 to 28900, and its bulk in a ratio of 1 to 4913000.

M. Leewenhoeck and M. Mulchenbroeck have succeeded very well in spherical *microscopes*; and the apparatus of the latter is much commended: but we forbear any descriptions thereof; it being easy for any, who considers the structure of those consisting of lenses, to conceive how those of spheres may be contrived.

Water MICROSCOPE.—Mr. S. Gray, and, after him, Wolffius, and others, have contrived *water-microscopes*, consisting of spherules, or lenses of water, instead of glass, fitted up somewhat after the manner of those above-mentioned (as spheres of water may be likewise used instead of glass in any of the common *microscopes*). But since the distance of the focus of a lens or sphere of water is greater than that of one of glass (the spheres whereof they are segments being the same), *water-microscopes* magnify less, and are therefore less esteemed than those of glass. The same Mr. Gray first observed, that a small drop or hemi-spherule of water, held to the eye by candle-light or moonlight, without any other apparatus, magnified the animalcule, contained in it, vastly more than any other *microscope*. The reason is, that the rays, coming from the interior surface of the first hemisphere, are reflected so as to fall under the same angle on the surface of the hind hemisphere, to which the eye is applied, as if they came from the focus of the spherule; whence they are propagated to the eye in the same manner

manner as if the objects were placed without the spherule in its focus.

Hollow glass spheres, of the diameter of about half a digit, filled with spirit of wine, are frequently used for *microscopes*; but they do not magnify near so much.

Theory of compound, or double Microscopes.—Suppose an object-glass E D, fig. 24. the segment of a very small sphere, and the object A B placed without the focus F.

Suppose an eye-glass G H, convex on both sides, and the segment of a sphere greater (though not too great) than that of D E; and let it be so disposed behind the object, as that if C E: C L :: C L: C K, the focus of the eye-glass may be in K.

Lastly, Suppose L K: L M :: L M: L I.

If, then, O be the place wherein an object is seen distinct with the naked eye; the eye, in this case, being placed in I, will see the object A B distinctly, in an inverted situation, and magnified in a compound ratio of M K to L K, and L C to C O; as is proved from the laws of dioptrics.

Laws of double Microscopes.—1°. The more an object is magnified by the *microscope*, the less is its field, i. e. the less of it it takes in at one view.

2°. To the same eye-glass may be successively applied object-glasses of various spheres, so as that both the intire objects, but less magnified, and their several parts, much more magnified, may be viewed through the same *microscope*. In which case, by reason of the different distance of the image, the tube L K, in which the lenses are fitted, should be made to draw out.

For the proportion of the object-glass to the eye-glass, some commend the subduple ratio, and some the subsextile. De Chales will have the semi-diameter of the convexity of the object-glass to be $\frac{1}{2}$ of a digit, or, at most, $\frac{1}{3}$; in the eye-glass an intire digit, or even $\frac{1}{2}$. Cherubin makes the semi-diameter of the object-glass, $\frac{1}{4}$, $\frac{1}{3}$, or $\frac{1}{2}$ of a digit; the semi-diameter of the eye-glass $\frac{1}{2}$, or $\frac{1}{3}$ of a digit.

3°. Since it is proved, that the distance of the image L K from the object-glass D E will be greater, if another lens, concave on both sides, be placed before its focus; it follows, that the object will be magnified the more, if such a lens be here placed between the object-glass D E, and the eye-glass G H.—Such a *microscope* is much commended by Conradi, who used an object-lens, convex on both sides, whose semi-diameter was two digits, its aperture equal to a mustard-seed; a lens, concave on both sides, 12, or at most 16 digits; and an eye-glass, convex on both sides, of 6 digits.

4°. Since the image is projected to the greater distance, the nearer another lens, of a segment of a larger sphere, is brought to the object-glass; a *microscope* may be composed of three lenses, which will magnify prodigiously.

5°. From these considerations it follows, that the object will be magnified the more, as the eye-glass is the segment of a smaller sphere; but the field of vision will be the greater, as the same is a segment of a larger sphere. If, then, two eye-glasses, the one a segment of a larger, the other of a smaller sphere, be so combined, as that the object appearing very near through them, i. e. not farther distant than the focus of the first, be yet distinct; the object, at the same time, will be exceedingly magnified, and the field of vision much greater than if only one lens was used: and the object will be still more magnified, and the field enlarged, if both the object and eye-glass be double. But in regard an object appears dim, when viewed through so many glasses, part of the rays being reflected in passing through each; the multiplying of lenses is not advisable: and the best, among compound *microscopes*, are those which consist of one object-glass, and two eye-glasses.

For a *microscope* of three lenses, De Chales commends an object-glass of $\frac{1}{4}$ or $\frac{1}{2}$ of a digit; and the first eye-glass he makes 2, or 2½ digits; the distance between the object-glass and eye-glass about twenty lines.—Conradi had an excellent *microscope*, the object-glass whereof was half a digit, and the two eye-glasses (which were placed very near) four digits: but it answered best, when, in lieu of the object-glass, he used two glasses, convex on both sides, their sphere about a digit and an half, or at most two, and their convexities touching each other within the space of half a line.—Eustachius de Divinis, instead of an object-glass, convex on both sides, used two plano-convex lenses, whose convexities touched; Grindelius did the same, only that the convexities did not quite touch. Zahnus made a binocular *microscope*, wherein both eyes were used.

Structure or mechanism of a double Microscope.—The industry and address of our countryman, Mr. Marshall, here deserves to be remembered: the most commodious *double microscope* is of his contrivance. In this, the eye-glasses are placed in the tube at A and B, fig. 25. and the object-glass at C; the little pillar D E is turned by means of a ball E, moveable in the socket F; and thus the *microscope* is accommodated to any situation. The same pillar is divided into as many parts, 1, 2, 3, 4, 5, &c. as there are lenses of different spheres to be used in viewing different objects; so that the distance of the object from the object-glass may be found without any trouble. But as it is scarce exactly enough determined this way, the tube may be brought nearer the object, at discretion, by means of the screw G H.

The objects are either laid on the circle I, or fitted to proper instruments, having their points, or stiles, passing through the little tube L M.

Lastly, To illuminate the object, a lens, convex on both sides, N O, is disposed in a convenient situation: the rest appears from the figure.

Reflecting Microscope is, properly, that which magnifies by reflexion, as the above-mentioned ones do by refraction.

The structure of such a *microscope* may be conceived thus: Near the focus of a concave speculum, A B, fig. 25. n°. 2. place a minute-object C, that its image may be formed larger than itself in D; to the speculum join a lens, convex on both sides, E F, so as the image D may be in its focus.

The eye will here see the image inverted, but distinct, and enlarged; consequently, the object will be larger than if viewed through the lens alone.

The inventor of this *microscope* is the great Sir I. Newton; but the objects appear dim in it.

Any telescope is converted into a *microscope*, by removing the object-glass to a greater distance from the eye-glass. And since the distance of the image is various, according to the distance of the object from the focus; and it is magnified the more, as its distance from the object-glass is greater; the same telescope may be successively converted into *microscopes*, which magnify the object in different degrees.

MID, or MIDDLE, in philosophy, and mathematics. See MEAN, and MEDIUM.

MIDDLE latitude, in navigation, is half the sum of two given latitudes. See LATITUDE.

MIDDLE latitude sailing, is used for a method of working the several cases in sailing, nearly agreeing with Mercator's way, but without the help of meridional parts. See SAILING.

MIDDLE priced stones. See the article STONE.

MIDDLE region. See the article REGION.

MIDDLE of the action. See the article ACTION.

MIDDLE of an eclipse. See the article ECLIPSE.

Masonry filled up in the MIDDLE. See the article MASONRY.

MID-HEAVEN, medium caeli, in astronomy, is that point of the ecliptic which culminates, or is in the meridian. See CULMINATION.

MIDRIFT, in anatomy. See the article DIAPHRAGM.

MIDSHIP-men, are officers aboard a ship, whose station, when they are on duty, is, some on the quarter-deck, others on the poop, &c.

Their business is, to mind the braces, to look out, and to give about the word of command from the captain, and other superior officers. They all assist, on occasion, both in sailing the ship, and in stowing and rummaging the hold.

They are usually gentlemen, who, having served their time as volunteers, are now upon their preferment.

MIDSUMMER-day, is the festival of St. John the baptist, held on the 24th of June. See QUARTER-DAY.

MIGRATION, or TRANSMIGRATION, the passage, or removal of any thing out of one state, or place, into another; particularly, of colonies of people, birds, &c. into other countries.

The *migration of the souls of men* into other animals after death, is the great doctrine of the Pythagoreans, called the *metempsychosis*. See METEMPSYCHOSIS.

The *migration of birds*, as the swallow, quail, stork, crane, fieldfare, woodcock, nightingale, and other birds of *passage*, is a very curious article in natural history, and furnishes a notable instance of the powerful instinct impressed by the creator. Mr. Derham observes two things remarkable therein; the first, that these untaught, unthinking creatures, should know the proper times for their passage, when to come, and when to go; as also, that some should come when others go.—No doubt, the temperature of the air, as to heat and cold, and their natural propensity to breed their young, are the great incentives to those creatures to change their habitation. But why should they at all shift their habitation? and why is not some certain place to be found, in all the terraqueous globe, affording them convenient food and habitation all the year round?

The second, That they should know what way to steer their course, and whither to go. What instinct is it, that moves a poor foolish bird to venture over vast tracts of land and sea? If it be said, that, by their high ascents up into the air, they can see across the seas; yet what should teach or persuade them that that land is more proper for the purpose than this? That Britain, for instance, should afford them better accommodation than Egypt? than the Canaries? than Spain? or any other of the intermediate countries? *Physico-Theol.* p. 349.

Lud. De Beaufort remarks, that birds, in their *migration*, observe a wonderful order and polity: they fly in troops, and steer their course through vast unknown regions, without the compass. *Casim. Divin.* It is to be added, that the birds of passage are all peculiarly accommodated, by the structure of their parts, for long flights.

Naturalists are divided as to the places whither birds of passage retire when they leave us. Mr. Willughby thinks the swallows fly into Egypt, and Ethiopia. *Ornith. lib. 2. c. 3.*

Olaus Magnus says, they lurk in holes, or under water; which is confirmed by Etimuller, who assures us, that he saw a buffel of them taken out of a frozen fish-pond, all hanging together head to head, feet to feet, &c. in one cluster. *Differt. 2. c. 10.*

—Olaus adds, that this is a common thing in the northern countries; and that such a cluster being carried accidentally by some boys into a stove, the swallows, after thawing, began to fly about, but weakly, and only for a very little time.

A further confirmation of this account was given by Dr. Colas, a person very curious in such things, to the *Royal Society*. Speaking of the way of fishing in the northern parts, by breaking holes, and drawing their nets under the ice, he related, that he saw sixteen swallows so drawn out of the lake of Samrodt, and about thirty out of the king's great pond in Rofenellen; and that at Schlebiten, near a house of the earl of Dohna, he saw two swallows just come out of the waters that could scarce stand, being very wet and weak, with their wings hanging on the ground.—He added, that he had often observed the swallows to be weak for some days after their first appearance. See supplement, article *MIGRATION*.

MILDEW, *rubigo*, a disease happening to plants, caused by a dewy moisture, which falling on them, and continuing, for want of the sun's heat to draw it up; by its acrimony corrodes, gnaws, and spoils the inmost substance of the plant, and hinders the circulation of the nutritive sap: upon which the leaves begin to fade, and the blossoms and fruit are much prejudiced.

According to Cook and Mortimer, *mildew* is a thick, clammy vapour exhaled in the spring and summer from plants, blossoms, and even from the earth itself, in close still weather, when there is neither sun enough to draw it on high, nor wind enough to disperse it.—Hanging thus in the lower regions, when the evening's cold comes on, it condenses and falls on the plants; by its thick clammy substance stops up their pores, and thus prevents perspiration, and hinders the sap from ascending to nourish the flowers, shoots, &c.

It is added, that this dew falling on the top of a shoot of a cherry-tree about Midsummer, has been found to stop the shoot; so that the tree has shot forth in other places.

Blights and *mildews* are commonly taken for the same thing; yet are they very different.

On plants which have smooth leaves, as the oak, &c. the dew hangs, and may be seen, tasted, &c. Others whose leaves are rougher, imbibe it. When it falls on wheat, &c. it spots the stems with a colour different from the natural one.

These dews, Mr. Mortimer takes to be the principal food of bees; being sweet, and easily convertible into honey.

MILE, in geography, a long measure, whereby the English, Italians, and some other nations, use to express the distance between places.

In which sense *mile* is used to the same purpose with *league* used by the French and other nations.

The *mile* is of different extent in different countries. The geographical, or Italian *mile* contains a thousand geometrical paces, *mile passus*, whence the term *mile* is derived. See *PACE*, *GEOGRAPHICAL*, &c.

The English *mile* consists of eight furlongs, each furlong of forty poles, and each pole of sixteen feet and an half.

Cassimir has made a curious reduction of the *miles*, or leagues, of the several countries in Europe into Roman feet, which are equal to the Rhinland feet generally used throughout the north.

The mile of Italy	Feet
—	5000
of England	5454
of Scotland	6000
of Sweden	30000
of Muscovy	3750
of Lithuania	18500
of Poland	19850
of Germany, the small	20000
The middle	22500
The largest	25000
of France	15750
of Spain	21270
of Burgundy	18000
of Flanders	20000
of Holland	24000
of Persia, called also Parafanga	18750
of Egypt	25000

MILES, a Latin term, which, in its general import, signifies *soldier*.

In our English laws and customs, *miles* is peculiarly appropriated to a knight, called also *eques*.

MILIARY glands, *glandulae MILIARES*, in anatomy, a great number of small glands interspersed throughout the substance of the cutis, or skin. See *GLAND* and *CUTIS*.

The *miliary glands* are the organs whereby the matter of sweat, and insensible perspiration, is secreted from the blood. They are interwoven with the pyramidal papillae of the skin; and are each served with a branch of an artery, vein, and

nerve; as also with a proper excretory duct, through which the fluid matter secreted from the blood in the substance of the gland, is excreted, and sent forth at the pores, or perforations of the cuticle.

MILIARY fever is a malignant fever wherein the skin is sprinkled over with little purple spots, like grains of millet.

It is also called a *purple fever*, from the colour of the spots.

MILIARY herpes. See the article *HERPES*.

MILITANT, a term understood of the body of Christians, while here on earth.

The Romanists divide the church into *militant*, patient, and triumphant: the *militant* is on earth; the patient, or passive, they place in purgatory; and the triumphant in heaven.

MILITARE ararium. See the article *ÆRARUM*.

MILITARIS toga. See the article *TOGA*.

MILITARIS via. See the article *VIA*.

MILITARY, something belonging to the *militia*, or soldiery.

Thus,

MILITARY architecture, denotes the art of fortification. See *ARCHITECTURE* and *FORTIFICATION*.

MILITARY art, is the art or science of making or sustaining war to advantage. See *WAR*.

MILITARY column, among the Romans, was a column on which was engraved a list of the troops of an army, or the soldiers employed in any expedition.

MILITARY execution, the delivery of a city, or country up to be ravaged and destroyed by the soldiers, upon its refusing to pay contribution-money.

MILITARY exercises, are the evolutions, or various manners of ranging, and exercising soldiers.

MILITARY fever, a kind of malignant fever frequent in armies, by reason of the ill food, &c. of the soldiers. See *FEVER*.

MILITARY government is the supreme command and disposal of all the military power of a nation, by land and sea.

MILITARY law. See *LAW of arms*, and *MARTIAL*.

MILITARY machine. See the article *MACHINE*.

MILITARY order. See *ORDER* and *KNIGHTHOOD*.

MILITARY pyrotechny. See the article *PYROTECHNY*.

MILITARY testament, among the Romans, was what we call a nuncupative-will; or a testament made only by word of mouth, in the presence of two witnesses.

This was a privilege peculiar to the soldiery, and to them only when in the field; for at other times they were subject to the common laws in this respect.

MILITARY ways, *viae militares*, are the large Roman roads, which Agrippa procured to be made through the empire, in the time of Augustus, for the more convenient marching of troops, and conveyance of carriages.

N. Bergier has wrote the history of the origin, progress, and amazing extent of these *military roads*; which were paved from the gates of Rome to the extreme parts of the empire. See *VIAE*.

MILITES candidati. See the article *CANDIDATI*.

MILITIA *, a collective term, understood of the body of soldiers, or persons who make profession of arms.

* The word comes from the Latin, *miles*, a soldier; and *miles*, from *mille*, which was antiently wrote *mile*: for in levying soldiers at Rome, as each tribe furnished a thousand, *mille* or *mile*, men, whoever was of that number, was called *miles*.

MILITIA, in its proper and most restrained sense with us, is used to signify the inhabitants, or, as we call them, the *trained-bands* of a town, or country; who arm themselves, on a short warning, for their own defence.

In which sense *militia* is opposed to regular stated forces.

The standing *militia* of England is now computed to be about 200000 horse and foot; but it may be increased at the pleasure of the king.

For the direction and command of these, the king constitutes *lords lieutenants* of each county, with power to arm, array, and form them into companies, troops, and regiments, to conduct (upon occasion of rebellion, or invasion), and employ the men so armed within their respective counties, and other places where the king commands; to give commissions to colonels, and other officers; and to charge any person with horse, horseman, arms, &c. proportionable to his estate, &c. See *LORD lieutenant*, &c.

No person is to be charged with a horse unless he have 500 pounds yearly revenue, or 6000 pounds personal estate; nor with a foot-soldier unless he have 50 pounds yearly, or 600 pounds personal estate.

MILITUM curia. See the article *CURIA*.

MILITUM expensis levandis. See the article *EXPENSIS*.

MILK, *lac*, a white juice, or humour, which nature prepares in the breasts of women, and in the udders of other animals; for the nourishment of their young.

Milk is thicker, sweeter, and whiter, than the chyle itself, from which it is derived, and that probably, without much more artifice or alteration than the leaving behind some of its aqueous parts.

The ancients held it formed from the blood; but the moderns are of opinion, it comes from the pure chyle, conveyed by the arteries to the breasts, and without any other coction filtrated through the glands whereof they are composed, like urine through the reins; without undergoing any considerable change.

According to M. Leewenhoeck's observations, *milk* consists of little globules swimming in a clear transparent liquor, called *serum*, or *whey*.

Milk is a composition of three different kinds of parts, butyrous, caseous, and ferous. The *butyrous* parts are the cream and oil that swim a-top. The *caseous* are the grosser parts, and those that coagulate, and are made into cheese. The *ferous* are properly a lymph, and these make what we call *whey*.

Dr. Drake says, that *milk* is nothing but oil and water united by the artifice of nature, perhaps by the intervention of some peculiar salts, which, *milk* itself, however sweet at first, does, after a little standing, discover to be pretty plentifully therein.

Milk is first found in the breasts of women after they have been pregnant about four months. The fermentation of the *milk* in the breasts, the first days after a woman is delivered, often occasions a fever, which takes its name therefrom.

Aristotle says, there are some men who have *milk* in their breasts. Cardan tells us he saw one that had enough to suckle a child.

In the *Philosophical Transactions*, we have an account of a wether brought to *milk* by the sucking of a lamb; which lamb was maintained by it all the summer, till it was weaned.

Milk corrupted in the stomachs of children, occasions most of the diseases incident to that age. Dobel, a Danish physician, who has wrote expressly on this subject, tells us, an excellent remedy in such case is a glass of water with a little salt dissolved in it: this acts as an emetic, and throws up the matter that occasioned the disorder. Celsus also mentions this remedy, L. 1. c. 3.

Galen observes, that in animals fed with *milk*, the greatest part of the food of the mother is for that time converted into that humour.

There are several kinds of *milk*, used not only as food, but as physic: as cows *milk*, asses *milk*, mares *milk*, sheeps *milk*, and goats *milk*.—These are prescribed as proper to alter a sharp thin blood into a crasis more soft, balsamic, and nutritive; and in constitutions where they fit the first passages, they must be very good for that end, as being ready prepared into nutriment, so far as is required for their admission into the blood. But where the juices of the stomach are sharp, these liquors are apt to be turned into curd. Whenever *milk*, therefore, of what kind soever, is ordered in consumptions, and as a restorative, it is with good reason joined with the testaceous powders, and such things as are proper to destroy those acidities.

Asses *milk* is said to be a great beautifier and preserver of the skin. Poppæa, wife of the emperor Nero, used it for that purpose; having four or five hundred asses constantly in her retinue, to furnish her every morning with a fresh bath.

We have several mineral *milks*, and some artificial ones, so called from their resemblance of the natural. As,

MILK of the moon, *lac lunæ*, a name given by naturalists to fossil agaric, a white light marble.

Milk of the moon, called also *flower of silver*, is a white, porous, friable, insipid earth, frequently found in form of a white farinaceous powder, but sometimes concreted into a mass, soft, fungous, and not unlike agaric.

Some say it is chiefly found in silver mines, and that it is a flower sublim'd from the ore of that metal; whence its denomination.

MILK of sulphur, *lac sulphuris*, a preparation of flowers of sulphur, and salt of tartar; prescribed by physicians, as a sudorific.

MILK water. See the article *WATER*.

Virgin's MILK, *lac virginale*, composed of rock alum, spring-water, litharge, and vinegar; used as a cosmetic, to drive in pimples, and check any cutaneous eruptions, by its cooling, refrigerant quality.

MILKY grotto. See the article *GROTTO*.

MILKY way, *via lactea*, or *galaxy*. See *GALAXY*.

MILL, in propriety, denotes a machine for grinding.

MILL, in a more general signification, is applied to all machines whose action depends on a circular motion.

Of these there are various kinds, which acquire different names according to the various manners in which the moving power is applied.—They may all be reduced to three: *viz.* *Wind-mills*, *water-mills*, and *hand mills*; under which last, are also comprehended those worked by horses, &c.

Water-MILLS are those turned by the force, or fall of a river, Of which, there are two kinds; those where the force of the water is applied above the wheel, called *over-shot*; and those where it is applied below the wheel called *under-shot mills*.

Wind-MILLS are those turned by the force of wind gathered in their sails.

Of these, some are called *vertical*, others *horizontal*, according to the position of the sails; or rather according to the direction of their motion with regard to the horizon.

For the best form of horizontal sails, as also for determining the position of the axis of wind-mills, see *WIND-mill*.

Portable, or *Hand-MILLS*, are those kept in motion by the hand; or else whose mill-stones are turned, or pistons driven, by the force of horses, or other beasts.

The use of *mills* and mill stones, according to Pausanias, was first invented by Myla, son of Meleges, first king of Sparta. Though Pliny attributes the invention of every thing belonging to bread and baking, to Ceres. Polydore Virgil was not able to discover the author of so useful a machine. It is doubted whether or no water-mills were known to the Romans, there being no mention made in the Digest but of *nills* turned by slaves and asses.—Salmatius, however, and Gothofred, will not allow *water-mills* to have been unknown to the ancient Romans, though they were not in ordinary use.—*Wind-mills* are of much more modern invention: the first model of these was brought from Asia into Europe, in the time of the holy wars.

MILL is also used for any machine, which being moved by some external force, serves to give a violent impression on things applied thereto.

Mills, in this sense, are machines of vast use in the manufactures, arts, and trades; for the making and preparing divers kinds of merchandizes.—The principal are those which follow.

Fulling-MILL, is a water-mill which raises and beats down large wooden pistons in proper vessels, called *peels* or *troughs*; in order to full, scower, and cleanse woollen stuffs.

Linen-MILLS do not differ much from fulling-mills. Their use is to scower linens, after their having been first cleansed when taken out of the lixivium, or lye. Some of these go by water, the generality by horses.

Paper-MILL, a water-mill furnished with several large hammers, which beat or pound the rags or cloth in a kind of wooden troughs; and thus by reducing them to little pieces, turn them into a kind of pulp, by means of water conveyed into the troughs by a pipe for that purpose.

MILL in coinage is a machine used to prepare the laminæ or plates of metal, and to give them the proper thickness, hardness, and consistence before they be struck or stamped.

This machine has not been long known among us; but is of some standing in Germany. It consists of several wheels dentated like those of clocks, &c. which move two cylinders of steel, between which the metal is passed to be brought to its proper thickness. It was first turned with water; since with horses.

MILL, among gold-wire-drawers, is a little machine consisting of two cylinders of steel, serving to flatten the gold or silver wire, and reduce it into laminæ, or plates. See *GOLD-WIRE*.

They have also *mills* to wind the gold-wire or thread on the silk; these are composed of several rows of bobbins all turned at the same time.

Forge-MILLS, turned by water, serve to raise and let fall one or more huge hammers, to beat and form the iron into bars, anchors, or other massive works.

Gun-powder MILL, is that used to pound, and beat together the ingredients whereof gun-powder is composed.

This is done in a kind of iron or brass mortar, by means of iron pestles wrought by a wheel without-side the *mill*, turned by the water falling on it.

Leather-MILLS are used to scower, and prepare with oil, the skins of stags, buffaloes, elks, bullocks, &c. to make what they call *buff-leather*, for the use of the soldiery.

This is effected by means of several large pistons rising and falling on the skins in large wooden troughs, by means of a wheel without-side, turned by the force of water.

Oil-MILLS, whether turned by men, water, hand, or horse, serve to bruise or break the nuts, olives, and other fruits and grains, whose juice is to be drawn by expression to make oil.

Sawing-MILL is a water-mill serving to saw several planks or boards at the same time.

These are frequent in France, especially in Dauphiné. They were lately prohibited in England, where they were begun to be introduced, from a view to the ruin of the sawyers, which must have ensued.

There are also *Silk-MILLS*, for spinning, throwing, and twisting silks; which are large round machines in form of turrets, five or six feet high, and six yards in diameter; which being turned either by the force of water, or that of men, work at the same time an infinity of bobbins fastened thereto, whereon the silk had been wound to be here spun and twisted.

There are abundance of *mills* of this kind in France, especially about Lyons and Tours, some of which are so disposed, as that three of them will go at the same time, and by the same wheel wrought by water, or by strength of hand. That

in the Hôpital de la Charité at Lyons, is wonderful, a single man working no less than forty-eight of these mills.

Stamping-MILL. See the article **STAMPING**.

Sugar-MILL is a machine that serves to bruise the sugar-canes, and express the liquor or juice contained therein.

The *sugar-mills* are very curious contrivances.—Of these there are four kinds, being turned either by water, wind, men, or horses.

Those turned by the hand were first in use, but they are now laid aside, as being an intolerable hardship on the poor negroes, who were doomed thereto; besides the slowness of their progress.

Wind-mills are the most modern, but they are yet somewhat rare; excepting in St. Christopher's and Barbadoes, and among the Portuguese. These make good dispatch, but have this inconvenience, that they are not easily stopped; which proves frequently fatal to the negroes who feed them.

Tan, or Bark-MILLS, wrought by water or horses, serve to cut certain barks into a coarser sort of powder, proper for the tanning of hides, &c.

MILLS for sword-blades, are likewise moved by water. They are frequent at Vienne in Dauphiné. By working heavy hammers they forge those excellent sword-blades, called *blades of Vienne*. The uses and operations of these several mills, more at large, see under the several heads, **PAPER, FULLING, SUGARS, &c.**

MILL-pool. See the article **POOL**.

MILLEPEDES, wood-lice, a sort of little insects, with a multitude of feet, usually of a dark colour, and which when touched roll up into a ball; they are of considerable use in medicine. *Millepedes* are so much in the acquaintance of the people, that they seem to be masters of their medicinal uses, and take them in many cases without any other direction. They are, by all experience, found to be very diuretic and absterive; which makes them not only frequent in prescriptions for disorders in the kidneys, but also in obstructions of the viscera, and particularly in the jaundice.

They abound with a nitrous salt, which they seem to derive from the earthy diet they live on. This is somewhat volatilized by its digestion and circulation in the insect; as such salt always is more or less, in proportion to the digestive powers of the animal, into whose blood it enters; yet not so much, but that it is brackish and pungent upon the palate. This makes their detestive qualities extend further than the larger glands, and enables them to scour even the minutest passages, and keep the nerves clear from viscidities, and such things as would clog their springs; whence they are good in palsies, epilepsies, and all nervous distempers.

As they open and cleanse away viscidities, and by their minuteness and aperities cut their way through any obstructions, they are good in frum's, and all inveterate tumours or ulcers. Remarkable cures have been performed in each way by a long use of them. They are best administered in substance, or bruised in white wine, the liquor being taken without settling.

There are also several chymical preparations of *millepedes*, as spirit, volatile salt, oil, and wine of *millepedes*. See supplement, article **MILLEPEDES**.

MILLENNARI *. **MILLENNARIANS,** a sect among Christians, chiefly in the primitive church; who hold that Jesus Christ is to come again and reign on earth for the space of a thousand years; during which time, the faithful are to enjoy all manner of temporal blessings, and at the expiration of this term, the day of judgment is to take place.

* The *millenarii* are also called *chiliasisti*, *chiliasæ*; from the Greek *χίλια*, *mille*, a thousand.

This opinion of the *millenarii* is very antient, and may be traced back almost as far as the time of the apostles. It had its origin from a passage in the apocalypse too literally understood, wherein mention is made of Christ's reign on earth, &c.

The opinion of S. Papias, says Mr. Launoy, touching the new kingdom of Jesus Christ on earth, after the resurrection, was held for near three centuries, before it was charged as erroneous; as appears from ecclesiastical history. It was allowed of, and followed by the greatest men among the primitive fathers; as Irenæus, Justin Martyr, Tertullian, &c. Dionysius of Alexandria, and St. Jerom, opposed this imaginary *millenary* reign very strongly.

MILLENNIUM *, a term literally signifying a *thousand years*; chiefly used for the time of our Saviour's second appearance and reign on earth.

* The word is Latin, compounded of *mille*, a thousand, and *annus*, a year.

Mr. Whiston, in several of his writings, has endeavoured to support the notion of a *millennium*. According to his computation it was to have commenced about the year 1720.

MILLIARE, or MILLIARIUM, among the Romans, denoted a *mile*, consisting of a thousand paces, *mille passus*; whence the name.

In the Roman empire, the *milliaria*, in all the great roads, were marked with stones, or columns, erected for that purpose; commencing from a column in the heart of the city, called *milliare aureum*.

Those columns were also hence denominated *milliary columns*.

MILLIARY fever. See the article **MILIARY**.

MILLIARY glands. See the article **MILIARY**.

MILLIARY herpes. See the article **HERPES**.

MILLIARY terms. See the article **TERM**.

MILLING, in the manufactories, an operation called also *fulling*. See **FULLING**.

MILLING, or throwing of silk, is the last preparation of silk before dyeing; serving to twist it, more or less according to the work it is intended for.

To prepare the silk for *milling*, they first put it in boiling water, inclosed between two linen cloths.—The *mill* is a square machine, composed of several pieces of wood mortised in each other so as to form a kind of large cage, in the centre whereof are two wheels placed parallel over each other, whose axis bears on two posts.—When the machine is simple, a single man turns these wheels by means of a little cog in which they catch, and a large handle.

The wheels put in motion by the handle, communicate their motion to eight windles, or reels, or even more, according to the largeness of the machine; on the flights, or arms whereof the silk is wound from off two rows of bobbins placed on each side the machine, each row at the height of one of the two wheels in the centre.—These bobbins have their motion by means of leathern thongs, which bear on little cylinders of wood that support them, and turn at length on the two wheels at the centre; so that the silk on each bobbin twists as it winds, and forms its separate skein.

The smallest wheel moves two hundred of these bobbins, over which a single person is sufficient to inspect, to put new bobbins or spools in lieu of those discharged of their silk, and to knot the ends when they break.

MILLION, in arithmetic, the number of ten hundred thousand; or a thousand times a thousand.

The revenues of princes are now only computed in *millions*.

A *million of gold*, or *million of money*, is sometimes understood of a *million of pounds*; and sometimes of a *million of crowns*.

MILL-REE, or MILLE RAY, a Portuguese gold coin, current for somewhat more than the Spanish pistole.

The *mill-ree* is thus called, as consisting of a thousand *rees*. See **REE**.—It is also called a *St. Stephen*, from the figure of that martyr impressed thereon.

They have also a *mill ree* of the little cross, which in reality is only half the former; and whose value is that chiefly used in computations.

MILHOYOIDÆUS. See **MYLOHYOIDÆUS**.

MILT, in anatomy, a popular name for the spleen. See **SPLEEN**.

MILT, or MELT, in natural history, the soft roe in fishes; thus called by reason it yields, by expression, a whitish juice resembling milk.

The *milt* is properly the seed, or spermatie part of the male fish.

The *milt* of a carp is reckoned a choice bit.

It consists of two long whitish irregular bodies, each included in a very thin fine membrane. M. Petit considers these as the testicles of the fish wherein the seed is preserved: the lower part, next the anus he takes for the vesiculae seminales. Vid. *Mém. Acad. R. Scien.* ann. 1733. p. 291.

MIME *, **MIMUS**, a term in the antient comedy, signifying a *buffoon*, or *mimic*, who acted by postures suitable to the person or subject he represented.

* The word comes from the Greek, *μιμῶ*, imitator; formed of *μιμῶμαι*, I imitate. The same comedians were also sometimes called *pantomimes*, because of their counterfeiting all manner of postures and gestures.

MIMESIS, ΜΙΜΗΣΙΣ, in rhetoric, a figure, whereby the words, gestures, speech, actions, &c. of another person are imitated.

MIND, mens, denotes a thinking or understanding being. Philosophers generally allow of three kinds of *minds*, viz. *God*, *angels*, and the human *soul*. For a thinking being must either be finite or infinite; if infinite, it is *God*; and if finite, it is either joined with a human body, or not; if the latter, it is an *angel*; if the former a *soul*.

The human *mind* is properly defined a thinking, rational substance: by *thinking*, it is distinguished from body; and by *reasoning*, from God, and angels, which are supposed to see and know things intuitively, without the help of deduction and discourse.

Affections of the MIND. See the article **AFFECTION**.

MINE, in natural history, a place under ground, where metals, minerals, or even precious stones, are dug up.

As, therefore, the matter dug out of *mines* is various; the *mines* themselves acquire various denominations: as *gold mines*, *silver-mines*, *copper-mines*, *iron-mines*, *diamond-mines*, *salt-mines*, *mines of antimony*, of *alum*, &c.

For gold and silver-mines, the richest and most celebrated are those of Peru and Chili in America. — Iron-mines are more abundant in Europe than elsewhere. — Copper-mines are chiefly found in Sweden, Denmark, and England. — Lead and Tin-mines abound most in England. — Quick-silver-mines in Hungary and Spain. — Diamond-mines in the East-Indies, and in the Brasis. — Salt-mines in Poland, &c.

Metallic mines are chiefly found in mountains; though the reason thereof does not appear. It is probable, plains may abound as much therewith, would people dig deep enough. But plains are commonly cultivated; and beside, the water will scarce allow them to be dug. Add, that the metallic veins always run either horizontal or oblique; and for that reason are easiest found on the sides of eminences.

The metallic veins are commonly encompassed with a sort of stone peculiar to the mine, and are accompanied with several strata of different matters, as clay, gravel, rock, &c. Those who work in mines, know by the size and colour of the stones, when they approach the vein.

They discover that there is a mine in a mountain by the marcasites, or mineral stones falling from it; by the mineral taste of the waters; by the quality of the exhalations raised from it; and by the difference between the earth over the mines, and that of the neighbouring parts in the cold time of spring and autumn, the frost lying on the adjacent places, when it thaws about the mines. Add, that the ground's producing but little grass, and that short, pale, and colourless, is an indication of a mine.

Some pretend to discover mines by the sole virtue of the hazle-tree, out of which they form a forked stick, called *virgula divinatoria*, which, they say, turns of itself, in their hands, but differently, according to the different nature of the metals or minerals underneath. This artifice made a great noise in France towards the end of the seventeenth century; and the corporeal philosophy was called to account for it. But it is now in little credit.

There are some mines wherein the metals are found at their first opening very crude and imperfect; which yet, in time, grow ripe and rich. Alonso Barba relates, that in Potosi, stones have frequently been at first thrown aside, as not containing any thing considerable of metal; and yet have been found many years afterwards exceeding full thereof. Casalpini assures us, that earths which before yielded no metal at all, sometimes become very fertile veins. In an island of the Tyrrhene-Sea, after the iron mines have been exhausted, they stop them up about ten years, at the end whereof, it is said, they find them as rich as before; many of these facts, however, are but slightly attested. — For the formation of mineral and metallic matters in mines, see MINERAL.

MINE, in the art of war, denotes a subterraneous canal, or passage dug under the wall, or rampart of a fortification intended to be blown up by gun-powder.

The *alley*, or passage of a mine, is usually about four feet square; at the end of this is the *chamber* of the mine, which is a cavity about five feet in width and in length, and about six in height; and here the gun-powder is bestowed.

The *jauciff* of the mine is the train; for which there is always a little aperture left.

There are various kinds of mines, which acquire various names; as royal mines, serpentine mines, forked mines, according as their passages are strait, oblique, winding, &c.

There are also mines made in the field, which are called *fougades*.

Mines are either dug within the body of the earth, as those made by the besieged to blow up the works of the besiegers, before they make a lodgment on the covered way; or in eminences and rising grounds, as to make a breach in the ramparts, &c. or to blow up walls: or, lastly, to tear up rocks.

Theory of MINES. — M. Chevalier, in the memoirs of the royal academy of sciences, has handled the subject of mines with a great deal of accuracy. He has calculated the force of gun-powder, the effort it makes, and the resistance it meets with in heaving up the ground. He shews, that a cubic foot of air inclosed in two cubic feet of gun-powder, is capable of supporting a weight of near 20000 pounds. But observes withal, that this force is vastly greater than what it is found by experience to have; and that in fact, 140 pounds of powder do not raise above 30000 pounds of earth. The reason of which difference he ascribes to several causes; as, that the powder does not take fire all at once, so that its force is divided; that part of the shock is lost in the canal or passage of the mine, and in the pores of the bodies encompassing the mine; that the tenacity of the parts of the earth resist a separation; that it is not enough that the earth be supported, but it must be carried upwards with a certain velocity; and that the weight of the atmosphere is a very considerable obstacle, to which no regard is had in the calculation.

From a great number of experiments it appears, 1^o. That the effect of a mine is always towards the weakest side; so that the disposition of the chamber of a mine does not at all contribute to determine this effect either one way or another, as the miners mistakenly imagine.

2^o. That the quantity of the powder must be greater or less, in proportion to the greater or less weight of the bodies to be raised, and to their greater or less cohesion; and the result of all the experiments that have been made for determining the different quantity of powder to be used for different bodies, is to allow for each cubic fathom,

Of loose earth } 9 or 10 pounds of powder.

Of firm solid earth, and strong sand, } 11 or 12

Of argil, or fat clayey earth, } 15 or 16

Of new masonry, not very strongly bound, } 15 or 20

Of old masonry well bound, } 25 or 30

3^o. That the aperture, or funnel of a mine that has been played, if it had been rightly charged, is a cone, the diameter of whose base is double the height, taken from the centre of the mine.

4^o. That when the mine has been over-charged, its aperture is nearly cylindrical, the upper extremity not being much wider than the chamber at bottom, where the powder was lodged.

5^o. That, beside the shock of the powder against the bodies it takes up, it likewise crushes all the earth that borders upon it, both underneath and side-ways, which crush extends itself the further as the matters make the less resistance.

To account for all the effects resulting from these experiments, and to determine the quantity of powder required for the charge of a mine, and the most advantageous disposition for answering the intent; let us conceive, 1^o. A mine, whereof all the parts wherewith it is encompassed are incapable of being compressed, and make an equable resistance, such as that of a bomb equally thick throughout, suspended in the air; where it must be observed, that besides the resistance of the body, the effort of the powder must likewise surmount the weight of the ambient air; in which case the body will be beaten into dust, or at least into very small pieces.

2^o. Conceive a mine encompassed wholly by such bodies as are equally compressible, and that resist every way with equal force. In this case the first effect of the powder will be to compress all those bodies equally, and they will not be separated, till by the violence of their compression, they are all incapable, any longer, to resist its effort; so that unless the powder be in great quantity, all its effect may end in the mere compression of the adjacent bodies. For this reason they sometimes block up the chamber of the mine with large beams, and sometimes wall it up with stones, that the adjacent bodies may resist the more.

Lastly, suppose a mine where all the bodies that encompass it, are equally compressible, but where there is less resistance on one side than another; in this case there will be a sphere of compression, whose diameter will be so much the greater, as the weak side resists the more. With regard to which, there are three things to be considered.

First, If the effort of the powder be very great with relation to the resistance of the weak side, the compression will but reach a little way, that side being torn off too suddenly for the neighbouring parts to receive their shock. In which case the aperture or funnel will be almost cylindrical, the diameter of the upper extreme not much exceeding that of the chamber; and the earth will be thrown to a great distance, which the enemy may make an advantage of, by forming lodgments in the cavity, as was done at the siege of Verue.

Secondly, If the mine be under-charged, it only makes a simple compression on the weakest side, as it happened at Ciudad Rodrigo.

Thirdly, If the mine be charged with a quantity of powder between the two extremes, it will raise a cone of earth, the diameter of whose base will have a greater or less ratio to its height from the centre of the mine, as the effort of the powder is greater or less.

The most advantageous effect is when the diameter of the base of the cone is double its height: in which case the earth blown up, falls almost all back again into the aperture of the mine; so that the enemy cannot make any lodgment.

To charge a mine, therefore, so as it may have the most advantageous effect possible, the weight of the matter to be carried up must be known, i. e. the solidity of a right cone, whose base is double the height of the earth over the centre of the mine, which is easily found from the rules of geometry. — Having found the solidity of the cone in cubic fathoms, multiply the number of fathoms by the number of pounds of powder necessary for raising the matter it contains, according to the proportion already laid down; and if the cone contain matters of different weights, take a mean weight between them all; having always a regard to their degree of cohesion. As to the disposition of mines, we have but one general rule, which is, that the side towards which one would determine the effect, be the weakest. But this varies according to occasions and circumstances.

Counter-MINE. See the article COUNTER-MINE.
Gallery of a MINE. See the article GALLERY.

Knight of the MINE is a military honour, antiently conferred on persons who had distinguished themselves in engagements in mines.

MINE-ships are ships filled with gun-powder, inclosed in strong vaults of brick or stone, to be fired in the midst of an enemy's fleet.

MINE is also a French measure. See *MEASURE*.

MINERA, in medicine, the seat, or rather matter, of a disease. See *DISEASE*.

The term is applied by some authors to those parts of the body wherein there are collections and coacervations of humours made; which, hardening, form obstructions, and produce diseases.

In this sense we say, the *minera morbi*, &c.

MINERAL, in natural history, is sometimes used in the general for *fossil*; and applied to any body, simple or compound, dug out of a subterraneous place or *mine*; from which it takes the denomination.

In this sense, metals, sulphurs, fossil salts, semi-metals, &c. are *minerals*.

On this principle, they divide *minerals* into two classes; the one *fusible*, and *malleable*; i. e. which melt with fire, and stretch on the anvil; which are what we properly call *metals*. See *METAL*.—The others want those two properties; and are what in the strict sense we call *minerals*.

Some divide *minerals* into *simple* and *compound*. To the first belong *stones*; *salts*, as alum, nitre, &c. *inflammable minerals*, as sulphur and bitumen; and *metals*, as gold, &c.

Other more accurate writers refrain the word *mineral* to what we otherwise call *semi-metals*; as antimony, cobalt, &c.

MINERAL, in this sense, may be defined a compound fossil, wherein there is something discovered, in all respects like metal, only that it is not malleable; joined or compounded with some other fossil, as salt, sulphur, stone, or earth.

Such are *antimony*, *cinnabar*, *bismuth*, *calaminaris*, *vitriol*, *pyrites*, *marcasites*, *cobalt*, *oker*, the *magnet*, *lapis hematites*, and *armenius*. See each under its proper article.

Some attribute the formation of *minerals* to the action of the sun without; some to the central fire within; and some think the cold does all by uniting, condensing, and congealing certain juices of the earth.

Des Cartes takes metals to have been formed from the beginning of the world; and to have ranged themselves, by the laws of gravity, about the centre. In process of time, he supposes these to have been corroded by the acid salts, &c. and abundance of the parts thereof carried up along with those salts by the subterranean heat, and deposited in divers parts of the earth. Monf. Tournesort supposes seeds of *minerals*, as of animals and vegetables. Every thing, according to him, comes from eggs, even stones; and the largest rocks, he thinks, were originally no more than grains of sand. See his system more at length under the article *STONE*.

Others, as M. Geoffroy, contend that metals, &c. may be the result of a mixture of certain matters, which had nothing metallic in them. Thus, in the ashes of all vegetables we find a ferruginous matter, which the load-stone attracts; and yet it will hardly be said, that iron existed in the plants. We see no signs of iron in clay, work it in what manner you will; and yet add to it linseed-oil, and by fire you will procure iron. The like may be said of divers other matters.

Hence it is probable, metals may be formed by a mere combination of different ingredients; much like sulphur, which we all know is made by adding an inflammable principle to a vitriolic salt. The earth may every-where abound with those matters, which are continually circulating through its pores and canals, and which, meeting with an earth homogenous to them, fix thereto; and commence *minerals*.

The *minerals*, metals, and stones, lie in beds; and have done so ever since the flood, if not from the creation; yet it is highly probable they have a faculty of growing in their respective beds; and that, as their beds are robbed and emptied by miners, so after a while they recruit again. Thus vitriol, Mr. Boyle thinks, may grow by the help of the air, and that alum does the same. We are assured (says that author) by the experienced Agricola, that the earth or ore of alum, being robbed of its salts, will, in tract of time, recover them again by being exposed to the air.

As for metals, there is good reason to believe they grow likewise, from what has been alleged by Mr. Boyle in his observations about the growth of metals, and particularly as to the growth of iron. To the instances he brings from Pliny, Fallopius, Cæsalpinus, and others, we may add, that, in the forest of Dean in Gloucestershire, the best iron, and in the greatest quantities, is found in the old cinders, which they melt over again.—This some impute to the negligence of the former masters in not exhausting the ore. And Mr. Derham thinks it rather owing to the new impregnations of the old ore, or cinders from the air, than to any seminal principle in the ore itself.

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The chymists generally take *minerals* to be nothing else but imperfect metals, and imperfect metals to be perfect ones, which, not having arrived at maturity, may be perfected by chymical operations, and raised to perfection.—This agreeable, but fatal delusion, has given rise to the sect of philosophers, who study the philosophers stone.

Æthiops MINERAL. See the article *ÆTHIOPS*.

Turbith MINERAL. See the article *TURBITH*.

MINERAL oil. See the article *OIL*.

MINERALE bezoardicum. See the article *BEZOARDICUM*.

Crystal MINERAL. See *CRYSTAL mineral*.

MINERAL waters are those, which, at their springing forth from under-ground, are found impregnated with some *mineral* matter; as salt, sulphur, vitriol, &c. See *WATER*.

Such are hot baths, spaws, purging, &c. springs.

MINIATURE *, or *MIGNATURE*, a delicate kind of painting, consisting of little points or dots, instead of lines; usually done on velvet, with very thin, simple water-colours.

* The word comes from the Latin *minium*, red lead; that being a colour much used in this kind of painting. The French frequently call it *mignature*, from *mignon*, fine, pretty, on account of its fineness and delicacy.

Miniature is distinguished from other kinds of painting by the fineness and delicacy of its figures, the weakness of their colours, and faintness of the colouring; and in that it requires to be viewed very near.

Those colours that have the least body, are the best and most commodious for painting in *miniature*; such are carmine, ultramarine, fine lakes, and green made of the juices of several kinds of herbs and flowers.

Painting in *miniature* is the nicest and most tedious of all others; being performed wholly with the point of the pencil.

There are some painters who never use any white colour in *miniature*, but make the ground of the velvet serve to raise their figures; in which case, the lights appear bright in proportion to the depth and strength of the colours of the figures. Others, before they go to work, give the velvet a light wash with white lead, well prepared and purified.

When the colours are laid on flat without dotting, though the figures be small, and the ground either velvet or paper, it is not called *miniature*, but *washing*.

The colours for *miniature* may be mixed up with a solution of gum arabic, or gum tragacanth, in water.

MINIM, in music, a note, or character of time; equal to two crotchets, or half a semibreve. See *TIME*, and *CHARACTERS of music*.

Sextuple of the MINIM. See the article *SEXTUPLE*.

MINIMA naturæ, or *MINIMA naturalia*, among philosophers, the primary particles, whereof bodies consist; the same with what are otherwise called *corpuscles*, and *atoms*.

MINIMA, in the higher geometry, the smallest quantities attainable in any given case.

Per MINIMA. See the article *PER minima*.

MINIMENTS, or *MUNIMENTS*. See *MUNIMENTS*.

MINIMI digiti extensor. See the article *EXTENSOR*.

MINIMI digiti pedis abductor. See the article *ABDUCTOR*.

MINIMS, *MINIMI*, an order of religious, instituted about the year 1440. by S. Francis de Paulo.

These have improved on the humility of the *minors*, by terming themselves *minimi*, or *minims*, q. d. least, or smallest. See *MINORS*.

MINIMUS glutæus. See the article *GLUTÆUS*.

MINION, a sort of cannon, or piece of ordnance, whereof there are two kinds; large, and ordinary.

The large *MINION*, or one of the largest size, has its bore $3\frac{1}{4}$ inch diameter, and is 1000 pounds weight; its load is $3\frac{1}{2}$ pounds of powder; its shot three inches in diameter, and $3\frac{1}{2}$ pound weight; its length is eight foot, and its level range 125 paces.

The ordinary *MINION* is three inches diameter in the bore, and weighs about 800 pounds weight. It is seven foot long; its load $2\frac{1}{2}$ pounds of powder; its shot near three inches diameter, and weighs three pounds four ounces; and shoots point-blank 120 paces.

MINISTER, one that serves, or attends on God, on the public, or on a private person.

In the reformed church, priests, or those ordained to preach, and do the other functions of the priesthood, are called absolutely and simply *ministers*.

In which sense, bishops, &c. are said to be *ministers* of God; *ministers* of the word; of the gospel, &c. In some churches they are also called *pastors*.

MINISTERS of the altar are properly those who attend, and assist the priest at the administration of the eucharist.

Deacon, and subdeacon, are titles that properly signify *ministers*; *Διακονοι*, *minister*. See *DEACON*, and *SUBDEACON*.

Officers of state, &c. are called the king's *ministers*; as administering the affairs of justice, policy, &c. for him.

MINISTER

MINISTER of state, is he with whom a prince entrusts the administration of his government; or to whom he commits the care and direction of the principal affairs thereof.

Boethius is proposed as a model for *ministers of state*. The grand vizier is the prime *minister* of the Ottoman empire.

Foreign MINISTERS, or the *ministers of foreign princes*, are their ambassadors, envoys, agents, or residents in the courts of other princes.

There are two kinds of foreign *ministers*.—*Ministers of the first rank*, who are also called *ambassadors*, and *envoys in extraordinary*.

And *ministers of the second rank*, who are the ordinary residents.

Those of the first rank have a representative character, which the others have not; though these last are sometimes invested with fuller powers than the former.

MINISTER is also the title which certain religious orders give to their superior.

In this sense we say, the *minister* of the Mathurins, or Trinitarians.

MINISTER, among the Jesuits, is the second superior of each house; thus called, as being an assistant to the superior, or rector.

The general of the Cordeliers order is also called the *minister general*.

MINISTRY, or **MINISTRY**, a profession, office, or employment, which a person discharges for the service of God, the public, or some particular person.

In which sense we say, a bishop must give account to God of his *ministry*, &c.

MINISTRY is also used for the government of a state, by some great minister, under the sovereign authority.

In which sense we say, the *ministry* of the cardinal de Richelieu, &c.

MINISTRY is also frequently used as a collective word, signifying the ministers or officers of state.

Thus we say, the *ministry* opposed a thing; meaning, the ministers opposed it.

MINIUM, a mineral colour, called also *red lead*, used by painters, illuminers, &c.

Minium is a preparation of lead, performed by fire. It is made by melting the metal in an earthen unglazed pan, and stirring it over the fire till it be reduced to a powder called *calcined lead*, which, being further urged by a reverberatory fire for three or four hours, turns red, and is the *minium*.

Beside the use of *minium* as a colour, it is also an ingredient in an official composition, called *emplastrum de minio*, used as a desiccative and cicatrizer.

It was with *minium* the ancient Roman and Grecian ladies tinged their nails and faces of a red colour. For, as to our modern paints, without doubt they were not known in those days.

MINOR, a Latin term, literally denoting *less*; used in opposition to *major*, greater.

Thus we say, St. James *minor*; Asia *minor*; the *minor* excommunication, &c.

The four *MINOR orders*, are the four inferior orders conferred in the Romish church, between the tonsure and subdiaconate.—These are that of *porter*, or *door-keeper*; that of *reader*; that of *exorcist*; and that of *acolyte*.

MINOR adiles. See the article **ÆDILE**.

MINOR anticus ferratus. See the article **SERRATUS**.

MINOR barons. See the article **BARON**.

Canis MINOR. See the article **CANIS**.

Rectus MINOR. See the article **RECTUS**.

MINOR gastricus. See the article **GASTRICUS**.

MINOR oculi obliquus. See the article **OBLIQUUS**.

Teres MINOR. See the article **TERES**.

Ursa MINOR. See the article **URSA**.

MINOR, in law, denotes a person yet under age, or who, by the laws of the country, is not yet arrived at the power of administering his own affairs, or the possession of his estate.

Among us, a person is a *minor* till the age of twenty-one; before which time his acts are invalid.

Yet if a patron, &c. have a right of advowson, by the common law he may present at the age of fourteen years; and may of himself, and without his father, or guardian, consent to any process relating to beneficiary matters.

Hence, in the canon law, there is no title, *de minoribus*; and the reason is, that the several ages whereat the common law declares a person capable of a benefice, or of sacred orders, are so many species of canonical majorities.

MINOR, in logic, is the second proposition of a formal or regular syllogism, called also the *assumption*. See **SYLLOGISM**.

I grant the major, but deny the *minor*.

MINOR, in music, is applied to certain concords, which differ from, or are lower than others of the same denomination by a lesser semi-tone, or four commas.

Thus we say, a third *minor*, or lesser third: or a sixth major, and *minor*.

Concords that admit of major and *minor*, i. e. greater and less, are said to be *imperfect concords*.

MINORS, or **FRATRES MINORS**, an appellation which the Franciscans assume, out of shew of humility; calling themselves *fratres minores*, i. e. *lesser brothers*; and sometimes *minorites*.

There is also an order of regular *minors* at Naples, which was established in the year 1588. and confirmed by Sixtus V.

MINOT, a French measure. See **MEASURE**.

MINOTAUR, **MINOTAURUS**, in antiquity, a fabulous monster, much talked of by the poets; feigned to be half man, and half bull.

The *minotaur* was brought forth by Pasiphae, wife of Minos king of Crete. It was shut up in the labyrinth of that island; and at last killed by Theseus.

Servius gives us the explanation of this fable. He says, that a secretary of king Minos, named Taurus, bull, had an intrigue with the queen Pasiphae, in the chamber of Dædalus; and that she was at length delivered of twins, one of which resembled Minos, and the other Taurus.—This occasioned the production to be reputed monstrous.

MINOVERY *, a trespass committed in the forest, by something that is a man's handy work; as an engine to catch deer, &c. See **FOREST**.

* The word is formed of the French *Main-œuvre*, q. d. handy-work.

MINSTER *, antiently signified the church of a monastery, or convent.

* The word is Saxon, *mynstre*, or *mynstre*.

MINSTREL *, an antient term for a fidler, or player on any other kind of musical instrument.

* Borel derives the word from *mannus* and *histris*, one who diverts with the hand; or from *minor histris*, little buffoon: Da Cange from *ministellus*, a diminutive of minister, by reason the *minstrels* were antiently ranked among the lower officers, ministers, or servants.

The word *minstrel*, in its original, was used for people who sung, and serenaded their mistresses. Afterwards it became a name for all kinds of musicians: and at length it passed to buffoons, and country-scraper.

MINT, the place where the king's money is coined.

Antiently there were *mints* in most cities of England. The chief *mint*, at present, is the tower of London.

Officers of the MINT are, 1°. The *warden*, who is the chief, and is to receive the bullion, and oversee all the other officers.

2°. The *master-worker*, who receives the bullion from the warden, causes it to be melted, and delivered to the moneyers, and takes it from them again when coined.

3°. The *comptroller*, who is to see, that the money be made to the just assize, and to oversee the officers.

4°. The *assay-master*, who weighs the silver and gold, and sees whether it be standard.

5°. The *auditor*, who takes all the accounts.

6°. The *surveyor of the melting*, who is to see the silver cast out, and that it be not altered after it is delivered to the melter, i. e. after the assay-master has made trial of it.

7°. The *clerk of the iron*, who is to see that the iron be clean, and fit to work with.

8°. The *graver*, who engraves the dyes and stamps for the coinage of the money.

9°. The *melters*, who melt the bullion before it comes to coining.

10°. The *blanchers*, who anneal, or boil and cleanse the money.

11°. The *porters*, who keep the gate of the mint.

12°. The *proofs of the mint*, who provides for all the moneyers, and oversees them.

And, lastly, the *moneyers*, some of which hear the money; some forge it; some stamp or coin it; and some round and mill it. See **COINAGE**.

MINT-water. See the article **WATER**.

MINTERS, or **MONEYERS**. See **MONEYERS**.

MINTING is sometimes used for the coining of money. See **COINING**.

MINUS, in algebra. See **CHARACTERS in arithmetic**.

Quo MINUS, in law. See the article **Quo minus**.

MINUSCULE, in printing, denotes the small or running letters; as contradicting distinguished from *majusculæ*, or capitals.

MINUTE *, in geography and astronomy, is the 60th part of a degree.

* The word comes from the Latin, *minutus*, small.

In which sense, *minute* is also called *prime*, or *prime-minute*.—The diameter of the sun is seen under an angle of 39 *minutes* in winter; and 31 in summer.

The divisions of degrees are fractions, whose denominators increase in a sexageuple ratio; that is, a *minute* or prime is $\frac{1}{60}$; a second, or second *minute*, is $\frac{1}{3600}$, &c.

In astronomical tables, &c. *minutes* are expressed by acute accents, thus, ' ; the seconds by two, '' ; the thirds by three, '''.
MINUTE,

MINUTE, in computation of time, is used for the sixtieth part of an hour.

MINUTE, in architecture, usually denotes the sixtieth, sometimes only the thirtieth part, or division, of a module. See **MODULE**.

MINUTE is also used to signify a short memoir, or sketch of any thing hastily taken in writing.

In this sense we say, the *minutes* of the proceedings of the house of lords, &c.

Meridional MINUTES. See the article **MERIDIONAL**.

MINUTES of emersion. See the article **EMERSION**.

MIPARTY, Chamber of. See **CHAMBER**.

MIQUELETS, a kind of foot-soldiers, inhabiting the Pyrenean mountains; armed with pistols under their belts, a carbine, and a dagger.—The *miquelets* are dangerous people for travellers to meet.

MIRABILIS aqua. See the article **WATER**.

REte MIRABILE. See the article **REte**.

MIROBOLANS, or MIROBALANS, in pharmacy. See **MYROBALANS**.

MIRACLE, in a popular sense, is a *prodigy*; or an extraordinary event that surprises us by its novelty.

MIRACLE, in a more accurate and philosophical sense, is an effect that does not follow from any of the known laws of nature; or which is inconsistent with some known laws thereof.

A *miracle*, therefore, being a suspension of some law, cannot come from any hand less than his who fixed that law; that is, from God.

Spinoza denies, that any power can supersede that of nature; or that any thing can disturb, or interrupt, the order of things: and accordingly defines a *miracle* to be a rare event, happening in consequence of some laws that are unknown to us.

Divines define a *miracle*, an extraordinary and wonderful effect, above the power of nature, wrought by God, to manifest his power or providence; or to give credit to some messenger sent from himself.—Thus Jesus Christ evinced the truth of his mission, and his doctrine, by *miracles*; and thus also did Moses. It is still a dispute in the world, how far it may be in the power of the devil to work *miracles*? or wherein the specific difference lies between the *miracles* of Moses, and those of Pharaoh's magicians; those of Jesus Christ and the apostles, and those of Simon Magus and Apollonius Tyaneus? Whether the latter were any more than mere delusions of the senses; or whether any supernatural and diabolical power concurred with them?

The Romans attribute *miracles* to their emperors Adrian and Vespasian.—The church of Rome abounds in *miracles*; if we believe their writers, some of their monks have wrought more *miracles* than all the apostles; and this without any visible necessity for them.

As full as that church pretends to be of saints, it is a rule with them, that none are ever canonized till there be good proof of his having wrought *miracles*. So that were all those allowed good *miracles*, and to have happened out of the common order of nature, they are so numerous, one would be tempted to think there was no order or law of nature at all.

St. Augustine is a strong advocate for *miracles*. He mentions several, whereof he was an eye-witness; and others, whereof he was informed by those that were. In the single city of Hippo he tells us there were seventy *miracles* wrought in the space of two years, on the building a chapel in honour of St. Stephen. There are those, however, who set aside the authority of all *miracles*; thinking it unbecoming the wisdom of God to establish such laws, as that he should find it frequently necessary to supersede. And as the former, from the avowed authority of some *miracles*, fetch an argument for the truth of all, pleading those which are allowed as well as those which are questioned; so these allege the false ones, as conclusions against all.

In effect, though *miracles* may prove the superintendency of a voluntary agent, and that the universe is not guided by necessity or fate; yet that mind must be weak and inadvertent, who needs them to confirm the belief of a wife and good deity; since the deviation from general laws, unless upon very extraordinary occasions, must be a presumption of infancancy and weakness, rather than of a steady wisdom and power; and must weaken the best arguments we have for the sagacity and power of the universal mind. *Inquiry into the original of the ideas of beauty, &c.*

MIRROUR, or MIRROR, a *speculum*, or body, which exhibits the images of objects presented thereto by reflexion.

The use of *mirrors* is very ancient. Mention is made of brazen *mirrors*, or looking-glasses, in Exodus xxxviii. 8. where Moses is said to have made a *brazen laver*, or basin, of the looking-glasses of the women continually assembled at the door of the tabernacle. It is true, some modern commentators will not allow the *mirrors* themselves to have been brass; but of glass, only set or framed in brass. But the most learned among the

rabbins do all allow, that in those times the *mirrors* made use of by the Hebrew women in dressing their heads were of metal; and that the devout women mentioned in this passage made presents to Moses of all their *mirrors* to make the brazen laver. See the Jesuit Bonfrerius's comment on this text.

It might likewise be proved, that the ancient Greeks made use of brazen *mirrors*, from divers passages among the ancient poets.

MIRROUR, in the more confined sense of the word, is peculiarly used to signify a smooth surface of glass, tinued and quicksilvered on the back-side; which exhibits the images of objects opposed thereto. See **LOOKING-GLASS**.

MIRROUR, in catoptrics, denotes any polished body impervious to the rays of light, and which of consequence reflects them equally.

Thus water in a deep well or river, and smooth polite metals, are ranked among the number of *mirrors*.

In this sense, the doctrine of *mirrors* makes the subject of catoptrics.

The doctrine of *MIRROURS* is founded on the following general principles.—1°. Light reflected from any *mirror*, or speculum, makes the angle of incidence equal to that of reflexion; which see demonstrated under the word **REFLECTION**.

Hence, a ray of light, as H B (*Tab. Optics, fig. 26.*), falling perpendicularly on the surface of a speculum, D E will be reflected back upon itself:—as we find by experience it actually is.

From the same point of a *mirror*, therefore, A, there cannot be several rays reflected to the same point; since, in that case, all the angles of reflexion must be equal to the same angle of incidence A B D, and therefore to each other; which is absurd. Nor can the ray A B be reflected to two or more points; since, in that case, all the angles of reflexion would be equal to the same angle of incidence A B F: which is likewise absurd.

2°. From every point of a *mirror*, are reflected rays thrown on it from every point of a radiant object.—Since then rays coming from different parts of the same object, and striking on the same point of the *mirror*, cannot be reflected back to the same point; the rays which flow from different points of the same radiating object are again separated after reflexion: so that each point shews whence it came.

Hence it is, that the rays reflected from *mirrors* exhibit the objects to view.—Hence also it appears, that rough uneven bodies must reflect the light in such manner, as that rays coming from different points will be blended or thrown confusedly together.

Mirrors may be divided into *plane, concave, convex, cylindrical, conical, parabolical, and elliptical*.

Plane MIRROURS are those which have a plane or flat surface.

These, by a popular name, we call *looking-glasses*.

For the manner of making plane *mirrors*, or specula, see **LOOKING-GLASS**.

Laws and phenomena of plane MIRROURS.—1°. In a plane *mirror*, every point of an object, as A (*Tab. Optics, fig. 27.*), is seen in the intersection, B, of the cathetus of incidence, A D, with the reflected ray C B.

Hence, 1°. As all the reflected rays meet with the cathetus of incidence in B; by whatever reflected ray the radiant point A be seen, it will still appear in the same place. Consequently, any number of persons viewing the same object in the same *mirror*, will all see it in the same place behind the *mirror*.—And hence it is, that the same object has only one image, and that we do not see it double with both eyes.

Hence also the distance of the image B, from the eye C, is compounded of the ray of incidence A D, and the reflected ray C D: and the object A radiates reflectedly, in the same manner as it would do directly, were it removed into the place of the image.

2°. The image of a radiant point, B, appears just so far behind a plane *mirror*, as the radiant point is before it.

Hence, if the *mirror* A G be placed horizontal, the point A will seem so much below the horizon, as it is really elevated above it: consequently, erect objects will appear as if inverted; and therefore men standing on their feet, as if on their heads. Or, if the *mirror* be fastened to the ceiling of a room, parallel to the horizon, objects on the floor will appear above the ceiling as much as they really are below it; and that upside down.

3°. In a plane *mirror*, the images are perfectly similar, and equal to the objects. And hence their use as looking-glasses.

4°. In a plane *mirror*, things on the right hand appear as on the left; and *vice versa*.

Hence also we have a method of measuring any inaccessible altitude by means of a plane *mirror*.—Thus, the *mirror* being placed horizontally in C (*Fig. 28.*), retire from it till such time as the top of the tree be seen therein. Measure the height of the eye D E, the distance of the station from the point of reflexion E C, and the distance of the foot of the tree

tree from the fame. Then to EC, CB, and ED, find a fourth proportional AB. This is the altitude sought.

50. If a plane *mirror* be inclined to the horizon in an angle of 45 degrees, an object perpendicular to it will appear parallel, and an horizontal object perpendicular.

And hence, the eye being placed beneath the *mirror*, the earth will appear perpendicularly over it; or if placed over it, the earth will appear perpendicularly under it. Hence also, a globe, descending down a plane a little inclined, may, by means of a *mirror*, be exhibited as mounting up a vertical plane, to the great surprize of such as are unacquainted with catoptrics.—And hence we have a method of representing ourselves as if flying.—For a *mirror* inclined to the horizon under an angle of 45°, we have observed, will represent vertical objects as if horizontal. Consequently, a large *mirror* being so disposed; as you advance toward it, you will seem to move horizontally; and nothing will be wanting to the appearance of flying, but to strike out the arms and legs. It must be added, however, that as the floor is elevated along with you, your feet will still be seen to walk as along a vertical plane. To deceive the eye intirely, therefore, it must be kept from the feet.

60. If the object AB (fig. 29.) be parallel to the speculum CD, and equally distant from it, with the eye; the reflecting line CD will be half the length of the object AB.

And hence, to be able to see the whole body in a plane *mirror*, its height and breadth must be half your height and breadth. Consequently, the height and breadth of any object to be seen in a *mirror* being given, we have also the height and breadth of the *mirror* wherein the whole object will appear, at the same distance with the eye.

Hence also, as the length and breadth of the reflecting part of the speculum are subduple of those of the object to be reflected; the reflecting part of the *mirror* is to the surface reflected in a subquadruple ratio. Consequently, the reflecting portion being a constant quantity, if in any place you see the whole body in a *mirror*, you will see it in every other place, whether you approach nearer, or recede farther from it.

70. If several *mirrors*, or several fragments or pieces of a *mirror*, be all disposed in the same plane, they will only exhibit an object once.

80. If two plane *mirrors*, or specula, meet in any angle, the eye, placed within that angle, will see the image of an object placed within the same, as often repeated as there may be catoptrics drawn determining the places of the images, and terminated without the angle.

Hence, as the more catoptrics, terminated without the angle, may be drawn as the angle is more acute; the acuter the angle, the more numerous the images. Thus Z. Traher found, at an angle of one third of a circle, the image was represented twice, at $\frac{1}{3}$ thrice, at $\frac{1}{2}$ five times, and at $\frac{1}{4}$ eleven times.

Further, if the *mirrors* be placed upright, and so contracted; or if you retire from them, or approach to them, till the images reflected by them coalesce, or run into one; they will appear most sensibly distorted. Thus, if they be at an angle somewhat greater than a right one, the image of your face will appear with only one eye; if the angle be less than a right one, you will see three eyes, two noses, two mouths, &c. At an angle still less, the body will have two heads. At an angle somewhat greater than a right one, at the distance of four feet, the body will be headless, &c. Again, if the *mirrors* be placed, the one parallel to the horizon, the other inclined to it, or declined from it, it is easy to perceive, that the images will be still more romantic. Thus, one being declined from the horizon to an angle of 144 degrees, and the other inclined to it, a man sees himself standing with his head to another's feet.

Hence it appears, how *mirrors* may be managed in gardens, &c. so as to convert the images of those near them into monsters of various kinds: and since glass *mirrors* will reflect the image of a lucid object twice or thrice, if a candle, &c. be placed in the angle between two *mirrors*, it will be multiplied an infinite number of times.

On these principles are founded various catoptric machines, some of which represent objects infinitely multiplied and distorted; others infinitely magnified, and set at vast distances.

CONVEX MIRRORS are those whose surface is convex.

Note, by *convex* surfaces, authors generally mean such as are spherically convex.

Manner of preparing or making convex specula, or MIRRORS.—There are divers methods used by divers artists; particularly as to the matter or composition for the silvering. One of the best that is known, is given us by Wolfius thus:

Melt one part of tin, another of bismuth, together; and to the melted mass add two parts of mercury: As soon as the mercury begins to evaporate into smoke (which it presently does), the whole compoist is to be thrown into cold water, and when well cooled, the water decanted off. The mixture is then to be strained through a linen cloth two or three-fold; and what is thus strained poured into the cavity of a glass sphere: this sphere is to be turned gently round its axis till the whole surface is covered, the rest being reserved for future use.

If the sphere were of coloured glass, the *mirror* will be so too.

And in the same manner may conic, elliptic, cylindric, and other *mirrors*, be made.

How they may be made of metal, see under *concave MIRROR*.

Laws or phenomena of convex MIRRORS.—10. In a spherical convex *mirror*, the image of a radiant point appears between the centre and the tangent; but nearer to the tangent than the centre.

Hence, the distance of the object from the tangent is greater than that of the image. And, consequently, the object is further distant from the speculum than the image.

2°. If the arch BD (fig. 31.), intercepted between the point of incidence D, and the cathetus AB; or the angle C formed in the centre of the *mirror* by the cathetus or incidence AC, and that of obliquation FC; be double the angle of incidence; the image B will appear on the surface of the speculum.

3°. If the arch intercepted between the point of incidence and the cathetus; or the angle C, formed in the centre of the *mirror* by the cathetus of incidence, and the cathetus of obliquation; be more than double the angle of incidence; the image will be without the *mirror*.

4°. If the arch intercepted between the point of incidence, and the cathetus; or the angle, formed in the centre of the *mirror* by the cathetus of incidence, and that of obliquation; be less than double the angle of incidence; the image will appear within the speculum.

5°. In a convex *mirror*, a remoter point, A (fig. 32.), is reflected from a point F, nearer the eye O, than any nearer point B in the same cathetus of incidence.

Hence, if the point of the object A be reflected from the point of the *mirror* F; and the point of the object B, from the point of the *mirror* E; all the intermediate points between A and B will be reflected from the intermediate points of the speculum between F and E. And, consequently, FE will be the line that reflects AB.

Hence, also, a point of the cathetus B seems at a greater distance C6 from the centre C, than a more remote one, A.

6°. A nearer point B (fig. 33.), not in the same cathetus with a remoter H, is reflected to the eye O, from a nearer point of the speculum, than the remoter H.

Hence, if the point of an object A be reflected from the point of a *mirror* C, and the point of the object B, from the point of the speculum D, all upon the same point O; all the intermediate points between A and B will be reflected from all the intermediate points between C and D. Consequently, the image FG of the object BA is contained between the cathetus BE and AE.

70. In a spherical convex *mirror*, the image is less than the object.

And hence the use of such *mirrors* in the art of painting, where objects are to be represented less than the life.

80. In a convex *mirror*, the more remote the object, the less its image: and, again, the smaller the *mirror*, the less the image.

90. In a convex *mirror*, the right hand is turned to the left, and the left to the right; and magnitudes perpendicular to the *mirror* appear topsy-turvy.

100. The image of a right line, perpendicular to the *mirror*, is a right line; but that of a right line either oblique to the *mirror*, or parallel thereto, is convex.

11°. Rays reflected from a convex *mirror* diverge more than if reflected from a plane *mirror*.

Hence light, by being reflected from a spherical *mirror*, is weakened; and, consequently, the effects of reflected light are weaker than those of direct. Hence also, myopes see remote objects more distinctly in a convex *mirror*, than they do directly.

Rays reflected from a convex *mirror* of a smaller sphere diverge more than those reflected from a larger. Consequently, the light is more weakened, and its effects are less considerable, in the former case than the latter.

CONCAVE MIRRORS are those, whose surface is concave. These are generally made of a mixed metal.

Note, by *concave*, authors commonly mean *spherically concave*.

Manner of preparing or making concave MIRRORS.—First, a mould is to be provided for casting them. In order to this, take clay well dried, pulverize and sift it; mix it up with water, and then strain or filter it; with this, work up horse-dung, and hair dried small, till the mass be sufficiently tough; to which, on occasion, may be added charcoal-dust, or brick-dust, well sifted.

Two coarse moulds are then prepared of a gritty stone, the one concave, the other convex; which are to be ground by one another with wet sand between, till such time as the one perfectly fits the other. By this means a perfect spherical figure is acquired.

The mass, prepared before, is now to be extended on a table, by means of a wooden roller, till it be of a thickness proper for the *mirror*; and then being strewn with brick-dust to prevent its sticking, it is laid over the convex mould, and so gets the figure of the *mirror*. When this is dry, it is covered with another lay of the same mass; which once dried, both the covers,

or segments of the hollow sphere made of clay, are taken off. The innermost of the two being laid aside, the stone mould is anointed with a pigment prepared of chalk and milk, and the outer cover again put over it.

Lastly, The joining being covered over with the same clay whereof the cover is formed, the whole mould is bound together with iron-wire, and two holes are cut through the cover, the one for the melted matter of the *mirrour* to be poured thro', the other for the air to escape at, to prevent the *mirrour's* being spoiled with bubbles.

The mould being thus prepared, eight parts of copper, one of English tin, and five of bismuth, are melted together; a little of the mixture is taken out with a ladle, and, if it be too red, when cold, more tin is put in; if too white, more copper: the mass is then poured into the mould before prepared, and so assumes the figure of a *mirrour*.

Some with ten parts of copper mix four of English tin, and a little antimony and sal armoniac, furring the mass about as long as any fumes arise in it: others have other compositions, many of which are described by Schottus and Zahnus.

The *mirrour*, being thus cast, is cemented to a wooden frame, and thus worked to and fro over the convex stone mould, first with water and sand, and, lastly, without sand, till it be fit for polishing: the stone mould is then covered with paper, and that is smeared over with Tripoly dust, and calx of tin, over which the *mirrour* is worked to and fro till it have got a perfect polish. —And in the same manner are glass *mirrours* polished, excepting that the convex surface is there worked in the concave mould.

When the *mirrours* are very large, they are fixed on a table, and first ground with a gritty stone, then with pumice, then with fine sand, by means of a glass cemented to a wooden frame; and, lastly, they are rubbed with calx of tin, and Tripoly dust, on a wet leather.

For concave *mirrours* of glass, the mould is usually made of alabaster; the rest is as in metal *mirrours*.

Uses and phenomena of concave MIRRORS.—10. If a ray, as *KI* (fig. 34.), fall on a concave *mirrour* *LI*, under an inclination of 60 degrees, and parallel to the axis *AB*; the reflected ray *IB* will concur with the axis *AB* in the pole of the glass *B*.—If the inclination of the incident ray be less than 60 degrees, as that of *E*, the reflected ray *EF* will concur with the axis at the distance *BF*, which is less than a fourth part of the diameter.—And, universally, the distance of the point *F*, wherein the ray *HE* concurs with the axis, from the centre *C*, is to half the radius *CD* in the ratio of the whole sine, to the cosine of inclination.

Hence it is gathered, by calculation, that in a concave spherical *mirrour*, whose breadth subtends an angle of six degrees, parallel rays meet, after reflexion, in a part of the axis less than the one thousand four hundred fifty-seventh part of the radius: if the breadth of the concave *mirrour* be 6, 9, 12, 15, or 18 degrees; the part of the axis wherein the parallel rays meet, after reflexion, is less than $\frac{1}{360}$, $\frac{1}{675}$, $\frac{1}{1080}$, $\frac{1}{1575}$, $\frac{1}{2160}$ of the radius.

And on this principle it is, that *burning glasses* are formed.

For since the rays diffused through the whole surface of the concave *mirrour*, after reflexion, are contracted into a very small compass; the light and heat of the parallel rays must be prodigiously increased thereby, viz. in a duplicate ratio of the breadth of the *mirrour*, and the diameter of the circle wherein all the rays are collected: and since the sun's rays are, as to any purposes on earth, parallel; no wonder concave *mirrours* should burn with so much violence.

From this same principle is likewise deduced a method of representing the images of objects in a dark room; which see under *CAMERA obscura*.

2°. A lucid body being placed in the focus *F*, of a concave *mirrour* *EL*, (fig. 34.) the rays, after reflexion, become parallel.

Hence an intense light may be projected to a vast distance, by a lighted candle, &c. placed in the focus of a concave *mirrour*.

Hence, also, if the parallel rays be received by another concave *mirrour*, they will again concur in its focus, and burn.

Zahnus mentions an experiment of this kind made at Vienna, where two concave *mirrours*, the one fix, the other three feet diameter, being placed about twenty-four feet apart, with a live coal in the focus of the one, and a match and tinder in the other, the rays of the coal lighted the tinder.

3°. If a lucid body be placed between the focus *F*, (fig. 34. n. 2.) and the *mirrour* *HBC*, the rays, after reflexion, will diverge from the axis *BA*: whence it follows, that light is weakened by reflexion.

4°. If a lucid body be placed between the focus *F*, and the centre *G*, the rays, after reflexion, will meet in the axis beyond the centre.

Hence, if a candle be placed in *I*, its image will appear in *A*; if it be placed in *A*, its image will be in *I*; in the intermediate points between *I* and *A*, the section of light will be a circle, and that so much the greater, as it is nearer the point of concourse.

5°. If a luminous body be placed in the centre of the *mirrour*, all the rays will be reflected back upon themselves.

Hence, if the eye be placed in the centre of a concave *mirrour*, it will see nothing but itself, and that confusedly through the whole *mirrour*.

6°. If a ray, falling from the point of the cathetus *b*, (fig. 35.) on the convex *mirrour* *bE*, be, together with its reflex *IF*, continued within the concavity of the *mirrour*; *FH* will be the incident ray from the point of the cathetus *H*, and *FO* its reflex.

Hence, since the point of the cathetus *H* is the image of the point *b* in the convex *mirrour*; but the point *b* the image of *H* in the concave; if the image of an object, reflected by a convex speculum, be seen by a reflexion made in its concavity, it will appear like the object itself.

And since the image of an infinite cathetus is less in a convex glass, by one fourth of its diameter; a portion of the cathetus, less than a fourth part of the diameter, may appear of any magnitude required in a concave one.

A point, therefore, distant from a concave speculum less than one fourth of the diameter, must appear behind the *mirrour* at any distance, how great soever.

Since the image of any object, how broad soever, is contained, in a convex speculum, between the two lines of incidence of its extreme points; if an object be placed between the two lines, at a distance less than one fourth of its diameter, the breadth of the image, how great soever, may all appear.

Since then the image of an object included between two lines, at a distance less than one fourth of the diameter, may exceed the just height and breadth of the object; nay, may be made of any magnitude, how big soever: objects placed between the focus and *mirrour* must appear of enormous magnitudes in concave *mirrours*; the image being so much the greater in the concave *mirrour*, as it is less in the convex.

In a convex *mirrour*, the image of a remote object appears nearer the centre than that of a nearer object: therefore, in a concave *mirrour*, the image of an object remote from the *mirrour* appears at a greater distance than that of a nearer object, provided the distance of the object from the centre be less than a fourth part of the diameter.

In a convex speculum, the image of a remote object is less than that of a near one: therefore, in a concave one, the image of an object placed between the focus and the *mirrour*, is nearer the focus than the speculum.

The image, therefore, of an object receding continually from a concave speculum, becomes continually greater, provided it do not recede beyond the focus, where it becomes confused; and as it approaches, it grows continually less.

In a convex speculum, if the sphere, whereof it is a segment, be smaller, the image is smaller than in another of a larger sphere: therefore in a concave, if the sphere whereof it is a segment be smaller, the image will be larger than in another whole sphere is larger: whence concave *mirrours*, if they be segments of very small spheres, will do the office of microscopes.

7°. If an object be placed between a concave *mirrour* and its focus, its image will appear behind the *mirrour*, in an inverted situation.

8°. If an object *AB* (fig. 36.) be placed between the focus and the centre, its image *EF* will appear inverted, and in the open air, beyond the centre, the eye being placed beyond the centre.

9°. If an object *EF* be placed beyond the centre *C*, and the eye likewise beyond the centre; the image will appear inverted in the open air, between the centre and the focus.

Hence, the inverted images of objects placed beyond the centre are reflected by a concave *mirrour*, erect; and may be received on a paper applied between the centre and the focus, especially if the room be dark: if the object *EF* be further distant from the centre than is the focus, the image will be less than the object.

On this principle, concave *mirrours*, especially those which are segments of large spheres, and are capable of reflecting intire objects, exhibit many pleasing phenomena. Thus, if a man flourish a sword against the *mirrour*, another comes out thereof, and meets him with the same motions; and the image of his head coming out of the *mirrour*, if he strike it with his real sword, the imaginary sword will strike his real head. If he stretch out his hand, another hand will be stretched out of the *mirrour*, and meet it at a great distance in the open air, &c. And on the same principle are built catoptric cistulae, which, when looked into, exhibit images vastly bigger than the chest. See *CATOPTRIC cistula*.

10°. The image of a right line, perpendicular to a concave *mirrour*, is a right line; but all oblique or parallel lines are concave.

Cylindrical, conical, parabolical, and elliptical MIRRORS, or specula, are those terminated by a surface respectively cylindrical, conical, parabolical, and spheroidal.

To prepare, or make, cylindrical, conical, parabolical, elliptical, and hyperbolic MIRRORS.—For the cylindrical and conical sorts, if they are to be of glass, the method of preparing them

them is the same as that already laid down for convex mirrors.

If of metal, they are to be made after the manner of concave mirrors, only that the clay moulds, there described, require other wooden ones of the figure of the mirror.

For elliptical, parabolical, and hyperbolical mirrors, the mould is to be thus prepared. On a wooden or brazen plane or table, describe the figure of an ellipsis, A B, (fig. 37.) a parabola, or an hyperbola, C D, (fig. 38.) after the manner taught under those heads; which done, cut out the figure from the plane with all the accuracy imaginable.

To the elliptic figure fit an axis, as E F, with two fulcra to sustain it, &c. and a handle to move it; lay a quantity of the clay, above described, under it; and turn about the axis by the handle, till the plane A B have turned, or impressed the elliptical figure exactly thereon.

The axis of the parabolical or hyperbolical figure, C D, is to be fixed at the vertex in such manner as that it may always remain erect; this to be turned about as above, till it have given its own figure to the clay applied about it.

The part of the mould, thus formed, is to be dried, and either smeared over with fat, or sprinkled with brick-dust; then a convex mould is to be made, by putting a quantity of the same clay into the cavity thus formed.—This latter is called the male, as the former the female mould.

The male mould, being well dried, is to be applied within the female, in such manner, as only to leave the intended thickness of the mirror between them.—The rest as for concave mirrors.

These mirrors are not made without the utmost difficulty; by reason, be the moulds ever so just, the figure of the mirror is apt to be damaged in the grinding.

Phænomena, or properties of cylindrical mirrors.—o. The dimensions of objects corresponding length-wise to the mirror, are not much changed; but those corresponding breadth-wise have their figures altered, and their dimensions lessened so much the more, as they are farther from the mirror: whence arises a very great distortion.

2^o. If the plane of reflexion cut the cylindric mirror through the axis, the reflexion is performed in the same manner as in a plane mirror; if it cut it parallel to the base, the reflexion happens in the same manner as in a spherical mirror; if, lastly, it cut it obliquely, or be oblique to its base, the reflexion is the same as in an elliptical mirror.

Hence, as the plane of reflexion never passes through the axis of the mirror, except when the eye and objective-line are in the same plane; nor parallel to the base, except when the radiant point and the eye are at the same height; the reflexion, in a cylindrical mirror, is usually the same as in an elliptical one.

3^o. If a hollow cylindrical mirror be opposed directly to the sun, instead of a focus of a point, the rays will be reflected into a lucid line, parallel to its axis, at a distance somewhat less than a fourth part of its diameter.

Hence arises a method of drawing anamorphoses, i. e. wild, deformed figures, on a plane, which appear beautiful, and well proportioned, when viewed in a cylindrical mirror.

For elliptic, parabolic, conic, and pyramidal mirrors, we are not much acquainted with their properties: only that,

In the first, if a ray strike on it from one of its focus's, it is reflected into the other: so that a lighted candle being placed in one, its light will be collected in the other.

That the second, inasmuch as all the rays they reflect meet in one point, make the best burning-glasses of all others.

And, lastly, That wild, irregular figures, may be so drawn on a plane, as that, the eye being placed over the axis of the two last, they shall appear beautiful, and well-proportioned. See ANAMORPHOSIS.

MIS, a particle prefixed to divers words, particularly law-terms; denoting some default, or defect.—As, in *misprison*; *misdoere*, to scandalize one; *misdoere*, to teach amiss, &c.

MISANTHROPY*, a general dislike or aversion to man, and mankind.

* The word is Greek, *μισανθρωπία*, formed of *μισος*, odium, hatred; and *ανθρωπος*, homo, man.

In which sense it stands opposed to *philanthropy*, or the love of mankind.

MISADVENTURE, or **MISADVENTURE**, in law, the killing a man partly by negligence, and partly by chance.—As, if a person, thinking no harm, carelessly throw a stone, or shoot an arrow, wherewith he kills another; this is a *misadventure*: and, in this case, he commits no felony, but only loses his goods, and has a pardon, of course, for his life.

Stauford distinguishes between *aventure* and *misadventure*. The first he makes to be mere chance: as if a man, being upon or near the water, be taken with some sudden sickness, and so fall in, and be drowned; or into the fire, and be burnt.

Misadventure, according to him, is when a man comes to his death by some outward violence; as the fall of a tree,

the running of a cart-wheel, the stroke of an horse, or the like.

Weft distinguishes homicide into casual and mixed. The first, when a man is slain by mere accident, against the mind of the killer; as, if the ax fly off the helve, and kill a man: which is the same with Briton's *misadventure*.

MISCHNA, or **MISNA**, a part of the Jewish talmud. See TALMUD.

The *mischna* contains the text; and the gemara, which is the second part of the talmud, contains the commentaries: so that the gemara is, as it were, a glossary on the *mischna*.

The *mischna* consists of various traditions of the Jews, and of explanations of several passages of scripture.—The Jews maintain, that it was completed, and reduced into a body, by rabbi Juda, in the second century, to prevent the memory of their traditions from perishing. But the generality of the learned scarce allow it of so much antiquity, but bring it several centuries lower.

It is written in a much purer style, and is not near so full of dreams and visions as the gemara.

MISCONTINUANCE, in law, the same with *discontinuance*.

See DISCONTINUANCE.

MISDEMEANOUR, an offence, or fault, particularly when in the execution of an office.

High crimes and misdemeanours denote offences of a heinous nature, next to high treason.

MISE, a French term, literally denoting expence, or disbursement: it is used in our law-books in divers acceptations.—Sometimes for the profits of lands; sometimes for taxes, or tail-lages; and sometimes for expences, or costs: as, *pro mise et custagii*, for costs and charges in the entries of judgments, &c.

MISE more peculiarly denotes an honorary gift, or customary present, wherewith the people of Wales used to salute every new king and prince of Wales at their entrance upon the principality.

Antiently, the *mise* was given in cattle, wine, corn, &c. for the support of the prince's family; but when that dominion was annexed to the English crown, the gift was changed into money.—The county of Flint paid two thousand marks, &c. for their *mise*.

The county of Chester also a *mise* or tribute of five thousand marks at the change of every owner of the said earldom, for enjoying the privileges of that palatinate.—At Chester they have a *mise*-book, wherein every town and village in the county is rated what to pay towards the *mise*.

MISE is also used in speaking of a writ of right. What in other actions is called an *issue*, in a writ of right is called a *mise* or *me*: so that to *join the mise upon the meer*, is as much as to say, to join issue on the meer right, i. e. to join upon this point, whether has the more right, the tenant or demandant.

Yet even in a writ of right, if a collateral point be tried, it is there called an *issue*, not a *mise*.

MISE is also sometimes used corruptly for *meuse*, a messuage or tenement.

In some manors, a *mise* or *meuse* place is taken for such a messuage or tenement as yields the lord an heriot at the death of the tenant.

MISERERE, *have mercy*, the name, and first word, of one of the penitential psalms; being that commonly given by the ordinary to such condemned malefactors as are allowed the benefit of the clergy.—Whence it is also called the *psalm of mercy*.

MISERERE mei, denotes a kind of colic, or disorder of the intestines, wherein the excrements, instead of passing off the common way, are often thrown up by the mouth.

The *miserere mei* is the same with what we otherwise call *volvulus*, and *iliac passion*. See *ILIAC passion*.

It takes its name from the intolerable pain and anguish it occasions the patient; which is such as claims pity from the beholders; *Miserere mei* being a Latin phrase, which literally signifies, Have pity on me.

MISERICORDIA, **MERCY**, in law, an arbitrary amercement, or punishment imposed on any person for an offence.

Where the plaintiff or defendant in any action is amerced, the entry is always *ides in misericordia*.

It is thus called, according to Fitzherbert, by reason it ought to be but small*, and less than the offence, according to the tenor of magna charta.

* Multa levior sic dicta, quod lenissima impositur misericordia; graviores enim multas fines vocant; atrocissimas, redemptiones. See FINE, and RDEMPTION.

Hence, if a man be unreasonably amerced in a court not of record, as a court-baron, &c. there is a writ called *moderata misericordia*, directed to the lord, or his bailiff, commanding them to take moderate amercements.

MISERICORDIA communis, is when a fine is set on the whole county, or hundred.

MISFEASANCE, in law, a misdeed or trespass. Whence also *misfeasor*, a trespasser.

MISKERING, *Miskerring*. See ABISHERSING.

MISLETOE. See the article MISTLETOE.

MISNA.

MISNA. See the article MISCHNA.

MISNOMER*, in law, a wrong name; or the using of one name for another.

* The word is compounded of *mis*, which in composition signifies amiss; and *nommer*, to name.

MISPRISON, in law, signifies a neglect, or oversight.—Thus,

MISPRISON of clerks, is a neglect of clerks, in writing or keeping records.

By the *misprison of clerks*, no process shall be annulled or discontinued. And justices of assize shall amend the defaults of clerks mis-spelling of a syllable, or letter, in writing.

MISPRISON of treason, is a negligence in not revealing treason, where a person knows it to be committed.

Misprison is the concealment, or not disclosing, of known treason, for which the offenders are to suffer imprisonment during the king's pleasure; and to lose their goods, and the profit of their lands during their lives.

MISPRISON of felony, is only fineable by the justices before whom the party is attained.

Justices of the common pleas have a power to assess any Americans upon persons offending by *misprisons*, contempts, or neglects, for not doing or misdoing any thing in or concerning fines.

MISAL, MISALE, a mass-book, containing the several masses to be used on the several days, feasts, &c.

The Roman *missal* was first compiled by pope Zachary, and afterwards reduced into better order by pope Gregory the great, who called it the *book of sacraments*.

Each diocese, and each order of religious, have their particular *missal*, accommodated to the festivals of the province, or of the order.

MISSELTREE. See the article MISTLETOE.

MISSEN-mast, or MIZZEN-mast, of a ship, is a mast, or round long piece of timber, standing upright in the sternmost part.

—See *Tab. Ship*, fig. 1. n. 13, 19. See also MAST.

MISSEN-fail, is that belonging to the missen-yard. See SAIL.

When at sea they use the word *missen* alone, they always mean the *sail*, and not the *mast*.

Some great ships require two *missens*; in which case, that next the main-mast is called the *main-missen*, that next the poop the *bonaventure-missen*.

Change the MISSEN, that is, bring the *missen-yard* over to the other side of the mast.

Peck the MISSEN, that is, put the *missen* right up and down the mast.

Spell the MISSEN, &c. that is, let go the sheet, and peck it up.

MISSION. See EMISSION, MANUMISSION, REMISSION, and TRANSMISSION.

MISSION, in theology, denotes a power or commission to preach the gospel.

Jesus Christ gave his disciples their *mission* in these words, *Go, and teach all nations*, &c.

The Romanists reproach the Protestants, that their ministers have no *mission*; as not being authorized in the exercise of their ministry, either by an uninterrupted succession from the apostles, or by miracles, or by any extraordinary proof of a vocation.

The anabaptists deny any other *mission* necessary for the ministry than the talents necessary to discharge it.

MISSION is also used for an establishment of people zealous for the glory of God, and the salvation of souls; who go and preach the gospel in remote countries, and among infidels.

There are *missions* in the East, as well as in the West Indies.—Among the Romanists, the religious orders of St. Dominic, St. Francis, St. Augustine, and the Jesuits, have *missions* in the Levant, America, &c.

The Jesuits have also *missions* in China, and all other parts of the globe where they have been able to penetrate.—The mendicants abound in *missions*.

MISSION, is also the name of a congregation of priests and laymen instituted by Vincent De Paul, and confirmed in 1626. by pope Urban VIII. under the title of *Priests of the congregation of the mission*.

These profess to make it their whole business to assist the poor people in the country; and to this purpose they oblige themselves never to preach, or administer any of the sacraments, in any town where there is an archbishop, bishop, or provincial residing.

They are settled in most provinces of France, Italy, Germany, and in Poland.—At Paris they have a seminary, which they call the *foreign mission*; where youth are bred up, and qualified for *missions* abroad.

MISSIONARY, an ecclesiastic who devotes himself and his labours to some *mission*, either for the instruction of the orthodox, the conviction of heretics, or the conversion of infidels.

MISSIVE, something sent to another.—From the Latin, *mitto*, I send.

We say *missive* letters, or letters *missive*, meaning letters sent from one to another.

In propriety, *letters missive* are letters of business, but not business

of great concern; in contradistinction from letters of gallantry, letters on points of learning, dispatches, &c.

MIST, a meteor, called also *fog*. See FOG.

MISTLETOE, MISLETOE, or MISSELTREE, in natural history, a plant of the parasite kind; growing, not on the ground, but on other trees, as the oak, apple-tree, pear-tree, white-thorn, ash, lime, willow, elm, &c.

Mistletoe, by physicians, &c. called *viscum*, grows to the height of about two feet. It consists of several stems, which are usually covered with a greenish, sometimes a yellowish bark, and are about the thickness of the finger, hard, woody, and divided by knots; from which spring the leaves, which grow by two and two opposite to each other: they are oblong, thick, of a greenish, or yellowish colour, veined their whole length, and rounded at the end. Its flowers grow by three and three, trefoil-wise, at the extremes of the branches: each flower is a sort of yellow calyx, one third of an inch in diameter, divided into four parts.

The fruit likewise grows by three and three, at the extremes of the branches: they are a kind of white roundish berries, not unlike pearls, containing a flatish seed in form of a heart; covered with a fine silvered membrane, and invironed with a viscid, glutinous humour, of a whitish colour, wherein the seed naturally buds or germinates, and puts forth two eyes.—From this juice it is, that the Latins denominate the plant *viscum*.—The fruit grows on different branches from the flowers. The uncommon foil, whereon the *mistletoe* grows, has occasioned abundance of fabulous notions, both as to its production and virtues.

Pliny and most naturalists relate, that thrushes, being exceedingly fond of the berries of the *mistletoe*, swallow them, and cast them out again on the branches of trees where they use to perch; and, by this means, give occasion to a new production of *mistletoe*. Hence that proverb, *Turdus sibi cacat malum*; the *viscum* being sometimes used as bird-lime. By cracking the berries, also, with their bills, or claws, they are supposed to let out the viscid juice, which facilitates their sticking.

Mr. Bradley endeavours to refute the popular opinion of the antients, that the seeds of the *mistletoe*, simply sown, could not vegetate. Their endeavouring to propagate it in the earth without success, he takes to have led them into the error; and asserts, that it may be propagated by seed on any tree whatever. The method too is very easy. About Christmas, when the berries are full ripe, you need only apply them on the smooth bark of any tree; the viscid juices they are encompassed withal, will make them stick; and, provided the birds do not devour the seed, you may, without any farther trouble, expect a young plant the following year.

But others rather chuse to account for the propagation of *mistletoe* from the system hereafter advanced for that of *mushrooms*. See MUSHROOM.

For the virtues of *mistletoe*; it seems of the most efficacy in the epilepsy; against which some will have it a specific. Dr. Colbatch has wrote expressly to prove it such. It is also prescribed in apoplexies, lethargies, and vretiges; and is worn about the necks of children to prevent convulsions, and ease the cutting of their teeth.

The best is the *mistletoe of the oak*; though it is not this which is commonly used, but that of the apple or pear-tree. Mr. Bradley observes, that there is no variety in this plant; but that the leaves, flowers, fruit, &c. are all alike, on whatever kind of tree it grows: but others pretend to be able to distinguish that of the oak by several particulars.

The virtues ascribed to the *mistletoe* may perhaps be the remains of the religious honours paid it by the antient Gauls; among whom the Druids, assembled constantly on the first day of the year, went in quest thereof with hymns, and other ceremonies and rejoicings, distributing it again among the people, as a thing sacred, after having first consecrated it, crying, *Au guy Pan neuf*, to proclaim the new year.

This cry is still kept up at Picardy, where they add *plantez*, to wish a plentiful new year.

M. Perrault observes, that the *mistletoe* is full of a disagreeable juice, which weakens the tree whereon it grows; and that the fruit has always a disagreeable taste, while it sticks on it.

MISY, MIST, in natural history, see CHALCITIS. See also Supplement, Article MISY.

MITE, a small coin, formerly current; equal to about one third part of a farthing.

MITE also denotes a small weight used by the moneyers. It is equal to the twentieth part of a grain, and is divided into twenty-four doits.

MITHRIDATE, MITHRIDATIUM, in pharmacy, an antidote or composition in form of an electuary, serving either as a remedy or a preservative against poisons.

Mithridate is one of the capital medicines in the apothecaries shops, being composed of a vast number of drugs; among which are, opium, myrrh, agaric, saffron, ginger, cinnamon, spikenard, frankincense, castor, pepper, gentian, &c. It is accounted a cordial, opiate, sudorific and alexpharmic.—Matthiolus says, it is more effectual against poison than Venice-treacle, and much easier to be made.

It takes its name from its inventor, Mithridates king of Pontus, who is reported to have fortified his body against poisons with antidotes and preservatives, that when he had a mind to dispatch himself, he could not find any poison that would take effect.

The receipt of it was found in his cabinet, written with his own hand, and was carried to Rome by Pompey. It was translated into verse by Damocrates, a famous physician, and was afterwards translated by Galen, from whom we have it. It has undergone considerable alterations since the time of its royal prescriber.

MITRALES *valvulae*, **MITRAL** *valves*, in anatomy, two valves in the heart; thus called from their resembling the figure of a mitre.

They are placed at the orifice of the pulmonary vein, in the left ventricle of the heart. Their office is, to close the orifice thereof, and to prevent the return of the blood through the pulmonary vein into the lungs again.

MITRE*, **MITRA**, a pontifical ornament, worn on the head by bishops, and certain abbots, on solemn occasions.

* The word comes from the Greek, *mitra*, which signifies the same.

The *mitre* is a round cap, pointed, and cleft atop with two pendants hanging down on the shoulders.—Abbots wear the *mitre* turned in profile, and bear the crozier inwards; to shew that they have no spiritual jurisdiction without their own cloisters.

The pope has also granted to some canons of cathedrals the privilege of wearing the *mitre*.—The counts of Lyons are also said to have assisted at church in *mitres*.

In Germany, several great families bear the *mitre* for their crest; to shew, that they are advocates or feudatories of ancient abbies, or officers of bishops, &c.

The pope has four *mitres*, which are more or less rich according to the solemnity of the feast-days they are to be worn on. The *mitre* was originally the women's head-dress, as the hat was that of the men. This appears from Remulus in Virgil, who reproaches the Trojans, that they were dressed like women, and wore *mitres*.—*Et tunice manica; & habent redimicula mitrae*.

The cardinals antiently wore *mitres*, before the hat, which was first granted them by the council of Lyons in 1245. Authors make no mention of the *mitre* as an episcopal ornament before the year 1000.

MITRE, in architecture, is the workmen term for an angle that is just 45 degrees, or half a right one.

If the angle be a quarter of a right angle, they call it a *half-mitre*.

To describe such angles, they have an instrument called the *mitre square*; with this they strike *mitre-lines* on their quarters, or battens: and, for dispatch, they have a *mitre-box*, as they call it, which is made of two pieces of wood, each about an inch thick, one nailed upright on the edge of the other; the upper piece hath the *mitre-lines* struck upon it on both sides, and a kerf to direct the saw in cutting the *mitre* joints readily, by only applying the piece into this box.

MITRED *abbots*. See the article **ABBOT**.

MITTENDIS *recordo & processu*. See **RECORDO**.

MITTIMUS, in law, a writ, by which records are ordered to be transferred from one court to another; sometimes immediately, as out of the King's Bench into the Exchequer; and sometimes by a certiorari into the Chancery, and from thence by a *mittimus* into another court.

MITTIMUS is also used for a precept in writing directed by a justice of peace to a gaoler, for the receiving and safe keeping a felon, or other offender, by him committed to the goal.

MIXING of *mortar*. See the article **MORTAR**.

MIXT, or **MIXT** *body*, in philosophy, is that which is compounded of divers elements or principles.

By which, *mixt* stands contradistinguished from *simple*, or *elementary*, which is applied to bodies consisting of one principle only; as the chymists take sulphur, salt, &c. to do.

The schoolmen define a *mixt body* to be a whole, resulting from several ingredients, altered or new-modified by the mixture.—On which principle, the several ingredients do not actually exist in the *mixt*; but they are all changed, so as to conspire to a new body of a different form from the form of any of the ingredients.—But the modern philosophers rarely conceive the term in so much strictness.

The business of chymistry, we say, is, to resolve *mixt bodies* into their principles, or component parts.

The school-philosophers distinguish *mixt bodies* into *perfect* and *imperfect*.

Perfect **MIXTS** are the class of organized and animated bodies; where the elements or ingredients, they are composed of, are changed or transformed by a perfect mixture.—Such are plants, beasts, and men.

Imperfect **MIXTS** are unorganized and inanimate bodies, the forms whereof remain still the same as of the ingredients that constitute them.—Such are meteors, minerals, metals, &c.

MIXT *action*, in law, is an action partly real, and partly personal.

A *mixt action* is that which lies both for the thing detained, and against the person of the detainer.—Or it is that which seeks both the recovery of a thing we are unjustly deprived of, and damages, or a penalty, for the unjust detainment thereof. Such are actions of waste, and quare impedit; actions for tithes on the statute 2 and 3 Edw. VI. &c.

MIXT *angle*. See the article **ANGLE**.

MIXT *cloths*. See the article **CLOTH**.

MIXT *fabrics*. See the article **FABRIC**.

MIXT *figure*, in geometry, is that which consists partly of right lines, and partly of curve lines.

MIXT *force*. See the article **FORCE**.

MIXT *history*. See the article **HISTORY**.

MIXT *mathematics*. See the article **MATHEMATICS**.

MIXT *mode*, according to Mr. Locke, is a combination of several simple ideas of different kinds.

Thus *beauty*, as it consists in a certain composition of colour, figure, proportion, &c. of different parts, causing delight to the beholder, is a *mixt mode*. Such also are *theft*, *murder*, &c.

The mind, that author observes, being once furnished with simple ideas, can put them together in several compositions, without examining whether or not they exist in nature together: and hence it is that these ideas are called *notions*; as if they had their original and constant existence more in the thoughts of men, than in the reality of things; and that, to form such ideas, it sufficed that the mind put the parts of them together; and that they were consistent in the understanding: without considering whether they had any real being.

There are three ways whereby we get these complex ideas of *mixt modes*. First, By experience and observation of things themselves: thus, by seeing two men wrestle, we get the idea of wrestling. Secondly, By invention, or voluntary putting together of several simple ideas in our own mind: so he that first invented printing had an idea of it first in his mind, before ever it existed. Thirdly, By explaining the names of actions we never saw, or notions we cannot see; and by enumerating all those ideas which go to the making them up.

Thus the *mixt mode* which the word *he* stands for, is made up of these simple ideas: First, Articulate sounds. Secondly, Certain ideas in the mind of the speaker. Thirdly, Certain words, the signs of these ideas. Fourthly, Those signs put together by affirmation, or negation, otherwise than the ideas they stand for are in the mind of the speaker, since the language was made.

Complex ideas are usually got by the explication of those terms that stand for them. For, since they consist of simple ideas combined, they may, by word standing for those simple ideas, be represented to the mind of one who understands those words, though that combination of simple ideas was never offered to his mind by the real existence of things.

MIXT *number*, in arithmetic, that which is partly an integer, and partly a fraction: as $\frac{1}{4}$.

MIXT *obligation*. See the article **OBLIGATION**.

MIXT *ratio*, or *proportion*, is when the sum of the antecedent and consequent is compared with the difference between the antecedent and consequent—as if $\frac{3}{4} : \frac{12}{16}$ as $a : b :: c : d$

then $\frac{7}{8} : \frac{28}{4}$
as $a : b :: c : d$

MIXT *salts*. See the article **SALTS**.

MIXT *stairs*. See the article **STAIRS**.

MIXT *service*. See the article **SERVICE**.

MIXT *tithes*, are those of cheese, milk, &c. and of the young of beasts. See **TITHES**.

MIXTILINEAR *angle*. See the article **ANGLE**.

MIXTION, **MIXTIO**, or **MISTIO**, the act of *mixing*; or the union and coalition of divers corpuscles into one body.

The Peripatetics, who hold an alteration essential to *mixtion*, define it, the union of several altered ingredients, or miscibles.

Mixtion makes a considerable operation in the chymical and Galenical pharmacy; where divers powders, species, and other simples, are said to be *mixed*, *misceri*, though without any communication or transition of the virtues of one into those of another. See **COMPOSITION**.

MIXTURE, **MIXTURA**, or **MISTURA**, in a philosophical sense, is an assemblage, or union of several bodies of different properties, in the same mass.

To determine the ratio of the ingredients of a *mixture*, is that celebrated problem proposed by Hiero, king of Syracuse, to Archimedes, on occasion of a crown of gold wherein the workman had fraudulently mixed silver; the solution whereof was matter of so much transport to that divine mechanic.

It may be determined thus.—Weigh the *mixture*; immerse it in some fluid; and find the weight it loses therein: then find what weight any determinate quantity of any ingredient loses in the same fluid: and by the rule of three find what weight each ought to lose therein, were its weight equal to that of the *mixture*: subtract the less loss from the greater, which will give the excess wherewith the loss of the lighter exceeds that of the heavier: then sub-

tract the weight lost by the heavier, from that lost by the whole mixture, to find the excess of the weight lost by the mixture beyond that lost by the heavier.

MIXTURE, in matters of drapery, denotes the union or blending of several wools of different colours, not yet spun.

Hence a mixture, or mixed stuff, is that whose wool and warp are of wools of different colours dyed and mixed before they were spun. See **CLOTH**.

MOAT, in fortification, a depth or trench dug round a town, or fortress to be defended, on the outside of the wall, or rampart.—See *Tab. Fortif. fig. 21. lit. h b b, &c.*

The depth and breadth of the moat often depend on the nature of the soil; according as it is marshy, rocky, or the like. The brink of the moat next the rampart in any fortification is called the *scarp*, and the opposite one the *counter-scarp*.

Dry MOAT is that which is destitute of water; this ought to be deeper than one which is full of water.

Lined MOAT is that whose scarp and counter-scarp are cased with a wall of mason's work lying aloope.

Flat-bottomed MOAT is that which hath no sloping, its corners being somewhat rounded.

Angle of the MOAT. See the article **ANGLE**.

MOATAZALITES, a religious sect among the Turks, who deny all forms and qualities in the divine Being.

There are two opinions among the Turkish divines concerning God. The first admit metaphysical forms, or attributes; as, that God has wisdom by which he is wise; power by which he is powerful; eternity by which he is eternal, &c.

The second allow God to be wise, powerful, eternal; but will not allow any form or quality in God, for fear of admitting a multiplicity.

Those who follow this latter opinion are called *Moatazalites*.—Those who follow the former, *Septonties*.

MOBILE, *Movæble*; any thing susceptible of motion, or that is disposed to be moved either by itself, or by some other prior *mobile*, or mover.

Primum MOBILE, in the antient astronomy, was a ninth heaven, or sphere, imagined above those of the planets and fixed stars.

This was supposed to be the first mover, and to carry all the lower spheres round along with it; by its rapidity communicating to them a motion whereby they revolved in twenty-four hours.—But the diurnal revolution of the planets is now accounted for without the assistance of any such *primum mobile*.

Perpetuum MOBILE. See **PERPETUAL motion**.

MOBILIA bona, in the civil law, are what in common law, &c. we call *moveables*, or *moveable goods*.

MOBILITY, in the schools, &c. an aptitude, or facility to be moved.

The *mobility* of mercury is owing to the smallness, and sphericity of its particles; and is this which also renders its fixation so difficult.

The hypothesis of the *mobility* of the earth is the most plausible; and is that universally admitted by the later astronomers.

Pope Paul V. appointed commissioners to examine the opinion of Copernicus touching the *mobility* of the earth. The result of their enquiry, was, a prohibition to assert, not that the *mobility* was possible, but that it was actually true. That is, they allowed the *mobility* of the earth to be held as an hypothesis, which gives an easy and sensible solution of the phenomena of the heavenly motions; but forbade the *mobility* of the earth to be maintained as a thesis, or a real effective thing; by reason they conceived it contrary to scripture.

MODAL, in logic, &c. a term applied to propositions which include certain conditions or restrictions.

MODE, or **MOOD**, **MODUS**, in philosophy, a manner of being; or a quality, or attribute of a substance, or subject, which we conceive as necessarily depending on the subject, and incapable of subsisting without it.

Mr. Locke defines *modes* to be those ideas (he should have said *things*) which do not imply any supposition of subsisting by themselves, but are considered as mere dependences, and affections of substances.

Our ideas of things may be reduced to two kinds: the one of things which we conceive separately, and by themselves, called *substances*; and the other of things which we conceive as existing in others, in such manner as that we cannot allow them existence without them; and these we call *modes*, or *accidents*.

Thus, when we reflect on wax, and roundness; we consider the wax as a thing which may subsist without the roundness; wax therefore we denominate a *substance*: on the contrary, we consider the *roundness* to be dependent on the wax, that it cannot subsist without it, there being no conceiving of roundness distinct and separate from a round body.—This therefore we call a *mode*, or *accident*.

It is the characteristic, then, of a true *mode*, to have such a relation to some subject, as not to be clearly and distinctly

conceivable without conceiving the subject, whereof it is a *mode*, at the same time: when, on the other hand, the conception of the subject does not at all infer or require that of the *mode*.

Thus, what gives us to know that thought is not a *mode* of extended substance, or matter, is, that extension, and the other properties of matter may be divided from thought, without ceasing to conceive thought all the while.

We always consider things as clothed with certain *modes*, except we reflect on them in the abstract, or general: and it is the variety of *modes*, and relations, that occasions the great variety of denominations of the same thing. It is the various *modes* of matter, *e. gr.* that make all the diversity of bodies, or corporeal beings in nature.

There are various divisions and kinds of *modes*: one of the most common is, into *internal* and *external*.

Internal MODES are those inherent in the substance;—as roundness in the bowl; flatness in a nose; crookedness in the finger, &c.

These, we have observed, cannot exist, nor even be conceived without the subject, as being only circumstances thereof, or even, according to some, only the subject itself considered, not simply, but as such. Thus the roundness of the bowl is only the bowl itself considered as round, &c.

External MODES are those extraneous to the subject;—as when we say a thing is desired, loved, beheld, &c. These coincide with what we call *relations*.

Add, that there are *modes* which are likewise substances, as apparel, hair, &c. which may subsist without the subject.

Mr. Locke divides *modes* into *simple*, and *mixed* or *compounded*.

Simple MODES are combinations of simple ideas of the same kind, or even of the same simple ideas divers times repeated;—as a dozen, a score, &c. which are only the ideas of so many distinct units put together.

The modifications of any simple idea, Mr. Locke observes, are as perfectly different and distinct ideas in the mind as those the most remote and inconsistent: thus, *two* is as distinct from *three*, as blindness is from heat. With this view that author examines the *simple modes* of space.—Which are found to be distance, capacity, extension, figure, place, and duration.

The mind has several distinct ideas of *sliding*, *rolling*, *walking*, *creeping*, &c. which are all but the different modifications of motion. *Swift* and *slow* are two different ideas of motion, the measures whereof are made out of the distances of time and space put together.

The like variety we have in sounds; every articulate word is a different modification of sound, as are all notes of different length put together, which make that complex idea called *time*.

The *modes* of colours might be also very various; some of which we take notice of as the different degrees, or as they are termed, *shades of the same colour*. But since we seldom make assemblages of colours without taking in figure also, as in painting, &c. those which are taken notice of, do most commonly belong to mixed *modes*; as *beauty*, *rainbow*, &c. All compounded tastes and smells are also *modes* made up of the simple ideas of those senses.

As to the *modes of thinking*; when the mind turns its view inward upon itself, *thinking* is the first idea that occurs, wherein it observes a great variety of modifications; and therefore frames to itself distinct ideas.

Thus the perception annexed to any impression on the body made by an external object, is called *sensation*. Where an idea recurs without the presence of the object, it is called *remembrance*. When sought after by the mind, and brought again in view, it is called *recollection*. When held there long under attentive consideration, it is called *contemplation*. When ideas float in the mind without regard or reflection, it is called in French a *reverie*. When the ideas are taken notice of, and, as it were, registered in the memory, it is *attention*. When the mind fixes its view on any one idea, and considers it on all sides, it is *intention* and *study*.

Of these various *modes* of thinking, the mind forms as distinct ideas, as it does of white and red, or of a square, or a circle.

Mixed MODES are combinations of simple ideas of several kinds; as in *beauty*, which consists in a certain composition of colour, figure, &c. *Theft*, which is the concealed change of the possession of any thing without consent of the proprietor, &c.

There are three ways whereby we get ideas of *mixed modes*. 1^o. By experience and observation of things themselves; thus by seeing two men wrestle, we get the idea of wrestling. 2^o. By invention, or voluntary putting together of several simple ideas in our own minds; so he that first invented printing, had an idea of it first in his mind, before ever it existed. 3^o. By explaining the names of actions we never saw, or notions we cannot see; and by enumerating all those ideas, which go to the making them up.—Thus the *mixed mode* which the word *he* stands for, is made up of these simple ideas:

(1.) Articulate sounds. (2.) Certain ideas in the mind of the speaker.

speaker. (3.) Words, the signs of these ideas. And, (4.) Those signs put together by affirmation, or negation, otherwise than the ideas they stand for are in the mind of the speaker.

Mixt modes have their unity from an act of the mind, combining those several simple ideas together, and considering them as one complex one: the mark of this union is one name given to that combination. Men seldom reckon any number of ideas to make one complex one, but such collections as there be names for. Thus, *the killing of an old man* is as fit to be united in one complex idea, as *the killing of a father*; yet there being no name for it, it is not taken for a particular complex idea; nor a distinct species of action from that of killing any other man: these collections of ideas have names generally affixed, which are of frequent use in conversation; in which cases men endeavour to communicate their thoughts to one another, with all possible dispatch. Those others, which they have seldom occasion to mention, they lay not together, nor give them names.

This gives the reason, why there are words in every language, which cannot be rendered by any one single word of another. For the fashions and customs of one nation make several combinations of ideas familiar in one, which another had never any occasion to make. Such were, *Οὐρανισμός*, among the Greeks; and *proscriptio* among the Romans.

This also occasions the constant change of languages; because the change of custom and opinion brings with it new combinations of ideas, which, to avoid long descriptions, have new names annexed to them; and so they become new species of *mixt modes*.

Of all our simple ideas, those which have had most *mixt modes* made out of them, are thinking, and motion (which comprehend in them all action), and power, from whence these actions are conceived to flow. For actions being the great business of mankind, it is no wonder that the several *modes* of thinking and motion, should be taken notice of; and the ideas of them observed, and laid up in memory, and have names assigned them. For without such complex ideas with names to them, men could not easily hold any communication about them.

Of this kind are the *modes* of actions distinguished by their causes, means, objects, ends, instruments, time, place, and other circumstances; as also of the powers fitted for those actions. Thus *boldness* is the power to do or speak what we intend, without fear or disorder; and this power of doing any thing, when it had been acquired by frequent doing the same thing, is that idea we call *habit*; and when forward and ready upon every occasion, to break into action, we call it *disposition*: thus *restiveness* is a disposition or aptness to be angry. Power being the source of all action, the substances, wherein those powers are, when they exert this power, are called *causes*; and the substances thereupon produced, or the simple ideas introduced into any subject, are called *effects*. The efficacy whereby the new substance or idea is produced, is called in the subject exerting that power, *action*; and in the subject wherein any simple idea is changed, or produced, *passion*. Which efficacy in intellectual agents, we can conceive to be nothing else but *modes* of thinking and willing: in corporeal agents, nothing else but modifications or motions.

Whatever sort of action, besides these, produces any effect, we have no notion or idea of. And, therefore, many words which seem to express some action, signify nothing of the action, but barely the effect, with some circumstances of the subject wrought on, or cause operating: thus *creation*, and *annihilation*, contain in them no idea of the action, or manner whereby they are produced, but barely of the cause, and the thing done. And when a countryman says, *the cold freezes water*, though the word *freezing*, seems to import some action, yet it truly signifies nothing but the effect, *viz.* that the water that was before fluid, is now become hard and consistent; without intimating any idea of the action whereby this is done.

In *mixt modes*, it is the name that seems to preserve their effects, and to give them their lasting duration. The collection of ideas is made by the mind; but the name is, as it were, the knot which ties them fast together: hence we seldom take any other for distinct species of *mixt modes*, but such as are set out by names. We must observe, that the names of *mixt modes* always signify the real essences of their species; which being nothing but the abstract complex ideas, and not referred to the real existence of things, there is no supposition of any thing more signified by any name of a *mixt mode*, but barely that complex idea which the mind itself has formed; which when the mind has formed, is all it would express by it, and is that on which all the properties of the species depend, and from which alone they flow; and so, in these, the real and nominal essence is the same.

This also shews the reason, why the names of *mixt modes* are commonly got, before the ideas they stand for are perfectly known; because there being no species of these ordinarily taken notice of but such as have names; and those species being complex ideas made arbitrarily by the mind; it is convenient, if

not necessary, to know the names, before we learn the complex ideas: unless a man will fill his head with a company of abstract complex ideas, which others having no names for, he has nothing to do with, but to lay by, and forget again. In the beginning of languages, it was necessary to have the idea, before one gave it the name; and so it is still, where a new complex idea is to be made, and a name given it. In simple ideas, and substances, it is otherwise; which being such ideas, as have real existence and union in nature, the ideas or names are got, one before the other, as it happens.

The schoolmen make numerous other divisions of *modes*; as into *immediate* and *mediate*: *essential* and *non-essential*: *positive* and *privative*: of *spirit* and of *body*: of *thinking*, and of *having*.

Immediate MODES are those immediately attributed to their subjects, or substances.

Mediate MODES are those attributed to subjects by the intervention of some other *mode*.

Thus, *e. gr.* motion is an immediate *mode* of the body; knowledge of the mind, &c. But swiftness and slowness are not immediately attributable to the body; but only to the body in respect of motion.

Essential or *inseparable MODES* are attributes without which the substance cannot exist.—As, wisdom, goodness, power, &c. in God: figure, place, quantity, extension, &c. in body.

Non-essential or *separable MODES* are attributes affecting created substances, and remaining affixed thereto so long as it is necessary.—Such are coldness, of water: hardness, of stone: whiteness, of milk, &c.

Positive MODES are those which give something real, positive, and absolute to their substance.—Thus roundness is a positive *mode* of a globe, &c.

Privative MODES are attributed to subjects, when the mind perceiving some attributes wanting therein, frames a word, which at first sight seems to note something positive, but which in reality only notes the want of some property, or *mode*.—Thus a privation of light is attributed to a blind man, &c.

MODES of spirit are two, *viz.* Cognition, or knowledge; and willing. See KNOWLEDGE and WILL.

MODES of body are three, *viz.* figure, rest, and motion. See FIGURE, REST, and MOTION.

MODES of having, are those whereby any thing may be had by another.—Aristotle enumerates seven of these: A thing, for instance, may be had either by the *mode* of quality, as knowledge; by that of magnitude, as circumference; or by the *mode* of part, as the hand, &c.

Division of a MODE. See the article DIVISION.

MODE, in grammar.

MODE, in logic. } See the article MOOD.

MODE is also used in logic, for the modification of a proposition; or that which renders it *modal* and *conditional*.

Indirect MODES. See the article INDIRECT.

MODES, or MOOD, in music, a particular manner of beginning, continuing and ending a song, whereby we are engaged to make use of certain notes, or chords, preferable to, or otherwise than others.

MODE is defined by some authors, the particular manner of constituting the octave; or the melodious constitution of the octave, as it consists of seven essential or natural notes, besides the key, or fundamental.

A *mode*, then, is not any single note or sound; but the particular order of the concinnous degrees of an octave: the fundamental note whereof may, in another sense, be called the *key*, as it signifies that principal note which regulates the rest. The proper difference between a *mode* and a *key*, consists in this, that an octave with all its natural and concinnous degrees, is called a *mode*, with respect to the constitution, or the manner and way of dividing it; and with respect to the place of it in the scale of music, that is, the degree or pitch of tune, it is called a *key*: that is, an octave of sounds may be raised in the same order and kind of degrees which makes the same *mode*, and yet be begun higher or lower; that is, be taken at different degrees with respect to the whole, which makes different keys: and from the same definition it follows, that the same key may be found with different *modes*; that is, the extremes of two octaves may be in the same degree of tune, and the division of them different.

Now it may be further observed, that of the natural notes of every *mode*, or octave, three go under the name of the essential notes in a peculiar manner, *viz.* the fundamental, the third, and fifth; their octaves being reckoned the same, and marked with the same letters in the scale: the rest are particularly called *dependents*. Again, the fundamental is also called the *final*; the fifth the *dominant*; and the third, as being between the other two, the *mediante*.

The doctrine of the antients with regard to *modes*, which they sometimes also call *tener*, is somewhat obscure; there being an unaccountable difference among their authors as to the definitions, divisions, and names of their *modes*. They agree indeed, that a *mode* is a certain system or constitution of sounds; and that an octave, with all its intermediate sounds, is such a constitution.

The sculptors have little *models* of clay or wax to assist them in their designs of others that are larger, in marble, &c. and to judge of the attitude and correctness of a figure.

Statuaries likewise give the name *model* to certain figures of clay or wax, which are but just fashioned, to serve by way of guide for the making of larger, whether of marble, or other matter.

MODERATOR, in the schools, the person who presides at a dispute, or in a public assembly.

Such a doctor was the *moderator*, that is the president, at such a disputation, in such an assembly, &c.

MODERN, something new, or of our time.—In opposition to what is antique, or *antient*.

Modern authors, according to Naude, are all those who have wrote since Boethius: the *modern* philosophy commences with Galileo: and the *modern* astronomy with Copernicus.

MODERN medals, are reckoned all those that have been struck within these three hundred years.

MODERN coins. See the article COINS.

MODERN Hebrew. See the article HEBREW.

MODERN weights. See the article WEIGHTS.

MODERN, in architecture, is improperly applied to the present, or Italian manner of building; as being according to the rules of the antique. Nor is the term less abused, when attributed to architecture purely Gothic.

Modern architecture, in propriety, is only applicable to that which partakes partly of the antique, retaining somewhat of its delicacy and solidity; and partly of the Gothic, whence it borrows members and ornaments, without proportion or judgment.

MODIFICATION, in philosophy, that which *modifies* a thing; that is, gives it this or that manner of being.

Quantity and quality are accidents which *modify* all bodies.

According to Spinoza's system, all the beings that compose the universe, are only so many different *modifications* of one and the same substance. And it is the different arrangement and situation of their parts, that make all the difference between them.

MODIFICATIVE, something that *modifies*, or gives a thing a certain manner of being.

Father Buffier establishes a new part of speech, which he calls *modificative*. Nouns, and verbs, he observes, are susceptible of divers circumstances or *modifications*: in the phrase, *zeal acts*, we have a noun and verb, without any *modification*; but in that *zeal without discretion acts rashly*, the noun and the verb are each attended with a *modification* or circumstance.

This last kind of words, which serve to *modify* nouns and verbs, since they have no general name in the common grammars, he chuses to call *modificatives*: — which include what grammarians commonly call *adverb*, *conjunction*, and *preposition*.

MODILLIONS*, in architecture, ornaments in the cornice of the Ionic, Corinthian, and composite columns.—See *Tab. Architect. fig. 20. and 26. lit. c.*

* The word comes from the Italian, *Modiglione*, a little measure.

The *modillions* are little inverted consoles, or brackets, in form of an S, under the soffit of the cornice, seeming to support the projection of the larmier; or though in reality they are no more than ornaments.

The *modillion* is sometimes also called *mutule*; though custom has introduced a little difference between the idea of a *modillion*, and a *mutule*; the *mutule* being peculiar to the Doric order, and the *modillion* to the higher orders.

The *modillions* ought always to be placed over the middle of the column. They are particularly affected in the Corinthian order, where they are usually enriched with sculpture.—Their proportions must be so adjusted, as to produce a regularity in the parts of the soffit.

The *inter-modillions*, i. e. the distances between them, depend on the inter-columnations, which oblige the *modillions* to be made of a certain length and breadth, in order to render the intervals perfect squares, which are always found to have better effect than parallelograms. To this it must be added, that in adjusting the *modillions*, care should be taken that they have such a proportion, as that when the orders are placed over one another, there be the same number in the upper order as in the lower, and that they fall perpendicularly over each other. *Modillions* are also used under the corniches of pediments; though Vitruvius observes that they were not allowed of in his time, in regard *modillions* were intended to represent the ends of rafters, which could not be supposed to be found in a pediment. Some will have the *modillions* of a pediment to represent purlins; and those at the eaves to represent rafters. Daviler rather takes them for a kind of inverted consoles or corbels.

MODIOLUS, a surgeon's instrument, the same with *anabaptismon* and *trepanum*. See TREPANUM.

MODIUS, in antiquity, a kind of dry measure in use among the Romans for several sorts of grain.

The *modius* contained thirty-two heminae, or sixteen sextaries; or $\frac{1}{2}$ of the amphora: amounting to an English peck.

MODUS & forma, in law, a phrase used in process and pleadings, whereby the defendant absolutely denies the thing charged on him by the plaintiff, *modus & forma declarata*, in the manner and form set forth.

The civilians in the like sense say, *negat allegata, prout allegantur, esse vera*.

MODULATION, in music, is the art of keeping in, and on occasion changing the mode or key; and returning to it again; without offence to the ear.

Under this term is comprehended the regular progression of the several parts through the sounds that are in the harmony of any particular key, as well as the proceeding naturally and regularly from one key to another.

The rules of *modulation* in the first sense belong to harmony and melody.—We shall here only add a word with regard to the rules of *modulation* in the latter sense.

As every piece must have a principal key; and since the variety so necessary in music to please and entertain, forbids the being confined to one key; and that therefore it is not only allowable, but necessary, to *modulate* into, and make cadences on several other keys, having a relation and connection with the principal key: it must be considered what it is that constitutes a connection between the harmony of one key and that of another, that it may be hence determined into what keys the harmony may be conducted with propriety.

As to the manner in which the *modulation* from one key to another is to be performed, so that the transition may be easy and natural; it is not easy to fix any precise rules: for though it is chiefly performed by the help of the seventh *g* of the key, into which the harmony is to be changed, whether it be flat or sharp; yet the manner of doing it is so various and extensive, that no rules can easily circumscribe it. A general notion of it may be conceived under the following terms.

The seventh *g* in either sharp or flat key, is the third *g* to the fifth *f* of the key, by which the cadence in the key is chiefly performed; and by being only a semi-tone under the key, is thereby the most proper note to lead into it, which it does in the most natural manner imaginable. Inasmuch that the seventh *g* is never heard in any of the parts, but the ear expects the key should succeed it; for whether it be used as a third, or as a sixth, it always affects us with so imperfect a sensation, that we naturally expect something more perfect to follow, which cannot be more easily and smoothly accomplished, than by the small interval of a semi-tone, to pass into the perfect harmony of the key. Hence it is, that the transition into one key is best effected, by introducing its seventh *g*, which so naturally leads to it.

MODULE, in architecture, a certain measure, taken at pleasure, for regulating the proportions of columns, and the symmetry, or distribution of the whole building.

Architects usually chuse the diameter, or semi-diameter, of the bottom of the column for their *module*; and this they subdivide into parts, or minutes.

Vignola divides his *module*, which is a semi-diameter, into twelve parts, for the Tuscan and Doric, and into eighteen for the other orders.

The *module* of Palladio, Scamozzi, M. Cambray, Desgodetz, Le Clerc, &c. which is also the semi-diameter, is divided into thirty parts, or minutes, in all the orders.

Some divide the whole height of the column into 20 parts for the Doric, 22 $\frac{1}{2}$ for the Ionic, 25 for the Roman, &c. and one of these parts they make a *module*, to regulate the rest of the building by.

There are two ways of determining the measures, or proportions of buildings; the first by a fixed standard measure, which is usually the diameter of the lower part of the column, called a *module*, subdivided into 60 parts, called *minutes*.—In the second there are no minutes, nor any certain and stated division of the *module*; but it is divided occasionally into as many parts as are judged necessary. Thus, the height of the Attic base, which is half the *module*, is divided either into three, to have the height of the plinth; or into four, for that of the greater torus; or into six, for that of the lesser.

Both these manners have been practised by the antient, as well as the modern architects; but the second, which was that chiefly used among the antients, is in my opinion preferable. Perrault.

As Vitruvius, in the Doric order, has lessened his *module*, which in the other orders is the diameter of the lower part of the column; and has reduced that great *module* to a mean one, which is a semi-diameter: M. Perrault reduces the *module* to a third part for the same reason, viz. to determine the several measures without a fraction.—For in the Doric order, beside that the height of the base, as in the other orders, is determined by one of these mean *modules*; the same *module* gives likewise the heights of the capital, architrave, triglyphs, and metopes. But our little *module*, taken from the third of the diameter of the lower part of the column, has uses much more extensive; for, by this the heights of pedestals, of columns, and entablatures, in all the orders, are determined without a fraction.

As then the great *module*, or diameter of the column, has sixty minutes; and the mean *module*, or half the diameter, thirty minutes; our little *module* has twenty. *Id.*

MODUS *decimandi* is when a parcel of land, a sum of money, or a yearly pension, belongs to the parson, either by composition or custom, time out of mind, in satisfaction for tithes in kind.

MOHAIR, a kind of stuff, ordinarily of filk, both woof and warp; having its grain woven very close.

There are two kinds of *mohairs*; the one smooth and plain; the other watered like tabbies: the difference between the two only consists in this, that the latter is calendered, the other not.—There are also *mohairs* both plain, and watered, whole woof is of wool, cotton, or thread.

MOIDORE, **MOEDORE**, or **MOEDA**, a gold coin, struck and current in Portugal.

The *moidore* is properly the Portuguese *pistole*; and is equivalent to two mille-rees.

There are also *deoppo-moedas*, or double *moidores* or *pistoles*, and demi-*pistoles*.

MOIETY, **MEDIETAS**, the half of any thing.

MOINEAU, in fortification, is a flat bastion raised before a curtain when it is too long, and the bastions of the angles too remote to be able to defend one another.

Sometimes the *moineau* is joined to the curtain, and sometimes it is divided from it by a moat.—Here musqueteers are placed, to fire each way.

MOISTURE *radical*. See the article **RADICAL**.

MOLA *, in medicine. See the article **MOLE**.

* The word is Latin, and literally signifies a mill-stone.

MOLA, in anatomy, a bone of the knee, called also *patella*, *rotula*, &c.—See *Tab. Anat. (osteol.) fig. 23. n. 21. 21.*

MOLARES, in anatomy, the *grinders*; an epithet given to the large teeth; as serving, like mill-stones, to grind the food.—See *Tab. Anat. (osteol.) fig. 2. lit. f.*

The number of *molars* is not always the same. Some persons have twenty; and others only sixteen, *viz.* four or five on each side of either jaw.—They are very large, hard, and strong; being flattened into their alveoli or sockets by several roots.

MOLASSES. See the article **MOLASSES**.

MOLD. See the article **MOULD**.

MOLDED column. See the article **COLUMN**.

MOLE *, **MOLA**, or **MOLA carnea**, in medicine, a mis-shapen mass of hard flesh, sometimes generated in the wombs of women, instead of a fetus; called also a *fusle conception*.

* The Latins give it the name *mola*, which literally signifies mill-stone, from its resemblance thereto in form.

The *mole* is the chaos of an embryo; and would have grown to an infant, had not the process of conception been disturbed. Though it be without regular bones, viscera, &c. yet the lineaments frequently are not so far effaced, but that there are some remains of a child; sometimes an hand, and sometimes a foot, have been seen; and commonly the fecundities.

It is rare that more than one *mole* is excluded at a time; though Sennertus observes there are instances of two, three, or even more. He adds, that though they usually come alone, yet they have been known to come with a fetus, sometimes before it, and sometimes after it.

The *mole* is distinguished from an *embryo*, in that it has no placenta whereby to receive its nourishment from the mother. Instead of that, it grows immediately to the womb; and is nourished thence.

It has a kind of vegetative life, and continues growing in bulk till the time of exclusion. Sometimes it has been borne in the womb for two or three years.

This production is supposed to arise from some defect or indispotion of the ovum, or egg; or, perhaps, from the male's seed wanting force to penetrate it sufficiently in order to open or expand the parts: or, the effect may be accounted for, by supposing an ovum to drop into the womb, without being impregnated by the seed of the male: in all which cases, the egg continuing to grow, and yet wanting something necessary to organize and form it into an embryo, becomes a shapeless lump.

Authors are divided whether or no women ever bring forth *mole*s without any intercourse with men? Some say there are *mole*s which derive their origin from the menstruous blood detained, coagulated, and hardened; through which the blood and spirits have made themselves passages, &c.

The *mole*, while in the womb, may be distinguished from a true conception, by its tremulous palpitating motion; by its rolling from side to side; and by the belly's swelling equally every way. The breasts swell as in case of a just embryo; but the humour generated therein is not true milk, but a crude matter, formed of the suppressed menfes.

To bring the *mola* out of the womb, bleeding and violent purging are used, and at last strong emmenagogues. If these fail, recourse is to be had to manual operation. See Supplement, article **MOLA**.

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MOLE, **MOLES**, a massive work formed of large stones laid in the sea by means of coffer-dams, extended either in a right line, or an arch of a circle, before a port; which it serves to close; to defend the vessels in it from the impetuosity of the waves, and to prevent the passage of ships without leave.

Thus we say the *mole* of the harbour of Messina, &c.

MOLE is sometimes also used to signify the harbour itself.

MOLE, **MOLES**, among the Romans, was also used for a kind of mausoleum, built in manner of a round tower on a square base, insulate, incompassed with columns, and covered with a dome.

The *mole* of the emperor Adrian, now the castle of St. Angelo, was the greatest, and most stately, of all the *mole*s. It was crowned with a brazen pine-apple, wherein was a golden urn containing the ashes of the emperor.

MOLECULE, **MOLECULA**, in physics, a little mass or portion of any body.

The air, by respiration, insinuating itself into the veins and arteries, endeavours by its elastic power to divide and break the *molecules* of the blood, which on their side resist such division.

MOLESTANDO. See the article **Non-molestando**.

MOLINE, in heraldry. A *Cross-MOLINE* is that which turns round both ways at all its extremities, though not so wide or sharp as that said to be *anchored*.

In Upton, the points are all cut off, which makes it very different from the cross anchored.

MOLINISTS, a sect in the Romish church, who follow the doctrine and sentiments of the Jesuit Molina, relating to sufficient and efficacious grace.

Their great antagonists are the Jansenists.

MOLINOSISTS, a sect among the Romanists, who adhere to the doctrine of Molinos.—They are the same with what are otherwise called *Quietists*.

MOLLET. See the article **MULLET**.

MOLLIS *partis*. See the article **POTTO**.

MOLMUTIN, or **MOLMUTIAN** *law*, the laws of Dunwallo Molmutius, XVIth king of the Britons, who is said to have begun his reign 440 years before the incarnation.

He was the first who published any laws in this land; and they continued famous therein till the time of William the Conqueror.

MOLOSSES, **MOLASSES**, or **MELASSES**, that gross, yet fluid matter remaining of sugar, after refining, and which no boiling will bring to a consistence more solid than that of syrup; hence also called *syrup of sugar*.

Properly, *mosses* are only the sediment of one kind of sugar called *chypre*, or brown sugar, which is the refuse of other sugars not to be whitened, or reduced into loaves.

Mosses are much used in Holland among poor people, for the preparation of tobacco, and also instead of sugar.

There is also a kind of brandy or spirit made of *mosses*; but by some erroneously held exceedingly unwholesome. See Supplement, article **MOLASSES**.

MOLOSSUS, in the Greek and Latin poetry, a foot consisting of three long syllables.—As *audari, cantant, virtutum*.

It takes its name either from a dance in use among the people called *Molossi*, or *Epirotæ*; or from the temple of Jupiter *Molossus*, where odes were sung, in which this foot had a great share; or else because the march of the *Molossi* when they went to the combat, was composed of these feet, or had the cadence thereof.—The same foot was also called among the antients, *Vertumnus, extensipes, hippius, & canius*. Dion. 3. p. 475.

MOLTA, or **MOLTURA**, a duty or toll paid by vassals to the lord for grinding their corn at his mill.

MOLTING, or **MOULTING**, the falling off or change of hair, feathers, skin, horns, or other parts of animals, happening in some annually, in others only at certain stages of their life.

The generality of beasts *molt* in the spring.

The *molting* of a hawk is called *mewing*.

The *molting* of a deer is the quitting of his horns in February or March.

The *molting* of a serpent is the putting off his skin. See **EXUVIÆ**.

MOLUTA *arma*. See the article **ARMA**.

MOMENT, in time, the most minute and indivisible part of duration; or what we otherwise call an *instant*.

MOMENTS, in the new doctrine of infinites, denote the infinitely small parts of quantity.

Moments are the same with what we otherwise call *infinitesimals*, and *differences*; being the *momentary* increments or decrements of quantity, considered as in a continual flux.

Moments are the generative principles of magnitude: they have no determined magnitude of their own; but are only inceptive thereof.

Hence, as it is the same thing, if, in lieu of these *moments*, the velocities of their increases and decreases be made use of, or the

the finite quantities proportionable to such velocities; the method of proceeding, which considers the motions, changes, or fluxions of quantities, is denominated by Sir Is. Newton the method of fluxions.

Leibnitz, and most foreigners, considering these infinitely small parts, or infinitesimals, as the difference of two quantities; and thereby endeavouring to find the differences of quantities, *i. e.* some moments, or quantities infinitely small, which being taken an infinite number of times, shall equal given quantities; call these moments, *differences*; and the method of procedure, the *differential calculus*. See *CALCULUS differentialis*.

MOMENT, MOMENTUM, in mechanics, is the same with *impetus*; or the quantity of motion in a moving body.

MOMENTUM is sometimes also used simply for the motion itself. *Moment* is frequently defined by the *vis insita*, or the power by which moving bodies continually change place.

In comparing the motions of bodies, the ratio of their *momenta* is always compounded of the quantity of matter, and the celerity of the moving body; so that the *moment* of any such body may be considered as a rectangle under the quantity of matter, and the celerity.

And since it is certain, that all equal rectangles have their sides reciprocally proportionable; therefore if the *moments* of any moving bodies be equal, the quantity of matter in one to that of the other will be reciprocally as the celerity of the latter to the celerity of the former; and, on the contrary, if the quantities of matter be reciprocally proportionable to the celerities, the *moments*, or quantities in each, will be equal.

The *moment* also of any moving body may be considered as the aggregate or sum of all the *moments* of the parts of that body; and therefore where the magnitudes and number of particles are the same, and where they are moved with the same celerity, there will be the same *moments* of the wholes.

MOMENTARY motion. See the article *QUANTITY*.

MONARCHY *, *MONAPXIA*, a large state governed by one; or a state where the supreme power is lodged in the hands of a single person.

* The word comes from the Greek *μοναρχος*, one who governs alone; for *monos* *solus*, and *arche* *imperium*, government.

The most ancient monarchy was that of the Assyrians, which was founded soon after the deluge.—We usually reckon four grand, or universal monarchies, the Assyrian, Persian, Grecian, and Roman: though St. Augustin makes them but two, *viz.* those of Babylon and Rome.—There seems in reality no necessity to make the Medes, Persians, and Greeks, succeed to the whole power of the Assyrians, to multiply the number of the *monarchies*; it was the same empire still, and the several changes that happened in it, did not constitute different *monarchies*. Thus the Roman empire was successively governed by powers of different nations, yet without any new monarchy being formed thereby. Rome therefore may be said to have immediately succeeded Babylon in the empire of the world. See *EMPIRE*.

Of *monarchies* some are *absolute* and *despotic*, where the will of the monarch is uncontrollable; as Denmark, &c. others are *limited*, where the prince's authority is restrained by laws, and part of the supreme power lodged in other hands; as in England.

Some *monarchies* again are *hereditary*, where the succession devolves immediately from father to son; and others are *elective*, where, on the death of the *monarch*, his successor is appointed by election; as in Poland.

According to Hobbes, *monarchy*, as well as aristocracy, derives all its authority from the people, who transfer all their rights, *gr. ex.* the supreme power, by a plurality of suffrages, &c. to some one person called a *monarch*; so that whatever the people could have done before this translation, may be now rightfully done by him, to whom the translation is made.—This done, the people are no longer to be looked upon as a body, but a dissolved multitude; in regard they were only one by virtue of the supreme power, which they have now transferred to another.

Nor can the *monarch*, according to this author, oblige himself by any covenants, to any person, for the authority he has received; in regard he receives the power from the people, which, as soon as that is done, ceases to be a body; and the body ceasing, the obligation to the body ceases of course.—The people therefore are obliged to pay obedience to the *monarch*, by virtue of those covenants, whereby they mutually oblige themselves to what the people, as a body, enjoins to be done.

He argues further, that as a *monarch* cannot be obliged by any covenants; so neither can he do any injury to his subjects; an injury being nothing else but a breach of covenant; and where there is no covenant, there can be no breach of one.

De cive, cap. 8.

MONASTERY provisor. See the article *PROVISOR*.

MONASTERY, a convent, or house built for the reception of religious; whether it be abbey, priory, nunnery, or the like. See *ABBEY*, *PRIORY*, &c.

MONASTERY is only properly applied to the houses of monks,

mendicant friars, and nuns. The rest are more properly called *religious houses*.

MONASTIC, something belonging to monks, or the monkish life.

The *monastic* profession is a kind of civil death, which in all worldly matters has the same effect with the natural death. The council of Trent, &c. fix sixteen years for the age at which a person may be admitted into the *monastic* life.

St. Antony is the person who in the fourth century first instituted the *monastic* life; as St. Pachomius, in the same century, is said to have first set on foot the cenobitic life, *i. e.* regular communities of religious.

In a short time, the deserts of Egypt became inhabited with a set of solitaries, who took upon them the *monastic* profession. See *ANACHORET*, *HERMIT*, &c.—St. Basil earned the monkish humour into the east, where he composed a rule, which afterwards obtained through a great part of the west.

In the eleventh century, the *monastic* discipline was grown very remiss: St. Odo first began to retrieve it in the monastery of Cluny: that monastery, by the conditions of its erection, was put under the immediate protection of the holy see; with a prohibition to all powers, both secular and ecclesiastical, to disturb the monks in the possession of their effects, or the election of their abbot. In virtue hereof, they pleaded an exemption from the jurisdiction of the bishop; and extended this privilege to all the houses dependent on Cluny. This made the first congregation of several houses under one chief immediately subject to the pope, so as to constitute one body, or, as they now call it, one *religious order*. Till then, each monastery was independent, and subject to the bishop.

MOND. See the article *MOOND*.

MONDAY.—*Plough Monday*. See the article *PLOUGH*.

MONETÆ per. See the article *PEN*.

MONETAGIUM, *MOKEATAGE*, or *MINTAGE*, the right or privilege of coining money.

MONETALES triumphi. See the article *TRIUMPHI*.

MONETARIUS, or *MONEYER*, a name which antiquaries and medallists give to those who struck the ancient coins, or money.

Many of the old Roman, &c. coins, have the name of the *monetarius*, either written at length, or at least the initial letters of it.

MONEY, or *MONY*, *MONETA*, a piece of metal marked for coin, with the arms of a prince, or state, who make it circulate or pass, at a fixed rate, for things of different value; to facilitate the business of commerce.

Paulus the lawyer defines *money* a thing stamped with a public coin, and deriving its use and value from its impression rather than its substance.

Monf. Boizard defines *money* a piece of matter to which public authority has affixed a certain value and weight, to serve as a medium in commerce.

The era of the invention of *money* is not easy to be settled. There is no room to doubt but that in the earliest ages, the ordinary way of traffick among men was by trucking or exchanging commodities for commodities. Thus, a Horse, Glaucius's armour was valued at one hundred oxen; and Diomedes's armour at ten.

But in such a time it was found necessary, in the way of commutative justice, to have some common measure or standard, according to which all other things should be estimated. This, as some gather from Josephus, was first invented by Cain; though the first tidings we hear of it, is in the time of Abraham, who paid four hundred shekels for a burying-place.

The Greeks refer the invention of *money* to Hermodice, wife of king Midas; and the Latins to Janus.—*Money* being a common measure for reducing wares to a balance, it was coined by the Greeks *nomisma*; not from king Numa; but from *nomos*, as being established by law. By the Latins it was called *pecunia*; either because the wealth of those days consisted in their cattle; or, as Pliny will have it, because their first coin was stamped with the figure of a cow. They also call it *moneta*, a *monendo*, as Suidas observes, because when the Romans were in want of *money*, Juno admonished them to use justice, and there should be no want of *money*. The effect whereof when they had found, she was furnished *Junio Moneta*, and *money* was coined in her temple. In process of time, *Money* herself was made a goddess, and enshrined by the name of *dea Pecunia*, under the figure of a woman holding a balance in one hand, and a cornucopia in the other.

On the foot *money* now stands, it may be divided into *real*, or *effective*; and *imaginary*.

Real MONEY includes all coins, or species of gold, silver, copper, and the like; which have course in commerce, and do really exist.—Such are *guineas*, *crowns*, *pieces of eight*, *duellats*, &c. Which see under their proper heads; as also under *COIN*.

Real money, civilians observe, has three essential qualities, *viz.* *matter*, *form*, and *weight* or *value*.—For *matter*, copper is that thought to have been first coined; afterwards silver; and, lastly, gold, as being the most beautiful, scarce, cleanly, divisible, and pure of all metals.

The degrees of goodness are expressed in gold by carats; and in silver by penny-weights, &c. For there are several reasons for not refining them pure and without alloy, viz. the great loss and expense in refining them, the necessity of hardening them to make them more durable, and the scarcity of gold and silver in many countries.

Among the ancient Britons, iron rings, or, as some say, iron plates, were used for money. Among the Lacedæmonians iron bars quenched with vinegar, intended that they might not serve for any other use. Seneca observes, that there was antiently stamped money of leather, *corium forma publica impressum*. And the same thing was put in practice by Frederic II. at the siege of Milan; to say nothing of an old tradition among ourselves, that, in the confused times of the barons wars, the like was done in England: The Hollanders, we know, coined great quantities of pasteboard in the year 1574. Numa Pompilius made money of wood and leather. Nor does it appear that the Romans were much acquainted with the art of striking money in metal during the time of their kings. The first silver money they coined was in the year of Rome 484; and their first gold money in 546.

As to the *forma* of money, it has been more various than the matter.—Under this are comprehended the weight, figure, impression, and value.

For the *impression*, the Jews, though they detested images, yet stamped on the one side their shekel, the golden pot which had the manna; and on the other, Aaron's rod. The Dardans, two cocks fighting. Alexander, as is held by some, his horse Bucephalus: Though this may be doubted of, in regard the horse is found as frequently on the coins of several of the kings of Macedonia, his predecessors, as on his: The Athenians stamped their coins with an owl, or an ox; whence the proverb attributed lawyers, *los in lingua*. The People of Aegina, with a tortoise; whence that other saying, *virtutem & sapientiam vinct testitudine*. For the Romans, the monetarii sometimes impressed the images of men that had been eminent in their families on their coins: But no living man's head was ever stamped on a Roman coin till after the fall of the commonwealth. After that time they bore the Emperor's head on one side. And from this time the practice of stamping the prince's image on coins, has obtained among all civilized nations; the Turks and other Mahometans excepted, who, in defecation of images, inscribe only the prince's name, with the year of the transmigration of their prophet.

As to the *figure*, it is either round, as in England; multangular or irregular, as in Spain; square, as in some parts of the Indies; or nearly globular, as in most of the rest.

After the arrival of the Romans in this island, the Britons imitated them, coining both gold and silver with the images of their kings stamped on them. When the Romans had subdued the kings of the Britons, they also suppressed their coins, and brought in their own; which were current here from the time of Claudius to that of Valentinian the younger, this being about the space of five hundred years.

Mr. Camden observes, that the most antient English coin he had known was that of Ethelbert king of Kent, the first Christian king in the island; in whose time all money accounts began to pass by the names of *pounds, shillings, pence, and mancusæ*.

The penny seems borrowed from the Latin *pecunia*, or rather from *pends*, on account of its just weight, which was about three pence of our money. These were coarsely stamped with the king's image on the one side, and either the mint-master's name, or the city's where it was coined, on the other. Five of these pence made their fillings, probably so called from *fillingus*, which the Romans used for the fourth part of an ounce. Forty of these fillings made their pound, and four hundred of these pounds were a legacv, or a portion for a king's daughter; as appears by the last will of king Alfred.

By these names they translated all sums of money in their old English testament; talents by *pounds*; Judas's thirty pieces of silver by *thirty fillings*; tribute-money, by *penning*; and the rate by *filling*.

But it must be observed, they had no other real money, but pence only; the rest being imaginary *monies*, i. e. names of numbers, or weights. Thirty of these pence made a mancus, which some take to be the same with a mark; mancus, as appears by an old MS. was *quinta pars markæ*.

These mancus or mancusæ, were reckoned both in gold and silver. For in the year 680. we read, that Ina king of the West Saxons obliged the Kentishmen to buy their peace at the price of thirty thousand mancusæ of gold. In the notes on king Canute's laws, we find this distinction, that *mancusæ* was as much as a mark of silver; and *manca* a square piece of gold, valued at thirty pence.

The Danes introduced a way of reckoning money by *ores*, *per oras*, mentioned in *Jones-day book*; but whether they were a several coin, or a certain sum, does not plainly appear. This, however, may be gathered from the abby-book of Burton, that twenty *oras* were equivalent to two marks.

They had also a gold coin called *bizantine*, or *bezant*, as being coined at Constantinople, then called *Bizantium*. The

value of which coin is not only now lost, but was so intirely forgotten even in the time of king Edward the third, that whereas the bishop of Norwich was fined a bizantine of gold, to be paid the abbot of St. Edmond's Bury, for infringing his liberties (as it had been enacted by parliament, in the time of the conqueror), no man then living could tell how much it was; so that it was referred to the king to rate how much he should pay. Which is the more unaccountable, because but an hundred years before, two hundred thousand bezants were exacted by the foldan for the ransom of St. Lewis of France; which were then valued at one hundred thousand livres.

Though the coining of money be a special prerogative of the king, yet the antient Saxon princes communicated it to their subjects; inasmuch that in every good town there was at least one mint, but at London eight; at Canterbury four for the king, two for the archbishop, one for the abbot of Winchester, six at Rochester, at Hastings two, &c.

The Norman kings continued the same custom of coining only pence, with the prince's image on one side, and on the other the name of the city where it was coined, with a cross so deeply impressed, that it might be easily parted, and broken into two halves, which so broken, they called half-pence; or into four parts, which they called *farthings*, or *farthings*. See *FARTHING*.

In the time of K. Richard the first, money coined in the east parts of Germany, came in special request in England, on account of its purity, and was called *eastling money*, as all the inhabitants of those parts were called *Eastlings*. And shortly after, some of those people, skilled in coining, were sent for thither, to bring the coin to perfection; which ever since has been called *sterling* for *Eastling*.

King Edward the first, who first adjusted the measure of an ell by the length of his arm, here imitating Charles the Great, was the first also who established a certain standard for the coin, which is expressed to this effect by Greg. Rockley, mayor of London, and mint-master.—‘A pound of money containeth twelve ounces: In a pound there ought to be eleven ounces, two eastlings, and one farthing; the rest alloy. The said pound ought to weigh twenty shillings and three pence in account and weight. The ounce ought to weigh twenty pence, and a penny twenty-four grains and a half.—Note, that eleven ounces two pence sterling ought to be of pure silver, called *half-silver*, and the minter must add of other weight seventeen pence half penny farthing, if the silver be so pure.’

About the year 1320, the states of Europe first began to coin gold, and among the rest, our king Edward III. The first pieces he coined were called *Florentines*, as being coined by Florentines; afterwards he coined nobles; then rose-nobles, current at six shillings and eight pence; half-nobles, called *half-pennies*, at three shillings and four pence of gold; and quarters at twenty pence, called *farthings of gold*. The succeeding kings coined rose-nobles, and double rose-nobles, great sovereigns, and half Henry nobles, angels, and shillings.

King James the first coined unices, double crowns, Britain crowns: Then crowns, half crowns, &c.

False, or *base* MONEY, is either that struck by an unqualified person, and of unfutatable metals; or that which has lost of its weight, either by being clipped on the corners, or filed on the edges, or lastly, by having some of its surface eaten off; if gold, by aqua regalis; if silver, by aqua fortis.

Another kind of *base money* is that made of pieces of iron, copper, or other metal, covered on each side with a thin plate or leaf of gold or silver, neatly soldered and joined around the edges, and struck, like other coin, with figures, legends, &c. only to be distinguished from them by the bulk, and weight, and sound.

Imaginary MONEY, or *MONEY of account*, is that which never existed, or at least which does not exist in real species, but is a denomination invented or retained to facilitate the stating of accounts, by keeping them still on a fixed footing, not to be changed, like current coins, which the authority of the sovereign sometimes raises or lowers, according to the exigencies of state.—Of which kinds are *pounds, livres, marks, maravedies*, &c.

Money of account, according to M. Boizard, is a sum of money, or a certain number of species which may change in substance and quantity, but never in quality.—Thus fifty pounds consists of fifty pieces called *pounds*, which are not real, but may be paid in several real species, as in guineas, crowns, shillings, &c. which are changeable, as guineas, *v. gr.* which are sometimes higher, sometimes lower.

MONIES of account, or manners of reckoning MONEY in Europe and Asia.—We here confine ourselves to the *monies* of those two parts of the world: America having none; the respective *monies* of account of the Europeans, who have there made settlements, being established with them. As to Africa, the cities of Barbary and Egypt, whither the Europeans traffick, reckon much after the same manner as in the Levant, and in the dominions of the grand signior: For the rest, throughout that vast extent of coast, where we trade for negroes, gold-dust, elephants teeth, wax, leathers, &c. either the miserable inhabitants do not know what *money* of account is, or if they have any, it is only what strangers, settled among them

them, have introduced.— The *macoute*, however, and the *piece*, which are manners of accounting among these Barbarians, will be mentioned in their place. See *PIECE*.

English MONEY of account, is the pound, shilling, and penny, sterling: The pound containing twenty shillings, and the shilling twelve pence.

French MONEY of account, was antiently the *parisis*, *tournois*, and the *ecu*, or crown: but since the ordonnance of 1667, they only reckon by *livres*, *i. e.* pounds; *sols*, *i. e.* shillings; and *deniers* *tournois*, *i. e.* pence. The *livre*, 20 *sols*, or $\frac{1}{2}$ of the *ecu*, or crown; the *sol*, 12 *deniers*.

The *maille*, *ohole*, or half-penny *tournois*, is also now a *money of account*, though antiently a real coin. The *maille* is divided into two *pires*, and each *pire* into two *semi-pires*; all *moneys of account*. To which must be added the *frank*, of the same value with the *livre*, *viz.* 20 *sols* *tournois*; and the *blanc*, 5 *deniers* *tournois*; and the *carolus*, ten: All three antiently real coins.

Dutch and Flemish MONIES of account. In Holland, Zealand, Brabant, and Cologne, they use the *pundt*, or *livre de gros*; *schellings*, or *sol de gros*; and *pennings*, or *deniers* *gros*. The *pundt*, containing 20 *schellings*; and the *schelling*, 12 *pennings*. The *pundt* equal to 7 *livres*, 4 *sols* French, or 10 shillings $\frac{1}{2}$ sterling. They also account by *florins* or *guldens*, *patards* and *pennings*. The *florin* is equal to $\frac{1}{2}$ of the *pound*, or 20 *patards*; and the *patard*, 12 *pennings*. The merchants use each method of accounting indifferently.

Spanish MONEY of account, is the *peso*, *ducat* of silver and vellon, *rial* of vellon, and *cornados* and *maravedis* of silver and vellon. The *peso* is to the *ducat* as 12 to 10. The *ducat* of silver contains 11 *rials* of silver; and that of vellon, 11 *rials* of vellon; which makes a difference of near one half. The silver *rial* being current for 7 shillings sterling, and that of vellon only at 3; 8 *d.* sterling. 34 *maravedis* make the *rial* of vellon, and 63 that of silver. The *maravedi* is divided into 4 *cornados*.

German and Swiss MONEY of account. In Switzerland, and many of the chief cities of Germany, particularly *Frankfort*, they account by *florins* (but on a footing different from that of Holland), by *creux's* or *creutzers*, and *pennings*. The *florin* is equal to 3 shillings sterling, and is divided into 60 *creux* or *kreutz*, and the *creux* into 8 *pennings*. In others, as *Nuremberg*, &c. they account by *rix-dollars*, *florins*, and *creux*. The *rix-dollar* equal to 4 *s.* 8 *d.* sterling, divided into 100 *creux*, and the *creux* into 8 *pennings*. In others, as *Hambourg*, *Berlin*, &c. by *rix-dollars*, *marks* *lubs*, *schellings* *lubs*, and *deniers* *lubs*. The *rix-dollar* and *dollar* on the foot of the French crown, or 4; 6 sterling, divided into 3 *marks*, and the *mark* into 16 *schellings*, and the *schelling* into 12 *pennings*. At *Hamburgh* they also use the *livre*, *schellings*, and *denier de gros*. At *Ausbourg* and *Bolzamont*, they account by *dollars* and *creux's*; the *dollar* equal to 4; 6 sterling, divided into 90 *creux's*. At *Nambourg*, by *rix-dollars* *gros* and *fenins*; the *rix-dollar* equal to 4; 6 sterling, divided into 36 *gros*, and the *gros* into 12 *fenins*. At *Strasbourg* by *florins*, *creux*, and *pennings*. The *florin* equal to 1 *s.* 6 *d.* sterling, divided into 60 *creux*, and the *creux* into 8 *pennings*.

Italian MONIES of account. In Italy, the *moneys of account* are as various, almost as the cities of commerce. At *Rome*, they account by *pounds*, *shillings*, and *pence* of gold *di stampa*. At *Venice*, by *ducats*, and *grofs di banco*. The *ducat* divided into 24 *grofs*, each *grofs* equal to 2 pence $\frac{1}{2}$ sterling. And by *ducats* *currant*, called also *sequins*, equal to 9 *s.* 2 *d.* sterling; and by *pounds*, *shillings*, and *pence*. At *Lucca* and *Bergamo*, they use the four last; and only the three last at *Bologna*, *Mantua*, and *Savoy*: In *Geneva*, besides *pounds*, *shillings*, and *pence*, they account also by *florins*, containing 6 *foldis*, or 6 pence $\frac{1}{2}$ sterling. At *Leghorn* and *Genoa*, besides *pounds*, *shillings*, and *pence*, they account by *piasters*, equal to 4 *s.* 6 *d.* sterling. At *Nova*, their *moneys of account* are *crowns*, *shillings*, and *pence* of gold *di marc*. At *Raconis*, *pounds*, *florins*, and *grofs*. At *Ancona*, *crowns*, *shillings*, and *pence*. At *Naples*, *ducats*, *grains*, and *tarins*, equal to one shilling sterling, and divided into 20 *grains*.

Sicilian and Maltese MONIES of account. At *Messina*, *Palermo*, and throughout *Sicily*, they account by *pounds*, *ounces*, *tarins*, *grains* and *piccoli's*; which are summed by 30, 20, and 6: the ounce being 30 *tarins*, the *tarin* 20 *grains*, and the *grain* 6 *piccoli's*. At *Malta*, they account by *pounds*, *ounces*, *carlins* and *grains*. The ounce 30 *tarins*, or 60 *carlins*, or 600 *grains*; the *carlin* equal to 6 *d.* $\frac{1}{4}$ sterling.

Polish MONIES of account. Throughout *Poland*, most of the dominions of the king of *Prussia*, and *Dantzic*, they account by *rix-dollars*, *roups*, and *grochs*. The *rix-dollar* equal to 4 *s.* 6 *d.* sterling, and divided into 32 *roups*; and again, in the *Prussian* territories, into 24 *grochs*: In *Poland*, into 90 *grochs*. Sometimes they use the *florin*, *groch*, and *penny*.

Swedish, Danish, and Muscovite MONIES of account. In *Sweden*, they account by *dalles*, equal to 32 *sols* *lubs*, or 3 shillings sterling. In *Denmark*, by *rix-dollars*, and *flivers*; the *rix-dollar* divided into 48 *flivers*.

In *Muscovy*, they account by *roobles*, *atkins*, and *grifs* or *grives*.

The *rooble* equal to 100 *copecs*, or 2 *rix-dollars*, or 9 shillings sterling; divided into 10 *grifs*; 3 *atkins*; make the *grif*, or 10 *copecs*; the *copec* at 13 pence $\frac{1}{2}$ sterling.

Turkish MONIES of account. The *Turks*, both in *Europe*, *Asia*, and *Africa*, account by *purfes*, either of silver or gold (the last only used in the *seraglio*), with half-purfes of gold, called also *riset*. The *purfe* of silver equal to 1500 French *livres*, or 112 *l.* 10 *s.* sterling. The half-purfe in proportion. The *purfe* of gold 15000 *sequins*, equal to 30000 French *crowns*, or 6750 *pounds* sterling; this is seldom used but for presents to favourites: So that a *purfe*, simply, signifies a *purfe* of silver, or 1500 *livres*. They are called *purfes*, because all the *money* in the treasury of the *seraglio* is kept in leather bags or *purfes*, of those contents. The merchants also use *Dutch* *dallars*, called *astani* or *abouquels*, with *meidens* and *apres*. The *dallar* is equal to 35 *meidens*, and the *meiden* to 3 *apres*; the *apre* to $\frac{1}{2}$ penny sterling.

Persian MONIES of account. In *Persia*, they account by the *toman* (called also *man*, and *tumein*) and the *dinar-outi*. The *toman* is composed of 50 *abassis*, or a hundred *mamodies*, or 200 *chapes*, or 10000 *dinars*; which accounting the *abassi* on the foot of eighteen French *sols*, or the *dinar* on that of a *denier*, amounts to 3 *l.* 12 *s.* 6 *d.* sterling the *toman*. They also account by *larins*, especially at *Ormus*, and on the coasts of the *Persian gulph*. The *larin* is equivalent to 11 pence sterling; and on that footing is used also in *Arabia*, and a great part of the *East-Indies*.

Chinese MONIES of account are the *pic*, *picol*, and *tael*; which, though in effect weights, do likewise serve as *moneys of account*; obtaining in *Touquin* as well as *China*. The *pic* is divided into 100 *catis*, some say 125. The *cati* into 16 *taels*; each *tael* equal to 1 ounce 2 *drachms*. The *picol* contains 66 *catis* $\frac{1}{2}$; the *tael* is equivalent to 6 *s.* 8 *d.* sterling.

Japanese MONIES of account, are the *schuites*, *cockiens*, *oebans* or *oubans*, and *taels*. Two hundred *schuites* are equal to 500 *Dutch* *pounds*; the *cockien* equal to 10 *Low-country* *pounds*; 1000 *oebans* make 450 *sols*.

Mogul MONIES of account. At *Surat*, *Agra*, and the rest of the *elates* of the *Great Mogul*, they use *lares*, *acres*, or *leeths*; implying a hundred thousand: Thus a *lare* or *rupees* is an hundred thousand *rupees*; the *lare* being nearly on the footing of the *tun* of gold in *Holland*, and the *million* of *France*.

MONIES of account of other islands and coasts of India. Throughout *Malabar*, and at *Goa*, they use *tangas*, *vintins*, and *pardos* *xeraphin*. The *tanga* is of two kinds, *viz.* of good, and bad alloy. Hence their custom is to count by good or bad *money*. The *tanga* of good alloy is $\frac{1}{2}$ better than the bad; so that 4 *tangas* good being allowed the *pardos* *xeraphin*, there will be required $\frac{1}{2}$ of the bad; 4 *vintins* good make a *tanga* likewise good; 15 *barucos* a *vintin*. The good *baruco* is equal to a *Portuguese* *ree*, a French *denier*, or $\frac{1}{4}$ of a penny sterling. In the island of *Java*, they use the *fant*, *spacou*, *fardos*, and *catis*; which last *money*, together with the *leeth*, or *lare*, is much used throughout all the *East-Indies*. The *fant* is two hundred *caxas*, or little pieces of that country hung on a string; and is equal to $\frac{1}{2}$ of a penny sterling. Five *fantas* make the *spacou*. The *fardos* equal to 2 *s.* 8 *d.* sterling. The *cati* contains 20 *taels*; the *tael* 6 *s.* 8 *d.* sterling.

There are islands, cities, and states of the *East-Indies*, whose *moneys of account* are not here exprest; partly because reducible to some of those above-mentioned; and partly because we find no certain consistent account of them in any of the authors, or memoirs herein consulted.

African MONIES of account. From *Cape Verd*, to the *Cape of Good Hope*, all exchanges and valuations of merchandizes are made on the foot of the *macoute* and *piece*: which though no *moneys of account* (for those *barbarians*, having no real *moneys*, need no imaginary ones to estimate them by), yet serve in lieu thereof. At *Loango de Boirie*, and other places on the coast of *Angola*, the estimations are made by *macoutes*; and at *Malimbo*, and *Cabindo*, on the same coast, the negroes reckon by *pieces*. Among the first, the *macoute* is equivalent to 10: Ten *macoutes* make 100; which likewise gives us a kind of imaginary *money*. To estimate any purchase, exchange, &c. they fix on the one side the number of *macoutes* required, *e. gr.* for a negro; on the other for how many *macoutes* they agree to receive each kind of merchandize required for the negro: so that there are several bargains made for one. Suppose, *v. gr.* the slave to be fixed at 3500; this amounts to 350 *macoutes*. To make up this number of *macoutes* in merchandizes, they fix the price of each in *macoutes*. Two *Flemish* knives, *e. gr.* are accounted one *macoute*; a copper-bason two *pounds* weight, three; a barrel of gun-powder, three, &c. For the *piece*, it serves in like manner to estimate the value of goods, duties, &c. on either side. Thus the natives require 10 *pieces* for a slave; and the Europeans put, *v. gr.* a fufee at 1 *piece*; a *piece* of *salampours* blue, at 4 *pieces*, &c.

MONIES of account among the antients.—Grecian MONIES of account. The *Grecians* reckoned their sums of *money* by *drachme*, *mine*, and *talenta*. The *drachma* equal to 7 $\frac{1}{2}$ *l.* sterling; 100 *drachmæ* made the *mina*, equal to 3 *l.* 4 *s.* 7 *d.* sterling;

sterling; 60 minæ made the talent, equal to 1937 l. 15 s. sterling: Hence 100 talents amounted to 19375 l. sterling. The mina and talentum, indeed, were different in different provinces. Their proportions in Attic drachms are as follow: The Syrian mina contained 25 Attic drachms; the Ptolemaic 33 $\frac{1}{2}$; the Antiochic and Eubœan 100; the Babylonian 116; the greater Attic and Tyrian 133 $\frac{1}{2}$; the Ægean and Rhodian 166 $\frac{2}{3}$.

The Syrian talent contained 15 Attic minæ; the Ptolemaic 20; the Antiochic 60; the Eubœan 60; the Babylonian 70; the greater Attic and Tyrian 80; the Ægean and Rhodian 100.

Roman MONIES of account were the sesterius, and sesterium. The sesterius was equal to 1 d. $\frac{1}{4}$ sterling. One thousand of these made the sesterium equal to 8 l. 1 s. 5 d. 2 q. sterling. One thousand of these sesteria made the decies sesterium (the adverb centies being always understood) equal to 8072 l. 18 s. 4 d. sterling. The decies sesterium they also called *decies centena millia nummorum*. Centies sesterium, or centies HS were equal to 80729 l. 3 s. 4 d. Millies HS to 80729 l. 13 s. 4 d. Millies centies HS to 888020 l. 16 s. 8 d.

CERT-MONEY.	} See the article	CERT-money.
Chimney-MONEY.		CHIMNEY-money.
Post-MONEY.		POLL-money.
Preft-MONEY.		PREST-money.
Prestation-MONEY.		PRESTATION-money.
Salvage-MONEY.		SALVAGE-money.
Ship-MONEY.		SHIP-money.
Trophy-MONEY.		TROPHY-money.

MONIERS, MONEYERS, or MONIERS, officers of the mint, who work and coin gold and silver money; and answer all the waste and charges.

MONIERS is sometimes also used for *bankers*; or those who make a trade of turning and returning money.

MONITORY letters are letters of warning and admonition, sent from an ecclesiastical judge upon information of scandals and abuses within the cognizance of his court.

MONK * antiently denoted a person who retired from the world to give himself up wholly to God, and to live in solitude and abstinence.

* The word is derived from the Latin *monachus*, and that from the Greek *μοναχος*, solitary, of *μονος*, solus, alone; by reason the ancient monks lived in solitude, as the true monks still do.

Such were the Hermits and Anachorets, who withdrew into deserts, and lived remote from all commerce of mankind. See HERMIT and ANACHORET.

Some writers, as father Heloyt, dissent. prelim. trace the original of monks up as early as the time of the Therapeutæ; and maintain, that there had been an uninterrupted succession of monks from the Therapeutæ to St. Anthony. Others, on the contrary, are contented with going back as far as St. Paul the hermit.

The monks, at least the antient ones, were distinguished into *solitaries*, *cenobites*, and *farabaites*.

The *solitary* are those who live alone, in places remote from all towns and habitations of men, as do still some of the hermits.

The *cenobites* are those who live in community with several others in the same house, and under the same superiors. The *farabaites* were treading monks, having no fixed rule or residence.

The houses of monks again were of two kinds, viz. *Monasteries*, and *laureæ*. See MONASTERY, and LAURA.

Those we call monks now-a-days, are cenobites, who live together in a convent or monastery, who make vows of living according to a certain rule established by the founder, and wear a habit which distinguishes their order. See Vow, and RULE.

Those that are endowed, or have a fixed revenue, are most properly called monks, *monachi*; as the Chartreux, Benedictines, Bernardines, &c. — The Mendicants, or those that beg, as the Capuchins, and Franciscans, are more properly called *religious*, and *fratres*; though the names are frequently confounded.

The first monks were those of St. Antony; of St. Basil, called in the east, *calogeri*, from *καλός* *καγας*, good old man; and those of St. Jerom; the hermits of St. Augustine, and afterwards those of St. Benedict and St. Bernard; at length came those of St. Francis, and St. Dominic, with a legion of others; all which see under their proper heads, BENEDICTINES, &c. Monks are distinguished by the colour of their habits into *black*, *white*, *grey*, &c. — Among the monks, some are called *monks of the choir*, others *professed monks*, and others *lay monks*; which last are defined for the service of the convent, and have neither clerical nor literature.

Classified MONKS are those who actually reside in the house: in opposition to *extra-mocho*, who have benefices depending on the monastery.

Monks are also distinguished into *reformed*, whom the civil and ecclesiastical authority have made masters of antient convents, and put in their power to retrieve the antient discipline, which had been relaxed; and *antient*, who remain in the convent,

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to live in it according to its establishment at the time when they made their vows, without obliging themselves to any new reform.

Antiently, the monks were all laymen, and were only distinguished from the rest of the people by a particular habit, and an extraordinary devotion. — Not only the monks were prohibited the priesthood; but even priests were expressly prohibited from becoming monks, as appears from the letters of St. Gregory. Pope Syricius was the first who called them to the clericate, on occasion of some great scarcity of priests, that the church was then supposed to labour under. And since that time, the priesthood has been usually united to the monastical profession.

Professed MONKS. See the article PROFESSED.

Proprietary MONKS. See the article PROPRIETARY.

MONKS-HOOD. See the article ACONITE.

MONKS *rhubarb*. See the article RHUBARB.

MONKS *jeam*, among sailors, is, when the felvelges of sails are laid a little over one another, and sewed on both sides.

MONOCHORD, a musical instrument wherewith to try the variety and proportion of musical sounds.

The *Monochord*, according to Boethius, is an instrument invented by Pythagoras, for measuring geometrically, or by lines, the quantities and proportions of sounds.

The antient *monochord* was composed of a rule divided, and subdivided into divers parts, whereon there was a string pretty well stretched upon two bridges, at each extreme thereof. In the middle between both was a moveable bridge, called *magas*, by means of which, in applying it to the different divisions of the line, the sounds were found to be in the same proportion to one another, as the divisions of the line cut by the bridge were.

The *monochord* is also called the *harmanical canon*, or *canonical rule*; because serving to measure the degrees of gravity, and acuteness of sounds. Ptolemy examines his harmonical intervals by the *monochord*.

There are also *monochords* with divers strings, and a multitude of fixed bridges; but the use of all these may be supplied by one single moveable bridge; by only shifting it under a new chord or string, which is placed in the middle, and represents the intire found, or the open note, answering all the divisions on the other bridges.

When the chord was divided into equal parts, so that the terms were as 1 and 1, they called them *unisons*; if they were as 2 to 1, *octaves*, or *diapasons*; when they were as 8 to 2, *fifths*, or *diapentes*; if they were as 4 to 3, they called them *fourths*, or *diatessarons*; if the terms were as 5 to 4, *diton*, or a greater third; if as 6 to 5, a *semi-diton*, or a lesser third; lastly, if as 24 to 25, *demi-diton* or *disis*.

The *monochord*, being thus divided, was properly what they called a *system*, of which there were many kinds, according to the different divisions of the *monochord*.

Dr. Wallis has taught the division of the *monochord* in the *Philosophical transactions*; but that instrument is now disused, the modern music not requiring such division.

MONOCHORD * is also used for any musical instrument, consisting of only one chord or string. — Such is the trumpet-marine.

* The word in Greek, *μονοχορδης*, formed of *μονος*, solus, single, and *χορδην*, chord.

MONOCHROMA*, MONOΧΡΩΜΑ, a picture all of one colour.

* The word is compounded of the Greek *μονος*, single; and *χρῶμα*, colour.

MONODY*, MONODIA, in the antient poetry, a kind of mournful song, or ditty, sung by a person all alone, to utter his grief.

* The word is compounded *μονος*, solus, and *ὁδῶς*, song.

MONOGAMY*, the state or condition of those who have only married once, or are restrained to a single wife.

* The word is compounded of *μονος*, solus, and *γαμος*, marriage. See POLYGAMY.

MONOGRAM, MONOGRAMMUS, a cypher, or character, composed of one or more letters interwoven; being a kind of abbreviation of a name; antiently much used as a badge, seal, arms, &c.

Under the eastern empire, it is usual to find MIK, which are the monogram of Maria, Jesus, Constantine.

The use of monograms is of an antient standing, as appears from Plutarch, and from some Greek medals of the time of Philip of Macedon, Alexander his son, &c.

The Roman labarum bore the monogram of Jesus Christ, consisting of two letters, a P placed perpendicularly through the middle of a X, *a. gr. R.* as we find it in several medals of the time of Constantine; those being the two first letters of the word ΧΡΙΣΤΟΣ, Christ. See LABARUM.

Kings formerly marked their coins with their monograms: of this we have instances in Charlemain's coins. That prince also used the monogram for his signature. Eginhard gives us this reason for it, viz. that Charlemain could not write; and that, having attempted in vain to learn in his green age, he was reduced to the necessity of signing with a monogram.

The antients also used *monograms* as notes, or abbreviations of inscriptions; for the understanding whereof we have express treatises of Valerius Probus, Sert. Uratus, &c.

MONOLOGUE*, a dramatic scene, wherein a person appears alone on the stage, and speaks to himself. See **SOLILOQUY**.

* The word is formed of the Greek, *μονος*, *solus*; and *λογος*, discourse, speech.

MONOMACHIA*, **MONOMACHIA**, a duel, or single combat of man against man.

* The word comes from the Greek, *μονος*, *solus*; and *μαχη*, combat.

Monomachia was antiently allowed by law, for the trial or proof of crimes. It was even permitted in pecuniary causes, as appears by antient records. It is now forbid both by the civil and canon laws. See **COMBAT**.—Alciat has wrote a treatise *De monomachia*.

MONOMIAL, in algebra, a root or quantity that has but one name; or consists but of one part or member.—Such are *ab*, *anb*, *acabb*. See **QUANTITY**, **BINOMIAL**, **TRINOMIAL**, **ROOT**, &c.

Monomials may be either rational, or irrational. See **RATIONAL**.

MONOPETALOUS, in botany, a term applied to flowers which have only one petalum, or leaf.

MONOPHYSITES*, a general name given to all those sectaries in the Levant, who only own one nature in Jesus Christ.

* The word comes from the Greek, *μονος*, *solus*; and *φύσις*, nature.

The *monophysites*, however, properly so called, are the followers of Severus, and Petrus Fullenias.

MONOPOLY*, **MONOPOLY**, an unlawful kind of traffic, when one or more persons make themselves sole masters of any commodity, trade, manufacture, or the like, with design to enhance its price; those who have occasion for it being obliged to purchase it at their hands, and on their own terms.

* The word is pure Greek, formed of *μονος*, *solus*, and *πωλεω*, *vendo*, q. d. I sell alone.—Among the Romans, the term was so odious, that Tiberius, as Suetonius relates, having occasion to make use of it, begged leave of the senate for it, as being borrowed from the Greeks.

There are two kinds of *monopolies*: the one, when a merchant buys up, for instance, all the corn of a province, to retail it at an advanced rate to the people.

The other, when a letter, or patent, is procured for the prince, prohibiting any other person to sell any commodity besides the patentee.

MONOPTERE, **ΜΟΝΟΠΤΕΡΟΣ**, a kind of temple among the antients, round, and without walls; having its dome supported by columns.

MONOPTOTE, **ΜΟΝΟΠΤΟΤΟΝ**, in grammar, a noun which has only one case: as, *infinitus*.

MONOPYRENEOUS fruits, are such as only contain one kernel, or seed.

MONORHYME*, a poetical composition, all the verses whereof end with the same rhyme.

* The word comes from the Greek, *μονος*, *solus*; and *ῥυθμος*, rhyme.

Monorhymes are said to have been invented by the old French poet Leonin, who addressed some Latin verses of this kind to pope Alexander III. whence they are also called *Leonine verses*.

MONOSTICH, **ΜΟΝΟΤΙΧΟΝ**, an epigram or poetical piece consisting of one single verse.

MONOSYLLABLE, **ΜΟΝΟΣΥΛΛΑΒΟΝ**, a word of a single syllable; or, that consists of one or more letters which are pronounced together.

The French language abounds in *monosyllables* more than any other. This renders it the more perplexing to foreigners, and yet the beauty of the language seems to consist in it. One of the best and smoothest lines in Malherbe consists of twelve *monosyllables*: speaking of Calista, he says,—*Et moi je ne voi rien quand je ne la voi pas*.—In this the genius of the English tongue differs very much from the French, an uninterrupted series of *monosyllables* in the former having always an ill effect. This Mr. Pope both intimates and exemplifies in the same verse.—*And ten low words oft creep in one dull line*.—Pascquier cites an elegy of forty-two verses, consisting wholly of *monosyllables*.

MONOTHELITES*, an antient sect, who sprung out of the Eutychians; thus called, as only allowing of one will in Jesus Christ.

* The word is compounded of the Greek *μονος*, single; and *θελημα*, will, of *θελοω*, *volo*, I will.

The opinion of the *monothelites* had its rise in 630. and had the emperor Heraclius for an adherent: it was the same with that of the Acephalous Severians.

They allowed of two wills in Christ, considered with regard to the two natures; but reduced them to one, by reason of the union of the two natures; thinking it absurd there should be two free wills in one and the same person.

They were condemned by the sixth general council, as being supposed to destroy the perfection of the humanity of Jesus Christ, depriving it of will and operation. That council declared their belief of two wills, and two operations, without division, or without changing the one for the other, without either distinguishing or confounding them; the human will being subject to the divine.

MONOTONIA, **MONOTONY**, a want of variation, or inflection, of the voice; or a fault in pronunciation, where a long series of words are delivered with one unvaried tone.

This is one of the principal faults of our English orators. *Monotonia* is opposed to chanting, or singing in speaking.

MONS LUNE. See **ABDUCTOR**.

MONSEIGNEUR*, in the plural **MESSEIGNEURS**, a title of honour and respect used by the French in writing to persons of superior rank, or quality.

* The word is a compound of *mon*, my, and *seigneur*, lord.

Dukes, peers, archbishops, bishops, and presidents *à la mortier*, are complimented with the title of *monseigneur*. In the petitions presented to the sovereign courts, they use the term *vosseigneurs*.

MONSEIGNEUR, absolutely used, is a title now restrained to the dauphin of France.

This custom was unknown till the time of Louis XIV. till then, the dauphin was styled *monseigneur le dauphin*.

MONSIEUR*, in the plural **MESSEIGNEURS**, a term or title of civility, used by the French, in speaking to their equals, or those a little below them; answering to Mr. or Sir, among the English.

* The word is a compound of *mon*, my, and *seigneur*, Sir.—Borel derives it from the Greek, *μυσις*, lord, or *seigneur*, q. d. *monseigneur*. Pascquier derives *seigneur*, and *monseigneur*, from the Latin *senior*, elder. The Italians say *signor*, and the Spaniards *señor*, in the same sense, and from the same origin.

The superscriptions of all letters begin, *A monseigneur monseigneur*, such a one.

The use of the word *monseigneur* was formerly more extensive than at present: they applied it to people who lived many ages before them. Thus, *monseigneur* St. Augustine, *monseigneur* St. Ambrose; and the vulgar still say, *monseigneur* St. Paul, *monseigneur* St. Jacques, &c. The Romans, during the flourishing times of their liberty, were unacquainted with that term of parade and flattery, which they afterwards made use of in the word *dominus*. In speaking or writing to each other, they only gave each other their proper names; which practice lasted even after Cæsar had brought the republic under his command: but after the Roman emperors were once well seated in the throne, the courtiers and minions, who by flattery sought to procure favours from them, studied new honours. Suetonius observes, that a comedian on the theatre having called Augustus *dominus*, lord; the spectators all stared at him. so that the emperor forbade, for the future, the title to be attributed to him. Caligula was the first who expressly commanded himself to be called *dominus*. Martial, intirely devoted to tyranny, calls Domitian, *dominum deumque nostrum*.—In time, the title was also applied to the people; and of *dominus*, at length, was formed *dom*. See **DOM**.

MONSIEUR, absolutely used, is a title or quality appropriated to the second son of France, or the king's brother.

In a letter of Philip De Valois, that prince, speaking of his predecessor, calls him *monseigneur le roy*, *monseigneur* the king. At present no-body calls the king *monseigneur*, but the children of France. See **SIRE**.

MONSOON, a regular, or periodical wind, in the East-Indies, blowing constantly the same way, during six months of the year, and the contrary way the remaining six.

In the Indian ocean, the winds are partly *general*, and blow all the year round the same way, as in the Ethiopic ocean; and partly *periodical*, i. e. half the year blow one way, and the other half near on the opposite points: and those points and times of shifting differ in different parts of this ocean.—These latter are what we call *monsoons*.

Monsoons, then, are a species of what we otherwise call *trade-winds*.

They take the denomination *monsoon* from an antient pilot, who first crossed the Indian sea by means hereof. Though others derive the name from a Portuguese word signifying *nation*, or change of wind, and sea.

Lucretius and Apollonius make mention of annual winds which arise every year, *estiva flabra*, which seem to be the same with what in the East-Indies we now call *monsoons*.

MONSTER*, **MONSTRUM**, a birth or production of a living thing, degenerating from the proper and usual disposition of parts, in the species it belongs to.—As; when there are too many members, or too few; or some of them are extravagantly out of proportion, either on the side of defect or excess.

* The word comes from the Latin, *monstrum*, of *monstrando*, shewing.—Whence also the box wherein relics were antiently kept to be shewn was called *monstrum*. Dugdale mentions an inventory of the church of York with this article, *Item unum monstrum cum ossibus sancti Petri in Beryl, & crucifixo in summatate*.

Aristotle

Aristotle defines a *monster* to be a defect of nature, when, acting towards some end, it cannot attain to it, by reason some of its principles are corrupted.

Monsters do not propagate their kind; for which reason some rank mules among the number of *monsters*, as also hermaphrodites.

Females, which naturally bring forth twins, are found most liable to produce *monsters*.—The reason, probably, is owing to this; that though the twins are covered with one common chorion, yet they have each their separate amnios, which, by their contiguity, may chance to grow together, and so occasion a confusion or blending of the parts.—Hence so many double creatures.

F. Malebranche accounts for the production of *monsters*, in the animal world, thus.—The Creator has established such a communication between the several parts of his creation, that we are not only naturally led to imitate one another, *i. e.* have a disposition to do the same things, and assume the same manners with those with whom we converse; but we also have certain natural dispositions which incline us to compassion, as well as imitation. These things most men feel, and are sensible of; and, therefore, they need not be proved. The animal spirits then are not only naturally carried into the respective parts of the body to perform the same actions, and the same motions, which we see others do, but also to receive in some manner their wounds, and take part in their sufferings.

Experience tells us, that, when we look attentively on any person severely beaten, or that has a large wound, ulcer, or the like; the spirits immediately flow into those parts of our body which answer to those we see suffer in the other; unless their course be stopped from some other principle. This flux of spirits is very sensible in persons of a delicate constitution, who frequently shudder, and find a kind of trembling in the body, on these occasions; and this sympathy in bodies produces compassion in the mind.

Now, it must be observed, that the view of a wound, &c. wounds the person who views it the more strongly and sensibly, as the person is more weak and delicate; the spirits making a stronger impression on the fibres of a delicate body, than on those of a robust one. Thus strong, vigorous men, &c. see an execution without much concern, while women, &c. are struck with pity and horror. As to children still in their mother's womb, the fibres of their flesh being incomparably finer than those in women, the course of the animal spirits must necessarily produce much greater alterations in them.

These things being laid down, *monsters* are easily accounted for. Suppose, *v. gr.* a child born a fool, and with all its legs and arms broken in the same manner as those of criminals in some countries are; which case we chuse to instance in, because we are told from Paris, that such a *monster* was actually born there, and lived in one of their hospitals twenty years: the cause of this accident, according to the principles laid down, was, that the mother seeing a criminal executed, every stroke given to the poor man struck forcibly the imagination of the woman; and, by a kind of counter-stroke, on the tender and delicate brain of the child. Now though the fibres of the woman's brain were strangely shaken by the violent flux of animal spirits on this occasion; yet they had strength and confidence enough to prevent an intire disorder; whereas the fibres of the child's brain, being unable to bear the shock of those spirits, were quite ruined; and the ravage was great enough to deprive him of reason all his life-time.

Again, the view of the execution frightening the woman, the violent course of the animal spirits was directed forcibly from the brain to all those parts of the body corresponding to the suffering parts of the criminal; and the same thing must also happen in the child. But in regard the bones of the mother were strong enough to resist the impulse of those spirits, they were not damaged; and yet the rapid course of these spirits could easily overpower and break the tender and delicate fibres of the bones of the child; the bones being the last parts of the body that are formed, and having a very tender confidence while the child is yet in the womb.

To which it may be here added, that had the mother determined the course of these spirits towards some other part of her body, by tickling or scratching herself vehemently, the child would not, in all probability, have had its bones broken; but the part answering that, to which the motion of the spirits was determined, would have been the sufferer.

Hence appears the reason why women, in the time of gestation, seeing persons, &c. marked in such a manner in the face, impress the same mark on the same parts of the child; and why, upon rubbing some hidden part of the body, when startled at the sight of any thing, or agitated with any extraordinary passion, the mark or impression is fixed on that hidden part rather than on the face of the child. From the principles here laid down, if the reader is disposed to allow them, may most, if not all, the phenomena of *monsters* be easily accounted for.

Vegetable MONSTERS.—There are also monstrous productions in the vegetable world: such, *e. gr.* are what some botanists call *mules*. See *MULE*.

Flourish also gave the denomination *monsters*, or *monstrous flowers*,

to those flowers which are not only double, but double-podded; or when instead of one flower there are two or three rising one above another from a single stalk.

MONSTRANS *de droit*, a writ issuing out of chancery, for restoring a person to lands or tenements that are his in right, tho' on some occasion found in possession of another lately dead.

MONSTRAVERUNT, a writ which lies for a tenant who holds by free charter in ancient demesne, upon his being distrained for the payment of any service or imposition contrary to the liberty he does, or ought to enjoy.

MONTANISTS, ancient heretics, so called from their leader Montanus, who acted the prophet, and had his propheticities. The *Montanists* are the same with what were otherwise denominated *Phrygians*, *Cataprygians*, and *Quintilians*; which see.

MONTANUM *veru*. See the article *VERU*.

MONTENSES. See *AGONISTICI*.

MONTH, *MENSIS*, the twelfth part of a year.

Time, we have observed, is duration marked out for certain uses, and measured by the motions of the heavenly bodies.

Hence result divers kinds of years, and *months*, according to the particular luminary by whose revolutions they are determined, and the particular purposes they are defined for: as, *solar months*, *lunar months*, *civil months*, *astronomical months*, &c.

Solar MONTH is the space of time wherein the sun moves thro' one intire sign of the ecliptic.

Hence, if regard be had to the sun's true motion, the *solar months* will be unequal; since the sun is longer in passing thro' the winter signs, than thro' those of the summer.

But as he constantly travels through all the twelve in 365 days, 5 hours, and 49 minutes, the quantity of a mean month will be had by dividing that number by 12. On this principle, the quantity of a *solar month* will be found 30 days, 10 hours, 29 minutes, 5 seconds.

Lunar MONTHS are either *synodical*, *periodical*, or *illuminative*.

Lunar synodical MONTH, called also, absolutely, *lunar MONTH*, and *lunation*, is the space of time between two conjunctions of the moon with the sun; or between two new moons. See *SYNOICAL MONTH*, and *LUNATION*.

The quantity of the *synodical month* is 29 days, 12 hours, 44', 3", 11". See *MOON*.

Lunar periodical MONTH is the space of time wherein the moon makes her round through the zodiac; or wherein she returns to the same point.

The quantity of this month is 27 days, 7 hours, 43', 8".

The ancient Romans made use of *lunar months*, and made them alternately of 29 and 30 days; and they marked the days of each month by three terms, *viz.* *calends*, *nones*, and *ides*.

Lunar illuminative MONTH is the space from the first time of her appearance after new moon, to her first appearance after the new moon following.

Hence, as the moon appears sometimes sooner after the new moon, and sometimes later; the quantity of the *illuminative month* is not always the same.—By this month the Turks and Arabs go.

Astronomical, or natural MONTH, is that measured by some exact interval corresponding to the motion of the sun, or moon.

Such are the *lunar* and *solar months* above-mentioned. Where note, That these months can be of no use in civil life, where it is required that the months begin and end on some certain day.

For this reason, recourse is had to another form of months.

Civil, or common MONTH, is an interval of a certain number of whole days, approaching nearly to the quantity of some astronomical, either lunar, or solar month.

Civil months are various, according to the astronomical month they are accommodated to.

Civil lunar MONTHS are to consist alternately of 29 and 30 days.

Thus will two *civil months* be equal to two astronomical ones, abating the odd minutes; and, consequently, the new moon will be hereby kept to the first day of each such *civil month* for a long time together.

However, to make them keep constant pace with the *civil months*, at the end of each 948 months, a month of 29 days must be added; or else every 33d month must consist of 30 days.

This was the month in civil or common use among the Jews, Greeks, and Romans, till the time of Julius Cæsar.

Civil solar MONTHS are to consist alternately of 30 and 31 days, excepting one month of the twelve, which for every fourth year should consist of 30 days, and for the other years of 29.—This form of *civil months* was introduced by Julius Cæsar.

Under Augustus, the sixth month, till then from its place called *sextilis*, was denominated *augustus*, in honour of that prince; and, to make the complimen. yet the greater, a day was added to it: so that it now consisted of 31 days, though till then it had only contained 30; to make up for which, a day was taken from February; so that henceforward it only consisted of 28 days, and every fourth year of 29; though before it had ordinarily consisted of 29 days, &c.—And such are the *civil* or *calendar months* which now obtain through Europe.

Philosophical

Philosophical MONTH, amongst chymists, is the space of 40 days and nights.

Dracontic MONTH. See the article **DRACONTIC**.

Embolismic MONTH. See the article **EMBOISMIC**.

Fence MONTH. See the article **FENCE-month**.

Twelve-month. See the article **TWELVE-month**.

MONTH climates. See the article **CLIMATE**.

MONTHLY courses. See the article **MENSES**.

MONT PAGNOTE, *the post of the invulnerable*, an eminence chosen without the reach of the cannon of a place besieged; where curious persons post themselves to see an attack, and the manner of the siege, without being exposed to danger.

MONUMENT*, in architecture, a building destined to preserve the memory of the person who raised it, or of him for whom it was raised.—Such are, a triumphal arch, a mausoleum, a pyramid, &c.

* The word comes from the Latin *monumentum*, of *monere*, to advise, advertise.

The first monuments, which the antients erected, were the stones which they laid over their tombs, whereon they wrote the names and actions of the deceased.

These stones were distinguished by various names, according as their figures were different. The Greeks gave the name *stelæ*, *stelæ*, to such as were square in their base, and preserved the same depth throughout their whole length; whence were derived our square pilasters, or Attic columns.

They called those *stylæ*, *stylæ*, which being round in their base, ended in a point at top, which gave occasion to the invention of diminished columns.

The name *pyramids* they gave to those which were square at the foot, and terminated in a point at top, in manner of a funeral pile.

And the name *obelisk*, to those whose bases were more in length than in breadth, and which rose, still lessening, to a very great height, resembling the figure of the spits or instruments used by the antients in roasting the flesh of their sacrifices, which they called *obelis*, *obelis*.

The **MONUMENT**, absolutely so called amongst us, denotes a magnificent pillar erected by order of parliament, in memory of the burning of the city of London, anno 1666, in the very place where the fire began.

It is of the Doric order, 202 feet high from the ground, and 15 feet in diameter, of solid Portland stone, with a staircase in the middle of black marble. The pedestal is 21 feet square, and 40 high; the front being enriched with curious bas-reliefs.

MONY. See the article **MONEY**.

MOOD, or **MODE**, in logic, called also *sylogistic* Moon, is a proper disposition of the several propositions of a syllogism, in respect of quantity and quality.

By proper disposition, we mean such wherein the antecedent being true, the consequent, in virtue of the form, cannot be false.—So that all those *moods* or manners of syllogisms are at once excluded, where no conclusion formally follows; or where the antecedent being true, a false conclusion may be drawn from it.

There are two kinds of *moods*; the one *direct*, the other *indirect*.

Direct MOOD is that wherein the conclusion is drawn from the premises directly and immediately.—As, every animal is a living thing; every man is an animal; therefore every man is a living thing.

Indirect MOOD, is that wherein the conclusion is not inferred immediately from the premises, but follows from them by means of a conversion.—As, every animal is a living thing; every man is an animal; therefore some living thing is a man.

There are fourteen direct *moods*; whereof four belong to the first figure; 4 to the second; and 6 to the third.

They are denoted by so many artificial words framed for that purpose; viz. 1. *Barbara*, *celarent*, *darii*, *ferioque*. 4. *Baralip*, *celantes*, *dabitis*, *festisom*, *frisesom*. 2. *Cesare*, *camestres*, *fijlines*, *baroco*. 3. *Darapti*, *selaptis*, *disamis*, *datisi*, *becardo*, *ferison*.

The use and effect of which words lie wholly in the syllables, and the letters whereof the syllables consist. Each word, e. gr. consists of three syllables, denoting the three propositions of a syllogism, viz. major, minor, and conclusion. Add, that the letters of each syllable are either vowels or consonants: the vowels are *A*, which denotes an universal affirmative proposition; *E*, an universal negative; *I*, a particular affirmative; and *O*, a particular negative.

Thus, *barbara* is a syllogism or *mood* of the first figure, consisting of three universal affirmative propositions: *Baralip* of the fourth figure, consisting of two universal affirmative premises, and a particular affirmative conclusion.—The consonants are chiefly of use in the reduction of syllogisms. See **REDUCTION**.

MOOD, or **MODE**, in grammar, is used to signify the different manners of conjugating verbs, agreeably to the different actions or affections to be expressed; as shewing, commanding, willing, &c.

Hence arise five *moods*, viz. the indicative, imperative, optative, subjunctive, and infinitive; which see.

Some grammarians reckon but four *moods*, confounding the optative with the subjunctive; and some make six, dividing the optative into potential and optative.

The Greeks have five *moods* of verbs differing in termination; but the Latins have but four.—In English the terminations are the same in all the *moods*.

For the origin of *mood*, it may be observed, that verbs are of that kind of words which signify the manner and form of our thought; whereof the principal is affirmation. Verbs are also formed to receive different inflections, as the affirmation regards different persons, and different times: whence arise the tenses and persons of verbs.

But, besides these, men have thought fit to invent other inflections, to explain what passes in their mind still more distinctly: for, in the first place, they considered, that, besides the simple affirmations, as *he loves*, *he loved*; there were others modified and conditional, as, *if he loved*, *though he should love*: and the better to distinguish these affirmations from the others, they doubled the inflections of those tenses or times; making some serve for simple affirmations, as, *I love*, *he loved*; and reserving the rest for affirmations that were modified, as, *if he should love*, *might he have loved*.—Yet they kept not steadily to their rules; but sometimes made use of simple inflections to express affirmations that were modified; as *estis veror*, for *estis veror*. And it is from this last kind of reflection, that grammarians have formed the *mood* they call *subjunctive*.

But further, besides the affirmation, the action of our will may be taken for a *mood*, or manner of our thought; and men have found themselves under a necessity of expressing what they will, as well as what they think.—Now we may will a thing in several manners; whereof there are three which may be considered as the principal. First then, we sometimes will things which do not depend on ourselves; and in that case we only will them by a bare wish, which the Latins express by the particle *utinam*; and we say, *please God*. Some languages, for instance, the Greek, have invented particular inflections for this end; whence the grammarians have taken occasion to call this the *optative mood*: and there seems something like both in the French, Italian, and Spanish tongues, in regard these have a kind of triple tenses; but in Latin, English, &c. the same inflections serve for the subjunctive, and for the optative. For this reason, one may very well retrench this *mood* from the Latin conjugations; it being the different inflections that make *moods*, not the different manners of signifying, which may be varied to infinity.

We sometimes will in another manner; as when we are content a thing should come to pass, though we do not absolutely desire it; as when Terence says, *profundat, perdat, perat*, let him spend, sink, perish.—Men might have invented a particular inflection to express this movement, as in Greek they have done to express a simple desire: but they have not done it; and in lieu thereof, they make use of the subjunctive. In English we add the particle *let*, let him spend, &c.—Authors call this the *potential*, or *concessive mood*. See **POTENTIAL**.

The third manner of willing is, when what we desire, depending on another person, of whom we can obtain it, we signify our will that he do it.—This is the motion we use, when we command or pray; and to express this motion, we have invented the *mood* we call *imperative*; which has no first person in the singular, because a man, properly speaking, cannot command himself: in some languages it has no third person, because, in strictness, a man cannot command any person, but him to whom he speaks and addresses himself.—And in regard the command or prayer always relates to what is to come, it happens that the imperative *mood*, and the future tense, are frequently used for each other (especially in the Hebrew); as, *non occides*, thou shalt not kill, for *do not kill*. Hence some grammarians place the imperative amongst the number of futures.

Of all the *moods* we have mentioned, the oriental languages have none but the last, which is the imperative; and, on the contrary, the modern languages have none of them any particular inflection for the imperative.—The method we take for it in English, is either to omit the pronoun, or transpose it: thus, *I love*, is a simple affirmation; *love*, an imperative: we love, an affirmation; *love we*, an imperative.

MOOD, in philosophy. } See the article **MODE**.

MOOD, in music.

MOON, *luna*, ☾, in astronomy, one of the heavenly bodies, usually ranked among the planets; but with more propriety accounted a satellite, or secondary planet.

The moon is an attendant of our earth, whom she respects as a centre, and in whose neighbourhood she is constantly found; inasmuch as, if viewed from the sun, she would never appear to depart from us by an angle greater than ten minutes.

As all the other planets move primarily round the sun, so does the moon round the earth: her orbit is an ellipse, in which she is retained by the force of gravity; performing her revolution in

round us in 27 days, 7 hours, 43 minutes, which is also the precise time of her rotation round her axis.

The mean distance of the moon from the earth, is 607 semi-diameters of the earth; which is equivalent to 240,000 miles. The mean eccentricity of her orbit, is $\frac{1}{188}$ of her mean distance, which makes a considerable variation in that mean distance.

The moon's diameter is to that of the earth, as 11 to 40.2; or 2175 miles: its mean apparent diameter is 31 minutes 16 $\frac{1}{2}$, and that of the sun 32 minutes 12 seconds.

The moon's surface contains 14,000,000 square miles; and its solidity 5,000,000,000 cubical ones: The density of the moon's body is to that of the earth, as 48911 to 39214; to that of the sun, as 48911 to 10000: its quantity of matter to that of the earth, nearly as 1 to 39.15: and the force of gravity on its surface, is to that on the surface of the earth, as 139.2 to 407.8.

Phænomena of the MOON.—The different appearances of the moon are very numerous: sometimes she is increasing, then waning; sometimes horned, then semi-circular; sometimes gibbous, then full and globular.

Sometimes again, she illumines us the whole night; sometimes only a part of it; sometimes she is found in the southern hemisphere; sometimes in the northern: all which variations having been first observed by Endymion, an ancient Grecian, who watched her motions, she was fabled to have fallen in love with him.

The source of most of these appearances, is, that the moon is a dark, opaque, and spherical body; and only shines with the light she receives from the sun; whence only that half turned towards him can be illumined; the opposite one remaining in its native darkness. The face of the moon visible on our earth, is that part of her body turned towards the earth; whence, according to the various positions of the moon with regard to the sun and earth, we observe different degrees of illumination; sometimes a large, and sometimes a less portion of the enlightened surface being visible.

Phases of the MOON.—To conceive the lunar phases: Let *S* (Tab. Astronomy, fig. 13.) represent the sun, *T* the earth, *RST* a portion of the earth's orbit, and *ABCDEFGH* the orbit of the moon, wherein she revolves round the earth, in the space of a month, advancing from west to east: connect the centres of the sun and moon by the right line *SL*, and through the centre of the moon imagine a plane *MLN*, to pass perpendicular to the line *SL*: the section of that plane with the surface of the moon, will give the line that bounds light and darkness, and separates the illumined face from the dark one.

Connect the centres of the earth and moon by *TL*, perpendicular to a plane *PLO*, passing through the centre of the moon; that plane will give on the surface of the moon, the circle that distinguishes the visible hemisphere, or that towards us, from the invisible one, and therefore called the *circle of vision*.

Whence it appears, that whenever the moon is in *A*, the circle bounding light and darkness, and the circle of vision, coincide: so that all the illumined face of the moon will be turned towards the earth: in which case the moon is with respect to us full, and shines the whole night; with respect to the sun, she is in opposition; in regard the sun and moon are then seen in opposite parts of the heavens, the one rising when the other sets.

When the moon arrives at *B*, the whole illumined disk *MNP* is not turned towards the earth; so that the visible illumination will be short of a circle, and the moon will appear gibbous, as in *B*.

When she reaches *C*, where the angle *CTS* is nearly right, there only one half of the illumined disk is turned towards the earth, and then we observe a half-moon, as in *C*; and she is said to be *dichotomized* or *bisected*.

In this situation the sun and moon are a fourth part of a circle removed from each other; and the moon is said to be in a *quadrant aspect*, or to be in her *quadrature*.

The moon arriving at *D*, only a small part of the illumined face *MPN*, is turned towards the earth: for which reason, the small part that shines upon us, will be seen *falcated*, or bent into narrow angles or horns, as in *D*.

At last, the moon arriving at *E*, shews no part of her illumined face at all to the earth, as in *D*; this position we call the *new moon*, and she is then said to be in conjunction with the sun; the sun and moon being in the same point of the ecliptic.

As the moon advances towards *F*, she resumes her horns: and as before the new moon, the horns were turned westward; so now they change their position, and look eastward: when she comes at *G*, she is again in quadrature aspect with the sun; in *H* she is gibbous, and in *A* she is again full.

Here, the arch *EL*, or the angle *STL*, contained under lines drawn from the centres of the sun and moon to that of the earth, is called the *elongation of the moon* from the sun: and the arch *MO*, which is the portion of the illumined circle *MON*, that is turned towards us, and which is the measure of the angle that the circle bounding light and darkness, and the circle of vision make with each other, is every where nearly,

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similar to the arch of elongation *EL*; or which is the same thing, the angle *STL* is nearly equal to the angle *MLO*: as is demonstrated by geometers.

To delineate the MOON's phases for any time.—Let the circle *COBP* (fig. 14.) represent the moon's disk turned towards the earth, and let *OP* be the line in which the semi-circle *OCP* is projected, which suppose cut at right angles by the diameter *BC*; then making *LP* the radius, take *LF* equal to the co-line of the elongation of the moon; and upon *BC*, as the greater axis, and *LF*, the less, describe the semi-ellipse *BFC*; this ellipse will cut off from the moon's disk the portion *BFCP* of the illumined face visible on the earth.

As the moon illumines the earth by a light reflected from the sun, so is she reciprocally illumined by the earth, which reflects the sun's rays to the surface of the moon, and that much more abundantly than she receives them from the moon.—For, the surface of the earth is above 15 times greater than that of the moon; and therefore supposing the texture of each body alike, as to the power of reflecting; the earth must return 15 times more light to the moon than she receives from it.—In new moons, the illumined side of the earth is turned fully towards the moon, and will therefore at that time illumine the dark side of the moon; and then the lunar inhabitants (if such there be) will have a full earth, as we, in a similar position, have a full moon: and hence arises that dim light observed in the old and new moons; whereby, besides the bright horns, we perceive somewhat more of her body behind them, though very obscurely.—When the moon comes to be in opposition to the sun, the earth seen from the moon will appear in conjunction with him, and its dark side will be turned towards the moon; in which position the earth will disappear to the moon, as that does to us at the time of the new moon, or in her conjunction with the sun. After this, the lunar inhabitants will see the earth in a horned figure.—In fine, the earth will present all the same phases to the moon, as the moon does to the earth.

Dr. Hook, accounting for the reason why the moon's light affords no visible heat, observes, that the quantity of light which falls on the hemisphere of the full moon, is rarerhied into a sphere 288 times greater in diameter than the moon, before it arrive at us; and consequently that the moon's light is 104368 times weaker than that of the sun.—It would therefore require 104368 full moons to give a light and heat equal to that of the sun at noon. See *SUN, HEAT, &c.*

Course and motion of the MOON.—Though the moon finish its course in 27 days, 7 hours, which interval we call a *periodical month*, yet she is longer in passing from one conjunction to another; which space we call a *synodical month*, or a *lunation*.

The reason is, that while the moon is performing its course round the earth in its own orbit, the earth with its attendant is making its progress round the sun, and both are advanced almost a whole sign towards the east; so that the point of the orbit, which in the former position was in a right line passing the centres of the earth and sun, is now more westerly than the sun: and therefore when the moon is arrived again at that point, it will not yet be seen in conjunction with the sun; nor will the lunation be completed in less than 29 days and an half.

Were the plane of the moon's orbit coincident with the plane of the ecliptic, i. e. were the earth and moon both moved in the same plane, the moon's way in the heavens, viewed from the earth, would appear just the same with that of the sun; with this only difference, that the sun would be found to describe his circle in the space of a year, and the moon hers in a month.—But this is not the case; for the two planes cut each other in a right line, passing through the centre of the earth, and are inclined to each other in an angle of about five degrees.

Suppose, e. gr. *AB* (fig. 15.) a portion of the earth's orbit; *T* the earth; and *CEDF* the moon's orbit, wherein is the centre of the earth: from the same centre *T*, in the plane of the ecliptic, describe another circle *CGDH*, whose semi-diameter is equal to that of the moon's orbit. Now, these two circles being in several planes, and having the same centre *E*, will intersect each other in a line *DC*, passing through the centre of the earth. Consequently, *CE*, *D*, one half of the orbit of the moon, will be raised above the plane of the circle *CGH*, towards the north; and *DFC*, the other half, will be sunk below it towards the south.—The right line *DC*, wherein the two circles intersect each other, is called the *line of the nodes*, and the points of the angles *C* and *D*, the *nodes*: whereof that where the moon ascends above the plane of the ecliptic, northwards, is called the *ascending node*, and the *head of the dragon*; and the other *D*, the *descending node*, and the *dragon's tail*; and the interval of time between the moon's going from the ascending node, and returning to it, a *draconic month*.

If the line of the nodes were immovable, that is, if it had no other motion, but that whereby it is carried round the sun, it would still look towards the same point of the ecliptic; i. e. it would always keep parallel to itself: but it is found by observation, that the line of the nodes constantly changes place, and shifts in situation from east to west, contrary to the order of the signs, and by a retrograde motion, finishes its circuit in about nineteen years; in which time each of the nodes

6 A a

returns

returns to that point of the ecliptic, whence it before receded.

Hence it follows, that the moon is never precisely in the ecliptic, but twice, each period, viz. when she is in the nodes.—Throughout the rest of her course she deviates from it, being nearer or further from the ecliptic, as she is nearer or further from the nodes. In the points F and E, she is at her greatest distance from the nodes; which points are therefore called her limits.

The moon's distance from the nodes, or rather from the ecliptic, is called her latitude, which is measured by an arch of a circle drawn through the moon perpendicular to the ecliptic, and intercepted between the moon and the ecliptic.—The moon's latitude, when at the greatest, as in E or F, never exceeds 5 degrees, and about 18 minutes; which latitude is the measure of the angles at the nodes.

It appears by observation, that the moon's distance from the earth is continually changing; and that she is always either drawing nearer, or going farther from us.—The reason is, that the moon does not move in a circular orbit, which has the earth for its centre; but in an elliptic orbit (as represented in fig. 16.) one of whose foci is the centre of the earth: AP represents the greater axis of the ellipse, and the line of the apses; and TC, the eccentricity: the point A, which is the highest apsis, is called the apogee of the moon; and P, the lower apsis, is the moon's perigee, or the point wherein she comes nearest the earth.

The space of time wherein the moon, going from the apogee, returns to it again, is called the anomalistic month.

If the moon's orbit had no other motion, but that wherewith it is carried round the sun, it would still retain a position parallel to itself, and always point the same way, and be observed in the same point of the ecliptic; but the line of the apses is likewise observed to be moveable, and to have an angular motion round the earth from west to east, according to the order of the signs, returning to the same situation in the space of about nine years.

The irregularities of the Moon's motion, and that of her orbit, are very considerable. For, 1°. When the earth is in her aphelion, the moon is in her aphelion likewise; in which case she quickens her pace, and performs her circuit in a shorter time: on the contrary, when the earth is in its perihelion, the moon is so too, and then she slackens her motion; and thus she revolves round the earth in a shorter space, when the earth is in her aphelion, than when in her perihelion: so that the periodical months are not all equal.

2°. When the moon is in her syzygies, i. e. in the line that joins the centres of the earth and sun, which is either in her conjunction or opposition; she moves swifter, *ceteris paribus*, than when in the quadratures.

3°. According to the different distance of the moon from the syzygies, i. e. from opposition to conjunction, she changes her motion: in the first quarter, that is, from the conjunction to her first quadrature, she abates somewhat of her velocity; which, in the second quarter, she recovers: in the third quarter, she again loses; and in the last, she again recovers.—This inequality was first discovered by Tycho Brahe, who called it the moon's variation.

4°. The moon moves in an ellipse, one of whose foci is in the centre of the earth, round which she describes areas proportionable to the time, as the primary planets do round the sun; whence her motion in the perigee must be quickest, and it must be slowest in the apogee.

5°. The very orbit of the moon is changeable, and does not always persevere in the same figure; its eccentricity being sometimes increased, and sometimes diminished; it is greatest, when the line of the apses coincides with that of the syzygies; and least, when the line of the apses cuts the other at right angles.

6°. Nor is the apogee of the moon without an irregularity; being found to move forwards, when it coincides with the line of the syzygies, and backwards, when it cuts that line at right angles.—Nor is this progress and regress in any measure equal: in the conjunction, or opposition, it goes briskly forwards; and in the quadratures, it moves either slowly forwards, stands still, or goes backward.

7°. The motion of the nodes is not uniform; but when the line of the nodes coincides with that the syzygies at right angles, they go backwards, from east to west; and this, Sir, I. Newton shews, is done with the velocity of 16'', 19'', 24'', in an hour.

The only equable motion the moon has, is that wherewith she turns round her axis exactly in the same space of time, in which she revolves round us in her orbit; whence it happens, that she always turns the same face towards us.

For, as the moon's motion round its axis is equal, and yet its motion or velocity in its orbit is unequal; it follows, that when the moon is in its perigee, where it moves swiftest in its orbit, that part of its surface, which, on account of its motion in the orbit, would be turned from the earth, is not so, entirely; by reason of its motion round its axis.—Thus, some parts in the limb, or margin of the moon, sometimes recede from the centre of the disk, and sometimes approach towards it, and some

parts, that were before invisible, become conspicuous: which is called the moon's libration.

Yet this equability of rotation occasions an apparent irregularity: for the axis of the moon, not being perpendicular to the plane of its orbit, but a little inclined to it; and this axis maintaining its parallelism, in its motion round the earth; it must necessarily change its situation, in respect of an observer on the earth; to whom, sometimes the one, and sometimes the other pole of the moon, becomes visible. Whence it appears to have a kind of wavering or vacillation.

Physical cause of the Moon's motions.—The moon, we have observed, moves round the earth, by the same laws, and in the same manner, as the earth and other planets move round the sun.—The solution therefore of the lunar motion, in general, comes under those of the earth, and other planets.

As for the particular irregularities in the moon's motion, to which the earth, and other planets, are not subject, they arise from the sun, which acts on, and disturbs her in her ordinary progress through her orbit; and are all mechanically deducible from the same great law, whereby her general motion is directed, viz. the law of gravitation or attraction.

Other secondary planets, v. gr. the satellites of Jupiter and Saturn, are doubtless subject to the like irregularities with the moon; as being exposed to the same perturbing or disturbing force of the sun; but their distance secures them from our observation.

The laws of the several irregularities in the syzygies, quadratures, &c. see under SYZYGIES, QUADRATURES, &c.

Astronomy of the MOON.—1°. To determine the period of the moon's revolution round the earth, or the periodical month; and the time between one opposition and another, or the synodical month.

Since, in the middle of a lunar eclipse, the moon is opposite to the sun. Compute the time between two eclipses, or oppositions; and divide this, by the number of lunations, that have passed in the mean time: the quotient will be the quantity of the synodical month.—Compute the sun's mean motion during the time of the synodical month, and add this to the entire circle described by the moon.—Then, as the sun is to 360°, so is the quantity of the synodical month to the periodical.

Thus, Copernicus, in the year 1500, November 6, at twelve at night, observed an eclipse of the moon at Rome; and August 1, 1523, at 4 h. 25', another at Cracow: hence, the quantity of the synodical month is thus determined:

Obs. 2 An. 1523 d. 237 h. 4.25'
Obs. 1 An. 1500 d. 310 h. 2.20'

Interval of time An. 22 d. 292 h. 2.5'
Add the intercalary days 5

Exact interval An. 22 d. 297 h. 2.5'
or 11991005'

Which, divided by 282 months elapsed in the mean time, gives the quantity of the synodical month 42521', 9'', 9''; that is, 29 days, 12 hours, 41 minutes.

From two other observations of eclipses, the one at Cracow, the other at Babylon, the same author determines more accurately the quantity of the synodical month to be

42524', 3'', 10'', 9''.

That is 29 d. 11 h. 43'. 3'', 10''.

The sun's mean motion in the time 29°. 6'. 24'', 13''.

The moon's motion 389. 6. 24. 18.

Quantity of the periodical month 27 d. 7 h. 43'. 5''.

Hence, 1°. The quantity of the periodical month being given; by the rule of three we may find the moon's diurnal and horary motion, &c. And thus may tables of the mean motion of the moon be constructed.

2°. If the sun's mean diurnal motion be subtracted from the moon's mean diurnal motion; the remainder will give the moon's diurnal motion from the sun: and thus may a table of latitudes be constructed, such as those of Bullialdus.

3°. Since in the middle of a total eclipse, the moon is in the node; if the sun's place be found for that time, and to this be added six signs, the sum will give the place of the node.

4°. From comparing the ancient observations with the modern, it appears that the nodes have a motion, and that they proceed in antecedentia, i. e. from Taurus to Aries, from Aries to Pisces, &c. If then to the moon's mean diurnal motion, be added the diurnal motion of the nodes, the same will be the motion of the latitude, and thence, by the rule of three, may be found in what time the moon goes 360° from the dragon's head, or in what time she goes from, and returns to it: that is the quantity of the draconic month.

5°. If the motion of the diurnal apogee be subtracted from the mean motion of the moon, the remainder will be the moon's mean motion from the apogee: and thence, by the rule of three, is determined the quantity of the anomalistic month.

According to the observations of Kepler, the mean synodical month is 29 d. 12 h. 44'. 3''. 2''.

27 d. 7 h. 43'. 8". The place of the apogee for the year 1700, January 1. old stile, was 11 S 80. 57'. 1". The place of the ascending nodes 4 S. 27°. 39'. 17". Mean diurnal motion of the moon 130. 10'. 35". Diurnal motion of the apogee 6'. 41". Diurnal motion of the nodes 3'. 11". Lastly, the eccentricity 4362 parts, such, whereof the semi-diameter of the eccentric is 100000 : and therefore the diurnal motion of the latitude is 130. 13'. 46"; and the diurnal motion from the apogee 130. 3'. 54".

To find the Moon's age.—To the day of the month add the epoch of the year, and the months from March inclusive.—The sum, if under 30 ; if over, the excess is the moon's age.—If the month have but 30 days, the excess above 29 is the moon's age. See AGE.

To find the time of the Moon's being in the meridian, or southing.—Multiply her age, if under 15 days, by 4 ; and divide the product by 5 ; the quotient gives the hour, and the remainder multiplied by 12, the minute. If her age exceed 15, subtract 15, and proceed with the remainder as before.

To find the time of the Moon's beginning to shine.—Multiply her age, if under 15, by 48 ; and divide the product by 60 : the quotient gives the hour ; and the remainder the minute. If her age be above 15 days, subtract the time thus found, from 24 ; the remainder gives the time of shining in the morning.

For the eclipses of the Moon, see ECLIPSES.—For the Moon's parallax, see PARALLAX.

Theory of the Moon's motions and irregularities.—The tables of equation, which serve to solve the irregularities of the sun, do likewise serve for those of the moon.

But then these equations must be corrected for the moon ; otherwise they will not exhibit the true motions in the syzygies.—The method is thus : Suppose the moon's place in the zodiac, required in longitude, for any given time ; here, we first find, in the tables, the place where it would be, supposing its motion uniform, which we call *mean*, and which is sometimes faster, and sometimes slower than the true motion : then, to find where the true motion will place her, which is also the *apparent*, we are to find in another table at what distance it is from its apogee ; for, according to this distance, the difference between her true and mean motion, and the two places which correspond thereto, is the greater.—The true place thus found, is not yet the true place ; but varies from it, as the moon is more, or less remote both from the sun, and the sun's apogee : which variation respecting, at the same time, those two different distances, they are to be both considered and combined together, as in a table apart. Which table gives the correction to be made of the true place first found.—That place thus corrected, is not yet the true place, unless the moon be either in conjunction, or opposition : if she be out of these, there must be another correction, which depends on two things taken together, and compared, *viz.* the distance of the moon's corrected place from the sun ; and of that at which she is with regard to her own apogee ; this last distance having been changed by the first correction.

By all these operations and corrections, we at length arrive at the moon's true place for that instant. In this it must be owned, there occur prodigious difficulties : the lunar inequalities are so many, that it was in vain the astronomers laboured to bring them under any rule, before the great Sir I. Newton ; to whom we are indebted both for the mechanical causes of these inequalities, and for the method of computing and ascertaining them : so that he has given us a world, in great measure, his own discovering, or rather subduing.

From the theory of gravity he shews, that the larger planets revolving round the sun, may carry along with them smaller planets revolving round themselves ; and shews also, *a priori*, that these smaller must move in ellipses having their umbilici in the centres of the larger ; and must have their motion in their orbits variously disturbed by the motion of the sun ; and, in a word, must be affected with those inequalities which we actually observe in the moon. And from this theory, he argues analogous irregularities in the satellites of Saturn.

From the same theory he examines the force which the sun has to disturb the moon's motion, determines the horary increase of the area which the moon would describe in a circular orbit by radii drawn to the earth—her distance from the earth—the horary motion in a circular and elliptic orbit—the mean motion of the nodes—the true motion of the nodes—the horary variation of the inclination of the moon's orbit to the plane of the ecliptic.

Lastly, From the same theory he has found the annual equation of the moon's mean motion to arise from the various dilatation of her orbit ; and that variation to arise from the sun's force, which being greater in the perigee, distends the orbit ; and being less in the apogee, suffers it to be again contracted.—In the dilating orbit she moves more slowly ; in the contracted, more swiftly : and the annual equation, whereby this inequality is compensated, in the apogee, and perigee is nothing at all ; at a moderate distance from the sun, it amounts to 11', 50'' ;

and in other places it is proportional to the equation of the sun's centre, and is added to the mean motion of the moon, when the earth proceeds from its aphelion to its perihelion ; and subtracted when in the opposite part.

Thus, supposing the radius of the *orbis magnus* 1000, and the earth's eccentricity 164 ; this equation, when greatest, according to the theory of gravity, comes out 11', 49".

He adds, that in the earth's perihelion the nodes move swifter than in the aphelion, and that in a triplicate ratio of the earth's distance from the sun, *inversely*. Whence arise annual equations of their motions, proportionable to that of the centre of the sun.—Now the sun's motions in a duplicate ratio of the earth's distance from the sun *inversely*, and the greatest equation of the centre which this inequality occasions, is 10, 56', 26", agreeable to the sun's eccentricity 16 1/2. If the sun's motion were in a triplicate ratio of its distance *inversely*, this inequality could generate the greatest equation 20, 56', 9" ; and therefore the greatest equations which the inequalities of the motions of the moon's apogee and nodes occasion, are to 20, 56', 9", as the mean diurnal motion of the moon's apogee, and the mean diurnal motion of her nodes are to the mean diurnal motion of the sun.—Whence the greatest equation of the mean motion of the apogee comes out 19', 42" ; and the greatest equation of the mean motion of the nodes 9', 27". The former equation is added, and the latter subtracted, when the earth proceeds from its perihelion to its aphelion ; and the contrary in the opposite part of its orbit.

From the same theory of gravity it also appears, that the sun's action on the moon must be somewhat greater when the transverse diameter of the lunar orbit passes through the sun, than when it is at right angles with the line that joins the earth and sun : and, therefore, that the lunar orbit is somewhat greater in the first case, than in the second.—Hence arises another equation of the mean lunar motion, depending on the situation of the moon's apogee with regard to the sun, which is greatest when the moon's apogee is in an octant with the sun ; and none, when he arrives at the quadrature, or syzygies ; and is added to the mean motion, in the passage of the moon's apogee from the quadrature to the syzygies, and subtracted in the passage of the apogee from the syzygies to the quadrature.

This equation, which Sir Isaac calls *semestris*, when greatest, *viz.* in the octants of the apogee, arises to 3', 45", at a mean distance of the earth from the sun ; but it increases and diminishes in a triplicate ratio of the sun's distance *inversely* ; and therefore in the sun's greatest distance, is 3', 34" ; in the smallest, 3', 56", nearly. But when the apogee of the moon is without the octants, it becomes less, and is to the greatest equation, as the sine of double the distance of the moon's apogee, from the next syzygy or quadrature, to the radius.

From the same theory of gravity it follows, that the sun's action on the moon is somewhat greater when a right line drawn through the moon's nodes passes through the sun, than when that line is at right angles with another joining the sun and earth : and hence arises another equation of the moon's mean motion, which he calls *secunda semestris*, and which is greatest when the nodes are in the sun's octants, and vanishes when they are in the syzygies, or quadratures ; and in other situations of the nodes is proportionable to the sine of double the distance of either node from the next syzygy, or quadrature.

It is added to the moon's mean motion while the nodes are in their passage from the sun's quadratures to the next syzygy, and subtracted in their passage from the syzygies to the quadratures in the octants.

—When it is greatest it amounts to 47", at a mean distance of the earth from the sun ; as appears from the theory of gravity : at other distances of the sun, this equation in the octants of the nodes is reciprocally as the cube of the sun's distance from the earth ; and therefore in the sun's perigee is 45" ; in his apogee nearly 49".

By the same theory of gravity the moon's apogee proceeds the fastest when either in conjunction with the sun, or in opposition to it ; and is retrograde when in quadrature with the sun.—In the former case, the eccentricity is greatest, and in the latter smallest.—These inequalities are very considerable, and generate the principal equation of the apogee, which he calls *semestris*, or *semi-menstrual*. The greatest *semi-menstrual* equation is about 120, 18".

Horrox first observed the moon to revolve in an ellipsis round the earth placed in the lower umbilicus : and Halley placed the centre of the ellipsis in an epicycle whose centre revolves uniformly about the earth : and from the motion in the epicycle arise the inequalities now observed in the progress and regress of the apogee, and the quantity of the eccentricity.

Suppose the mean distance of the moon from the earth divided into 100000, and let T (*Tab. Astron. fig. 17.*) represent the earth, and TC the mean eccentricity of the moon 5505 parts ; produce TC to B, that CB may be the sine of the greatest *semi-menstrual* equation 120, 18", to the radius TC ; the circle BDA, described on the centre C, with the interval CB, will

will be the epicycle wherein the centre of the lunar orb is placed; and wherein it revolves according to the order of the letters BDA.—Take the angle BCD equal to double the annual argument, or double the distance of the true place of the sun from the moon's apogee once equated, and C'D will be the semi-menstrual equation of the moon's apogee; and TD the eccentricity of its orbit tending to the apogee equated a second time.—From hence the moon's mean motion, apogee, and eccentricity, as also the greater axis of its orbit 200000; the moon's true place, as also her distance from the earth are found, and that by the commonest methods.

In the earth's perihelion, by reason of the greater force of the sun, the centre of the moon's orbit will move more swiftly about the centre C, than in the aphelion, and that in a triplicate ratio of the earth's distance from the sun inversely. By reason of the equation of the centre of the sun, comprehended in the annual argument, the centre of the moon's orbit will move more swiftly in the epicycle BDA, in a duplicate ratio of the distance of the earth from the sun inversely.

That the same may still move more swiftly in a simple ratio of the distance inversely from the centre of the orbit D, draw DE towards the moon's apogee, or parallel to TC; and take the angle EDG equal to the excess of the annual argument, above the distance of the moon's apogee from the sun's perigee in consequentia; or which is the same thing, take the angle CDF equal to the complement of the true anomaly of the sun to 360°; and let DF be to DC as double the eccentricity of the orbis magnus to the mean distance of the sun from the earth, and the mean diurnal motion of the sun from the moon's apogee, to the mean diurnal motion of the sun from its own apogee, conjunctly, i. e. as 33 $\frac{1}{3}$ is to 1000, and 52', 27'', 16''' to 59', 8'', 10''', conjunctly; or as 3 to 100. Conceive the centre of the moon's orbit placed in the point F, and to revolve in an epicycle whose centre is D, and its radius DF, while the point D proceeds in the circumference of the circle DABD: thus the velocity wherewith the centre of the moon's orbit moves in a certain curve, described about the centre C, will be reciprocally as the cube of the sun's distance from the earth.

The computation of this motion is difficult, but it will be made easy by the following approximation. If the moon's mean distance from the earth be 100000 parts, and its eccentricity TC 5505 of those parts, the right line CB or CD will be found 1172 $\frac{1}{2}$, and the right line DF 35 $\frac{1}{2}$. This right line at the distance TC, subtends an angle to the earth, which the transferring of the centre of the orbit from the place D to F generates in the motion of this centre; and the same right line doubled, in a parallel situation, at the distance of the upper umbilicus of the moon's orbit from the earth, subtends the same angle, generated by that translation in the motion of the umbilicus; and at the distance of the moon from the earth subtends an angle which the same translation generates in the motion of the moon; and which may therefore be called the second equation of the centre.

This equation of a mean distance of the moon from the earth, is as the sine of the angle contained between the right line DF, and a right line drawn from the point F to the moon, nearly; and when greatest, amounts to 2', 25''.—Now the angle comprehended between the right line DF and a line from the point D, is found either by subtracting the angle EDF from the mean anomaly of the moon, or by adding the moon's distance from the sun to the distance of the moon's apogee from the apogee of the sun. And as radius is to the sine of the angle thus found, so is 2', 25'', to the second equation of the centre, which is to be added, if that sine be less than a semi-circle, and subtracted if greater: thus we have its longitude in the very syzygies of the luminaries.

If a more accurate computation be required, the moon's place thus found must be corrected by a second variation. The first and principal variation we have already considered, and have observed it to be greatest in the octants. The second is greatest in the quadrants, and arises from the different action of the sun on the moon's orbit, according to the different position of the moon's apogee to the sun, and is thus computed: As radius is to the versed sine of the distance of the moon's apogee from the sun's perigee, in consequentia, so is a certain angle P to a fourth proportional. And as radius is to the sine of the moon's distance from the sun, so is the sum of this fourth proportional and another angle Q to the second variation, which is to be subtracted, if the moon's light be increasing; and added, if diminishing.

Thus we have the moon's true place in her orbit; and by reduction of this place to the ecliptic, we have the moon's longitude. The angles P and Q are to be determined by observation: in the mean time, if for P be assumed 2', and for Q 1', we shall be near the truth.

Nature and furniture of the Moon.—1°. From the various phases of the moon: from her only shewing a little part illuminated, when following the sun ready to set: from that part increasing as the recedes from the sun, till at the distance of 180° she shines with a full face; and again wanes as the re-

approaches that luminary, and loses all her light when she meets him: from the lucid part's being constantly turned towards the west, while the moon increases; and towards the east when she decreases; it is evident, that only that part shines on which the sun's rays fall.—And from the phenomena of eclipses, happening when the moon should shine with a full face, viz. when she is 180° distant from the sun; and the darkened parts appearing the same in all places, it is evident she has no light of her own, but borrows whatever light she has from the sun.

2°. The moon sometimes disappears in a clear heaven, so as not to be discoverable by the best glasses; little stars of the fifth and sixth magnitude all the time remaining visible.—This phenomenon Kepler observed twice anno 1580, and 1583; and Hevelius in 1620. Riccioli, and other Jesuits at Bologna, and many people throughout Holland observed the like April 14, 1642, yet at Venice and Vienna she was all the time conspicuous. December 23, 1703, there was another total obscuration. At Arles the first appeared of a yellowish brown; at Avignon ruddy and transparent, as if the sun had shone through; at Marseilles, one part was reddish, the other very dusky; and, at length, though in a clear sky, the wholly disappeared.—Here it is evident, that the colours appearing different at the same time, do not belong to the moon; but that they are occasioned by an atmosphere around her variously disposed in this and that place, for refracting of these or those coloured rays.

3°. The eye, either naked, or armed with a telescope, sees some parts in the moon's face darker than others, which are called *maculae*, or *spots*. Through the telescope, while the moon is either increasing or decreasing, the illuminated parts in the maculae appear evenly terminated; but in the bright parts, the boundary of the light appears jagged and uneven, composed of dissimilar arches, convex and concave. (See *Tab. Astron. fig. 18*.)—There are also observed lucid parts dispersed among the darker; and illuminated parts are seen beyond the limits of illumination; other intermediate ones remaining still in darkness; and near the maculae, and even in them, are frequently seen such lucid specks.—Beside the maculae observed by the ancients, there are other variable ones invisible to the naked eye, called *new maculae*, always opposite to the sun; and which are hence found among those parts which are the soonest illuminated in the increasing moon, and in the decreasing moon lose their light later than the intermediate ones; running round, and appearing sometimes longer, sometimes smaller.

Hence, (1.) As all parts are equally illumined by the sun, inasmuch as they are equally distant from him: if some appear brighter, and others darker; some reflect the sun's rays more copiously than others; and therefore they are of different natures. And, (2.) Since the boundary of the illumined part is very smooth and equable in the maculae, their surface must be so too. (3.) The parts illumined by the sun sooner, are deserted later than others that are nearer, are higher than the rest, i. e. they stand up above the other surface of the moon. (4.) The new maculae answer perfectly to the shadows of terrestrial bodies.

4°. Hevelius writes, that he has several times found, in skies perfectly clear, when even stars of the sixth and seventh magnitude were conspicuous, that at the same altitude of the moon, and the same elongation from the earth, and with one and the same excellent telescope, the moon and its maculae do not appear equally lucid, clear, and perspicuous, at all times; but are much brighter, purer, and more distinct at one time than another. From the circumstances of the observation, 'tis evident, the reason of this phenomenon is not either in our air, in the tube, in the moon, nor in the spectator's eye; but it must be looked for in something existing about the moon.

5°. Cassini frequently observed Saturn, Jupiter, and the fixed stars, when hid by the moon, near her limb whether the illumined or dark one, to have their circular figure changed into an oval one; and in other occultations he found no alteration of figure at all. In like manner, the sun and moon rising and setting in a vapourous horizon, do not appear circular, but elliptical.

Hence, as we know, by sure experience, that the circular figure of the sun and moon is only changed into an elliptical one by means of the refraction in the vapourous atmosphere; it is pretty apparent, that at the time when the circular figure of the stars is thus changed by the moon, there is a dense matter incomparably the moon, wherein the rays emitted from the stars are refracted; and that at other times, when there is no change of figure, this matter is wanting.

This phenomenon is well illustrated by the following experiment: To the inner bottom of any vessel, either plane, convex, or concave, with wax fasten a circle of paper; then pouring in water, that the rays reflected from the circle into the air may be refracted before they reach the eye; viewing the circle obliquely, the circular figure will appear changed into an elliptical.

6°. The moon, then, is a dense opaque body, furnished with mountains, valleys, and seas.—That the moon is dense, and impervious to the light, has been shewn; but some parts sink below,

and others rise above the surface; and that considerably, inasmuch as they are visible at so great a distance as that of the earth from the sun: in the moon, therefore, are huge mountains, and very deep valleys. Riccioli measured the height of one of the mountains, called *St. Catherine*, and found it nine miles high. Again, in the moon are spacious tracts having smooth even surfaces, and those reflecting less light than the rest: hence, as the surface of fluid bodies is naturally even; and as such bodies, being transparent, transmit a great part of the rays of light, and reflect very little; these lunar spots are fluid, transparent bodies: and as they continue constantly the same, they are *seas*.—In the moon, therefore, are mountains, valleys, and seas.—Hence, again, the lucid parts of the spots are *islands* and *peninsulas*.

And since in these macule, and near the limbs, are seen some parts higher than others; in the lunar seas there are *rocks* and *promontories*.

And since the new spots are contiguous to the mountains, and in all respects like the shadows of bodies on our earth; no doubt they are the shadows of the lunar mountains: whence also it appears, that the matter of the moon is opaque.

Note. This reasoning will be put past doubt by viewing the sensible horizon from some eminence: where it passes over a plane, the line will appear smooth and even; where across mountains and valleys, irregular and winding; smooth, but dark, &c.

7°. The moon is encompassed with an heavy and elastic atmosphere, wherein vapours and other exhalations ascend, and whence they return in form of dew and rain.

In a total eclipse of the sun, we find the moon incircled with a lucid ring parallel to her periphery.

Of this, we have too many observations to doubt it: in the great eclipse in 1715, the ring was very conspicuous at London, and elsewhere. Kepler observes the same of an eclipse in 1605, at Naples and Antwerp; and Wolfius of another in 1606, at Leipzick, described at large in the *Acta Eruditorum*, with this notable circumstance, that the part next the moon was visibly brighter than that farthest from it; which is confirmed by the observations of the French astronomers in the *Memoires de l'Academie*, &c. an. 1706.

Hence about the moon there is some fluid, which corresponds to her figure, and which both reflects and refracts the sun's rays: and hence, also, this fluid is denser below, near the moon's body; and rarer above. Now as the air which encompasses our earth is such a fluid, it is manifest there is *air* above the moon; and since the different density of the air depends on its different gravity and elasticity; no doubt the different density of the lunar air has the same causes. Again, we have observed, the lunar air is not always equally clear and transparent: sometimes it changes the spherical figures of the stars into ovals; and in the several total eclipses just mentioned there was observed a trembling in the moon's limb, immediately before immersion, with an appearance of thin, light smoke, flying over it during the immersion: this was very apparent in England. And hence, as these same phenomena are observed in our air when full of vapours; it is pretty plain, at the time when these phenomena are observed in that of the moon, it is full of *vapours* and *exhalations*. And, lastly, since at other times the lunar air is clear and transparent, producing none of these phenomena; the vapours must have been precipitated on the moon; and therefore either dew, or rain, or snow, must have fallen.

8°. The moon, then, is a body in all respects like our earth, and fitted for the same purposes: for we have shewn, that it is dense—opaque—has mountains and valleys—seas, with islands, peninsulas, rocks, and promontories—a changeable atmosphere, wherein vapours and exhalations rise and fall—day and night; a sun to illuminate the one, and a moon the other—summer and winter, &c.

From these, by analogy, may infinite other properties and appendages of the moon be deduced.—From the changes in the atmosphere will follow winds, and other meteors; and according to the different seasons of the year, rain, mists, frost, snow, &c.—From the inequalities upon the moon's surface will arise lakes, rivers, springs, &c.

Now nature, we know, produces nothing in vain: rains and dews fall on our earth to make plants vegetate; and plants take root, grow, produce seeds, and fruits for animals to feed on.—But nature is still uniform and consistent with herself, and like things serve for like ends.—Why then may not there be plants and animals in the moon? To what other purpose so nice a provision for them?

These arguments will receive new force when we come to shew that our earth itself is a planet; and that, when viewed from the other planets, it appears, in some, like the moon; in others, like Venus; in others, like Jupiter, &c. a similitude between the planets, both optical and physical, being a strong presumption that their furniture is alike.

To measure the height of the mountains of the MOON.—Suppose ED (fig. 10.) the moon's diameter, ECD the boundary of light and darkness; and A the top of an hill in the dark part beginning to be illuminated: with a telescope observe the pro-

portion of AE, or the distance of A from the line where the light commences, to the diameter ED: here we have two sides of a rectangled triangle AE, CE; the squares of which added together give the square of the third; whence the semidiameter CD being subtracted, leaves AB, the height of the mountain.

Riccioli, v. gr. found the top of mount St. Catherine illuminated at the distance of $\frac{1}{5}$ of the moon's diameter from the confines of light. Supposing, therefore, CE 8; and AE 1; the squares of the two will be 65, whose root is 8.062 the length of AC: subtracting therefore BC = 8, the remainder is AB = 0.062. The moon's semidiameter, therefore, is to the mountain's height as 8 is to 0.062; i. e. as 8000 to 62. Supposing, therefore, the semidiameter of the moon 1182 English miles, by the rule of three we find the height of the mountain nine miles.

The heights, &c. of the lunar mountains being measurable, astronomers have taken occasion to give each its name. Riccioli, whom most others now follow, distinguished them by the names of celebrated astronomers; and by these names they are still expressed in observations of the lunar eclipses, &c.

See the figure, *Tab. Astron. fig. 20.*

MOON-dial. See the article DIAL.

Prime of the MOON. See the article PRIME.

MOOR, MORA, a word sometimes used to express an heath, or barren tract of ground.

The word is sometimes also used for a *morass*, *moor*, or *fen*.

Mora musa, in ancient writings, particularly denotes a *moor*, or peat-moors.

MOORING, at sea, is the laying out of anchors, in a proper place, for the secure riding of a ship.

To MOOR *across*, is to lay out one of the anchors on one side.

To MOOR *along*, is to have an anchor in a river, and a hawser on shore.

To MOOR *quarter-shot*, is to moor quartering, between the two first ways.

MOORING *for east, west*, &c. is when they observe which way, and on what point of the compass the wind or sea is most likely to endanger the ship, and there lay out an anchor.

MOORS-head, in chymistry, a copper cap made in form of a head, to be set over any vessel, or over a reverberating furnace.

MOORS-head also denotes the head of a copper or glass still or alembic, which is luted on to the body or cucurbit, and hath a beak or pipe to let the spirit run down into the receiver.

MOOT*, a difficult case, or question, argued by the students of laws of court, by way of exercise.

* The word is formed either from the Saxon, *metan*, *gemetan*, meeting; or from the French, *mot*, word.

MOOTING, the chief exercise of the students in the inns of court; being the arguing of cases, which young utter barristers, &c. perform at appointed times, the better to enable them for practice, and the defence of their clients causes.

Such as, from their learning and standing, are called by the benchers to argue *moot-cases*, are sometimes called *utter barristers*; the rest, who, for want of experience, &c. are not admitted, are by some called *inner barristers*.

The place where the *moot cases* were argued, was antiently called a *moot-hall*.

In the inns of court there is a *bailliff* or *surveyor of the moots*, yearly chosen by the bench to appoint the *moot-men* for the inns of chancery, and to keep account of performance of exercises, both there and in the house.

MOOT-men, are those who argue *moot cases*.

Out of these *moot-men* are chosen readers for the inns of chancery; where, in term-time, and in vacations, they argue cases in the presence of attorneys and clerks.

MORALS, any thing relating to the manners, or conduct of life.

Besides the theological virtues, as *faith*, *hope*, *charity*, &c. there are also *moral virtues*; as *justice*, *temperance*, &c.

MORAL *actions*, or *acts*, are such as render the agent *good*, or *evil*; and, consequently, rewardable, or punishable, because he does them.

MORAL *cause*. See the article CAUSE.

MORAL *certainty*, or *assurance*, is used to signify a very strong probability; in contradistinction to a mathematical demonstration.

MORAL evidence.	} See the article	{ EVIDENCE.	
MORAL evil.			{ EVIL.
MORAL fables.			{ FABLE.
MORAL good.			{ GOOD.

MORAL *impossibility*, is what we otherwise call a *very great*, and almost *insuperable difficulty*; in opposition to a physical, or natural impossibility.

MORAL *necessity*. See the article NECESSITY.

MORAL *perfection*. See the article PERFECTION.

MORAL *philosophy*, a science whose object is to direct, and form mens manners; to explain the reason, and nature of actions; and to teach and instruct us how to acquire that felicity which is agreeable to human nature.

Moral philosophy is the same with what we otherwise call *ethics*, sometimes *morality*.

MORAL quantity. See the article QUANTITY.

MORAL sense, the faculty whereby we discern or perceive what is good, virtuous, beautiful, &c. in actions, manners, characters, &c.

A late author has endeavoured to prove, that it is a peculiar sense whereby we get the ideas of these things; and denominates it a *moral sense*. See SENSE.

MORAL theology is that which treats of cases of conscience; called also *casuistry*, or *casuistical divinity*.

MORAL universality. See the article UNIVERSALITY.

MORAL of a fable is the instruction drawn from it.

Thus when Phædrus at the end of a fable adds, *Hoc illis dictum qui, &c.* this makes what we call the *moral*: the Greeks called it *επισόδιον*, when at the end of the fable; and *προοίμιον*, when at the beginning. Among the Latins it was called *affabulatio*.

MORALITY denotes a conformity, in things and actions, to those unalterable obligations which result from the nature of our existence, and the necessary relations of life; whether to God as our creator, or to mankind as our fellow-creatures.

MORALITY is also used for the science or doctrine of morals; or the art of living well and happily; deduced from reason, and the nature, relation, and fitness of things.

In this sense it amounts to the same with what we otherwise call *ethics*, *moral philosophy*, or the *doctrine of ethics*.

Notwithstanding the great obscurity and uncertainties in the moral science, Mr. Locke is of opinion, that the doctrine of manners is equally capable of being brought to demonstration with the doctrine of quantity and number; that is, with the purest parts of mathematics.

According to this author, the idea of a Supreme Being, infinite in power, goodness, and wisdom, whose workmanship we are, and on whom we depend; and the idea of ourselves, as understanding, rational creatures; would, if duly considered, afford such foundations of our duty, and rules of action, as might place *morality* among the sciences capable of demonstration: wherein we need not doubt but that, from principles as incontestable as those of the mathematics, by necessary consequences, the measure of right and wrong might be made out to any one, who will apply himself, with the same indifference and attention to the one, as he doth to the other of these sciences: for the relations of other modes may certainly be perceived, as well as those of number and extension.—E. gr. *That where there is no property, there can be no injustice*, is a proposition as certain as any in Euclid: for the idea of property being a right to any thing; and the idea of injustice being the invasion or violation of that right; it is evident, that these ideas being thus established, and these names annexed to them, I can as certainly know this proposition to be true, as that a triangle has three angles equal to two right ones.—Again, *no government allows absolute liberty*: the idea of government being the establishment of society, upon certain rules or laws, which require conformity to them; and the idea of absolute liberty being for any one to do whatever he pleases; I am as capable of being certain of the truth of this proposition, as of any in mathematics.

What has given the advantage to the ideas of quantity, and made them thought more capable of certainty and demonstration than the ideas of good and evil, right and wrong, &c. is,

1^o. That the former can be represented by sensible marks, which have a nearer correspondence with them than any words or sounds. Diagrams drawn on paper are copies of the ideas, and are not liable to the uncertainty that words carry in their signification; but we have no sensible marks that resemble our moral ideas, and nothing but words to express them by, which though, when written, they remain the same; yet the ideas they stand for may change in the same man, and it is very seldom that they are not different in different persons.

2^o. Moral ideas are commonly more complex than figures; whence these two inconveniences follow: 1^o. That their names are of more uncertain signification; the precise collection of simple ideas they stand for not being so easily agreed on; and so the sign that is used for them in communication always, and in thinking often, does not readily carry with it the same idea.

2^o. The mind cannot easily retain those precise combinations so exactly and perfectly, as is necessary in the examination of the habitudes and correspondencies, agreements or disagreements, of several of them one with another, especially where it is to be judged of by long deductions, and the intervention of several other complex ideas, to shew the agreement or disagreement of two remote ones.

One part of these disadvantages in moral ideas, which has made them be thought not capable of demonstration, may in a good measure be remedied by definitions, setting down that collection of simple ideas which every term shall stand for, and then using the term steadily and constantly for that precise collection.

The mathematician considers the truth and properties belonging to a rectangle or circle, only as they are ideas in his own

mind, which possibly he never found actually existed mathematically; that is, precisely true: yet his knowledge is not only certain, but real; because real things are no farther, nor intended to be, meant by any such propositions, than as things really agree to those archetypes in the mind. It is true of the idea of a triangle, that its three angles are equal to two right ones; it is true also of a triangle, where-ever it exists: what is true of those figures that have barely an ideal existence in the mind, will hold true of them also, when they come to have a real existence in matter. Hence it follows, that moral knowledge is as capable of real certainty as mathematics: for certainty being nothing but the perception of such agreement, by the intervention of other ideas; our moral ideas, as well as mathematical, being archetypes themselves, and so adequate or complete ideas; all the agreement or disagreement we shall find in them, will produce real knowledge, as well as in mathematical figures. That which is requisite to make our knowledge certain is, the clearness of our ideas; and that which is required to make it real is, that they answer their archetypes.

But it will here be said, that if moral knowledge be placed in the contemplation of our own moral ideas, and those are of our own making; what strange notions will there be of justice and temperance! What confusion of virtues and vices, if every man may make what ideas of them he pleases! It is answered, No confusion or disorder at all in the things themselves, nor the reasonings about them, no more than there would be a change in the properties of figures, and their relations one to another, if a man should make a triangle with four corners, or a trapezium with four right angles; that is, in plain English, change the names of the figures, and call that by one name which is called ordinarily by another. The change of name will indeed at first disturb him who knows not what idea it stands for; but as soon as the figure is drawn, the consequences and demonstration are plain and clear.

Just the same is it in moral knowledge: let a man have the idea of taking from others, without their consent, what they are justly possessed of, and call this *justice*, if he pleases; he that takes the name there, without the idea put to it, will be mistaken, by joining another idea of his own to that name: but strip the idea of that name, or take it, such as it is in the speaker's mind, and the same things will agree to it, as if you called it *injustice*. One thing we are to take notice of, That where God, or any other law-maker, has defined any moral names, there they have made the essence of that species to which that name belongs; and there it is not safe to apply or use them otherwise: but in other cases it is bare impropriety of speech to apply them contrary to the common usage of the country they are used in.

MORASS*, a marsh, fen, or low moist ground, which receives the waters from above, without having any descent to carry them off again.

* Sommer derives the word from the Saxon *myrse*, lake; Salmassius from *mare*, a collection of waters; others from the German *maroff*, a muddy place; and others from *marjic*, of *maricetum*, à *mariscis*, i. e. rushes.

In Scotland, Ireland, and the north of England, they have a peculiar kind of *morasses*, called *moisses*, or *peat-moisses*, whence the country people dig their peat or turf, for firing.

The earl of Cromartie gives a particular account of these moisses in the *Philosophical Transactions*. They are covered with a heathy scurf, under which is a black, moist, spongy earth, in some places shallower, in others deeper, ordinarily from three or four, to seven or eight feet depth, though in some few places twice or thrice as much.

This black, spongy earth, they cut into oblong squares with iron spades made for that purpose, eight or nine inches long, and four or five broad: as the men cut them up, they are carried and spread on a dry ground, to be dried in the wind and sun. Some of these become harder, some softer, according to the nature of the mould or earth: the more black and solid they are, the better fire they make; and those are the least esteemed which are greyest, lightest, and most spongy.

When they have cut off one surface of four or five inches deep, they proceed downwards to another, and so to a third and a fourth, till they come to the hard strata; unless they be stopped with water, which they also ordinarily remove by making a channel, if they can; but, where they cannot, there the water stagnates. In such wasted pits, or *peat-dikes*, as they call them, where water hinders the cutting the spongy earth to the bottom, the pits will be filled up again, in some years, with a new spongy earth; which, in process of time, comes to the consistence of peat-moiss: at first, and a scurfy heathy turf grows over the top of it. When the dikes are dug down to the hard channel, the moisses do not renew, as in the other case; though it has been observed, that if they be cut down to the channel, provided the heathy turf cut off from the top be but laid on the channel, in course of time the moss grows again. These moisses are always level; though they are frequently found on hills, and near the tops of them too. Yet, as that curious nobleman observes, the moisses have always a descent to them, and generally from them; inasmuch that he never knew any where the water might stagnate. It is the water draining from

from above, that seems to be the parent of the peat. In many of these mosses are found quantities of fir and oak wood, usually in whole trees; but the smaller branches are seldom found unfused. This wood is as good for use as any old wood is; only that, having imbibed a deal of moisture, it takes some time to dry, in order to fit it for burning.

There are many places where wood will not grow, where yet the mosses are well stocked with this under-ground timber; but yet it appears there must have been woods formerly there; else how come they in the mosses? To prove this, that noble lord gives us the history and origin of a moss, in great measure from his own experience.—In the parish of Lochburn, in the year 1651, he saw, near the top of a very high hill, a plain about a mile over, then covered with a firm standing wood, but which was so very old, that not only the trees had no leaves or bark on, but the outside for the space of an inch inward was dead white timber, though within they were firm. Coming by the same place fifteen years after, he could not discover the least appearance of a tree; but, instead thereof, there was a plain green ground covered with a moss; the trees being all fallen, and having lain so thick over one another, that the green had over-run the whole timber, by means of the moisture draining from the hill above it, and flagging on the plain. He adds, that none could pass over it; the turf not being firm enough to support them. In thirty years more he found this whole piece of ground turned into a common peat-moss, and the country people digging turf and peats there.—This accounts for a generation of mosses, and whence it is that many of them are furnished with timber. See *Supplement*, article *Bog-wood*.

MORATUR, or **DEMORATUR**, in law, signifies as much as, *he demurs*; that is, the party here goes not forward, but rests or abides by the judgment of the court, who take time to deliberate, argue, and advise thereon.

When the counsel of the party are of opinion, that the count or plea of the adverse party is insufficient in law; then he *demurs*, or abides in law, and refers the same to the judgment of the court.

MORBID, **MORBIDUS**, in medicine, is applied to those parts, humours, &c. wherein a disease lies.

MORBID, in painting, is particularly applied to fat flesh very strongly expressed.

MORBILLI, in medicine, a disease popularly called *measles*. See *MEASLES*.

MORBUS, a term purely Latin, signifying *disease*. See *DISEASE*. **MORBUS comitialis** denotes the *epilepsy*; thus called by the Romans, because, when in any of their public assemblies persons fell down with this disorder, they immediately broke up, and dissolved the comitia, which was the common appellation for such courts. See *EPILEPSY*.

MORBUS Gallicus.	} See the article	VENEREAL disease.
MORBUS prodomus.		PRODOMUS.
MORBUS pedicularis.		PEDICULARIS.
MORBUS regius.		JAUNDICE.
MORBUS virginis.		CHLOROSIS.
Cholera MORBUS.		CHOLERA.

MORESK, or **MORISKO**, a kind of painting, carving, &c. done after the manner of the *Moors*; consisting of several grotesque pieces and compartments promiscuously intermingled, not containing any perfect figure of a man, or other animal, but a wild resemblance of birds, beasts, trees, &c.

These are also called *arabesques*, and are particularly used in embroideries, damask-work, &c.

Moresque dances, vulgarly called *morric-dances*, are those altogether in imitation of the *Moors*; as *farabands*, *chacons*, &c. and are usually performed with castanets, tambours, &c.

MORGANATIC marriage. See the article *MARRIAGE*.

MORNING, the beginning of the day; or the time of the sun-rising.

The astronomers reckon *morning*, *mane*, from the time of mid-night, to that of mid-day.—Thus an eclipse is said to begin at eleven o'clock in the *morning*, &c.

MORNING-star is the planet *Venus*, when a little to the westward of the sun; that is, when she rises a little before him. In this situation she is called by the Greeks, *phosphorus*; by the Latins, *lucifer*, &c.

MORNING twilight. See the article *CREPUSCULUM*.

MOROCCO*, or **MARROQUIN**, the skin of a goat, or some other animal resembling it, dressed in sumac or galls, and coloured of any colour at pleasure; much used in book-binding, &c.

* The name is ordinarily derived from the kingdom of *Morocco*, whence it is supposed the manner of preparing these skins was first borrowed.

We have *Morocco* skins brought from the *Levant*, *Barbary*, *Spain*, *Flanders*, and *France*; red, black, yellow, blue, &c.—The various manners of preparing *Morocco*, both black, and in colours, are so curious, and withal so little known among us, that the public will not be displeased to find them here.

Manner of preparing black Morocco.—The skins, having been dried in the hair, are steeped in clear water three days and nights; then they are stretched on a wooden horse or leg, like that used by tanners; then beaten with a large knife for

the purpose, and steeped afresh in water, changed daily till they be well come again.—In this state they are thrown into a large vat in the ground, full of water, wherein quick-lime has been flaked, where they lie fifteen days; whence, however, they are taken, and again returned every night and morning: they are thrown into a fresh vat of lime and water, and shifted night and morning, as before, for fifteen days longer; then rinsed in clear water; and the hair is then taken off, on the leg, with the knife; the skins are then returned into a third vat, and shifted, as before, for about eighteen days; then steeped twelve hours in a river; then taken out, rinsed, put in pails, where they are pounded with wooden pestles, changing the water twice; then laid on the horse, and the flesh taken off, returned into pails of new water, taken out, and the hair-side scraped; then returned into fresh pails, taken out, and thrown into a pail of a particular form, having holes at bottom: here they are beaten the space of an hour, and fresh water poured on from time to time; stretched on the leg, and scraped on either side; returned into pails of fresh water; taken out, stretched, and sewed up all around in manner of bags, leaving out the hind legs, which serve to make an aperture for the conveyance of a mixture mentioned hereafter.

The skins, thus sewed, are put in lukewarm water, where dogs excrement has been dissolved. Here they are stirred with long poles half an hour, left at rest a dozen, taken out, rinsed in fresh water, and filled by a tunnel with a preparation of water and sumac mixed and heated over the fire till ready to boil; and as they are filled, the hind-legs are sewed up to stop the passage. In this state they are let down into the vessel of water and sumac, and kept stirring four hours successively; they are then taken out, and heaped on one another; after a little time, their sides are changed: and thus they continue an hour and half, till drained. This done, they are loosened, and filled a second time with the same preparation, sewed up again, and kept stirring two hours, piled up, and drained as before. This is again repeated a third time, with this difference, that they are now only stirred a quarter of an hour; after which, they are left till the morrow morning, when they are taken out, drained on a rack, unfewed, the sumac taken out, folded in two from head to tail, the hair-side outwards, laid over each other on the leg, to perfect their draining, stretched out, and dried; then trampled under-foot by two and two, stretched on a wooden table, what flesh and sumac remains scraped off, and the hair-side rubbed over with oil, and that again with water.

Having thus received their oil and water they are wrung in the hands, then stretched and pressed tight on the table with an iron instrument like that of the curriers, the flesh-side uppermost; then turned, and the hair-side rubbed strongly over with an handful of rushes, to squeeze out as much of the oil remaining within as possible. The first course of black is now laid on the hair-side, by means of a lock of hair twisted and steeped in a kind of black dye, prepared of four beer, wherein pieces of old rusty iron have been thrown. When half-dry by hanging in the air, they are stretched on a table, and rubbed over every way with a paumelle, or wooden-toothed instrument, to raise the grain, over which is passed a light couche of water, then sleeked by rubbing them with rushes prepared for the purpose. Thus sleeked, they have a second couche of black; they are then dried, laid on the table, rubbed over with a paumelle of cork, to raise the grain again; and, after a light couche of water, sleeked over anew; and, to raise the grain a third time, a paumelle of wood is used.

After the hair-side has thus received all its preparations, the flesh-side is pared with a sharp knife for the purpose; and the hair-side rubbed strongly over with a woollen cap, having first given it a lustre with barberries, citron, or orange. The whole is finished by raising the grain lightly, for the last time, with the paumelle of cork, which leaves them in a condition for sale and use.

Manner of preparing red Morocco.—The skins are steeped twenty-four hours in a river, taken out, stretched on the leg, beat with the knife, returned into the water for twenty-four hours, re-beaten on the leg, re-steeped; thrown into a vat, and for three weeks taken out and returned every morning, to dispose them to peel.—Being taken out for the last time, they are scraped with the knife, and, when the hair is quite off, thrown into pails, of fresh water, where they are rinsed; then the flesh-side scraped, thrown into the pails, and thus alternately from the leg to the pails, till they leave the water quite clean: then they are put in lukewarm water, with the sumac as before; and, after twelve hours, they are rinsed in clear water, and scraped on the leg on both sides, pounded in pails, and the water changed three times; then wrung, and stretched on the leg, and passed after each other into water, with alum dissolved in it. Thus alumed, they are left to drain till the morning, then wrung out, pulled on the leg, and folded from head to tail, the flesh inwards.

In this state they receive their first dye, by passing them one after another into a red liquor, prepared with lacca, and some other ingredients, kept secret among the *marroquins*.—This they repeat again and again, till the skins have got their first colour.

colour. They are then rinsed in clear water, stretched on the leg, and left to drain twelve hours; then thrown into water, into which white galls pulverized have been passed through a sieve, and stirred incessantly for a whole day with long poles, taken out, hung on a bar across the water all night, white against red, and red against white; and in the morning the water is stirred up, and the skins are returned into it for twenty-four hours.

MORPHEW, **MORPHÆA**, a leprous sort of freckle or scurf, which breaks out sometimes upon the skin; particularly about the forehead; called also *albus*.

MORSELLI, or **MORSULI**, are denominations given to those forms of medicines intended to be sucked in the mouth, as a *lozenge*; the word signifying a little mouthful.

MORSUS diaboli, *devil's bit*; a plant of the scabious kind, which seems to have a fringe around the bottom of its root: otherwise called *fuccifa*. See *Supplement*, article *SCABIOUS*. It has its denomination from its roots, which appear as if bitten off at the bottom: which superstitious people attributed to the devil, as done out of envy, left we should have too much of so salutary a root. It was formerly looked on as a good alexipharmac; but is now much out of use.

From a likeness hereto, the edge or selvedge of the tubæ Pallopiæ has obtained the same appellation.

MORSUS canis rabidi. See the article *HYDROPHOBIA*.

MORSUS viperæ. See the article *VIPERÆ*.

MORT d'ancestre, in law. See *ASSISE of mort d'ancestre*.

MORTALITY, a term frequently used to signify a contagious disease, which destroys great numbers of either men, or beasts.

Bills of Mortality are weekly lists compiled by the parish-clerks in and about London, containing the numbers of such as die of each disease, as well as of those that are born, every week.

The bills of mortality comprehend not only the alleys, suburbs and liberties of London and Westminster, and borough of Southwark, but fifteen out-parishes next adjacent.—But then they are limited to the christenings and burials in the parish-churches: for as to those of the Dissenters, Quakers, &c. they do not come under the cognizance of the parish-clerks.

These bills are of some standing in England, in imitation whereof the like are now established at Paris. They are very useful on several accounts, particularly in judging of the mortality of any disease, and whether an epidemic or infectious distemper increases or abates.

There are also yearly bills, collected out of the weekly ones.—By these it appears, that the annual numbers of burials at London is twenty-five or twenty-six thousand: at Paris it is seventeen or eighteen thousand.

Mr. Graunt, who examined the London bills very accurately, has wrote an express treatise of them.—Among other things, he calculates from them, that of 100 persons who are born in the same week, there are but 64 left the end of six years; but 40 at the end of sixteen years; at the end of twenty-six years but 25; at the end of thirty-six years, but 16; at the end of forty-six years, but 10; at the end of fifty-six, no more than 6; at the end of sixty-six years, but 3; at the end of seventy-six, but 1; and at they end of eighty years, they are reduced to none.

He likewise makes it appear, that in England in general, more are born than die; but in London, more die than are born: the proportion of births to burials, in the former, being as 1 $\frac{1}{4}$ to one; in the latter as 1 $\frac{1}{8}$ to one. Thus also cities and market-towns are found to bury 1 $\frac{7}{8}$ to one birth. But in Paris they outdo London; their deaths being 1 $\frac{1}{2}$ to 1 birth. In the villages of England fewer die than are born; there being in general but one death to 1 $\frac{1}{16}$ births.

MORTAR, or **MORTER**, in architecture, a composition of lime, sand, &c. mixed up with water; serving, as a cement, to bind the stones, &c. of a building.

The ancients had a kind of mortar so very hard and binding, that, after so long a duration as to this time, 'tis next to impossible to separate the parts of some of their buildings; though there are some who ascribe that excessive strength to time, and the influence of certain properties in the air, which is, indeed, found to harden some bodies very surprisngly.

The lime used in the ancient mortar is said to have been burnt from the hardest stones, or often from fragments of marble.

De Lorme observes, that the best mortar is that made of pozzolana for sand; adding, that this penetrates black flints, and turns them white. See *POZZOLANA*; and in the *Supplement*, *PUTEOLANUS PULVIS*.

Mr. Worlidge observes, that fine sand makes weak mortar; that the larger the sand, the stronger the mortar. He therefore advises the sand to be washed before it is mixed; and adds, that dirty water weakens the mortar considerably.

Wolfius observes, that the sand should be dry and sharp, so as to prick the hands when rubbed; yet not earthy, so as to foul the water it is washed in.

Vitruvius observes, that fossil sands dry sooner than those taken out of rivers. Whence he adds, the latter is fitted for the insides, the former for the outsides of a building. He subjoins,

that fossil sand, lying long in the air, becomes earthy. Palladio takes notice, that of all sands white ones are the worst; and the reason is owing to their want of asperity.

The proportion of lime and sand in our common mortar is extremely variable: Vitruvius prescribes three parts of pit-fand, and two of river-fand, to one of lime; but the sand here seems to be over-dosed. About London, the proportion of sand to quick-lime is generally about as 36 to 25: in some parts they use equal quantities of each.

Mixing and blending of MORTAR.—M. Felibien observes, that the ancient masons were so very scrupulous herein, that the Greeks kept ten men constantly employed, for a long space of time, to each bason; this rendered the mortar of such prodigious hardness, that Vitruvius tells us the pieces of plaster falling off from old walls served to make tables.—The same Felibien adds, it is a maxim among old masons to their labourers, that they should dilute with the sweat of their brow, i. e. labour it a long time, instead of drowning it with water, to have done the sooner.

Besides the common mortar used in laying of stones, bricks, &c. there are several other kinds: as,

White MORTAR, used in plastering the walls and ceilings; made of ox-hair mixed with lime and water, without any sand.

MORTAR used in making of water-courses, cisterns, &c. is very hard and durable, being made of lime and hogs-grease, sometimes mixed with the juice of figs, and sometimes with liquid pitch: and after application, it is washed over with linseed-oil.

MORTAR for furnaces, &c. is made with Windsor loam wrought in water, wherein horse-dung and chimney-foot have been steeped.

MORTAR for sun-dials on walls may be made of lime and sand tempered with linseed-oil; or, for want of that, with scummed milk. This will grow to the hardness of a stone.

For buildings, one part of washed soap-ashes mixed with another of lime and sand, make a very durable mortar. See *CEMENT*.

MORTAR-PIECE, a short piece of ordnance, thick and wide, proper for throwing bombs, carcasses, shells, stones, &c. There are two kinds of mortars: the one hung or mounted on a carriage with low wheels, after the manner of guns; called a *pendent*, or *hanging mortar*: the other fixed on an immoveable base, called *standing mortars*.

At the head of the bore, or chase of the mortar, is the chamber for the charge of powder.—This is usually made cylindrical, all but the base, which they make hemispherical; though some of the latter engineers prefer spherical chambers; as the surfaces of those, being less, under equal capacities, make less resistance to the gunpowder.

The thickness of the mortar about the chamber is to be much greater than about the chase; by reason the gun-powder makes a much greater effort about the chamber than elsewhere: the diameter of the chamber is also to be much less than that of the bore; by reason bombs, shells, &c. are much lighter than the bullets of equal diameters; and, consequently, less powder suffices.

To charge, or load a MORTAR, the proper quantity of gun-powder is put into the chamber, and if there be any vacant space, they fill it up with hay; some chuse a wooden plug: over this they lay a turf, some a wooden tampon fitted to the bore of the piece; and, lastly, the bomb; taking care that the fulsee be in the axis thereof, and the orifice be turned from the muzzle of the piece: what space remains, is to be filled up with hay, straw, turf, &c. so as the load may not be exploded without the utmost violence.

The quantity of gun-powder to be used, is found by dividing the weight of the bomb by 30: though this rule is not always to be strictly observed.

To elevate the MORTAR, so as its axis may make any given angle with the horizon; they apply the artillery-level, or gunner's quadrant: the use whereof see under the articles *LEVEL*, and *QUADRANT*.

An elevation of 70 or 80 degrees is what is commonly chosen for rendering mortars most serviceable in casting shells into towns, forts, &c. though the greatest range be at forty-five degrees.

If all mortar-pieces were, as they ought to be, exactly similar, and their requisites of powder as the cubes of the diameters of their several bores; and if their shells, bombs, carcasses, &c. were also similar; then, comparing like with like, their ranges on the plane of the horizon, under the same degree of elevation, would be equal; and, consequently, one piece being well proved, i. e. the range of the granado, bomb, carcass, &c. being found to any degree of elevation, the whole work of the mortar-piece would become very easy, and exact. But since mortars are not thus similar, it is required, that the range of the piece, at some known degree of elevation, be accurately found by measuring; and from hence all the other ranges may be determined.

Thus, to find the range of the piece at any other elevation required; say, as the sine of double the angle under which the

experiment was made, is to the sine of double the angle proposed, so is the range known, to the range required.

Suppose, for instance, it be found that the range of a piece elevated to 30 degrees is 2000 yards: to find the range of the same piece with the same charge, when elevated to 45 degrees: Take the sine of 60°, the double of 30°, and make it the first term of the rule of three; the second term must be the sine of 90°, the double of 45°; and the third the given range 2000: The fourth term will be 2310, the range of the piece at 45°. If the elevation be greater than 45°, instead of doubling it, take the sine of double its complement to 90°. As suppose the elevation of a piece be 50°, take the sine of 80°, the double of 40°.

Again, if a determinate distance to which a shot is to be cast, be given, and the angle of elevation to produce that effect be required; the range known must be the first term in the rule of three, which suppose 2000 yards; the range proposed, which we suppose 1600 yards, the second term; and the sine of 60 double of the elevation for the range of 2000 yards, the third term. The fourth term will be found the sine of 43°, 52', whose half 21°, 56', is the angle of elevation the piece must have, to produce the desired effect. And if 21°, 56', be taken from 90°, you will have 68°, 4' for the other elevation of the piece, with which the same effect will likewise be produced.

Note, to avoid the trouble of finding sines of double the angles of proposed elevations, Galileo and Torricelli gives us the following table, wherein the sines of the angles sought are had by inspection.

Degrees.	Degrees.	Ranges.	Degrees.	Degrees.	Ranges.
90	0	0	0	0	0
89	1	349	66	24	7431
88	2	698	65	25	7660
87	3	1045	64	26	7880
86	4	1392	63	27	8090
85	5	1736	62	28	8290
84	6	2709	61	29	8480
83	7	2419	60	30	8660
82	8	2556	59	31	8829
81	9	3090	58	32	8988
80	10	3420	57	33	9135
79	11	3746	56	34	9272
78	12	4067	55	35	9397
77	13	4384	54	36	9511
76	14	4695	53	37	9613
75	15	5000	52	38	9703
74	16	5299	51	39	9781
73	17	5592	50	40	9841
72	18	5870	49	41	9903
71	19	6157	48	42	9945
70	20	6428	47	43	9976
69	21	6691	46	44	9994
68	22	6947	45	45	10000
67	23	7193			

The use of the table is obvious.—Suppose, for instance, it be known by experiment, that a mortar elevated 15°, charged with three pounds of powder, will throw a bomb to the distance of 350 fathom; and it be required, with the same charge, to throw a bomb 100 fathom farther: Seek in the table the number answering to 15 degrees, and you will find it 5000. Then as 350 is to 450, so is 5000 to a fourth number, which is 6428. Find this number, or that nearest it in the table, and against it you will find 20°, or 70°; the proper angles of elevation. For the weight, dimensions, &c. of the bombs, &c. to be cast out of mortars, and the lines of their projection; see BOMB, and PROJECTILE.

MORTGAGE *, in law, an obligation, whereby lands or tenements of a debtor are pawned or bound over to the creditor for money, or other effects borrowed; peremptorily to be the creditor's for ever, if the money be not repaid at the day agreed on.

* Glanvil defines mortgage, *mortuum quidam*, to be that *cujus fructus vel redditus interim percepti in nullo se acquiescant*. Thus 'tis called mortgage, i. e. dead gage, of mort, death; and gage, pledge; because whatever profit it yields, yet it redeems not itself by yielding such profit, except the whole sum borrowed be likewise paid at the day; the mortgagee being by covenant to receive the profits till default of payment. Others hold it called mortgage, because if the money be not paid at the day, the land mortitur, dies, to the debtor, and is forfeited to the creditor.

In this sense, mortgage, in common law, amounts to much the same with *hypotheca* in the civil law.

The creditor holding such land, on such agreement, is in the mean time called *tenant in mortgage*.—He who lays the pawn or gage, is called the mortgagee, and he that takes it the mortgagee.—If a mortgage include excessive usury, it is prohibited by a statute 37 Hen. VIII.

The French sometimes use the word mortgage in the same sense in their language, where it stands in contradiction to a simple contract, which does not carry with it the mean profits, and which they call *vif gage*, live-pledge.

A mortgage is an engagement for the security of the creditor; Vol. II.

for which purpose various means have been contrived: That of the pawn or pledge, seems to have been the most ancient, being in reality the same thing with the mortgage; all the difference consisting in this, that in a mortgage the pawn was put into the hands of the creditor; whereas in a simple engagement, the thing remained in the hands of the debtor.—But it was afterwards found much more commodious to engage lands by a simple convention, than by an actual delivery.

Accordingly, this was practised by the Greeks; and from them borrowed by the Romans; who, the better to prevent deceits, fixed up visible marks to inform the public, that the estate was engaged by the proprietor: Though these marks were found so injurious to the debtors, that the use of them was at length prohibited.

The Romans had four kinds of mortgages, or *hypothecæ*. The *conventional*, which proceeds from the will and consent of the contractors: The *legal*, which is introduced by the law, and which is therefore called *tacit*: The mortgage of the praetor, when, by the flight or refusal of the debtor, the creditor was put in possession of his effects: And the *judiciary mortgage*, when the creditor was put in possession, in consequence of a decree or sentence.

The civil lawyers distinguish twenty-six different kinds of *tacit mortgages*.

MORTIER, a badge or ensign of dignity, borne by the chancellors, and great presidents, of the parliaments of Paris. That borne by the chancellor is a piece of cloth of gold, lined and turned up with ermin: That of the first president is a piece of velvet edged with a gold lace; that of the other presidents is only a piece of gold lace.

They formerly bore it on their head, but now in their hands, except in grand ceremonies, as at the entry of a king.—Hence the denomination, *presidents a mortier*.

MORTIFICATION, *necrosis*, in medicine, a total extinction of the natural heat of the body, or a part thereof.

Some define *mortification* a disease, wherein the natural juices of any part quite lose their proper motion; and by that means fall into a fermentative one, and corrupt and destroy the texture of the part.

There are two species, or rather degrees of *mortification*: The one called a *gangrene*, which is a *mortification* in its first, or beginning state: The other a *spbaculus*, which is a perfect or finished *mortification*.

MORTISE *, or **MORTTOISE**, in carpentry, &c. a kind of joint, wherein a hole or incision, of a certain depth, is made in the thickness of a piece of wood, which is to receive another piece, called a *tenon*.

* The word is originally French, *mortaise*, which signifies the same; and which Borel derives further from *morder*, to bite.

MORTMAIN *, in law, the alienation of lands and tenements to any guild, corporation, or fraternity, and their successors; as bishops, parsons, vicars, &c. which may not be done without the king's licence, and that of the lord of the manor; or that of the king alone, if it be immediately holden of him. †

* The word literally denotes *dead-hand*; being a compound of *mort*, dead, and *main*, hand.—Accordingly Hototian defines *mortmain* to be the possession of those who are, as it were, immortal, because they never cease to have hers; so that the estate never reverts to its first lord; *main*, hand, being used for possession; and *mort*, dead, by antiphrasis, for immortal.—Others assign the reason of the name thus; that the services and other profits due for such lands, should not, without such licence, come into a dead hand (*mainmort*), i. e. into a hand as it were dead, that is, so dedicated to God, or pious uses, as to be different from other lands, tenements, or hereditaments, and never to revert to the donor, or any temporal or common use.

The presidents and governors of hospitals may, without licence in *mortmain*, purchase land, &c. not exceeding the yearly value of 3000 *l*. Stat. 14. Car. 2.

MORTUARY is a gift left by a man at his death to his parish church, for a recompence of personal tithes and offerings, not duly paid in his life-time.

Mortuary is also the fee paid to an incumbent, for carrying a corpse out of his parish, to be buried in another.

A *mortuary* is not properly and originally due to an incumbent from any but those of his own parish: But, by custom, in some places of the kingdom, it is paid to the parsons of other parishes, as the corpse passes through them.

MORTUUM CAPUT. See the article CAPUT.

MOSAIC *, **MOSAIC work**, or, as some chuse to call it, **MUSAIK**, an assemblage of little pieces of glass, marble, shells, precious stones, woods, or the like, of various colours, cut square, and cemented on a ground of stucco, &c. imitating the natural colours and degradations of painting. In this sense *mosaic work* includes *maquetry*, or *inlaid work*, *vanerwork*, &c.

* The critics are divided as to the origin and reason of the name: some derive it from *mosaicum*, a corruption of *musaicum*, as that is of *musivum*, as it was called among the Romans. Scaliger derives it from the Greek *μουσα*, and imagines the name was given to this sort of works, as being very fine, and ingenious. Nebriensis is of opinion it was so called, because *ex illis picturis ornabantur musæ*.

But, in its more proper and restrained sense, *Mosaic* only takes in 6 C c works

works of stone, metals, and glass; those of wood being distinguished by the name of *marquetry* or *inlaying*. Others distinguish otherwise between *mosaic* and *marquetry*. In that properly called *mosaic*, they say, the several stones are all of the same colour; and the changes and diminutions of colours, and shades, are made by applying different stones one on another, but all of the same colour. *Marquetry*, on the contrary, consists of stones of different colours; and by these the several colours, shades, degradations, &c. are expressed.

Mosaic seems to have taken its origin from *paving*: The first effect and use of pavements, composed of pieces of marble of different colours so well joined together, as that, when dried, they might be polished, and the whole make a very beautiful and solid body, which continually trodden upon, and washed with water, was not at all damaged; gave the painter the hint; who soon carried the art to a much greater perfection: so as to represent foliage, masks, and other grotesque pieces of various colours, on a ground of black or white marble. In fine, observing the good effect which this kind of work had in pavements, and finding that it resisted water, they proceeded to line walls therewith, and to make various figures by it, for the ornament of their temples and public buildings. But nature not producing variety of colours enough for them in marbles, to paint all kinds of objects, they bethought of counterfeiting them with glass and metal colours; which succeeded so well with them, that having given all manner of tints to an infinite number of little pieces of these two matters, to counterfeit stones of various colours, in order to get more colours; the workmen arranged them with so much art, that their *mosaic* seemed almost to dispute with paintings. This way of representing objects having this advantage, that it resists the injuries of the air as well as marble itself; and even grows more beautiful with time, which effaces all other kinds of painting.

But the moderns have gone yet further, and setting aside glass and metals, as too mean materials, have introduced, along with the finest marbles, the richest of precious stones, as lapis-lazuli, agat, carnelians, emeralds, turquoises, &c.

Of these three kinds of *mosaic* work, that of coloured glass and metals is now little in use, though of a surprising lustre and durability: of the other two, that of marbles alone is in common use; the *mosaic* in precious stone being so very dear, that the few workmen who apply themselves to it, make little else but petty works, as ornaments for altar-pieces, tables for rich cabinets, &c. Though out of these must be excepted that sumptuous chapel of the dukes of Tuscany, which will be a noble monument of the magnificence and piety of those princes, as well as of the patience and address of the workmen employed therein.

We shall, however, enter into some detail of the manner of working in those three kinds of *mosaic*; to which we shall add a fourth much newer, yet equally ingenious with any of the rest, made with a kind of gypsum or talc, found in the stone-quarries about Paris.

Mosaic work of glass.—This kind they begin with little pieces of glass, which they provide of as many different colours as possible. To this end, the glassmen's furnaces being disposed, and their pots or crucibles full of the matter of which glass is made, or rather of glass already made, they put what metalline colour or dye they think fit in each crucible, always beginning with the weakest, and augmenting the strength of the colours from crucible to crucible, till they come to the deepest dye, as in mixing of colours on a palette to paint in oil. When the glass has had sufficient coction, and all the colours are in their perfection, they take out the glass hot, as it is, and lay it on a smooth marble, flattening it down with another marble, and then cutting it into slices of equal bigness, and about the thickness of an inch and half. They then with an instrument, which the Italians call *bocca di cane*, make other pieces square, and others of different figures and sizes, as occasion requires; these they dispose orderly in cases; as in painting in fresco, 'tis usual to range all the different tints in shells, according to their colour. If it be desired to have gold, either in the ground of the painting, or in the ornaments, or the draperies, they take some of the pieces of glass, formed and cut in the manner just mentioned. These they moisten on one side with gum-water, and afterwards lay them over with gold-leaf. They then put this piece, or several pieces at a time, on a fire-shovel, which they place in the mouth of the furnace, after having first covered them with another hollow piece of glass. Here they continue till such time as they become red-hot; after which the shovel is drawn out, all at once, and the gold becomes so firmly bound to the glass, that it will never afterwards leave it.

Now, to apply these several pieces, and out of them to form a picture, they first make a cartoon, or design; this they transfer on the ground or plaster, by calquing, as in painting in fresco.

As this plaster is to be laid thick on the wall, it will continue fresh and soft a considerable time, so that there may be enough prepared at once to serve three or four days. This plaster is

composed of lime made of hard stone, with brick-dust ground very fine, gum-tragacanth, and whites of eggs; when it is thus prepared, and laid on the wall, and the design finished of what is to be represented; with plying they take out the little pieces of glass, ranging them one after another, and fill keeping strictly to the light, shadow and different tints and colours represented in the design; pressing or flattening them down with a ruler, which serves both to sink them within the ground, and to render the surface even.

Thus, in a long time, and with an infinite deal of trouble, they finish the work, which is still the more beautiful, as the pieces of glass are more uniform, and ranged at more equal heights. Some of these are executed with so much justness, that they appear as smooth as a table of marble, and as finished and masterly as a painting in fresco; with this advantage, that they have a fine lustre, and will hold almost for ever.

The finest works of this kind, that have descended to us, and those from which the moderns have retrieved the art, almost lost, are those of the church of St. Agnes, formerly the temple of Bacchus, at Rome; besides some at Pisa, Florence, and other cities of Italy. The most esteemed among the works of the moderns are those of Joseph Pine, and the chevalier Lanfranc, in the church of St. Peter at Rome. There are some very good ones likewise at Venice.

Mosaic work of marble, and precious stones.—These two kinds bear so near a relation to each other, as to the manner of working, that, to avoid repetition, we shall give them both under one; observing, by the way, wherein the one differs from the other, either in the sawing or the ranging of the stones.

Mosaic of marble is used in large works, as in pavements of churches, basilics, and palaces; and in the incrustation and vaneering of the walls of the same edifices.—As to that of stones, especially *precious stones*, 'tis only used in small works, as before observed.

The ground of *mosaic* works wholly marble, is ordinarily a mass of marble, either white or black. On this ground the design is cut with a chisel, having been first calqued. When 'tis dug of a sufficient depth, *i. e.* an inch or more, 'tis filled up with marble of a proper colour, first contoured, or fashioned to the design, and reduced to the thickness of the cavities, with various instruments. To make the pieces, thus inserted into the cavities, hold, whose several colours are to imitate those of the design, they use a stucco, composed of lime and marble dust; or a mastic, which each workman prepares differently: after which, the work is half polished with a soft kind of stone.

The figures thus marked out, the painter or sculptor himself draws, with a pencil, the colours of the figures not determined by the ground, and in the same manner makes strokes or hatchings, in the places where shadows are to be; and when he has engraved, with the chisel, all the strokes thus drawn, he fills them up with a black mastic, composed chiefly of Bugundy-pitch, poured on hot; taking off, afterwards, what is superfluous, with a piece of soft stone or brick, which with water and beaten cement, takes away the mastic, polishes the marble, and renders the whole so even, one would imagine it only consisted of a single piece: 'Tis this kind of *mosaic* we see in the pompous church of the invalids at Paris, and the fine chapel at Versailles; and wherewith some intire apartments of that palace are incrustured.

For mosaic work of precious stones; there are required other and more delicate instruments than those used in marble; as wheels, drills, tin-plates, &c. used by lapidaries, and carvers in stone. As none but the richest marbles and stones enter this work, to make them go the further, they are sawn into the thinnest leaves imaginable, scarce exceeding half a line in thickness; the block to be sawed, is fastened firmly with cords, on the bench, only raised a little on a piece of wood, one or two inches high. Two iron pins, which are on one side the block, and which serve to fasten it, serve also to direct the saw. The pieces to be sawed, are put into a vice contrived for the purpose; in which state, with a kind of saw or bow made of a fine brass wire, bent on a piece of springy wood, together with emery moistened with water, the leaf is gradually fashioned, by following the strokes of the design made on paper, and then glued on the piece.

When there are pieces enough fashioned to form an intire flower, or some other part of the design, they are applied. The ground that sustains this *mosaic*, is usually of stone. The matter wherewith the stones are joined together, is a mastic, or stucco, laid very thin on the leaves as they are fashioned; and the leaves in this state are applied with plying. If any contour, or side of a leaf, be not either rounded enough, or squared enough, to fit the place where it is to be used, when it is too large, it is brought down with a brass file or rasp, and when too small, is managed with a drill, and other lapidary instruments.

Manner of making Mosaic work of gypsum. This is a kind of coarse talc, or shining transparent stone, found in the quarries of Montmartre near Paris, among the stones thence dug to make the plaster of Paris.—It is different from the plaster, but retains the name which the Romans gave the plaster, viz. *gypsum*.

Of this stone, calcined in a kiln, beaten in a mortar, and passed through a sieve, they make a kind of artificial marbles, imitating precious stones; and of these they compose a kind of mosaic work, which comes little short either of the durability or vivacity of the natural stones; and which has this advantage, that it admits of continued pieces, or paintings of intire compartments, without any joining visible.

Some make the ground of plaster of Paris, others of free stone: if the former, it is spread in a wooden frame, of the length and breadth of the intended work, and about an inch and half thick. This frame is so contrived, as that the tenons being only joined to the mortises by single pins, they may be taken asunder, and the frame be dismounted when the plaster is dry. This frame they cover on one side with a strong linen cloth, nailed all round; and, being placed horizontally, with the linen at bottom, it is filled with plaster, passed through a wide sieve. The plaster being half-dry, the frame is set perpendicular, and left till it be quite dry; and then taken out, by dismounting the frame. In this mosaic, the ground is the most important part. Now, to prepare the sifted gypsum to be applied on this ground, they dissolve and boil it in the best English glue; and, after mixing with it the colour it is to bear, the whole is worked up together into the ordinary consistence of plaster; and then taken and spread on the ground, five or six inches thick. It must be observed, that if the work be such, as that mouldings are required, they are formed with gouges and other instruments.

'Tis on this plaster, thus coloured like marble or precious stone, and which is to serve as a ground to a work either of lapis lazuli, agat, alabaster, or the like, that the design to be represented is drawn; having been first pounced or calqued. To hollow or impress the design, they use the same instruments with the sculptors; the ground whereon they are to work, not being much less hard than marble itself. The cavities thus made in the ground are filled up with the same gypsum boiled in glue, only differently coloured; and thus are the several colours of the original represented. To have the necessary colours and tints at hand, they temper quantities of the gypsum with the several colours, in little pots. When the design is thus filled, and rendered visible, by half-polishing it with brick or soft stone; they go over it again, cutting such places as are either to be weaker, or more strongly shadowed, and filling them with gypsum; which is repeated till all the colours, added one after another, represent the original to the life. The work, being finished, is scoured with soft stone, sand, and water; then with pumice-stone; and, lastly, polished with a wooden rubber, and fine emery. Then, a lustre is given it, by smearing it over with oil, and rubbing it a long time with the palm of the hand; which gives it a gloss nothing inferior to that of natural marble.

If it be only required to make a variegated table, or other work of several colours, without mosaic figures; the process is somewhat different.—To this end, they only prepare separately, in large bowls, as many different colours as nature shews in the marble to be imitated; and, after incorporating them with the gypsum and glue-water, they take a trowel-full of each, and dispose them in a trough, without any order; then without mingling them, and only by cutting or crossing the gypsum of each trowel once or twice with each of the rest, they give them that beautiful confusion, for which natural marbles are so much valued: of these they then make their tables, or lay a mold, according to the work to be done.

As to MOSAIC work of wood, more properly called marquetry or inlaid work, the antients were well acquainted with it, and used it for the adorning of their beds, tables, and other moveables; employing for this purpose ivory, beside the richest woods.—But insar John of Verona seems to have contributed the most to its perfection, by discovering the secret of dying woods of all colours and degrees, by which means he was enabled to imitate paintings, and even to represent architecture in perspective. They begin with sawing their woods into leaves, of the thickness of one or two tenths of an inch; then they take pieces of the design they are to follow, and fasten them to those leaves; and with a little steel saw fashion these to the contour of the design. All that is necessary being taken off with the saw, they give the shadow to those places that require it, by placing the piece in a hot sand, or otherwise, with the direction necessary to shadow it more or less. This done, they lay each piece in its place, on a ground of another wood, as dry oak; and there fasten them with strong glue.

There are, beside these, two other branches of mosaic work; the one called damaskening, or damask-work, consisting in an assemblage of gold or silver threads, of which are sometimes formed flat works, and sometimes bas-reliefs.

The other is called shell-work, consisting of shells, artificial congelations, petrifications, &c. used in grottoes.

MOSQUE ⁴, or MOSK, among the Mahometans, is a temple set apart for the exercises of their religion.

* The word comes from the Turkish *mesjid*, or *meschit*, which properly signifies a temple built of wood, such as the Turks still use. Hence the Spaniards derive their *mezquita*, and the Italians *moschea*, and the French and English *mosque*, and *meski*.

Borel derives the word from the Greek *μωσος* calf, because of the frequent mention of a cow in the Alocran. But others, with the greatest appearance of reason, derive it from the Arabic *maljiah*, a place of worship.

There are royal *mesques* founded by the emperors, as the Solimania and Velidea at Constantinople; and private *mesques* founded by muskies, vizirs, bailiffs, &c.

Mosques are built like large halls, with isles, galleries, and domes; and are adorned on the inside with compartments and pieces of arabesque work.—On one side is always found a pool with several cocks: and on the top is placed a crescent.

The Turks have converted most of the Christian churches into *mesques*.

MOSS, *Muscus*, in natural history, a little plant of the parasite kind, growing on the barks, &c. of several trees, as oak, poplar, ash, cedar, &c. as well as on the ground.

The most esteemed and odoriferous *moss* is that of the cedar: it is of some medicinal use, being astringent, and proper to stop hæmorrhages and dysenteries.

The antients took the *moss* of trees to be the effect of a disorder or discomposure of the texture of the bark; or, at most, a kind of little filaments arising from the bark. But the moderns find by several observations, that *mosses* are all real, distinct plants, whose seed, being extremely small, is inclosed in little capsule; which bursting of themselves, the seed is carried off by the winds; till, falling into the inequalities of the bark of trees, it is there stopped, takes root, and feeds at the expence of the tree, as mouldiness does on bread, &c.

The different kinds of *mosses* are very numerous: Monf. Vailant reckons 137 several species growing only in the neighbourhood of Paris. And the number of mosses in general has been since vastly increased by Dillenius.

There is also a kind of greenish *moss* growing on human skulls that have been long exposed to the air, called *usnea humana*, or *muscus calvarius*. The antients made great use of it as an astringent, &c.

Mosses make an article of commerce; there being several kinds used in medicine, in perfuming, &c. among others, the *sea-moss*, called *cralline*, and the *moss* of cedar and fir, which enter the composition of Cyprus powder.

The *moss* of common trees, as oak, ash, poplar, &c. is used for caulking of vessels. 'Tis also used by bird-merchants, to prepare cages for certain kinds of birds to hatch in.

The gardeners, &c. reckon *moss* among the diseases or infirmities of plants. Mr. Mortimer, &c. direct it to be rubbed and scraped off with some proper instrument, that will not hurt the bark of the tree, or with a piece of hair-cloth after a soaking rain; though the surest cure is by removing the cause; which is effected by draining the land well of all superfluous moisture: or they say it may be prevented in the first planting of trees, by not setting them too deep. The general distinctions and species of *mosses*, see in the Supplement, article *Muscus*.

MOITE, MORA, frequently occurs in our antient customs, for a meeting, court, or plea.

Of *metes*, by the Saxons also called *gemetes*, considered in the sense of assemblies, or courts, there were divers kinds; as *witenagemote*, *folkeagemote*, *schiregemote*, *hundredagemote*, *burgemote*, *wardagemote*, *haligemote*, *swainagemote*, &c. See each under its proper article, WITTENAGEMOTE, FOLKEAGEMOTE, &c.

MOTE, *meta*, was also used for a fortress, or castle; as *meta de Windsor*, &c.

MOTE also denoted a standing water to keep fish in; and sometimes a large ditch encompassing a castle, or dwelling-house.

MOTECTICO *style*. See the article *STYLE*.

MOTHER, *mater*, a female who stands in the relation of parent to another.

Thus Eve is called our common *mater*: Cybele, among the antients, was the *mother* of the gods.

QUEEN-MOTHER, signifies the same with what we otherwise call *queen dowager*.

We meet with empresses on medals and inscriptions with the title of *mother* of the camp; *mother* of the senate, *mother* of the country: *mater senatus*, *mater castrorum*, *mater patriæ*, &c.

MOTHER of God, is an attribute commonly given to the blessed Virgin. It had its origin from the Greeks, who first called her Θεοτοκος; in imitation of whom some Latins began to call her *Deipara*, *Dei genitrix*. The council of Ephesus first gave a sanction to the appellation; but the 5th of Constantinople decreed, that the Virgin should always be thus called. This gave rise to terrible disputes: Anastasius, a presbyter of Nestorius patriarch of Constantinople, first asserted in a sermon, that the Virgin was by no means to be called Θεοτοκος; upon which words a great tumult arising, Nestorius took his presbyter's part, and taught the same doctrine.

But tho' Θεοτοκος may be extended so as to signify as much as the *Mother of God*, because τίκτω sometimes denotes as much as γάρμει; whence accordingly it had been translated in Latin *Dei genitrix*, as well as *Deipara*; yet those antient Greeks, who called the virgin Θεοτοκος, did not call her πατήρ τῆς Θεῆς, the *mother of God*, till the Latins translating Θεοτοκος by *Dei genitrix*,

genitrix the Greeks came at length to re-translate *Dei genitrix*, by *Dei Mater*. And thus both were brought to call her *Mother of God*.

The first who is noted by the Greeks to have thus styled her *Mother of God*, is Leo Magnus: his reason, as represented by S. Cyril, was this, that, taking the *Lord* and *God* to be synonymous, he apprehended that Elizabeth first styled Mary the *Mother of God*, because she styled her the *Mother of her Lord*.

MOTHER-TONGUE is properly an original language, from which others are formed.

Of *mother-tongues*, Scaliger reckons ten in Europe; viz. the Greek, Latin, Teutonic or German, Sclavonic, Epirotic, Scythian or European Tartar, Hungarian, Cantabrian, Irish, and British.

MOTHER-CHURCHES are those which have founded or erected others. In beneficiary matters, they say, it is not lawful for a man to enjoy at the same time both the *mother* and the daughter; meaning that the canon-law does not allow an abby, and the benefices depending thereon, to be held by the same person.

FITS OF THE MOTHER. See the article *HYSTERIC affection*.

MOTION, primarily so called, or *local MOTION*, is a continued and successive change of place; or that state of a body, whereby it corresponds successively to several different places; or is present successively in different parts of space.

In this sense, the doctrine and laws of *motion* make the subject of mechanics, or statics.

The ancient philosophers considered *motion* in a more general and extensive manner. They defined it, a passage out of one state into another: and thus made six kinds of *motion*, viz. *Creation, generation, corruption, augmentation, diminution, and lation, or local motion*.

Some of the later schoolmen reduce these six kinds of *motion* to four: the first is general, including any passage from one state to another; under which kind come *creation, production, and mutation*.—The second is a passage of something already existing from one state to another: and thus *generation* is a *motion*.—The third is a successive passage of something already existing from one term to another; and thus *alteration, and accretion*, are species of *motion*.—The last, is *lation or local motion*; and thus walking is *motion*.

But the latest philosophers deny any other species beside *local motion*; and reduce all the sorts above-mentioned to this one.—So that we have here only to do with *lation, or local motion*; whereof the rest are only for many different determinations, or effects.

Physical writers, both ancient and modern, have ever been perplexed about the nature and definition of *local motion*.—

The Peripatetics define it by, *Actus entis in potentia, prout in potentia*, Arist. 2. Phys. c. 2. But this notion seems too abstract and metaphysical for our days; and is of no use in explaining the properties of *motion*.

The Epicureans explain *motion* by the migration of a body, or a part of a body, from one place to another. On which definition the later Epicureans refine, and call it the migration or passage of a body from space to space; thus substituting the word *space* for that of *place*.

The Cartesians define *motion* a passage or removal of one part of matter out of the neighbourhood of those parts immediately contiguous thereto, into the neighbourhood of others.

Which definition agrees, in effect, with that of the Epicureans; all the difference between them consisting in this; that what the one calls *body and place*, the other calls *matter, and contiguous parts*.

Borelli, and other late writers after him, define *motion* more accurately and fully, the successive passage of a body from one place to another, in a determinate time, by becoming successively contiguous to all the parts of the intermediate space.

Motion, then, is agreed to be the translation of a body from place to place: but authors differ infinitely when they come to explain wherein this translation consists.—And hence their divisions of *motion* become exceedingly precarious.

Aristotle, and the Peripatetics, divide all *motion* into *natural, and violent*.

NATURAL MOTION is that which has its principle, or moving force, within the moving body.—Such is that of a stone falling towards the centre of the earth.

Violent MOTION is that whose principle is without, and against which the moving body makes a resistance.—Such is that of a stone thrown upwards.

The moderns generally divide *motion* into *absolute and relative*.

Absolute MOTION is the change of absolute place, in any moving body: whose celerity, therefore, will be measured by the quantity of absolute space, which the moveable body runs through.

Relative MOTION is a mutation of the relative or vulgar place of the moving body; and has its celerity estimated by the quantity of relative space run through.

Others divide *motion* into *proper, and improper, or foreign*.

Proper MOTION is a removal out of one proper place into another, which hereby becomes proper, as being possessed by this body alone, in exclusion of all others.—Such is the *motion* of a wheel in a clock.

Improper, extraneous, foreign, or common MOTION, is the passage of a body out of one common place into another common place.—Such is that of a clock when moving in a ship, &c.

The reason of all this diversity seems to arise from the not attending to the different meanings of the words; but comprising all in one definition and division; which they should rather have distinguished into several parts.

Some, e. gr. in their definitions of *motion*, consider the moving body, not as it regards the adjacent bodies, but as it regards immovable and infinite space.—Others, again, consider the moving body, not as it regards infinite space, but as it regards other bodies vastly remote.—And others, lastly, consider the moving body, not as it regards remote bodies, but that surface only to which it is contiguous.

But these various meanings being once settled, the dispute clears up; for as every thing that moves may be considered in these three several manners; there hence arise three several kinds of *motions*: whereof that which regards the parts of infinite immovable space, without consideration of the circumambient bodies, may be called *absolutely and truly proper motion*.

That which regards circumambient bodies vastly remote, which may themselves possibly be moved, we call *relatively common motion*.

The last, which regards the surfaces of the next contiguous bodies, inasmuch as it may want all both absolute and common motion, we call *relatively proper motion*.

Absolutely and truly proper MOTION, then, is the application of a body to different parts of infinite and immovable space.

This alone is *proper and absolute motion*, being always generated and changed by forces impressed on the moving body itself, and by those only; and being that to which the real forces of all bodies to put others in *motion* by impulse, are owing; and to which those motions are proportioned.—But this *motion* we cannot investigate or determine accurately; nor can we distinguish, when two bodies are impelled on each other, in which of the two (e. gr. that which appears to move the more swiftly, or the other, which appears to move more slowly, and perhaps even to be at rest) the real *motion*, and consequently, the real force whence the impulse arose, is placed; not being able to determine whether the centre of gravity of the whole system (which is but a point in infinite space) is itself at rest, or in *motion*.

Relatively common MOTION is a change of the situation of a body with respect to other remote circumambient bodies: and this is the *motion* we speak of, when we say, that men, cities, and the earth itself, move round the sun.

This is also the *motion* we mean, when we estimate the quantity of *motion*, and the force any body has to impel another.—For instance, if a wooden sphere, filled with lead to make it the heavier, be dropped from the hand, we use to estimate the quantity of *motion*, and the force which the sphere has to impel another, by the celerity of the sphere, and the weight of the included lead; and that truly with regard to the force itself, and the effect thereof, as it falls under our senses.—But whether the real power or *motion* be in the sphere which appears to strike, or in the earth which appears to be struck, that, as has been observed above, we cannot determine.

Relatively proper MOTION is the successive application of a body to the different parts of the contiguous bodies.

And this is the *motion* usually understood in physical disputes about the natures of particular things; as when we say, that heat, sound, fluidity, &c. consist in *motion*.

This must be added, however; that, by successive application of a body, its whole surface, taken together, must be conceived successively applied to different parts of the contiguous bodies. From these several definitions of *motion* arise as many definitions of place: for when we speak of *motion* (or rest) *truly and absolutely proper*, then place is that part of infinite and immovable space which the body fills.—When of *motion relatively common*, then place is a part of any space or moveable dimension.—When of *motion relatively proper* (which is really very improper), place is then the surface of the next adjacent bodies, or sensible spaces.

The definition of rest is pretty well agreed on; but whether rest be a mere privation of *motion*, or any thing positive, is hotly disputed.—Malebranche, and others, maintain the former side of the question; Cartes, and others, the latter.—These last contend, that a body at rest has no power to persevere in that rest, nor to resist any bodies that would destroy it; and that *motion* may as well be called a cessation of rest, as rest of *motion*.

The main argument urged by the former is this: Suppose a globe at rest, and suppose God cease to will its rest; what will be the consequence? It will rest still. Let it be in *motion*, and let God cease to will its *motion*; what will be the consequence? It will cease to move; that is, it will be at rest; because the power whereby a body in *motion* perseveres in that state, is the positive will of God: that whereby the quiescent body perseveres, is only his privative will.

But this is a *petitio principii*; for the force or conatus whereby bodies, whether moving or quiescent, persevere in those states, is the more inactivity of matter; and therefore, were it possible

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for God not to will any thing, a body already in *motion*, would move for ever; as a body at rest, would rest for ever.—To this inactivity of matter it is owing, that all bodies resist according to their quantities of matter, and that any body striking another with any given velocity, will move it in the same proportion which its density, or quantity of matter has, to the density or quantity of matter of the other.

Motion has ever been esteemed a species of quantity; and its *quantum*, or greatness, which we otherwise call its *momentum*, is estimated partly from the length of the line which the moving body describes (as if a body pass over a line of an hundred feet, the quantity of its *motion* is greater than if it passed over only ten feet) and partly from the quantity of the matter moved together, or at the same time, *i. e.* not from the bulk or extension of the body, but from its mass or weight; the air, and other subtle matters wherewith the pores are filled, not entering into the account: as if a body of two cubic feet run over a line of an hundred feet, the quantity of its *motion* is greater than that of a body of one cubic foot describing the same line: for whatever *motion* one whole has; that is had in one half of the other; and the *motion* of the whole is the sum or the *motion* of all its parts.

Hence it follows, that for two unequal bodies to have equal *motions*, or momentums, the lines which they pass over must be in a reciprocal proportion of their masses or weights; *i. e.* if any body have three times the quantity of matter that another has, the line it runs over must be $\frac{1}{3}$ of the line run over by the other.—If two bodies, then, fastened to the two extremities of a balance or lever, have their masses in a reciprocal ratio of their distances from the fixed point, when these are moved, they must describe lines in a reciprocal ratio of these masses.

For instance, if the body A (*Tab. Mechanic. fig. 30.*) have three times the mass or weight of B, and each be fastened to the extremes of the lever AB, whose fulcrum or fixed point is C, in such manner as that the distance BC is thrice the distance CA; the lever cannot incline either way, but the space which the less body moves, BE, will be thrice the space AD, which the greater moves: so that their motions will be equal.—Nor is there any reason why the body A tending downwards, *v. gr.* with four degrees of *motion*, should raise the body B, rather than B, tending downwards likewise with the same four degrees of *motion*, should raise the body A: they will therefore be in equilibrium.—On which foundation depends the whole doctrine of mechanics.

Hence that great problem of Archimedes, with any given power, how small soever, to raise any weight given, how great soever.—For by increasing the distance CB infinitely, the power of the body A will be increased infinitely.

It is allowed on all hands, that *motion* is no essential attribute of matter; and hence arises a dispute about its production, and to what cause its continuation is owing.

Quantity of Motion, if always the same?—The Cartesians maintain, that the Creator at the beginning impressed a certain quantity of *motion* on bodies; and that under such laws, as that no part of it should be lost, but the same portion of *motion* should be constantly preserved in matter: and hence they conclude, that if any moving body strike on any other body, the former loses no more of its *motion* than it communicates to the latter.

This principle Sir Isaac Newton overturns in the following words:—'From the various compositions of two *motions*, it is manifest there is not always the same quantity of *motion* in the world; for if two balls joined together by a slender wire, revolve with an uniform *motion* about their common centre of gravity, and at the same time that centre be carried uniformly in a right line drawn in the plane of their circular *motions*; the sum of the *motions* of the two balls, as often as they are in a right line drawn from their common centre of gravity, will be greater than the sum of their *motions* when they are in a line perpendicular to that other. Whence it appears, that *motion* may both be generated and lost. But by reason of the tenacity of fluid bodies, and the friction of their parts, with the weakness of the elastic power in solid bodies, nature seems to incline much rather to the destruction, than the production of *motion*; and in reality *motion* becomes continually less and less. For bodies which are either so perfectly hard, or so soft, as to have no elastic power, will not rebound from each other: their impenetrability will only stop their *motion*. And if two such bodies, equal to each other, be carried with equal but opposite *motions* so as to meet in a void space, by the laws of *motion* they must stop in the very place of concurrence, lose all their *motion*, and be at rest for ever: unless they have an elastic power to give them a new *motion*. If they have elasticity enough to enable them to rebound with $\frac{1}{2}$, or $\frac{2}{3}$, or $\frac{3}{4}$, of the force wherewith they meet, they will lose $\frac{1}{2}$, or $\frac{1}{3}$, or $\frac{1}{4}$ of their *motion*. And this is confirmed by experiments: for if two equal pendulums be let fall from equal heights, so as to strike full on each other; if those pendulums be of lead, or soft clay, they will lose all, or almost all their *motion*; and if they be of any elastic matter, they will only retain a much *motion* as they receive from their elastic power.' If it be asked, how it happens that *motion*

being thus continually lost, should be continually renewed again: the same author add, that it is renewed from some active principles, 'Such as the cause of gravity, whereby the planets and comets preserve their *motions* in their orbits, and all bodies acquire a great degree of *motion* in falling; and the cause of fermentation, whereby the heart and blood of animals preserve a perpetual warmth and *motion*; the inner parts of the earth are kept continually warmed; many bodies burn and shine; and the sun himself burns and shines, and with his light warms and cheers all things.' (as also from the cause of elasticity, by which bodies restore themselves into their former figures;) 'For we find but little *motion* in the world, except what plainly flows, either from these active principles, or from the command of the willer.'

As to the continuation of *MOTION*, or the cause why a body once in *motion* comes to persevere in it; this has been extremely controverted among physical writers, and yet it follows very evidently from one of the grand laws of nature, *viz.* That all bodies persevere in their present state, whether of rest or *motion*, unless disturbed by some foreign powers. *Motion* therefore once begun, would be continued in *infinitum*, were it to meet with no interruption from external causes; as the power of gravity, the resistance of the medium, &c. So that Aristotle's principle, every thing in *motion* affects rest, is groundless.

Nor has the communication of *motion*, or the manner how a moving body comes to affect another at rest; or how much of its *motion* is communicated by the first to the last, been less disputed. See the laws thereof under the word PERCUSSION.

MOTION, we have observed, is the subject of mechanics; and mechanics is the basis of all natural philosophy; which hence becomes denominated, *mechanical*.

In effect, all the phenomena of nature; all the changes that happen in the system of bodies, are owing to *motion*; and are directed according to the laws thereof.

Hence, the modern philosophers have applied themselves with peculiar ardour to consider the doctrine of *motion*; to investigate the properties, laws, &c. thereof; by observation, experiment, and the use of geometry.—And to this we owe the great advantages of the modern philosophy above that of the antients; who were extremely disregarding of *motion*; notwithstanding that they seemed so sensible of its importance, that they defined nature by the first principle of *motion*, and the rest of the substance wherein it is.

Among all the antients there is nothing extant on *motion*, excepting some things in Archimedes's books, *De aequiponderantibus*.—To Galileo, a great part of the doctrine of *motion* is owing: he first discovered the general laws of *motion*, and particularly of the descent of heavy bodies, both at liberty, and on inclined planes; the laws of the *motion* of projectiles; the vibrations of pendulums, and stretched chords with the theory of resistences, &c. which were things the antients had little notion of.

His disciple, Torricelli, polished, and improved the discoveries of his master; and added to them divers experiments concerning the force of percussion, and the equilibrium of fluids.—M. Huygens improved very considerably on the doctrine of the pendulum; and both he and Borelli on the force of percussion.—Lastly, Newton, Leibnitz, Varignon, Mariotte, &c. have brought the doctrine of *motion* still greatly nearer to perfection.

The general laws of *motion* were first brought into a system, and analytically demonstrated together, by Dr. Wallis, Sir Christopher Wren, and M. Huygens, all much about the same time; the first in bodies not elastic, and the two last in elastic bodies.—Lastly, the whole doctrine of *motion*, including all the discoveries both of the antients and moderns on that head, was given by Dr. Wallis in his *Mechanica, sive de motu*, published in 1670.

MOTION may be considered either as *equable*, and *uniform*; or as *accelerated*, and *retarded*.—*Equable motion* again may be considered either as *simple*, or as *compound*: and *compound motion* either as *rectilinear*, or as *curvilinear*.

And all these again may be considered either with regard to themselves, or with regard to the manner of their production, and communication, by percussion, &c.

Equable MOTION is that wherein the moving body proceeds with the same unvaried velocity.

The laws of *equable motion* are as follow;—the reader being only to observe, by the way, that *mass*, or quantity of matter is expressed by *M*; *momentum*, or the quantity of *motion* or impetus, by *T*; *time*, or the duration of *motion*, by *T*; *velocity*, or its swiftness, by *V*; and *space*, or the line it describes, by *S*.

Thus, if the space be $\frac{1}{2}t^2$, and the time t ; the velocity will be expressed by $\frac{1}{2}t$. And if the velocity be v , and the mass m ; the momentum will likewise be mv .

Laws of uniform or equable MOTION.—1^o. The velocities *V* and *v* of two bodies moving equably, are in a ratio compounded of the direct ratio of the spaces *S* and *s*, and the reciprocal ratio of the times *T* and *t*.

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For, $V : S :: T$ and $v = f : t$
Therefore, $V : v :: S : f$
 $\frac{T}{t}$

$$V : v :: S t : f T.$$

Q. E. D.

This, and the following theorems, may be illustrated in numbers, thus:—Suppose a body A, whose mass is 7, that is, 7 pounds, in the time of 3 seconds passes over a space of 12 feet; and another body B, whose mass is 25, in the time of 8 seconds passes over a space of 16 feet. We shall then have $M=7$, $T=3$, $S=12$; $m=25$, $t=8$, $f=16$. And therefore $V=4$, $v=2$. The case then will stand thus:

$$V : v :: S t : f T.$$

$$4 : 2 :: 12 : 8 : 16 : 3 :: 4 : 2.$$

Hence, if $V=v$, then will $S t = f T$; therefore $S : f :: T : t$. That is, if two bodies move equally, and with the same velocities, their spaces are as the times.

The corollaries may be illustrated by numbers, in like manner as the theorems.—Thus suppose $S=12$, $T=6$, $f=8$, $t=4$. Then will the $V=12 : 6 = 2$, and $v=8 : 4 = 2$.

Consequently by reason $V=v$
 $S : f :: T : t$
 $12 : 8 :: 6 : 4.$

If $V=v$, and also $t=T$; then will $S=f$, and so the bodies moving equally, will describe equal spaces in equal times.

20. The spaces S and f , over which two bodies pass, are in a ratio compounded of the ratio of the times T and t , and of the velocities V and v .

$$\text{For } V : v :: S t : f T$$

Therefore $V f T = v S t$
And $S : f :: V T : v t$.

In numbers $12 : 16 :: 4 : 2 : 8 : 12 : 16$.

Hence, If $S=f$, $V T = v t$, so that $V : v :: t : T$, that is, if two bodies moving equally, describe equal spaces; their velocities will be in a reciprocal ratio of their times.

In numbers, if we suppose $S=12$, and $f=16$. Because $S=f$, $V T = v t$; if $V=2$ and $v=3$, $T=6$ and $t=4$.

So that we have $V : v :: t : T$
 $2 : 3 :: 4 : 6.$

Farther, if $t=T$, then will $V=v$; and therefore bodies which move equally, describe equal spaces in equal times, and have their velocities equal.

30. The momenta, or quantities of motion, of two bodies moving equally, I and i , are in a ratio compounded of the velocities V and v , and the masses or quantities of matter M and m .

For $I = V M$, and $i = v m$; therefore $I : i :: V M : v m$; that is, the ratio I to i is compounded of the ratio of V to v , and of M to m . Q. E. D.

If $I=i$, then will $V M = v m$; and therefore $V : v = m : M$. That is, if the momenta of two bodies moving equally, be equal; the velocities will be in a reciprocal ratio of their masses.

And therefore if $M=m$, $V=v$; that is, if the momenta and masses of two moving bodies be equal, their velocities are also equal.

40. The velocities V and v of two bodies moving equally, are in a ratio compounded of the direct ratio of their momenta I and i , and the reciprocal one of their masses M and m .

Since $I : i :: V M : v m$

$$I v m = i V M$$

$$V : v = I m : i M.$$

Q. E. D.

In numbers $4 : 2 :: 28 : 5 : 10 : 7 :: 4 : 1 : 2 : 1 :: 4 : 2$

Hence, If $V=v$, then $I m = i M$; and therefore $I : i = M : m$; that is, if two bodies move equally, and with the same velocity, their momenta will be in the same ratio with their masses. If $M=m$, $I=i$; and therefore if two bodies, that have the same masses, move equally, and with equal velocity, their momenta are equal.

50. In an equable motion, the masses of the bodies M and m are in a ratio compounded of the direct ratio of their momenta, and the reciprocal ratio of their velocities V and v .

For, since $I : i :: V M : v m$

$$\text{Therefore } I v m = i V M$$

$$M : m = I v : i V.$$

In numbers $7 : 5 :: 28 : 10 : 4 :: 7 : 1 : 5 : 1 :: 7 : 5$.

If $M=m$, then will $I v = i V$; and therefore $I : i = V : v$. That is, if two bodies moving equally, have their masses equal, their momenta will be as their velocities.

In numbers, suppose $I=12$, $i=8$, $M=4$, $m=4$; then will $V=12 : 4 = 3$, and $v=8 : 4 = 2$.

Therefore $I : i = V : v$.

$$12 : 8 :: 3 : 2.$$

60. In an equable motion, the momenta I and i are in a ra-

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tio compounded of the direct ratio's of the masses M and m , and the spaces S and f , and the reciprocal ratio of the times T and t .

For because $V : v :: S t : f T$
And $I : i :: V M : v m$

$$\text{Therefore } VI : vi :: VM St : vm f T$$

$$I : i :: M S t : m f T.$$

Q. E. D.

Hence, if $I=i$, then will $M S t = m f T$; and therefore $M : m = f T : S t$, $S : f = m T : M t$ and $T : t = M S : m f$; that is, if two bodies moving equally, have their momenta equal, 10. Their masses are in a ratio compounded of the direct ratio of their time, and the reciprocal one of their spaces. 20. Their spaces are in a ratio compounded of the direct ratio of the times, and the reciprocal one of their masses. 30. Their times are in a ratio compounded of their masses, and their spaces.

Farther, if $M=m$; then will $f T = S t$; and therefore $S : f = T : t$; that is, if two bodies moving equally, have their momenta, and their masses equal, their spaces are as their times.

Again, if $T=t$, then will $S=f$. Two moving bodies therefore, whose masses and momenta are equal, describe equal spaces in equal times.

If besides $I=i$, $S=f$; then will $m T = M t$; and therefore $M : m :: T : t$; that is, if two moving bodies, whose momenta are equal, pass over equal spaces, their masses are proportionable to their times.

Farther, if $T=t$, then will $M=m$; and therefore bodies, whose momenta are equal, and which moving equally, describe equal spaces in equal times, have their masses equal.

If besides $I=i$, $T=t$; then will $M S = m f$; and therefore $S : f :: m : M$; that is, the spaces passed over in the same time, by two moving bodies, whose momenta are equal, are in a reciprocal ratio of their masses.

70. In an equable motion, the spaces S and f are in a ratio compounded of the direct ratio's of the momenta I and i , and the times T and t ; and the reciprocal one of the masses M and m .

For because $I : i :: M S t : m f T$,
 $I m f t = i M S T$.

Wherefore $S : f :: I T m : i T M$.
Q. E. D.

In numbers $12 : 16 :: 3 : 28 : 5 : 8 : 10 : 7 :: 3 : 4 : 1 : 2 : 16$.

Hence, if $S=f$, $I t m = i T M$; and therefore $I : i :: t M : T m$, $M : m :: I T : i t$, $T : t :: i M : I m$. If two bodies therefore move equally over equal spaces, 10. Their momenta will be in a ratio compounded of the direct ratio of the masses, and the reciprocal one of the times. 20. Their masses will be in a ratio compounded of the momenta and the times. 30. The times will be in a ratio compounded of the direct ratio of the masses, and the reciprocal one of the momenta.

If beside $S=f$, $M=m$; then will $I t = i T$; and therefore $I : i :: t : T$. That is, bodies whose masses are equal, have their momenta reciprocally proportionable to the times in which they move over equal spaces.

If beside $S=f$, $T=t$; then will $I m = I m$; and therefore two bodies moving equally, and through equal spaces in equal times, have their momenta proportionable to their masses.

80. Two bodies moving equally, have their masses M and m , in a ratio compounded of the direct ratio's of the momenta I and i , and the times T and t , and the reciprocal one of the spaces f and S .

For because $I : i :: M S t : m f T$, $I m f T = i M S t$.
Wherefore $M : m :: I T f : i t S$.
Q. E. D.

In numbers $7 : 5 :: 3 : 28 : 10 : 8 : 10 : 12 :: 3 : 7 : 2 : 1 : 10 : 3 :: 7 : 5$.

Again, $I : i :: M S t : m f T$.

In numbers $28 : 10 :: 7 : 12 : 8 : 5 : 16 : 3 :: 7 : 4 : 1 : 5 : 2 : 1 :: 28 : 10$.

Hence, if $M=m$, then will $I T f = i t S$; and therefore $I : i :: t S : T f$, $S : f :: I T : i t$, and $I : i :: S : I f$. That is, in two moving bodies, whose masses are equal; 10. The momenta are in a ratio compounded of the direct ratio of the spaces, and the reciprocal one of the times. 20. The spaces are in a ratio compounded of the momenta and the times. 30. The times are in a ratio compounded of the direct ratio of the spaces, and the reciprocal one of the momenta.

If beside $M=m$, $T=t$, then will $i S = I f$; and therefore $I : i :: S : f$. That is, the momenta of two bodies, whose masses are equal, are proportional to the spaces passed over in equal times.

90. In equable motions, the times T and t are in a ratio compounded of the direct ratio's of the masses M and m , and the spaces S and f , and the reciprocal one of the momenta I and i .

For because $I : i :: M S t : m f T$, $I m f T = i M S t$.
Wherefore $T : t :: i M S : I m f$.
Q. E. D.

Hence,

Hence, if $T=t$, $MS=Imf$; and therefore $I::MS::mf$, $M::m::If::tS$; and $S::f::Im::tM$. That is, if two bodies, moving equally, describe equal spaces in equal times; 1°. Their momenta will be in a ratio compounded of the masses and the spaces. 2°. Their masses will be in a ratio compounded of the direct ratio of the momenta, and the reciprocal one of the spaces. 3°. The spaces will be in a ratio compounded of the direct ratio of the momenta, and the reciprocal one of the masses.

Accelerated Motion, is that which continually receives fresh accretions of velocity:—It is said to be *uniformly accelerated*, when in equal times its accretions of velocity are equal.

Retarded Motion is that whose velocity continually decreases.—It is said to be *uniformly retarded*, when its decrease is continually proportional to the time.

Laws of Motions uniformly accelerated and retarded.—T is an axiom that a body once at rest, will never move, unless some other body put it in *motion*; and when once in *motion*, it will continue for ever to move, with the same velocity, and in the same direction, unless it be forced from its state by some other cause.—This is evident from that fundamental axiom in philosophy, That nothing happens without a sufficient cause.

It follows, that a body moved by one only impulse, must proceed in a right line.—If then it be carried in a curve, it must be acted on by a double power; one, whereby it would proceed in a right line; another, whereby it is continually drawn out of it.

If the action and re-action of two (*unelastic*) bodies be equal, there will no *motion* ensue; but the bodies after collision, will remain at rest, by each other.

If a moving body be impelled in the direction of its *motion*, it will be accelerated; if by a resisting force, it will be retarded. Heavy bodies descend with an accelerated *motion*.

10°. If a body move with an uniform accelerated velocity; the spaces will be in a duplicate ratio of the times.

For, if the velocity acquired in the time t be v , then will the velocity acquired in the time $2t$ be $2v$, in the time $3t$ be $3v$, &c. and the spaces corresponding to those times, t , $2t$, $3t$, &c. will be as 1 , 4 , 9 , &c. (by Law 2.) The spaces therefore are as 1 , 4 , 9 , &c. And the times as 1 , 2 , 3 , &c. that is, the spaces are in a duplicate ratio of the times. Q. E. D. Hence, in a *motion* uniformly accelerated, the times are in a subduplicate ratio of the spaces.

11°. The spaces passed over by a body uniformly accelerated, increase, in equal times, according to the unequal numbers 1 , 3 , 5 , 7 , &c.

For, if the times, wherein a moving body equally accelerated, proceeds, be as 1 , 2 , 3 , 4 , 5 , &c. the space passed over in one moment, will be as 1 , in 2 moments as 4 , in 3 as 9 , in 4 as 16 , in 5 as 25 , &c. (Law 10.) If therefore you subtract the space passed over in one moment, *viz.* 1 , from that passed over in two moments, 4 , there will remain the space corresponding to the second moment, *viz.* 3 . In the same manner may be found the space passed over in the third minute, $9-4=5$. The space corresponding to the fourth minute, $16-9=7$; and so of the rest. The space of the first minute therefore is as 1 , that of the second as 3 , that of the third as 5 , of the fourth as 7 , of the fifth as 9 , &c. Therefore the spaces passed over by a body, moving with an uniformly accelerated *motion*, in equal times, increase according to the unequal numbers 1 , 3 , 5 , 7 , 9 , &c. Q. E. D.

12°. The spaces passed over by a body equally accelerated, are in a duplicate ratio of the velocities.

For, supposing the velocities to be V and v , the times T and t , the spaces S and s ; then will $V::v::T::t$. Wherefore, since $S::T^2::t^2$, (Law 10.) $S::f::V^2::v^2$.

Wherefore, in a *motion* uniformly accelerated, the velocities are in a subduplicate ratio of the spaces.

13°. Heavy bodies descend with an uniformly accelerated *motion*, in a medium void of resistance, if the spaces be not very great. For, since heavy bodies descend with an accelerated velocity, the power of gravity must continually impel them. But the power of gravity is found the same at all distances from the earth where the experiment can be made. Therefore heavy bodies must be driven downwards in the same manner in equal times. If then, in the first moment of time, they be impelled with the velocity v , they will be impelled with the same velocity v in the second moment, and with the same in the third, fourth, &c. moments. Now the medium being supposed void of all resistance (by *Hypothesis*) they will still retain the velocity they acquire; and by reason of their equal fresh acquisitions every minute, they will descend with a *motion* uniformly accelerated. Q. E. D.

Hence, the spaces of descent are in a duplicate ratio of their times, and also of their velocities, and increase according to the uneven numbers 1 , 3 , 5 , 7 , 9 , &c.

The times, and likewise the velocities, are in a subduplicate ratio of the spaces.

In supposing heavy bodies to move through a medium void of resistance, we exclude, at once, all manner of impediments, under what name soever they be called, or from whatsoever

cause they proceed; and among the rest, that *motion* whereby the earth revolving on its axis, carries with it heavy bodies during the time of their fall; though this is not sensible at any moderate distance.

It was Galileo who first discovered the law of the descent of heavy bodies; and that too by reasoning; though he afterwards confirmed it by experiments. These he repeated again and again, and still found the spaces passed over to be as the squares of the time: but it must be observed, that the spaces are not to be taken in the length, but the height of the plane, as will be shewn elsewhere.

The same experiments were tried, though in a different manner, by Ricciolus and Grimaldus, who let fall several stone balls of the same bulk and weight, eight ounces each, from various altitudes; measuring the times of descent by the vibrations of a pendulum. The result of their experiments is seen in the following table.

Vibrations.	Time.	Space at the end of the time.	Space passed over in each time.
		Roman feet.	Roman feet.
5	0	50	10
10	1	40	30
15	2	30	50
20	3	20	70
25	4	10	90
6	1	0	15
12	2	0	60
18	3	0	135
24	4	0	240

14°. If a heavy body fall through a medium void of resistance, and from a height not very great; the space it passes over in the subduplicate of that which it would pass over by an uniform *motion* in the same time, with the velocity it has acquired at the end of its fall.

For, let the right line AB (*Tab. Mechanics, fig. 31.*) represent the whole time of a heavy body's descent; and let this be divided into any number of equal parts; to the abscissæ AP, AQ, AS, AB, draw the right lines PM, QI, SH, BC, which may be as the velocities acquired, in those times, in the descent. Since then $AP::AQ::PM::QI$, $AP::AS::PM::SH$, &c. (*Eucl. VI. 2.*) If then the altitude of the triangle ABC be conceived to be divided into equal parts infinitely small; the *motion* being uniform in a moment of time infinitely small; the little area $PpMm=Pp$. PM as the space passed over in the little moment of time Pp . Therefore the space passed over in the time AB, will be as the sum of all the little areas, *i.e.* as the triangle ABC. But the space that would be described in the same time AB with the uniform velocity BC, being as the rectangle ABCD, it will be to the other space as 1 to 2 (*Eucl. I. 41.*).

Hence, the space passed over in half the time AB, with the velocity BC, is equal to the space which the heavy body passes over from a state of rest in the whole time AB.

Hence also, the time wherein a heavy body falls from any given altitude being given; to determine the spaces it passes over in each part of that time.

Let the given altitude $=a$, the time $=t$, the space passed over in one part of that time x . Then

$$\begin{aligned} 1:x::t^2:a \\ t^2x=a \\ x=a:t^2 \end{aligned}$$

The space therefore passed over in the first part of time is $a:t^2$, and therefore that passed over in the second part of time $=3a:t^2$; that passed over in the third part $=5a:t^2$, &c.

E.g. In the above-mentioned experiments of Ricciolus, the ball descended 240 feet in four seconds. The space therefore passed in the first second $=240:16=15$; that in the next second $=15$. $3=45$: that in the third $=15$. $5=75$, &c. The time of a heavy body's descent in a medium void of resistance through any given space, being given, to determine the time wherein it will pass over another given space in the same medium.

Since the spaces are as the squares of the time, to the space the heavy body moves in the given time, the space required in the question, and the square of the given time, seek a fourth proportional; this will be the square of the time required: its square root therefore being extracted, will yield the time required.—*E.g.* In Ricciolus's experiments the ball fell 240 feet in four seconds; it is demanded then how much time it will take up in falling 135 feet? This time will be found $=\sqrt{(135:16:240)}=\sqrt{(135:15)}\sqrt{9}$.

The space a body falls in any given time in a medium void of resistance being given, to determine the space it will fall, in any other given interval of time.

Since the spaces are as the squares of the times, find a fourth proportional to the square of the time wherein the body falls through the given space, the square of the time wherein it is to fall through the space required, and the space given; this fourth proportional will be the space required.

Thus, by Ricciolus's experiments a ball falling 60 feet in two seconds, to find the space it falls through in four seconds? The answer will be found $16.60 : 4 = 4.60 = 240$.

150. If a body proceed with a *motion* uniformly retarded, it will pass over half the space which it would describe in the same time by an equable *motion*.

For, suppose the given time divided into any number of equal parts; and draw the right lines BC, SH, QI, PM thereto, which are to be as the velocities corresponding to the parts of time a , BS, BQ, BP, BA; so as letting fall the perpendiculars HE, IF, MG, the right lines CE, CF, CG, CB, may be as the velocities in the times HE, FI, GM, AB; that is, BS, BQ, BP, BA. Since CE : CF :: EH : FI, CG : CB :: GM : BA, ABC will be a triangle (*Euc.* III. 17.)

If Bb, therefore, be a moment of time infinitely small, its *motion* will be uniform; and, therefore the space described by the moving body will be as the little area BbCc. The space therefore described in the time AB is as the triangle ABC, viz. as the sum of all the little areas BbCc. Now the space described by the body moving uniformly with the velocity BC in the time AB, is as the rectangle ABCD, therefore the former is half of this. (*Euc.* I. 41.)

160. The spaces described by a *motion* uniformly retarded, in equal times, decrease according to the unequal numbers 7, 5, 3, 1.

For, suppose the moving body in the first instant of time to pass over seven feet; I say, that in the second if it be equally retarded, it will pass over 5; in the third 3; and in the fourth 1. For, let the equal parts of the axis of the triangle BS, SQ, QP, PA be as the times; the semi-ordinates BC, SH, QI, PM, as the velocities at the beginning of any time; the trapezia BSHC, SQIH, QPMI, and the triangle PAM as the spaces described in those times. Let then BC=4 and BS=SQ=QP=PA=1. Then will SH=3, QI=2, PM=1, (*Law* 17.) BSHC=(4+3) : 1 : 2=7. SQIH=(3+2) : 1 : 2=5. QPMI=(2+1) : 1 : 2=3. PAM=1. Consequently the spaces described in equal times are as $\frac{7}{2}, \frac{5}{2}, \frac{3}{2}, \frac{1}{2}$, that is as 7, 5, 3, 1.

For the cause, &c. of the acceleration of MOTION, see GRAVITY, and ACCELERATION.

For the cause, &c. of retardation, see RESISTENCE and RETARDATION.

The *law* wherein MOTION is communicated by the collision and percussion of bodies, are very different, as the bodies are either *elastic* or *unelastic*, and as the direction of the stroke is either *oblique* or *direct*.

What relates to the collision of bodies *not elastic* when the stroke or shock is direct, will come under the following heads.

170. A moving body striking against a body at rest, will communicate *motion* thereto, and both will proceed in the direction of the first; and the momentum, or quantity of *motion*, in the two, will be the same after the stroke, as in the single one before it.

For, it is the action of the first that gives the latter all the *motion* it has; and it is the re-action of the latter that takes off any part of the *motion* of the first. Now, as action and re-action are always equal, the momentum acquired by the one must be just equal to that lost by the other; so that there is neither loss nor gain from the stroke.

Hence, the velocity after the stroke, is found by multiplying the mass of the first body by its velocity before the stroke, and dividing the product by the mass of the second body.

Hence if a body in *motion* strike on another moving in the same direction, but moving more slowly, both will continue their *motion* in their first direction; and the momenta, or sum of *motion* will be the same after as before the stroke.

If two equal bodies move against each other with equal velocities, after the stroke they will both remain at rest.

Simple MOTION is that produced by some one power.

Compound MOTION is that produced by several conspiring powers. See COMPOUND and COMPOSITION.

Powers are said to *conspire*, when the direction of the one is not opposite to that of the other; as when the radius of a circle is imagined to whirl round on its centre, and a point in the same radius is at the same time supposed impelled straight along it.

All *curvilinear motion* is compound; as all simple *motion* is rectilinear.

180. If a moving body (*fig.* 26.) be acted on by a double power; the one according to the direction AB, the other according to AC; with the *motion* compounded thereof, it will describe the diagonal of a parallelogram AD; whose sides AB and AC it would have described in the same time with each of the respective powers apart.

For, if the body A were only acted on by the force im-

pressed along AB; in the first instant of time it would be in some point of the right line AB, as in H, and so in the line HL parallel to AC; if it were only acted on by the power impressed in the direction AC, it would in the same instant of time be in some point of the line AC, as in I, and so in the line IL parallel to AB.—But since the directions of the powers are not opposite to each other, neither of them can impede the other; and therefore the body in the same instant of time will arrive both at the point HL and at IL; and will consequently be in the point L, where the two meet. — In the same manner it appears, that if KM and MG be drawn parallel to AB and AC, the body in the second instant of time will be in M, and at length in D. *Q. E. D.*

Hence, since about every right line as AD, a parallelogram as ABDC, may be constructed, by making two equal triangles ACD and ABD, on one common base AD: every *rectilinear motion*, when it may be of service for the demonstration, may be considered as a *compound* one.

But as the proportion of the sides AC and CD may be various, so also may the right line AD be described by a *motion* compounded various ways; and therefore the same *rectilinear motion* may be reduced to various *compound motions*.

Hence, if a moveable body be drawn by three several powers, according to the directions BA, AD, and AC (*fig.* 33.) two of which taken together are equivalent to the third; they will be to each other as the right lines BD, DA, DC, parallel to their directions; that is, reciprocally as the sines of the angles included between the lines of their directions, and the line of direction of the third: DB being to AD as the sine of the angle BAD to the sine of the angle ABD.

190. In an equable *compound motion*, the velocity produced by the conspiring powers is, to the velocity of each of the two parts, as the diagonal AD (*fig.* 25.) of the parallelogram ABDC, in the direction of whose sides they act, to either of those sides AB or AC.

For in the same time that one of the powers would carry it over the side of the parallelogram AB, and the other over AC separately, joined together they carry it over the diagonal AD. The diagonal AD therefore is the space described by the conspiring powers in the same time: but in an equable *motion* the velocities in the same time are as the spaces; the velocities therefore arising from the conspiring forces are to the velocity arising from either force, as AD to AB or AC.

Hence the conspiring forces thereof being given; i. e. the ratio of the velocities being given, by the lines AB and AC given in magnitude, and the direction through those lines being given in position, or by the angle of direction; the celerity and direction of the oblique *motion* is given: because the diagonal is given both in magnitude and position.

The oblique *motion* however being given, the simple ones are not, *vice versa*, given; because the same oblique *motion* may be compounded of various simple ones.

200. In a compound *motion* produced by the same forces, the velocity is greater if the angle of direction be less; and less, if this be greater.

For, let the greater angle of direction be BAC (*fig.* 34.) the less FAC; since the powers are supposed the same, AC will be common to each parallelogram AFCE and BACD and besides AB=AF. Now it is evident that in the case of the greater angle, the diagonal AD is described; and in the case of the less angle AE; and both in the same time, by reason AB=AE. The velocities therefore are as AD to AE: Wherefore since AD is less than AE, the velocity in the case of the greater angle is less than in that of the less angle.

Hence, since the legs AC and CE, with the included angle being given, the angle CEA, and thence, also, AE is found; the velocity of the conspiring powers, and the angle of direction, in any particular case, being given, the velocity of the compound *motion*, and consequently the ratio of the velocities produced by the same powers under different angles of directions, may be determined.

For the particular laws of MOTION arising from the collision of bodies both elastic and unelastic, and that where the directions are both perpendicular and oblique, see PERCUSSION.

For circular MOTION, and the laws of projectiles see PROJECTILE.

For the MOTION of pendulums, and the laws of oscillation, see PENDULUM.

Altitude of MOTION. See the article ALTITUDE.

Longitude of MOTION. See the article LONGITUDE.

Undulatory MOTION. See the article UNULATORY.

Perpetual MOTION. See PERPETUAL MOTION.

The celebrated problem of a perpetual *motion*, consists in the inventing a machine, which has the principle of its *motion* within itself. — M. de la Hire has demonstrated the impossibility of any such machine, and finds that it amounts to this, viz. to find a body which is both heavier and lighter at the same time; or to find a body which is heavier than itself.

Animal MOTION is that whereby the situation, figure, magnitude, &c. of the parts, members, &c. of animals are changed.

Under

Under these *motions* come all the animal functions; as *respiration*, *circulation* of the blood, *excretion*, *swallowing*, &c. *Animal motions* are usually divided into two species, *viz.* *spontaneous*, and *natural*.

Spontaneous, or *muscular MOTION*, is that performed by means of the muscles, at the command of the will; hence also called *voluntary motion*.

Natural, or *involuntary MOTION*, is that effected without such command of the will; by the mere mechanism of the parts.

Such is the *motion* of the heart, and pulse; the peristaltic *motion* of the intestines, &c.

Intestine MOTION, denotes an agitation of the particles whereof a body consists.

Some philosophers will have every body, and every particle of a body, in continual *motion*. For fluids, it is the definition they give of them, that their parts are in continual *motion*.

And as to solids, they infer the like *motion* from the effluvia continually emitted through their pores.

Hence *intestine motion* is represented to be a *motion* of the internal and smaller parts of matter, continually excited by some external, latent agent, which of itself is insensible, and only discovers itself by its effects; appointed by nature to be the great instrument of the changes in bodies.

MOTION, in astronomy, is peculiarly applied to the orderly courses of the heavenly bodies.

The *motion* of the earth, from west to east, is now generally granted among astronomers: see it proved under the article EARTH.

The *motions* of the celestial luminaries are of two kinds: *diurnal*, or *common*; and *secondary*, or *proper*.

Diurnal or *primary MOTION*, is that wherewith all the heavenly bodies, and the whole mundane sphere, appear to revolve every day round the earth, from east to west.

This is also called the *motion* of the primum mobile, and the *common motion*; to distinguish it from that rotation which is peculiar to each planet, &c.—It is about the various phenomena resulting from this *motion*, that astronomy is chiefly employed.

Secondary, or *proper MOTION*, is that wherewith a star, planet, or the like, advances a certain space every day from west towards east.

See the different *motions* of each luminary, with the irregularities, &c. thereof, under the proper articles; EARTH, MOON, STAR, &c.

Angular MOTION. See the article ANGULAR.

Horary MOTION of the earth. See the article HORARY.

Paracentric MOTION of impetus. See PARACENTRIC.

MOTION of trepidation, &c. See TREPIDATION, and LIBRATION.

MOTION, in music, denotes the manner of beating the measure, to hasten or slacken the time of the words, or notes. See TIME.

The *motion*, in songs composed in double time, differs from that in those in triple time. It is the *motion* that distinguishes courants and farabands, from gavots, boreses, chacones, &c.

MOTION is also used, among mechanics, for the inside of a watch, &c. more commonly called *movement*.

MOTIONS, in war, denote the marches, counter-marches, &c. which an army makes in changing its post.

The great skill of a general consists in discovering the enemies *motions*, and concealing his own. Nothing is more dangerous, than to make great *motions* before a powerful enemy, ready to come to blows.

MOTION, or *emotion*, in rhetoric, &c. See PASSION.

MOTORII, *MOTORY nerves*, the third pair of nerves; serving for the motion of the eye.

This pair is united into one near their insertion into the brain; by which means, when one eye is moved towards any object, the other is naturally directed towards the same.

MOTOS, *MOTOS*, a piece of lint, or linen cloth, opened like wool, to be put into ulcers, to stop the flux of blood, &c.

MOTRIX, something that has the power or faculty of *moving*.

MOTTO, an Italian term, literally signifying *word*, or *saying*; used in arms, devices, &c.

MOTTO of an *armoury*, is a short sentence or phrase carried in a scroll generally over, sometimes under the arms; sometimes alluding to the name of the bearer, sometimes to the bearing, and sometimes to neither.

The *motto*, or word, says Guillim, is an external ornament annexed to coat-armour; being the invention or conceit of the bearer, succinctly and significantly expressed, usually in three or four words, which are set in some scroll or compartment, placed at the foot of the escutcheon.

As the *motto* holds the lowest place in arms; so it is the last in blazoning. In strictness, it should express something intended in the achievement; but custom has now received whatsoever be the fancy of the deviser.

The use of *mottos* is very antient; history, both sacred and profane, furnishing instances thereof. Our ancestors made choice of *mottos* to express their predominant passions; as of piety, love, war, &c. or some extraordinary adventure befallen them: most of which, from some such original, have become hereditary in divers families.

The *motto* of the royal family of England is, *Dieu & mon droit*, God and my right; of the royal family of Bourbon, *Esperance*, Hope; of the order of the Garter, *Honi soit qui mal y pense*, Shame be to him that evil thinks; of the duke of Norfolk, *Sola virtus invicta*; of the duke of Bedford, *Che sera sera*; of the duke of Devonshire, *Cavendo tutus*, aluding to the family's name, Cavendish; of the duke of Kingston, *Pie repon te*, aluding to the name Pierpoint; of the earl of Radnor, *Que supra*, aluding to the three stars in his arms; of the earl of Abingdon, *Virtus ariete fortior*, aluding to the three battering rams bore in the arms; of Fortescue lord Clinton, *Fortis scutum solus ducum*.

The *motto* of a *devise*, is also called the *soul* of the *devise*. See DEVISE.

MOTU.—*Ex mero MOTU*. See the article EX.

MOVE in *arrest* of judgment. See the article ARREST.

MOVEABLE, something susceptible of motion; or that is disposed to be moved. See MOTION.

A sphere is the most *moveable* of all bodies, *i. e.* it is the easiest to move: a door is *moveable* on its hinges, the magnetical needle on a pin, or pivot, &c.

Moveable is frequently used in contradistinction to *fixt*.

MOVEABLE feasts, are such as are not always held on the same day of the year, or month; though they be on the same day of the week.

Thus, Easter is a *moveable feast*; being always held on the Sunday which falls upon or next after the first full moon following the 21st of March. Vid. *Philos. Transf.* n^o. 240. p. 185.

All the other *moveable feasts* follow Easter, *i. e.* they keep their distance from it; so that they are fixed with respect thereto.

Such are *Septuagesima*, *Sexagesima*, *Ash-Wednesday*, *Ascension-Day*, *Pentecost*, *Trinity-Sunday*, &c. which see under their proper articles, SEPTUAGESIMA, &c.

MOVEABLES, or *MOVEABLE goods*, by civilians called *bona mobilia*, are those which are capable of being removed from one place to another; or which may be concealed or perverted; as not being fixed to the ground, &c.

In England, we have two kinds of effects, *moveable* and *immoveable*: the *moveable* are, ready money, merchandizes, bonds, book-debts, cattle, and household-furniture, not fastened either with iron or nail, nor sealed in the plaster, but which may be transported without either fraction, or deterioration.

In the customary laws, they say, *moveables* follow the person, and his proper habitation; *moveables* follow the body, &c. which words have different meanings in different countries.

Sometimes they signify, that *moveables* go according to the custom of the place where is the habitation of the deceased, though he die in another place; and sometimes they signify, that *moveables* follow the custom of the place where the defunct died.

MOVEMENT, *motion*, a term frequently used in the same sense with *automaton*.

The most usual *movements* for keeping time are *watches* and *clocks*: the first are such as shew the parts of time; the second such as publish it by sounds.

MOVEMENT, in its popular use among us, signifies all the inner work of a watch, clock, or other engine, which *move*, and, by that motion, carry on the design of the instrument.

The *movement* of a clock, or watch, is the inside; or that part which measures the time, strikes, &c. exclusive of the frame, case, dial-plate, &c.

The parts common to both of these *movements* are, the *main-spring*, with its appurtenances; lying in the spring-box, and in the middle thereof leaping about the spring-arbor, to which one end of it is fastened.—Atop of the spring-arbor is the *endless screw*, and its wheel; but, in spring-clocks, this is a ratchet-wheel with its click, that stops it.—That which the main spring draws, and round which the chain or string is wrapped, is called the *fusy*: this is ordinarily taper; in large works, going with weights, it is cylindrical, and called the *barrel*.—The small teeth at the bottom of the *fusy* or barrel, which stop it in winding up, is called the *ratchet*; and that which stops it when wound up, and is for that end driven up by the spring, the *garde-gut*.—The *wheels* are various; the parts of a wheel are, the *hoop* or *rim*; the *teeth*, the *cross*, and the *callet* or piece of brass soldered on the arbor or spindle, whereon the wheel is riveted.—The little wheels, playing in the teeth of the larger, are called *pinions*; and their teeth, which are 4, 5, 6, 8, &c. are called *leaves*; the ends of the spindle are called *piquets*; and the guttered wheel, with iron spokes at bottom, wherein the line of ordinary clocks runs, the *pully*.—

We need not say any thing of the *band, screws, wedges, stops, &c.* See *WHEEL, FUSY, &c.*

Theory of calculating the numbers for MOVEMENTS.—1°. It is to be observed, that a wheel, divided by its pinion, shews how many turns the pinion has to one turn of the wheel.

2°. That from the fuly to the balance, the wheels drive the pinions; consequently, the pinions run faster, or make more revolutions than the wheel: but it is the contrary from the great wheel to the dial-wheel.

3°. That the wheels and pinions we write down either as vulgar fractions, or in the way of division in common arithmetic: *v. gr.* a wheel of 60, moving a pinion of 5, is wrote either $\frac{60}{5}$, or better 5)60. And the number of turns the pinion has in one turn of the wheel, as a quotient, thus, 5)60(12. A whole movement may be wrote, as in the adjoining scheme; where the uppermost number expresses the pinion of report 4, the dial-wheel 36, and the turns of the pin 9; the second, the pinion, and great wheel; the third, the second wheel, &c. the fourth, the contrat wheel; and the last, 17, the crown wheel.

Hence, 4°. From the number of turns any pinion makes in one turn of the wheel it works in, may be determined the number of turns a wheel or pinion has at any greater distance, *viz.* by multiplying together the quotients; the produce whereof is the number of turns. Thus,

Suppose the wheels and pinions as in the case ad-joining; 11 multiplied by 9, gives 99, the number of turns of the second pinion 5, in one turn of the wheel 55, which runs concentrical, or on the same spindle with the pinion 5. Again, 99 multiplied by 8, gives 792, the number of turns the last pinion has in one turn of the first wheel 5.

Hence we proceed to find, not only the turns, but the number of beats of the balance in the time of those turns. For, having found the number of turns the crown wheel has in one turn of the wheel fought, those turns multiplied by its notches, give half the number of beats in that one turn of the wheel. Suppose, *v. gr.* the crown wheel to have 720 turns, to one of the first wheel; this number multiplied by 15, the notches in the crown wheel, produces 10800; half the number of strokes of the balance in one turn of the first wheel of 80 teeth.

The general division of a movement is, into the clock, and watch parts. See *CLOCK-work*, and *WATCH-work*.

MOVER, or first MOVER. See *MOBILE*.

Perpetual MOVER. See *PERPETUAL motion*.

MOULD, or MOLD, in the mechanic arts, &c. a cavity artificially cut, with design to give its form, or impression, to some softer matter applied therein.

Moulds are implements of great use in sculpture, foundery, &c.

The workmen employed in melting the mineral or metallic glebe dug out of mines, have each their several *mould*, to receive the melted metal as it comes out of the furnace; but these are different, according to the diversity of metals and works.—In gold mines, they have *moulds* for ingots; in silver mines, for bars; in copper and lead-mines, for pigs or falmons; in tin mines, for pigs and ingots; and in iron mines, for sows, chimney-backs, anvils, caldrons, pots, and other large utensils and merchandizes of iron; which are here cast, as it were, at first hand.

The Moulds of founders of large works, as statues, bells, guns, and other brazen works, are of wax, supported within-side by what they call a *core*, and covered without-side with a cap or case.—It is in the space which the wax took up, which is afterwards melted away to leave it free, that the liquid metal runs, and the work is formed; being carried thither through a great number of little canals, which cover the whole *mould*. See *FOUNDERY*.

The Moulds of moneyers are frames full of sand, wherein the plates of metal are cast that are to serve for the striking of species of gold or silver.

Moulds of founders of small works, are like the frames of coiners: it is in these frames, which are likewise filled with sand, that their several works are fashioned; into which, when the two frames, whereof the *mould* is composed, are re-joined, the melted bras is run.

Moulds of letter-founders are partly of steel, and partly wood: the wood, properly speaking, serves only to cover the real *mould* which is within, and to prevent the workman who holds it in his hand from being incommoded by the heat of the melted metal. Only one letter or type can be formed at once in each *mould*.

Moulds in the manufacture of paper are little frames composed of several bras or iron wires fastened together by another wire still finer. Each *mould* is of the bigness of the sheet of paper to be made, and has a rim or ledge of wood to which the wires are fastened. These *moulds* are more usually called *frames* or *forms*.

Furnace and crucible-makers Moulds are made of wood, of the same form with the crucibles; that is, in form of a truncated

cone: they have handles of wood to hold and turn them with, when, being covered with the earth, the workman has a mind to round or flatten his vessel.

Moulds for leaden bullets are little iron placers, each of whose branches terminates in a hemispherical concave, which, when shut, form an intire sphere. In the lips or sides where the branches meet, is a little jet or hole, through which the melted lead is conveyed.

Glaziers Moulds.—The glaziers have two kinds of *moulds*, both serving to cast their lead: in the one they cast the lead into long rods or canes fit to be drawn through the vice, and the grooves formed therein; this they sometimes call *ingot-mould*. In the other they *mould* those little pieces of lead a line thick, and two lines broad, fastened to the iron bars. These may be also cast in the vice.

Goldsmiths Moulds.—The goldsmiths use the bones of the cuttle-fish to make *moulds* for their small works; which they do by pressing the pattern between two bones, and leaving a jet or hole to convey the silver through, after the pattern has been taken out.

MOULD, among masons, is a piece of hard wood or iron, hollowed within-side, answerable to the contours of the mouldings or corniches, &c. to be formed: this is otherwise called *caliber*.

Moulds, among plumbers, are the tables whereon they cast their sheets of lead.—These they sometimes call simply *tables*.—Besides which, they have other real *moulds*, wherewith they cast pipes without folding. See each defended under the article *PLUMBERY*.

Moulds, among glass-grinders, are wooden frames whereon they make the tubes wherewith they fit their perspectives, telescopes, and other optic machines.

These *moulds* are cylinders, of a length and diameter according to the use they are to be applied to, but always thicker at one end than the other, to facilitate the sliding.

The tubes made on these *moulds* are of two kinds; the one simply of paste-board and paper; the other of thin leaves of wood joined to the paste-board.—To make these tubes to draw out, only the last or innermost is formed on the *mould*; each tube made afterwards serving as a *mould* to that which is to go over it; but without taking out the *mould* from the first.

Moulds used in basket-making are very simple, consisting ordinarily of a willow or other turned or bent into an oval, circle, square, or other figure, according to the baskets, panners, hampers, hots, and other utensils intended.—On these *moulds* they make, or, more properly, measure all their work; and, accordingly, they have them of all sizes, shapes, &c.

Moulds, among tallow-chandlers, are of two kinds: the first for the common dipped candles, being the vessel wherein the melted tallow is disposed, and the wick dipped.

This is of wood, of a triangular form, and supported on one of its angles, so that it has an opening of near a foot step: the other, used in the fabric of *mould-candles*, is of bras, pewter, or tin.—Here each candle has its several *mould*. See each under the article *CANDLE*.

MOULD, among gold-beaters, a certain number of leaves of velom, or pieces of guts, cut square, of a certain size, and laid over one another, between which they put the leaves of gold and silver which they beat on the marble with the hammer.

They have four kinds of *moulds*; two whereof are of velom, and two of gut: the smallest of those of velom consists of forty or fifty leaves, the largest contains an hundred; for the others, each contains five hundred leaves.

The *moulds* have all their several cases, consisting of two pieces of parchment, serving to keep the leaves of the *mould* in their place, and prevent their being disordered in beating.

MOULD, or MOLD, in agriculture, denotes a loose kind of earth, every-where obvious on the surface of the ground; called also *natural* or *mother earth*, and by some also *loam*.

The best *mould* for the gardener's purposes, according to Mr. Evelyn, is that of a blackish-grey colour; according to Mr. Switzer, that of a lively chefnut, or hazel colour, which cuts like butter, and does not flick obstinately, but is short, tolerably light, breaks into small clods, and may be tempered without crusting or chapping in dry weather, or turning to mortar in wet.

Next to chefnut are the dark greys, and russet; the light and dark ash colours are naught, being those commonly found in heathy ground: the yellowish red is worst of all.

Hip-Mould. See the article *HIP-mould*.

Iron-Mould. See the article *IRON-mould*.

MOULDINESS, a term applied to bodies which corrupt in the air, from some hidden principle of humidity therein; and whose corruption shews itself by a certain white down, or lanugo, on their surface.

This *mouldiness*, when viewed with a microscope, affords a curious spectacle; being a kind of meadow, out of which arise herbs

herbs and flowers; some only in the bud, others full-blown, and others decayed; each having its little root, stalk, and other parts. the figure whereof may be seen in Hook's *Micrographia*.—The same may be observed of the *mouldiness* which gathers on the surface of liquid bodies.

Mr. Bradley observed this *mouldiness* in a melon very accurately, and found the vegetation of these little plants to be exceedingly quick.—Each plant had its seeds in great abundance, which did not seem to be three hours ere they began to shoot up; and in six hours more the new plant was complete and mature, and the feed ready to fall.—When the fruit had been covered with a *mould* for six days, its vegetative quality began to abate, and it was intirely gone in two days more; then came on a putrefaction, and the fleshy parts of the melon yielded nothing but a stinking water, which began to have a gentle motion in its surface; and in two days time maggots appeared, which in six more laid themselves up in their bags, where they continued four days, and then came out flies. These maggots were owing to the eggs of flies deposited in the putrefaction.

MOULDING, any thing cast in a mould, or that seems to have been so, though in reality it were cut with a chisel, or the ax.

MOULDINGS, in architecture, are jettings, or projectures beyond the naked of a wall, column, waistcoat, &c. the assemblage whereof forms cornices, door-cases, and other decorations of architecture.—See *Tab. Architect.* fig. 1, to 12. Some *mouldings* are square, others round; some are straight, others curved, &c. and some are plain, others carved, or adorned with sculpture, either hollowed, or in relief. Some *mouldings*, again, are crowned with a fillet; others are without, as the doucine, talon, ovolo, torus, plinth, scotia, astragal, gola, corona, and cavetto. See each under its proper article.

Mouldings are in architecture what letters are in writing.—By the various dispositions and combinations of *mouldings*, may be made an infinite number of different profiles for all sorts of orders and compositions, regular and irregular; and yet all the kinds of *mouldings* may be reduced to three; viz. square, round, and mixt, i. e. composed of the other two.

For this reason, those who invented the Gothic architecture, resolving to recede from these perfect figures, and affecting to use others less perfect, to distinguish their architecture from the antique, introduced a new set of whimsical *mouldings* and ornaments.

Regular *mouldings* are either *large*; as doucines, ovolos, gulas, talons, toruses, scotias, &c. or *small*, as fillets, astragals, congés, &c. which lie in their places.

BED-MOULDING. See the article *BED-moulding*.

Plane-MOULDING. See the article *PLANE*.

MOULIN.—*Fer de MOULIN*. See *FER*.

MOULINET, a French term properly signifying a little mill; being a diminutive of *moulin*, mill.

It is used in mechanics to signify a roller, which being crossed with two levers, is usually applied to cranes, captains, and other sorts of engines of the like nature, to draw ropes, and heave up stones, timber, &c.

MOULINET is also a kind of turn-stile, or wooden cross, which turns horizontally upon a stake fixed in the ground; usually placed in the passages to keep out horses, and to oblige passengers to go and come one by one.

These *moulinets* are often set near the out-works of fortified places, at the sides of the barriers, through which people pass on foot.

MOULTING, in natural history. See *MOLTING*.

MOUND, a term used for a bank, rampart, or other fence, particularly of earth.

MOUND, or **MOND**, in heraldry, is a ball or globe with a cross upon it; such as our kings are usually drawn with, holding it in their left hand, as they do the sceptre in the right.

MOUNT, an elevation of earth, called also *mountain*.

The words *mount* and *mountain* are synonymous; but the former is scarce ever used in prose, unless when accompanied with some proper name; as *mount Aetna*, *mount Gibel*, *mount Lebanon*, *mount Sinai*, *mount Atlas*, *mount Parnassus*, &c.

St. Catherine of MOUNT Sinai. See the article *CATHERINE*.

Knight of MOUNT Carmel. See the article *CARMEL*.

MOUNTS of piety, are certain funds, or establishments in Italy, where money is lent out on some small security.—We had also *mounts of piety* in England, raised by contribution for the benefit of people ruined by the extortions of the Jews.

MOUNTAIN, **MONS**, a part of the earth rising to a considerable height above the level of the surface thereof.

The origin of *mountains* is variously assigned by philosophers: some will have them coeval with the world, and created along with it.

Others, among whom is Dr. Burnet, will have them to take their rise from the deluge; urging, that the extreme irregularity and disorder visible in them plainly shews they do not come immediately out of the hand of God, but are the wrecks of the old world broken into the abyss.

Others, again, alledge from history, that the roots of many hills being eaten away, the hills themselves have subsided, and sunk into plains: whence they conclude, that where the corruption is natural, the generation is so too.

It appears certain to many, that some *mountains* must have been generated gradually, and have grown up in process of time, from the sea-shells, &c. found in many of them; which they suppose may be accounted for from a violent wind blowing the sand, &c. into huge heaps, which are afterwards made into a mass by the rain, &c.—Some among the divines tell us, that the earth was created perfectly even; and that when God separated the water from the land, he dug channels in the earth; and the earth scooped out he threw up in *mountains*: but whether all the *mountains* be sufficient to fill all the channels of the ocean, let them look to it.

The uses of *mountains* are numerous: we shall only mention two or three. 1^o. They serve as screens to keep off the cold and nipping blasts of the northern and eastern winds. 2^o. They serve for the production of a great number of vegetables and minerals, which are not found in any other soil. 3^o. The long ridges and chains of lofty and topping *mountains*, being generally found to run from east to west, serve to stop the evagation of the vapours towards the poles, without which they would all run from the hot countries, and leave them destitute of rain.

Mr. Ray adds, that they condense those vapours, like alembic-heads, into clouds; and so, by a kind of external distillation, give origin to springs and rivers; and, by amassing, cooling, and confining them, turn them into rain; and, by that means, render the fervid regions of the torrid zone habitable.

In history we have instances of *mountains* travelling a considerable distance; particularly Hufket-Marvel-Hill, if I misremember not, in Herefordshire, which is said to have made a considerable journey.

To measure the height of a *mountain*, see *ALTITUDE*, &c.—Though there is another way used by Dr. Halley in the measure of Snowdon-hill in Wales, by means of a barometer, the different heights of whose mercury at the top and bottom of the *mountain* give its perpendicular altitude; accounting 82 feet perpendicular ascent for every inch varied in the height of the mercury. See *Supplement*, article *MOUNTAIN*.

MOUNTAIN-green. } See the article { **GREEN**.

Burning-MOUNTAINS. } See the article { **VULCANO**.

MOUNTAINS in the moon. } See the article { **MOON**.

MOUNTING the guard, trencher, breach, &c. denotes the going upon duty, being upon guard, in the trenches, running to the breach, &c.

MOUNTING a cannon, mortar, &c. is the setting it on its carriage, or the raising its mouth.

MOUNTING, in the manufactories, something that serves to raise or set off a work.—Thus the frame or border, and its dependencies, make the *mounting* of a looking-glass: the fust, or but, the *mounting* of a musquet, carbine, &c. and the hilt, &c. the *mounting* of a sword.

MOUNTING of a fan, the sticks which serve to open and shut it, whether they be of wood, ivory, tortoise-shell, whalebone, Indian-cane, or the like.

MOURNING, a particular dress or habit, worn to signify grief, on some melancholy occasion.

The modes of *mourning* are various in various countries; as are also the colours that obtain for that end.—In Europe, the ordinary colour for *mourning* is black; in China, it is white; in Turkey, blue, or violet; in Egypt, yellow; in Ethiopia, brown. The antient Spartan and Roman ladies *mourned* in white; and the same colour obtained formerly in Castile, on the death of their princes. Herrera observes, that the last time it was used, was in 1498. at the death of prince John.—Kings and cardinals always *mourn* in purple.

Each people pretend to have their reasons for the particular colour of their *mourning*: white is supposed to denote purity; yellow, that death is the end of human hopes; in regard leaves, when they fall, and flowers, when they fade, become yellow. Brown denotes the earth, whither the dead return. Black, the privation of life, as being the privation of light. Blue, expresses the happiness which it is hoped the deceased does enjoy; and purple, or violet, sorrow on the one side, and hope on the other; as being a mixture of black and blue.

MOUTH, in anatomy, a part of the human face, consisting of the lips, the gums, the inside of the cheeks, and the palate.

All these parts are lined with a glandulous coat, which is continued over the whole inner surface of the *mouth*, and all its parts, the teeth excepted.

From the glands of this coat, through innumerable little excretory ducts, is separated a kind of salivary juice, which serves to keep the *mouth* and all its parts moist, smooth, and slippery.

On the hind part of the palate, perpendicularly over the rima of the larynx, hangs a round, soft, smooth body, like the end of a child's finger, formed by the duplicature of the membrane

brane of the palate, and called the *uvula*, which is moved by two muscles, called *sphensaphylinus* and *pterygoaphylinus*; and is suspended by as many ligaments.

Under the membrane of the palate are a great number of glands, pretty conspicuous in the fore-part, like grains of millet; whose excretory ducts, piercing the membrane, open into the *mouth*: but towards the hind-part they lie much thicker, and about the root of the uvula they are gathered so close to one another, that they seem to form one large conglomerate gland; which is therefore, by Verheyen, called *glandula conglomerata palatina*. See *PALATE*.—The gums are, as it were, the sockets and ligaments of the teeth.

Besides the proper parts of the *mouth*, there are in and about it others highly serviceable and necessary thereto: among which are the glands; the most considerable whereof are, the parotides, the glandulæ maxillares, the sublinguales, and the tonsils, or amygdalæ; which see in their respective places. These are the salivary organs, whence springs all that liquor we call the *spittle*, which flows into the *mouth* by the respective ducts, after its separation from the blood in the bodies of the glands: as the demand of spitte is greater in actions of the lower jaw, *i. e.* in mastication, deglutition, much talking, &c. so does the disposition of these salivary ducts favour that discharge on those occasions.

Mr. Derham observes, that the *mouth*, in the several species of animals, is nicely adapted to the uses of such a part; and well fitted and shaped for the catching of prey, for the gathering and receiving food, the formation of speech, &c.

In some creatures it is wide and large, in others little and narrow; in some it is formed with a deep incisure up into the head, for the better catching and holding of prey, and more easy comminution of hard, large, and troublesome food; in others with a shorter incisure, for the gathering and holding of herbaceous food.

In insects it is very variable: in some it is forspicated, to catch, hold, and tear the prey; in others aculeated, to pierce and wound animals, and suck their blood; in others strongly ridged with jaws and teeth, to gnaw and scrape out their food, carry burdens, perforate the earth, nay, the hardest wood, and even stones themselves, for houses and nests for their young.

Nor is the *mouth* less remarkable in birds, being neatly shaped for piercing the air, hard and horny, to supply the want of teeth; hooked, in the rapacious kind, to catch and hold their prey; long and slender, in those who have their food to grope for in moist places; and broad and long, in those that search it in muddy places.

MOUTh is also used, in the courts of princes, for what relates to their eating and drinking.—Hence, *officers of the mouth*, *yeomen of the mouth*, &c.

Daviler defines *mouth*, an apartment composed of several rooms, as offices, kitchens, &c. where the meat intended for the first tables is dressed by itself.—At court, this is called the *king's mouth*.

MOUTh, in the manege, denotes a horse's feeling or sensibility in that part where the bits are applied.

Ridges of a horse's Mouth. See the article *RIDGE*.

Opening, or shutting the Mouth, of a cardinal, is a ceremony used in the consistory at Rome; wherein the pope shuts a new-elected cardinal's *mouth*, so as he may not speak at all, even though the pope should speak to him; and remains, in the mean time, deprived of all voice, both active and passive, till the calling of another consistory; when the pope opens his *mouth* again, making a little harangue, to teach him how to speak, and comport himself in the consistory.

MOXA, a sort of cotton, or downy substance, brought from China, and by authors said to grow on the lower part of the mugwort leaf.

It is not much known among us for any medicinal efficacy: how ever celebrated in the Indies for curing the gout, by being burnt upon the part, people here have not faith enough to try it this way; and some think, if they had, in all likelihood, any other caustic would do as well. See *Supplement*, article *MOXA*.

MUCILAGE, *MUCILAGO*, in pharmacy, &c. a thick, viscous juice; so called, as resembling the *mucus* of the nose. See the article *MUCUS*.

Mucilages are prepared chiefly from roots and seeds, pounded in a mortar, and infused in hot water, and strained through a cloth.

The roots principally used for this purpose are, those of althea, mallows, symphytum, &c. the seeds are, those of quinces, fleawort, &c.

Mucilages enter the composition of several plaisters.—They are sometimes also made of gums and fruits; as figs, quinces, figs-gels, tragacanth, &c.

MUCILAGE also denotes a thick, pituitous matter, evacuated with the urine, in the gravel, and dysuria.

MUCILAGINOUS glands, a very numerous set of glands in the joints, first described by Dr. Havers.—There are two sorts of *mucilaginous glands*, some small, next akin to milary glands, being glandules placed all along the surface of the membranes which lie over the articulations. See *MUCUS*, and *ARTICULATION*.

The other sort are conglomerated, or are many glandules collected, and planted one upon another, so as to make a bulk, and appear conspicuously. In some of the joints there are several of them; in others there is a single one.

As to the structure of these large glands; they consist of small vesicles, which are not gathered together into several lobes, or bags of glandules, but are disposed upon several membranes lying over one another; of which membranes there are several in every one of these glands, which appear evidently in those who are hydropical. They have their blood-vessels, as other glands: but their veins have a particular texture, in their course, for retarding the return of the blood from the glands, that the *mucilaginous liquor*, which is not separated with the greatest expedition, may have time for separation; which is a contrivance, observed where-ever a thick fluid is to be secreted.

The large *mucilaginous glands* are variously situated; some in a sinus formed in the joint; others stand near or over-against the interstice between the articulated bones: but in general, they are so placed, as to be squeezed gently, and lightly pressed, in the inflexion or extension of the joint, in order to yield a quantity of mucilage proportionate to the motion of the part, and the present occasion, without any injury.

The design of all these glands is to separate a *mucilaginous* kind of liquor, which serves principally to lubricate the joints, or to make them slippery: it serves likewise to preserve the ends of the articulated bones from attrition and heating; but all this it does in conjunction with the medullary oil; with which, together, is made a composition admirably well fitted for those ends; for the mucilage adds to the lubricity of the oil, and the oil preserves the mucilage from growing too thick and viscous.

Dr. Havers observes the same glands to lie between the muscles and tendons; and supposes that there is the same mixture there of an oily and *mucilaginous* substance; the one being that fat, which is found between the muscles, and is supplied by the glandulæ adiposæ; and the other separated by the *mucilaginous* glandules, of which the common membrane of the muscles is every-where full: This mixture in the interstices of the muscles lubricates them and their tendons; and preserves them from shrinking, and growing rigid and dry.

MUCOUS glands are three glands which empty themselves into the urethra; so called by the first discoverer, Mr. Cowper, from the tenacity of the liquor which they secrete.—See *Tab. Anat. (Splanch.) fig. 8. lit. w.*

The two first discovered of these are about the bigness of a French-bean, of a depressed oval figure, and a yellowish colour, like the prostates; being on each side the bulb of the cavernous body of the urethra, a little above it.

Their excretory ducts spring from the internal surface, next the inner membrane of the urethra; into which they open a little lower, by two distinct orifices, just below its bending under the ossa pubis, in perinaeo, where they discharge a transparent viscous liquor.

The third *mucous* gland is a small, conglobate, yellowish gland, like the former, but somewhat less, situate above the angle of flexure of the urethra, under the ossa pubis, in the perinaeo, near the anus.—It has two excretory ducts, which enter the urethra obliquely, a quarter of an inch below the two former; and discharge a liquor like the former, both in colour and consistence.

MUCRO cordis, in anatomy, the lower or pointed end of the heart.

The word is Latin, *mucro*, where it properly signifies the point of a spear, &c.

Hence, **MUCRONATED** is applied to whatever tends to, or terminates in a point, like that of a spear; as *mucronata cartilago*, &c.

MUCUS of the joints is a mucilaginous liquor, separated by its proper glands, conveniently placed in the interstices of the bones, where those glands are gently pressed by the motion of the parts: it serves to make the extremities of the bones or joints slip more easily.

Mucus of the urethra, a viscous transparent liquor, serving to line and lubricate the part; that the seed and the urine may slip more freely, without either adhering to or lacerating the part.

It comes from glands, lately discovered by Mr. Cowper, about the penis; and is that, which in women is often mistaken for semen.

Mucus of the nostrils is a viscid excrementitious humour separated by its proper glands, placed in the internal membrane of those parts.—It serves to moisten, lubricate, and defend the olfactory nerves; which, being extremely soft and naked, would, without such provision, be soon spoiled. See *Nose*.

MUD-walls. See the article *WALL*.

MUFFT. See the article *MUPHTI*.

MUGGLETONIANS, a religious sect, which arose in England about the year 1657. so denominated from their leader, Lodowick Muggleton, a journeyman taylor.

Muggleton, with his associate Reeves, set up for great prophets; and, it is said, pretended to an absolute power of saving and damning whom they pleased; giving out, that they were

the two last witnesses of God, that should appear before the end of the world.

MUID, a large measure, in use among the French, for dry commodities; as corn, pulse, salt, lime, coals, &c.

The *muid* is no real vessel used as a measure; but an estimation of several other measures, as the septier, mine, minot, bushel, &c.

At Paris, the *muid* of wheat, pulse, and the like, is composed of twelve septiers, each septier making two mines, the mine two minots, the minot three bushels, the bushel four quarts, or sixteen litrons, each litron 36 cubic inches, exceeding our pint by $1\frac{1}{2}$ cubic inch.—The *muid* of oats is double that of wheat, though composed, like that, of 12 septiers; but each septier contains 24 bushels.—The *muid* of charcoal contains 20 mines, sacks, or loads, each mine two minots, each minot eight bushels, and each bushel four quarts, &c.

MUID is also one of the nine calks, or regular vessels used in France, to put wine and other liquors in.—The *muid* of wine divided into two *demi-muids*, four *quarter-muids*, and eight *half quarter-muids*, contains 36 septiers, each septier 8 pints, Paris measure; so that the *muid* contains 288 pints.

MULATTO *, a name given, in the Indies, to those who are begotten by a negro man on an Indian woman; or an Indian man on a negro woman.

* The word is originally Spanish, *mulata*, formed of *mule*, a mule, as being begotten of two different species.

Those begotten of a Spanish woman and an Indian man, are called *metis*; and those begotten of a savage by a *metis* are called *jambos*.—These are all very different in colour, and in their hair.

MULCT, **MULCTA**, a penalty, or fine of money, imposed for a fault or misdemeanour.

MULE, in natural history, a mongrel kind of quadruped usually generated between an ass and a mare; sometimes also between a horse and a she-ass.

Mules are a sort of monsters; and, therefore, they do not propagate their kind.

And yet the antients mention a sort of *mules* that were prolific, in Phrygia, Syria, Cappadocia, and Africa. Witness Aristotle, *Hist. Animal.* l. 6. c. 36. Varro de re Rustica, l. 2. c. 1. Columella, l. 7. c. 36. Theophrastus, and, after him, Pliny, l. 8. c. 44. Steno, examining the testicles of a *mule*, found *ova* therein, with a sort of placenta about them; which persuaded him, that *mules* might engender without any miracle. But the observation is fanciful, and the conclusion unworthy to able a naturalist.

The Roman ladies had equipages drawn by *mules*; as appears from the medals of Julia and Agrippina. And, at this day, in Spain, the coaches of the nobility, and even of princes, are usually drawn by no other than *mules*. We are assured, that M. de Thou, first president of the parliament, had the fourth coach in France, in 1585; till which time every body rode to court, parliament, &c. on *mules*.

MULES, among gardeners, denote a sort of vegetable monsters produced by putting the farina fecundans of one species of plant into the pistil, or utricle of another.

The carnation and sweet-william being somewhat alike in their parts, particularly their flowers; the *farina* of the one will impregnate the other: and the seed so enlivened will produce a plant differing from either.—An instance of this we first had in Mr. Fairchild's garden at Hoxton; where a plant is seen neither sweet-william, nor carnation, but resembling both equally: this was raised from the seed of a carnation that had been impregnated by the farina of the sweet-william.—These couplings being not unlike those of the mare with the ass, which produce the *mule*; the same name is given them; and they are like the others, incapable of multiplying their species.

This gives us a hint for altering the property and taste of any fruit, by impregnating one tree with the *farina* of another of the same class; *e. gr.* a codling with a pearmain, which will occasion the codling, so impregnated, to last a longer time than usual, and to be of a sharper taste. Or if the winter-fruits be fecundated with the dust of the summer kinds, they will ripen before their usual time. And from this accidental coupling of the *farina* of one with another, it may possibly be that in an orchard where there is variety of apples, even the fruit gathered from the same tree differ in their flavour, and in the season of maturity. It is also from the same accidental coupling that proceeds the numberless varieties of fruits and flowers raised every day from seed.

MULIEBRIA, a term sometimes used to signify the privities of women; or so much as is otherwise called *cunus*—See *Tab. Anat. (Splanch.)* fig. 9.

MULIER, in law, signifies lawful issue born in wedlock, but begot before.

If a man have a son by a woman before marriage, which is a bastard and illegitimate; and he after marries the mother of the bastard, while with child of another, and they have another

son: this second son is called *mulier* *, and is lawful, and shall be heir to his father. These we sometimes also find with the additions, *bastard eigne*, and *mulier puiſne*.

* Some derive the word from the Latin *melior*, or French *meilleur*, better; in regard the condition of a son born thus is better than that of an elder brother born before wedlock. Though, according to Glanvil, the lawful issue is rather called *mulier* than *melior*, because begotten on *mulieres*, and not on *concubine*: For he calls such issue *filius mulieratus*; opposing them to bastards.—Agreeable to which, Briton has *frere mulier*, i. e. the brother begotten of the wife; in opposition to *frere bastard*.

The like seems to obtain in Scotland, where, according to Skene, *mulieratus filius* is a lawful son, begot of a lawful wife.

MULIER was also antiently used as an addition for a wife; sometimes also for a widow.—According to Coke, virgin is also included under the name *mulier*.

MULLER, or **MULLAR**, denotes a stone flat and even at bottom, but round a-top; used for grinding of matters on a marble. The apothecaries use *mullers* to prepare many of their terreous powders; and painters for their colours, either dry or in oil.

MULLER is also an instrument used by the glass-grinders; being a piece of wood, to one end whereof is cemented the glass to be ground, whether convex, in a basin or concave, in a sphere or bowl.

The *muller* is ordinarily about six inches long, turned round; the cement they use is composed of ashes and pitch. See GLASS-GRINDING.

MULLET, or **MOLLET**, in heraldry, a bearing in form of a flat, or rather of the rowel of a spur, which it originally represented.

The *mullet* has but five points; when there are six it is called a *star*.—Though others make this difference, that the *mullet* is, or ought to be, always pierced, which a star is not.—*Vid. Tab. Heraldry*, fig. 71.

The *mullet* is usually the difference, or distinguishing mark for the fourth son, or third brother, or house.

Though it is often also borne alone, as coat-armour: Thus, Ruby on a chief pearl, two *mullets* diamond, was the coat of the famous lord Verulam, first Sir Francis Bacon.

MULSUM, **MULSE**, a liquor made of wine and honey; or even of honey and water. See HYDROMEL.

MULTA, or **MULTURA**, *episcopii*, a fine, or final satisfaction antiently given the king by the bishops, that they might have power to make their last wills; and that they might have the probate of other mens, and the granting of administrations.

MULTANGULAR, a figure, or body which has many angles.

MULTILATERAL, in geometry, is applied to those figures which have more than four sides or angles, more usually called *polygons*.

MULTINOMIAL, or **MULTINOMINAL** roots, in mathematics, are such as are composed of many names, parts, or members; as, $a + b + c + d$, &c.

For the method of raising an infinite *multinomial* to any given power, or of extracting any given root out of such a power; see a method of M. de Moivre, in *Philos. Transact.* N^o. 230.

MULTIPLE, **MULTIPLIX**, in arithmetic, a number which comprehends some other several times.

Thus 6 is a *multiple* of 2, or, which is the same, 2 is a quota part of 6; 2 being contained in 6 three times. And thus 12 is a *multiple* of 6, 4, 3; and comprehends the first twice, the 2d thrice, the 3d four times, &c.

MULTIPLE ratio, or *proportion*, is that which is between *multiple* numbers.

If the lesser term of a ratio be an aliquot part of the greater; the ratio of the greater to the less is called *multiple*: And that of the less to the greater *sub-multiple*.

A *sub-multiple* number is that contained in the *multiple*. Thus the numbers 1, 2, and 3 are *sub-multiples* of 6 and 9.

Duple, triple, &c. ratio's; as also sub-duples, sub-triples, &c. are so many species of *multiple* and *sub-multiple* ratio's.

MULTIPLER *echo*. See the article ECHO.

MULTPLICAND, in arithmetic, is one of the factors in the rule of multiplication; being that number which is given to be multiplied by another called the *multiplicator*, or *multiplier*.

MULTIPLICATOR, in arithmetic, a number multiplying another called the *multiplicand*.

The largest number is ordinarily made the *multiplicand*, and placed above the smaller, or *multiplicator*; but the result is the same, which soever of the numbers be made *multiplicand* or *multiplicator*; 4 times 5, and 5 times 4, making the same sum.

MULTIPLICATION, the act of multiplying, or increasing the number of any thing.

The multiplication of the loaves in the wilderness was one of our Saviour's greatest miracles. The Romanists hold a real multiplication of the body of Christ in the eucharist; so that every communicant has a whole body, &c.

An old statute says, It is ordained and established, that none

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from henceforth shall use to multiply gold, or silver, nor use the craft of multiplication; and if any the same do, he shall incur the pain of felony. *Stat. 5 Hen. IV. c. 4.*
 This statute was made on presumption that some persons skillful in chymistry, could multiply or augment those metals by elixirs, or other ingredients; and change other metals into very gold and silver.—Under Henry VI. letters patent were granted to certain persons (who undertook to perform the same, and to find the philosopher's stone), to free them from the penalty in the said statute.—But the statute has been since repealed, *1 Will. & Mar. c. 30.*

MULTIPLICATION, in arithmetic, the act, or art of multiplying one number by another, to find the product.

Multiplication, which is the third rule in arithmetic, consists in finding some third number, out of two others given; wherein one of the given numbers is contained as often as unity is contained in the other.

Or, *Multiplication* is the finding what will be the sum of any number added to itself, or repeated, as often as there are units in another.—So that multiplication of numbers is a compendious kind of addition.

Thus the multiplication of 4 by 5 makes 20, i. e. four times five amount to twenty; which algebraists express thus, $4 \times 5 = 20$.

In multiplication, the first factor, i. e. the number to be multiplied, or the multiplicand, is placed over that whereby it is to be multiplied (See **MULTIPLICAND**); and the factum or product under both.

An example or two will make the process of multiplication easy.—Suppose I would know the sum 269 multiplied by 8, or 8 times 269.

Multiplicand	269
Multiplier	8

Factum, or Product	2152
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The factors being thus disposed, and a line drawn underneath, (as in the example), I begin with the multiplier thus: 8 times 9 make 72, set down 2, and carry 7 tens, as in addition; then 8 times 6 make 48, and 7 I carried, 55; set down 5, and carry 5; lastly, 8 times 2 make 16, and with 5 I carried 21, which I put down: so as coming to number the several figures placed in order, 2, 1, 5, 2, I find the product to be 2152.

Now supposing the factors to express things of different species, viz. the multiplicand men, or yards, and the multiplier pounds; the product will be of the same species with the multiplier. Thus the product of 269 men or yards multiplied by 8 pounds or pence, is 2152 pounds or pence; so many of these going to the 269, at the rate of 8 a-piece. Hence the vast use of multiplication in commerce, &c.

If the multiplier consists of more than one figure, the whole multiplicand is to be added to itself, first, as often as the right-hand figure of the multiplier shews, then as often as the next figure of the multiplier shews, and so on.—Thus 421×23 is equal to 421×3 , and also 421×20 . The product arising from each figure of the multiplier, multiplied into the whole multiplicand, is to be placed by itself in such a manner, that the first or right-hand figure thereof may stand under that figure of the multiplier from which the said product arises.

For instance;

Multiplicand	421
Multiplier	23

Particular product of 421×3	1263
Particular product of 421×20	842

The total product	9683
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This disposition of the right-hand figure of each product, follows from the first general rule; the right-hand figure of each product being always of the same denomination with that figure of the multiplier from which it arises.

Thus, in the example, the figure 2 in the product 842, is of the denomination of tens, as well as the figure 2 in the multiplier. For 1×20 (that is the 2 of 23) = 20, or 2 put in the place of tens, or second place.

Hence, if either of the factors have one or more cyphers on the right-hand, the multiplication may be performed without regarding the cyphers, till the product of the other figures be found: To which they are to be then affixed on the right. And if the multiplier have cyphers intermixed, they need not be regarded at all.—Instances of each follow.

12	358	10	2400	8013
10	6000	10	310	5006
120	2148000	100	72000	48078
				40065
				40113078

Thus much for an idea of multiplication, where the multiplicand consists wholly of integers; in the praxis whereof, it is supposed, the learner is apprized of the product of any of the nine

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digits multiplied by one another, easily learnt from the common table, or otherwise.

There are also some abbreviations of this art.—Thus to multiply a number by 5, you need only add a cypher to it, and then halve it.—To multiply by 15, do the same, then add both together. The sum is the product.

Expedients for the more easy and expeditious multiplying large sums are sliding rules and Neper's bones.—The want of which may be supplied by tabulating the multiplicand.

Where the multiplier is not composed wholly of integers; as it frequently happens in business, where pounds are accompanied with shillings and pence; yards with feet and inches: the method of procedure, if you multiply by a single digit, is the same as in simple numbers, only carrying from one denomination to another, as the nature of each species requires.

E. gr. to multiply 123 l. 14 s. 9 d. 3 q. by five: Say, $5 \times 3 q. = 15 q.$ that is, 3 d. 3 q. write down the 3 q. and proceed, saying, $5 \times 9 = 45 d.$ that is 3 s. 9 d. set down the 9 d. and proceed in the same manner through the rest.

If you multiply by two or more digits, the methods of procedure are as follow.—Suppose I have bought 37 ells of cloth at 13 l. 16 s. 6 d. per ell, and would know the amount of the whole.

—I first multiply 37 ells by the 13 l. in the common method of multiplication by integers, leaving the two products without adding them up; then multiply the same 37 ells by 16 s. leaving, in the like manner, the two products without adding them.

Lastly, I multiply the same 37 by the 6 d. the product whereof is 222 d. which divided by 12 (See **DIVISION**), gives 18 s. 6 d. and this added to the products of the 16 s. the sum will be 610 s. 6 d. the amount of 37 ells at 16 s. 6 d. the ell.

Lastly, the 610 s. 6 d. are reduced into pounds by dividing them by 20 (See **REDUCTION**). upon adding the whole, the amount of 37 ells at 13 l. 16 s. 6 d. will be found as in the following:

37 ells At 13 pounds.	37 ells At 16 shillings.	37 ells. At 6 pence.
111	222	222
37	37	
30 10 6	18 6	

Product 511 10 6	610 6
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Or thus: Suppose the same question; reduce the 13 l. 16 s. into shillings, the amount will be 276 s. reduce 276 s. into pence, adding 6, the amount will be 3318 d. Multiply the 37 ells by 3318, the amount will be 122766 d. which divided by 2; and the quotient 10230 s. 6 d. reduced into pounds by cutting off the last figure on the right, and taking half of those on the left, yields 511 l. 10 s. 6 d. the price of the 37 ells, as before.

Though by these two methods any multiplication of this kind may be effected, yet the operations being long, we shall add a third much shorter.—Suppose the same question: Multiply the price by the factors of the multiplier, if resolvable into factors: if not, by those that come nearest it; adding the price for the odd one, or multiplying it by what the factors want of the multiplier. So, the work will stand thus; 37 ells at 16 s. 6 d. $6 \times 6 = 36 \times 1 = 37$:

Therefore	82 19 0
	497 14 0
	13 16 6
	511 10 6

The price of the 37 ells.

But the most commodious is the fourth method, which is performed by aliquot and aliquant parts—where you are to observe by the way, that aliquot parts of any thing are those contained several times therein, and which divide without any remainder; and that aliquant parts are other parts of the same thing composed of several aliquot parts.

To **MULTIPLY** by aliquot parts, is in effect only to divide a number by 3, 4, 5, &c. which is done by taking a 3d, 4th, 5th, &c. from the number to be multiplied. Example:

To multiply, v. gr. by 6 s. 8 d. Suppose I have 347 ells of ribbon at 6 s. 8 d. per ell.

Multiplicand	347 ells.
Multiplier	6 s. 8 d.

Product	115 l. 13 s. 4 d.
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The question being stated, take the multiplier, which according to the table of aliquot parts is the third; and say, the third of three is 1, set down 1; the third of 4 is 1, set down 1, remains 1, that is, 1 ten, which added to 7, makes 17; then the third of 17 is 5; remain 2 units, i. e. two thirds, or 13 s. 4 d. which place after the pounds. Upon numbering the figures 1, 1, and 5, integers, and 13 s. 4 d. the aliquot part remaining, I find the sum 115 l. 13 s. 4 d.

For **MULTIPLICATION** by aliquant parts: Suppose I would multiply by the aliquant part 19 s. I first take for 10 s. half the multiplicand; then for 5 s. which is the fourth, and lastly, for 4 s. which is the 5th. The products of the three aliquot parts that

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that compose the aliquant part, being added together, the sum will be the total product of the *multiplication*, as in the following example; which may serve as a model for *multiplication* by any aliquant part that may occur.

Multiplicand	336	ells.
Multiplier	19	s.
	178	l. for 10 s.
	89	l. for 5 s.
	71	l. 4 s. for 4 s.

Product 338 l. 4 s.

For the proof of MULTIPLICATION.—The operation is right when the product divided by the multiplier quotes the multiplicand; or divided by the multiplicand quotes the multiplier.—A readier way, though not absolutely to be depended on (See ADDITION), is thus: add up the figures of the factors, casting out the nines; and setting down the remainders of each. These multiplied together, out of the factum, cast away the nines, and set down the remainder. If this remainder agree with the remainder of the factum of the sum, after the nines are cast out; the work is right.

Cross MULTIPLICATION, otherwise called *duodecimal arithmetical*, is an expeditious method of multiplying things of several species, or denominations, by others likewise of different species, &c. *E. gr.* Shillings and pence by shillings and pence; feet and inches by feet and inches: this is much used in measuring, &c.—The method is thus.

Suppose 5 feet 3 inches to be multiplied by 2 feet 4 inches; say, 2 times 5 feet is 10 feet, and 2 times 3 is 6 inches; again, 4 times 5 is 20 inches, or 1 foot 8 inches; and 4 times 3 is 12 parts, or one inch; the whole sum makes 12 feet 3 inches.—In the same manner you may manage shillings and pence, &c.	F.	l.
	5	3
	2	4
	10	6
	1	8
		1

MULTIPLICATION, in geometry, or in lines, is effected by supposing a line *a b* (*Tab. Geomet. fig. 9.*) called the *describent*, moving perpendicular along another *b c*, called the *dirigent*.

For by this means the describent forms the rectangle *a d c b*; and if it be divided together with the dirigent into any number of equal parts, it will by its motion describe as many little rectangles as the units in the describent and dirigent will produce when multiplied into one another; viz. 21. For when the line *a b* hath moved over one part of *a d*, it will by its three parts have described the three little rectangles in the first column; when it comes to 2, it will have described three more. And this is the reason why *multiplication* in the Latin tongue is usually expressed by the word *ducta*, drawn (and from hence also comes *product*): as if *a b* were multiplied by *b c*, they say, *a b ducta in b c*, because the describent is led, as it were, or carried along in an exact posture upon the dirigent, and by that means describes the rectangle; so that the rectangle and product are all one in geometry.

Now, as in all *multiplication* unity is to one factor as the other is to the product, *multiplication* in lines may be performed thus. Let *a b* (*Fig. 10.*) be to be multiplied by *a d*.—Make any angle at pleasure; on one of the legs set off *a u* = to unity; and on the same leg set off *u d*, the multiplier (3); then set the multiplicand *a b* (2) from *a* on the other leg of the angle; draw *u b*, and parallel to it through *d*, draw *d c* (6). I say, *d c*, or 6, is the product: for *a u : a d :: a b : b c*.

MULTIPLICATION of plants. See FERTILITY of plants.

MULTIPLICATIVES. See NUMERALS.

MULTIPLYING, in the animal economy, the producing of one's like.

Mankind multiplied at a prodigious rate before the flood: rabbits, fish, and most insects, multiply incredibly: the single milt of a cod, examined with M. Leewenhoeck's microscope, was found to contain more ova than there are animals on the face of the earth.

M. Dodart has several discourses on the multiplication of plants in the *Memoirs of the royal academy of sciences*. He has examined the beech-tree particularly with this view, and found its increase to surpass all imagination.

MULTIPLYING, in arithmetic, is the finding a number which contains the multiplicand as often as there are units in the multiplier.

The rule of three consists in multiplying the third term by the second, and dividing the product by the first. See RULE of three.

MULTIPLYING-glass, a lens, or glass, in which objects appear increased in number.

A multiplying-glass, called also a *polyhedron*, is a glass formed or ground into several planes, or faces, making angles with one another; through which the rays of light issuing from the same point undergo different refractions, so as to enter the eye from every surface in a different direction; as if they came from several points.

And thus the same point is seen in several imaginary foci; and

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therefore appears multiplied. For the phenomena and laws of multiplying-glasses, see POLYHEDRON.

MULTISILICOUS plants, are the same with *corniculate plants*, viz. those which, after each flower, have divers distinct, slender, and frequently crooked, filique, or pods, wherein their seed is contained; and which, when they ripen, open of themselves, and let the seeds drop.

MULTITUDE, *MULTITUDO*, an assemblage, or collection, of a great number of things, or persons. *Multitude* is properly the abstract whereby things are said to be many.

In which sense *multitude* may be considered as number; and stands opposed to unity.

In law, some will have *multitude* to imply at least ten persons; but Sir Edward Coke says, he could never find it restrained by the common law to any certain number, but always left to the discretion of the judges.

A MULTO fortiori, or *a minore ad majus*, is a way of argumentation often used by Littleton; whose force is thus: If it be so in a feoffment passing a new right; much more is it for the restitution of an antient right.

MULTUM, in arithmetic.—If A be one, B one, C one, D one, &c. and B, C, and D, be not the same with A; A, B, C, and D, are *multa*, or *plura*, many. Wolfius.

MULTURA episcopi. See the article *MULTA*.

MUM, a wholesome kind of malt liquor, chiefly prepared in Germany.

The process of making *mum*, as recorded in the town-house of Brunswick, the place of most note for this liquor, is as follows:

Take 63 gallons of water that has been boiled to the consumption of a third part; brew it with seven bushels of wheat-malt, one bushel of oat-malt, and one bushel of ground-beans; when it is tunned, let not the hoghead be too full at first; and as soon as it begins to work, put into it of the inner rind of fir three pounds, tops of fir and birch each one pound, carduus benedictus three handfuls, flower of rosa solis one handful or two; burnet, betony, marjoram, avens, penny-royal, wild thyme, of each a handful and a half; of elder-flowers, two handfuls or more; seeds of cardamum bruised 30 ounces, barberries bruised one ounce: put the herbs and seeds into the vessel when the liquor has worked a while; and, after they are added, let the liquor work over the vessel as little as may be; then fill it up: lastly, when it is stopp'd, put into the hoghead ten new-laid eggs unbroken or cracked, stop it up close, and drink it at two years end.

Our English brewers use cardamum, ginger, and saffras instead of the inner rind of fir; and add also walnut-rinds, madder, red sanders, and clemppane.

MUMMY *, *MUMIA*, a carcase or body embalmed or dried in the manner of the antient Egyptians.

Menage, after Bochart, derives the word *mummy* from the Arabic *mumia*; of *mun*, wax. Salmassius, from *amomum*, a kind of perfume. Though others hold, that in the Arabic tongue, the word *mumia* signifies a body embalmed, or aromatized.

Properly speaking, *mummy* is not the flesh of the deceased, but the composition wherewith it is embalmed; but in common acceptance *mummy* is also used for the body.

The preparation of *mummy* is of so old a standing, that it was in use in Egypt before the time of Moses. The coffin in which the *mummy* is contained was to be of sycamore-wood, which is found to keep sound for the space of 3000 years; but the tree properly thus called was very different from our sycamore.

Mummy is said to have been first brought into use in medicine by the malice of a Jewish physician, who wrote that flesh thus embalmed was good for the cure of divers diseases, and particularly for bruises, to prevent the blood's gathering and coagulating. The Turks prevent the exportation of *mummy* into Europe as much as possible.

There are two kinds of bodies denominated *mummies*.—The first are only carcases, dried by the heat of the sun, and by that means kept from putrefaction; these are frequently found in the dry sands of Lybia.—Some say, they are the bodies of deceased people buried there on purpose to keep them intire without embalming; others, that they are the carcases of travellers, &c. who have been overwhelmed with clouds of sand raised by the hurricanes frequent in those deserts. Be that as it will, these *mummies* are of no use in medicine, and are only preserved as curiosities.

The second kind of *mummies* are bodies taken out of the pits or catacombs near Cairo, wherein the Egyptians deposited their dead after embalming.—It is these that make the *mummy* once so much valued, and to which such extraordinary virtues are ascribed. It is said, that all the *mummy* sold in the shops, whether brought from Venice or Lyons, or even directly from the Levant by Alexandria, is factitious, and the work of certain Jews, who, knowing the value the Europeans set on the Egyptian *mummy*, counterfeit it by drying carcases in ovens, after having prepared them with powder of myrrh, caballin aloes, Jews pitch, black pitch, and other coarse or unwholesome drugs.

The French charletans, it seems, have likewise got the art of

of preparing *mummies*. Their method is simple enough: Out of the carcase of a person hanged, they take the brain and entrails, and dry the rest in an oven, steeping it in pitch, and other drugs. And this they sell for right Egyptian *mummy*. Pareus has a very curious treatise of *mummies*, wherein he shews the abuses thereof; and makes it appear, that they can never be of any real medicinal use.

Matthiolus is of the same opinion, after Serapion. Both these authors take even the Egyptian *mummies* to be no more than bodies embalmed with pissaspaltum.

MUMMY, *mumia*, is more particularly used for the liquor or juice oozing from human bodies aromatized and embalmed; gathered in the sepulchres.—This is the *mummy* chiefly spoken of among the antient writers.

MUMMY also denotes a medicinal drug, or a viscous composition partaking of bitumen and pitch, found in the mountains and forests of Arabia, and other hot countries of the east; much used in embalming of dead bodies.

Dioscorides speaks of a *mummy* found on the sea-coast near Epidaurus, brought thither by the torrents from the Ceraunian mountains, and there dried by the sun into huge masses.

It smells like bitumen mixt with pitch. The people thereabouts call it *mineral wax*.—In Latin, or rather Greek, it is called *pissaspaltus*. See **PISSASPALTUS**.

MUMMY, *mumia*, is also used by some physicians for I know not what implanted spirit, found chiefly in carcases, when the infused spirit is fled.

The infused spirit is sometimes also called *mummy* in living subjects; and both the one and the other are supposed to serve in transplantation. See **TRANSPLANTATION**.

A plant, for instance, bringing this *mumia* from one subject to another, the *mumia* joins and unites itself immediately with the *mumia* or spirit of the new subject; and from this union arises a natural and common inclination between the two subjects.—And on this principle they account for sympathetic or magnetic cures. But this whole doctrine is now deservedly laughed out of doors.

MUMMY is also used among gardeners for a sort of wax used in the planting and grafting of trees.

Agricola directs the preparation thereof as follows: Take one pound of common black pitch, and a quarter of a pound of common turpentine; put them together in an earthen pot, and set them on fire in the open air, having something in your hand to cover and quench the mixture in time; the matter is to be thus alternately lighted and quenched till all the nitrous and volatile parts be evaporated. To this a little common wax is to be added; and the composition is then to be set by for use.

To apply it in the dressing of the roots of trees, melt it, and dip in the two ends of the pieces of root one after another; then put them in water, and plant them in the earth, the small end downward, so that the larger may appear a little way out of the earth, and so may have the benefit of the air; then press the earth hard down upon them that they may not receive too much wet.

MUNDANDIS *vicis & venellis*. See the article **VICIS**.

MUNDIRBURDUS. See **ADVOCATE**.

MUNDICK, a name for marcasite; a kind of mineral glebe, found in the tin-mines and elsewhere, sometimes white, yellow, or green, and sometimes of a dark brown colour.

It is frequently called *masy*; and appears to be nothing else but a mixture of sulphur with some metalline particles.

The *mundick ore* is easily distinguished by its glittering, and sometimes by its discolouring the fingers.—Some say it feeds the tin; and yet they allow that where there is much *mundick*, there is little or no tin. Vid. *Gibbs. Addit. to Camd. Brit. in Cornwall*.

What is called *mundick* in Cornwall, frequently contains a large portion of copper.

The steams of the *mundick* are very troublesome to the miners, yet it is found a good vulnerary; and the miners use no other remedy for wounds but washing them in water that runs from the *mundick ore*. See Supplement, article **MARCHASITA**.

MUNDIFICATIVES, or **MUNDIFYERS**, in medicine, denote *cleansers, purifiers, or detergents*.

Mundificative plasters, or unguents, are such as deterge, and dry, and thus cleanse ulcers of two kinds of matter, *viz. pus and sanies*.

The chief ingredients in *mundificative* unguents, are gentian, aristolochia, enula campana, and the vulnerary herbs.

MUNDUS, *world*. See the article **WORLD**.

ANIMA MUNDI. See the article **ANIMA**.

MUNERARIUS. See **DESIGNATOR**.

MUNICIPAL *, **MUNICIPALS**, or **MUNICEPS**, an appellation given to the inhabitants of the *municipia*, or municipal cities.

* The word is compounded of *munus*, office, employ; and *capio*, I take or hold.

In the Roman law, *municipal* denotes a person vested with the rights and privileges of a Roman citizen.

This title the Romans frequently bestowed on foreign cities and people; and in effect, it was little more than a title.

MUNICIPAL cities, *municipia*, were those whose inhabitants were capable of civil offices in the city of Rome.

These, however, according to Mariana, came somewhat short of the privileges of the colonies.

They had no suffrages or votes at Rome; but were left to be governed by their own laws and magistrates.—It is true, some few *municipal* cities, by particular merit, &c. obtained the liberty of votes; which occasioned that received distinction of *municipium sine suffragio*, & *municipium cum suffragio*.

They were so called, because *muneris hujus honorarii participes*; but by *munus honorarium* was meant no more than the bare appellation of a Roman, whereby they were privileged to fight in a legion, as denizens; and not in auxiliary bands, as associates. The first who had this honour, were the *Cærites*.

MUNICIPAL, among us, is now applied to the customary laws, that obtain in any particular city, or province; and which have no authority in the neighbouring places.

MUNICIPAL officers are those elected to defend the interests of cities, their rights and privileges, and to maintain order and good policy; as mayors, sheriffs, consuls, bailiffs, &c.

In Spain, the *municipal* offices are bought. In England, they are obtained by election.

MUNIMENTS, or **MINIMENTS**, the evidences or writings, whereby a man is enabled to defend the title of his estate.

Wrightford says, the word *muniment* includes all manner of evidence, deeds, charters, &c.

MUNIMENT-house, a little, strong apartment in cathedral and collegiate churches, castles, colleges, or the like, destined for keeping the seal, evidences, charters, &c. of such church, college, &c. called *muniments*, or *miniments*.

MUNIMINA, the grants or charters of kings and princes to churches *, so called, because *cum eis muniantur* against all those who would deprive them of those privileges.

* The word is formed of the Latin *munio*, I defend or strengthen,

MUNIONS, in architecture, the short upright posts or bars, which divide the several lights in a window-frame.

MUNITION, or **AMMUNITION**, the provisions wherewith any place is furnished in order for defence, or wherewith a vessel is stocked for a voyage; or those that follow a camp for its subsistence.

MUNITION-bread is the proportion of bread distributed every day to the soldiers of a garrison or army.—Each officer is allowed so many rations of *munition-bread*.

MUPHTI, or **MUFTI**, the chief or patriarch of the Mahometan religion, residing at Constantinople.

The *muphti* is the sovereign interpreter of the Alcoran, and decides all questions of the law.

He takes place of the bakhaws; and his authority is often terrible to the grand signor himself.—It is he who gives the sword to the grand signor's side; which ceremony answers to the coronation of our kings.

MURAGE, **MURAGIUM**, in our customs, a reasonable toll to be taken of every cart or horse coming laden into a city or town, for the building or repairing the walls thereof.

MURAL, something belonging to a wall; which the Latins call *murus*.

MURAL crown, among the antient Romans, was a kind of crown indented a-top, like the battlements of a wall.

The *mural crown* was the reward of those who first mounted the walls of the enemy: whence it was also called *corona obsidionalis*.

MURAL arch is a wall, or walled arch, placed exactly in the plane of the meridian, *i. e.* upon the meridian line, for the fixing of a large quadrant, sextant, or other instrument, to observe the meridian altitudes, &c. of the heavenly bodies. See **MERIDIAN line**.

Tycho Brahe was the first who used a *mural arch* in his observations; after him Mr. Flamsteed, de la Hire, &c. used the same means.

MURDER. See the article **MURTHUR**.

MURDERING battery. See the article **BATTERY**.

MURE.—**COUNTER-MURE**. See the article **COUNTER-MURE**.

MURENGERS, two officers of great antiquity in the city of Chester, being two of the principal aldermen chosen yearly to see the walls kept in good repair, and to receive a certain toll and custom for the maintenance thereof.

MURING, the walling, or raising the walls of a building. See **WALL**.

MURORUM domesticus. See the article **DOMESTICUS**.

MURRAIN, *gargle*, a mortality, or contagious disease among cattle.

Murrains are occasioned various ways, but principally by an hot, dry season; or rather by a general putrefaction of the air, which

which begets an inflammation in the blood, and a swelling in the throat, with other symptoms: the disease soon proves mortal, and is communicated from one to another.

The symptoms are generally a hanging down or swelling of the head, rattling in the throat, short breath, palpitation of the heart, staggering, abundance of gum in the eyes, &c. breath hot, and tongue shining.

The most remarkable *murrain* we hear of, is that mentioned in the *Philosophical transactions*, which spread itself through Switzerland, and Germany, into Poland, &c.

The contagion seemed to propagate itself in form of a blue mist, which fell on the grafs where the cattle grazed, inasmuch that whole herds returned home sick, and being very dull, and forbearing their food, most of them died away in twenty-four hours time. On dissection there were found large corrupted spleens, splenelous and corroded tongues, &c. Those people who managed them, without a due regard to their own health, were infected by them, and died like the beasts.

Some imagine it had its rise from noxious vapours thrown out of the earth in three distinct earthquakes perceived in the neighbourhood of the place where it began: though Dr. Slaré rather thinks it owing to swarms of volatile insects. The antidote for the found, and the medicine for the sick, were the same, viz. equal parts of foot, gun-powder, brimstone, and salt, with as much water as would wash it down: a spoonful was a dose. See Supplement, article OXEN, DISEASES OF.

MURREY, in heraldry, a kind of purple colour, called also *fangine*.

MURRHINE, MURRHINUS, MOPINOX, in antiquity, an appellation given to a delicate sort of ware, brought from the east, whereof cups and vases were made, which added not a little to the splendor of the Roman banquets.

Critics are divided concerning the matter of the *pacula* or *vasa murrhina*, *murrina*, or *murra*. Some will have them to have been the same with our porcelain, or china-ware.

The generality hold them to have been made of some precious kind of stone, which was found chiefly, as Piny tells us, in Parthia, but more especially in Caramania.—Some conjecture them to have been of agate, others of onyx, others of coral. Baronius doubtless was furthest out of the way, when he took them to be made of myrrh congealed and hardened.

Pempey is recorded as the first who brought these *murrhine* vessels out of the east, which he exhibited in his triumph, and dedicated to Jupiter Capitolinus.—But private persons were not long without them. So fond, in effect, did the Roman gentry grow of them, that a cup which held three sextaries was sold for seventy talents. T. Petronius before his death, to spite Nero (or, as Pliny expresses it, *ut mensum ejus exheredaret*), to disinherish his table broke a basin, *in idola murrhina*, valued at three hundred talents, on which that emperor had set his heart. See Supplement, article MYRRHINA.

MURTHER *, or MURDER, the act of killing another with violence and injustice.

* The word comes from the Saxon *morth*, death: which some will have to signify a violent death; whence, the barbarous Latin, *murdi um*, and *mordum*.

Among the number of popular errors, is the notion which has obtained, that the dead body would bleed in the presence, or upon the touch of the *murderer*.

The crime of *murder* is punished with death in almost all nations.

MURTHUR, in our law, denotes a wilful, and felonious killing another upon premeditated malice, whether secretly or openly, and whether Englishman or foreigner, living under the king's protection.

This premeditated malice, which makes the essence of *murther*, is two-fold: 1^o. *Expressis*, where it may be evidently proved that there was ill-will. 2^o. When one kills another suddenly, he having nothing to defend himself withal; as in going over a stile, or the like: for in such a case, or when a man kills a mere stranger, the law presumes he had malice, or that he would not have done it without any manner of provocation.

Formerly, *murther* was restrained to a clandestine, and treacherous killing.—Thus, *Murdricus homo antiquis dicebatur. ejus interfector nesciebatur ubiqueque vel quomodocumque esset invenire. Nunc adiunctum est, licet scilicet quis murdum fecerit, licet diu per proditorem.* Leges Hen. I.—*Arthurum nepotem regis in manus per proditorem interfecit, pessimo mortis genere, quod Angli murdum appellavit.* Matth. Paris, an. 1216.

SELMURTHUR, is otherwise called *suicide*. See FLEO de se.

MURTHURERS, or MURTHURING-pieces, are small pieces of ordnance, either of brass or iron, having chambers, put in at their breeches.

They are mostly used at sea, at the bulk-heads of the fore-castle, half-deck, &c. in order to clear the decks when an enemy boards the ship.

MUSCADINE *, a rich wine, of the growth of Provence, Languedoc, Cividad, &c.

* The word, as well as the liquor, is French: some fetch it original from *muske*; the wine being supposed to have a little of the smell of that perfume: others from *musca*, a fly, because the

flies are extremely fond of its grapes; as the Latins had their *vinum apinum*, so called, *ab apibus*, from the bees which fed on the grapes it was made of.

The way of making *muscadine* at Frontignac is as follows: They let the *muscadine* grapes grow half dry on the vine; and as soon as they are gathered, they tread and press them immediately, and tun up the liquor, without letting it stand, and work in the fat; the lee occasioning its goodness.

MUSCLE *, MUSCULUS, in anatomy, a fleshy, fibrous part of the body of an animal, destined to be the organ or instrument of motion.

* The word is derived from the Greek *μῦς*, or the Latin *mus*, a mouse; on account of the resemblance it is supposed to bear to a skinned mouse.—Dr. Douglas will have it from *μῦς*, to shut or contract; that being the proper office of a *muscle*.

The *muscle*, is a bundle of thin, parallel plates; and is divided into a great number of fasciculi, or little *muscles*, each inclosed in its proper membrane, from the internal surface whereof, pass an infinite number of transverse filaments, which intersect the *muscle* into several distinct areas, filled with their respective fasciculi of fibres.—See *Tab. Anat. (Myol.) fig. 1, 2, 3, 5, 7, &c.* A *muscle* is usually divided into three parts, the *head*, the *tail*, and the *belly*.—The *head* and *tail*, which are also called *tendons*, are the two extremes of the *muscle*; whereof the first is fixed to the stable part, and the latter to the part intended to be moved.

The *venter* or *belly* is the body of the *muscle*; being a thick, fleshy part, into which are inserted arteries and nerves, and out of which issue veins and lymphatics.

These several parts of a *muscle*, the *belly*, and the *tendons*, are composed of the same fibres: their only difference consists in this, that the fibres of the *tendons* are more closely and firmly bound together than those of the *belly*, which are more loose. Hence in the *belly* there is room for a sufficient quantity of blood to give them an appearance of redness; and the whiteness of the *tendons* only proceeds from the blood's being in some measure excluded by the tightness of their texture.—The difference then between the *belly* and the *tendons* seems to be the same as between a skein of thread, and a cord made of the same thread.

All the *muscles* act by having their bellies inflated or swelled: for by that means they are shortened, so as to draw, or press the solid bodies to which they are fastened, according to the direction of their fibres.—All the difficulty then in *muscular* motion, is, to assign their fabric and the cause of their swelling.

Every simple *muscle*, then, consists of one fleshy belly, and two tendons; but it may be again divided into others similar, though less; and those again into others still less, yet still similar to the great one: which division may be carried on to a degree of subtilty that exceeds all imagination; though it is reasonable to think it must have an end.—That last, therefore, being similar to the first, must, in like manner, have its *belly* and *tendons*; and this is what we ordinarily call a *muscular fibre*, in an assemblage or union of several whereof, a *muscle*, properly so called, consists.

Some take the *muscular fibres* to be productions of the arteries and veins, or the capillaries of those vessels insinuated with, and continued to each other; by the intumescence of whose contents, the extremities are drawn nearer each other, and by consequence, the bone to which the moveable part is fixed, approximated to the other.—But that they are, in truth, neither venous, nor arterious, nor lymphatic vessels, is evident from the last observation. Whether they are vesicular; or whether they only consist of single threads, may be still a question!

Dr. Boerhaave, from a consideration that the nerves enter every *muscle* along with its veins and arteries, and that there laying aside their outer integument, they are so distributed through the whole body of the *muscle*, as that no one point can be assigned wherein a part of them is not found; that those nerves terminated here; and that in other parts of the body the extremities of the nerves are expanded, as it were, into membranes; concludes, that the *muscular fibres* are nothing else but extremely slender expansions of the nerves stript of their integument, hollow within, and of the figure of a *muscle*, and full of a spirit communicated by the nerve from its origin in the brain or cerebellum, by the continual action of the heart.

Of these fibres united are formed fasciculi or bundles; which, again, have each their several membrane, wherein they are involved, and kept distinct from others. This membrane is extremely slender and porous within, and is full of oil, which is accumulated in time of rest, and spent in motion, furnished by the arteries; and this oil, in conjunction with a smooth mucous juice secreted by small mucilaginous glands, interspersed among these fasciculi, serves to lubricate the parts, and to preserve the fasciculi from fretting on each other.

Now, besides the nerves, there are arteries also carried into the *muscles*, and those in such abundance, and of such contexture, that a man might be inclined to think the whole body of the

the *muscle* composed of them.—These are principally distributed among the fasciculi, and the membranes that separate them, and perhaps also in the external surface of each fibrilla, where they terminate in reticular plexus's, in little oily secretories, small lymphatics, and perhaps in hollow fibrille like nerves; which fibrille may again either terminate in the cavity of the nervous muscular fibres, or make others like them.—This, at least, is clear, that every branch of an artery in the *muscles* has its corresponding little vein, which, united to the other, increases its bulk; whence the blood-vessels of the *muscles* are also lymphatics.

Of two such *muscles* as have been described, fastened in opposite situations to each other, most of the *muscles*, or pairs of *muscles* we know of, consist.

It has been already observed, that the tendon of a *muscle* consists of the same number of fibres with the *muscle* itself; with this difference, that the cavities of the muscular fibres diminishing, and losing of their former diameter, there form one compact, hard, rough, dry, narrow body, which is but little vascular.—From what has been said then it appears, that the redness of a *muscle* is owing to the blood; and its bulk to the fluids of the arteries, veins, oily cells, and lymphatics.—Hence we see, why in old age, leanness, consumptions, atrophies, constant heat, and hard labour, their redness as well as bulk are diminished; and yet in old age, leanness, &c. the motion remains. This may be effected, when the *muscles* have no redness left; as appears in insects, whose flesh is not perceivable.

The fibres, fasciculi, arteries, and nerves, may be separated from each other in a live or a dead body, without breaking: they are always in a degree of tension, and are endued with a contractive force; so that when cut asunder, the ends fly back from each other; and then they become shorter, their bulk is lessened, and they contract themselves into an undular kind of surface, and throw off their proper juices. Hence it appears, that they are always in a state of violence, are ever opposing their elongation, and ever endeavouring to shorten themselves. But more in a live body than in a dead one; and therefore they require antagonists.

If the brain be strongly compressed, or have any violent contusion; if it be suppurated, obstructed, or torn, the voluntary action of all the *muscles* immediately ceases; as well as all sense and memory: however, the spontaneous action of the *muscles* in the heart, lungs, the viscera, and vital parts, remains.—These same alterations being made in the cerebellum, the action of the heart, lungs, and life itself, ceases; when yet the vermiform motion continues a long time after in the stomach and intestines.

The nerve of any *muscle* being compressed, tied up, corrupted, or cut, all the motion of that *muscle*, both vital and voluntary, immediately ceases; and if a nervous trunk sending branches to several *muscles*, be thus bound up, cut, &c. they are all affected in the same manner.—The same things being done in any part of the spinal marrow, the action of all the *muscles* whose nerves arise from the part affected, is destroyed: and, the same thing being done to the artery which carries blood to one or more *muscles*, the effect is the same.

The tendon of a *muscle* in action does not undergo any sensible alteration, but the belly shortens, and becomes hard, pale, swollen, and protuberant; the tendons are approached nearer, and the more moveable part fastened to the tendon, is drawn towards the other less moveable: which action of a *muscle* is called its *contraction*, which is much greater and stronger than that inherent contraction observed under the first phenomenon; and therefore is not natural, but superadded.—The tendon of a *muscle* not in action, is still the same; but the belly is softer, redder, laxer, longer, and flatter: and this state of a *muscle* is called its *relaxation*, though it is usually owing to the contrary action of its antagonist; for that being frustrated, the contraction of the other continues, as not being balanced by the action of an antagonist.

If one antagonist remain at rest while the other is in action, the member in that case will be bent; if both act at the same time, it will be fixed and immovable; if neither act, it will be indifferent, and ready to be moved whither the least excess shall carry it.

All which changes are performed in the smallest moment of time, and in the whole *muscle* at once; so that they can pass and repass reciprocally without leaving any trace in the body behind them.

By injecting warm water into the artery of a quiescent *muscle*, even that of a dead carcase; its contraction is restored; and that long after death.—The bulk of a *muscle* is increased rather than diminished by every experiment of its contraction.

A limb being bent, by some external force, against the will, the flexor *muscle* of that limb assumes a state of contraction, as if acted by its proper motion; though not altogether so strenuously.—The wall remaining indifferent, all the voluntary *muscles*, and all their vessels, are equally full, and moved by the blood and spirits equally conveyed to them, and that throughout the whole body at once.

For the application of this structure of the *muscles*, in accounting for the great phenomenon of muscular motion, see MUSCULAR MOTION.

As to the muscular fibres, or, which comes to the same, the fasciculi of muscular fibres, they have not always the same situation with regard to each other, nor run in the same direction; but they sometimes run parallel to themselves and their tendons; and are sometimes disposed obliquely both to their tendons and to each other: hence there arise two different kinds of *muscles*. The one direct, and parallel; which some call *simple MUSCLES*.

The other inclined, or oblique; called *compound MUSCLES*. Under the first of these kinds are included several other species: For, first, Either the fleshy fibres run straight from one extreme to the other, as in the *sartorius*, &c. or they are turned into a circle, as in the *sphincters* of the bladder, and anus; or twisted into a spiral, as in the *oculophares*; and hence they come to be called *recti*, *obliqui*, and *spirales*.

The second kind also includes various species, according to the various angles which the oblique fibres make with the tendons; some inclining equally to each tendon, so as to form a rhombus, or acute-angled parallelogram with them, whence the *muscles* are called *rhomboidales*; others arising from two parallel tendons, are inserted obliquely into one common tendon, as in the biceps of the hand; lastly, others arising from the periphery of the circle, concur in a centre, and form *muscles* called *radiales*.

There are divers other species, and divisions of *muscles*.—Some authors distinguish them into *muscles of voluntary*, and of *involuntary*, or *necessary motion*.

MUSCLES of involuntary, or necessary motion, have their contracting and extending powers within themselves, and have no antagonist: such are the heart and lungs supposed to be.

MUSCLES of voluntary motion, which we more peculiarly denominate *muscles*, and which are those we have here chiefly regard to, have each of them their antagonist *muscles*, which act alternately in a contrary direction; the one being stretched and extended, while the other is contracted at the instance of the will.

The *muscles* have also different names from their different actions, situations, forms, &c. Those which serve to move the same members contrary ways, are called *antagonists*; and those that concur to the same action, *synergists*, or *pairs*.

Digastrie MUSCLES are those which have two bellies.—*Trigastrie*, those with three.

Sphincter MUSCLES are those destined to shut several apertures and passages in the body; as the *muscle* at the neck of the bladder, and that of the anus, which have the same effect with the string of a purse to close those parts.

Some *muscles* have two or three heads, called *biceps* and *triceps*.

We call *elevators*, those which lift up or raise the parts; and *depressors*, those which move them downwards.

Flexors, those which bend them; *extensors*, those which stretch them out; *adductors*, those which move the parts inwards; *abductors*, those which move them outwards; and *rotators*, those which move them round.

Muscles have also different names from their different figure; some resembling a bat; and some a lizard. Some are triangular, others square, others scalenous, others pentagonal, others pyramidal, round, &c. Whence the names of *deltoides*, *rhomboides*, *scalenus*, *trapezius*, &c.

Anatomists are not agreed on the number of *muscles* in the human body; some reckon five hundred and twenty-nine; some four hundred and forty-six; and others only four hundred and thirty-five.—The calculus, according to these last, is as follows. Two of the forehead; two of the occiput; six of the eyelids; twelve of the eyes; seven of the nose; eight of the external ear; four of the internal ear; thirteen of the lips; eight of the tongue; four of the palate; fourteen of the larynx; seven of the pharynx; ten of the os hyoides; twelve of the under-jaw; fourteen of the head; eight of the neck; eight of the omoplates; eighteen of the arms; twelve of the elbows; eight of the radii; twelve of the carpi; forty-eight of the fingers; fifty-seven of use in respiration; six of the loins, ten of the abdomen; two of the testicles; one of the bladder; four of the penis; four of the anus; thirty of the thighs; twenty-two of the legs; eighteen of the feet; forty-four of the toes.

The following table of the names and offices of the several *muscles* in the body, is taken from Dr. Keil.

Frontales, serve to pull the skin of the forehead upwards.

Occipitales, pull the skin of the hind-head upwards.

Atlantes } *articulorum*.

Depressores }

Internus malleoli, distends the tympanum.

Externus malleoli, relaxes the tympanum.

Obliquus malleoli.

Musculus stapedius, moves the stirrup.

Corrugator supercillii.

Rectus palpebrae superioris, lifts up the upper eye-lid.

Orbicularis palpebrarum, shuts both eye-lids.

Atlantes.

Attollens }
Deprimens } *oculorum.*
Abductor }
Adductor }
Obliquus major, pulls the eye forwards, and obliquely downwards.
Obliquus minor, pulls the eye forwards, and obliquely upwards.
Attollens }
Dilatans } *nares.*
Deprimens }
Incisivus, pulls the upper lip upwards.
Triangularis, pulls it downwards.
Caninus }
Elevator labii inferioris } pull, the lower lip upwards.
Quadratus, pulls it downwards.
Zygomaticus, draws both lips obliquely to either side.
Orbicularis, draws both lips together.
Buccinator, thrusts the meat between our teeth.
Temporalis } pull the jaw upwards.
Masseter }
Pterygoideus internus, draws the jaw to either side.
Pterygoideus externus, draws the jaw forwards.
Quadratus, pulls the jaw and the cheeks downwards.
Digastricus, pulls the jaw downwards.
Peristaphylinus internus, pulls the uvula forwards.
Peristaphylinus externus, pulls the uvula backwards.
Styloglossus, draws the tongue upwards.
Genioglossus, thrusts it out of the mouth.
Ceratoglossus, pulls it into the mouth.
Geniohyoideus, pulls the os hyoides and tongue upwards and forwards.
Sternohyoideus, pulls the os hyoides downwards.
Milohyoideus, pulls it obliquely upwards.
Coracohyoideus, pulls it obliquely downwards.
Stylohyoideus, pulls it to either side, and somewhat upwards.
Stylopharyngeus, pulleth up, and dilateth the pharynx.
Ossophagæus, straitens the pharynx.
Sternothyroideus, pulls the thyroids downwards.
Hyothyroideus, pulls the thyroids upwards.
Cricothyroideus.
Cricocarynoideus pssicus.
Cricorytenoideus lateralis.
Thyrocarynoideus, dilates the glottis.
Arytænoideus, contracts the glottis.
Splenius }
Complexus } move the head backwards.
Rectus major } nod the head backwards.
Rectus minor }
Obliquus inferior }
Obliquus superior } perform the semi-circular motion of the head.
Massetæus }
Rectus internus major } nod the head forwards.
Rectus internus minor }
Rectus lateralis, nods the head to one side.
Intercostales interni & externi }
Subcostæus } pull the ribs upwards in inspiration.
Serratus anticus major }
Serratus pssicus superior }
Triangularis }
Serratus pssicus inferior } make the motion of the ribs downward in expiration the swifter.
Sacro-lumbaris }
Diaphragma, used in inspiration and expiration.
Obliquus externus } compres the parts contained in the lower belly; assist the motion of the ribs downwards in expiration; and help to bend the vertebrae of the loins forwards.
Obliquus internus }
Transversalis }
Rectus }
Pyramidalis }
Longissimus dorsi, moves the body erect.
Transversalis dorsi, moves the body obliquely backwards.
Interspinalis, draws the acute processes near one another.
Quadratus lumborum, draws the vertebrae of the loins to one side.
Longus } bend the vertebrae of the neck.
Scolenus }
Psoas parvus, helps to bend the vertebrae of the loins.
Cremaster, draws up the testicles in the act of generation.
Præternes penis.
Transversalis penis.
Accelætores urinae.
Prostatae claudis.
Sphincter vesicae, contracts the neck of the bladder, that the urine may not run continually.
Levatores ani, draw up the anus.
Sphincter ani, shuts the anus.
Serratus anticus minor, draws the shoulder-blade forwards.
Trapezius, moves it upwards, backwards, and downwards.
Rhomboidei, pulls it backwards.
Levator scapulae, pulls the shoulder-blade upwards.
Deltoides }
Supra-spinatus } lift the arm upwards.
Coracobrachialis }

Teres major } pull the arm downwards.
Latissimus dorsi }
Pectoralis, moves the arm forwards.
Infra-spinatus } draw the arm backwards.
Transversalis }
Subscapularis }
Biceps } bend the fore-arm.
Brachæus internus }
Longus }
Brevis } extend the fore-arm.
Brachæus externus }
Anconæus }
Rotundus } perform the motion of pronation, or turn the palm of the hand downwards.
Quadratus }
Longus } perform the motion of supination, or turn the palm of the hand upwards.
Brevis }
Cubitæus internus } bend the wrist.
Radæus internus }
Cubitæus externus } extend the wrist.
Radæus externus }
Palmaris, helps the hand to grasp any thing closely.
Palmaris brevis, makes the palm of the hand concave.
Sublimis } bend the fingers.
Profundus }
Extensor digitorum communis.
Lumbricales, assist in bending the first joint of the fingers.
Interossei interni, draw the fingers to the thumb.
Interossei externi, draw the fingers from the thumb.
Flexor pollicis longus.
Flexor pollicis brevis.
Extensor primi }
secundi } *internodii pollicis.*
terti }
Thenar, draws the thumb from the fingers.
Antithenar, draws the thumb to the fingers.
Abductor indicis.
Extensor indicis.
Hypothenar, draws the little finger from the rest.
Extensor auricularis.
Psoas }
Iliacus } bend the thigh.
Pectinæus }
Glutæus major } extend the thigh.
Glutæus medius }
Glutæus minor }
Triceps, pulls the thigh inwards.
Pyramiformis } move the thigh outwards.
Gemini }
Quadratus }
Obturator internus } help to move the thigh obliquely and circularly.
Obturator externus }
Seminervosus } bend the leg.
Seminembranosus }
Biceps }
Gracilis }
Rectus } extend the leg.
Vastus externus }
Vastus internus }
Cruceus }
Sartorius, makes the legs cross one another.
Popliteus, turns the leg somewhat inwards.
Membranosus, turns it a little outwards.
Tibialis anticus } bend the foot.
Peronæus anticus }
Gastrocnemii } extend the foot.
Soleus }
Plantaris }
Tibialis pssicus, moves the foot inwards.
Peronæus pssicus, moves the foot outwards.
Profundus } bend the four lesser toes.
Sublimis }
Lumbricales }
Longus } extend the four lesser toes.
Brevis }
Flexor pollicis.
Extensor pollicis.
Thenar, draws the great toe from the rest.
Antithenar, draws it to the rest.
Flexor pollicis longus.
brevis.
Abductor minimi digiti } draw the toes toward the great toe.
Interossei interni }
Interossei externi, draw them from the great toe.
Transversalis, brings all the toes close to one another.

MUSCOVITE bible. See the article BIBLE.
MUSCOVITE coinage. See the article COINAGE.
MUSCOVITE coin. See the article COINS.
MUSCOVITE measures. See the article MEASURE.
MUSCOVITE moneys. See the article MONEY.
MUSCULAR, or MUSCULOUS, something that relates to the muscles; or that partakes of the nature thereof. See MUSCLE.

In which sense we say, *muscular fibre*, *muscular coat*, *muscular flesh*, *muscular veins*, *muscular arteries*, &c.

MUSCULAR arteries, two arteries proceeding from the subclavians, and distributed among the hind-muscles of the neck. The same denomination is also given by some to certain arteries of the loins: these are divided into *upper* and *under*. — *Musculares superiores*, the *upper-musculars*, proceed from the large artery, and lose themselves in the flesh. The *under-musculars*, *musculares inferiores*, are branches of the inner iliac arteries.

MUSCULAR, *muscularis*, is also a name given to two arteries of the thigh, the one called the *internal-muscular*, as being distributed among the inner muscles of the thigh; the other the *external-muscular*, because it proceeds to the outer part.

MUSCULAR fibres are the fine threads, or fibres, whereof the body of muscles is composed.

Anatomists are exceedingly divided as to the nature of these fibres. Some will have them blood-vessels, *viz.* veins and arteries; others nerves, &c.

Some restrain *muscular fibres* to the longitudinal and red, called also *fleshy fibres*: the transverse, and spiral ramifications whereof the former are bound about, they call *nervous fibres*.

Dr. Morgan endeavours to prove, that all the fibres which enter the structure and composition of a muscle, are endued with an intrinsic elasticity, spring, or power of contracting or restoring themselves, as a given weight or force, by which they may be stretched; and that this elasticity, or contractive restitutive power being a natural inherent property of the fibres themselves, does not depend on the mixture, rarefaction, or effervescence of any fluids, or humours whatsoever.

MUSCULAR flesh. See *MUSCULAR FLESH*.

MUSCULAR membrane, *membrana MUSCULOSA*, is a membrane by some supposed to invest the whole body, immediately under the adipose membrane; called also *panniculus carnosus*, and *membrana muscularum communis*. See *PANNICULUS carnosus*, and *MEMBRANA communis*.

MUSCULAR motion, is used for voluntary or spontaneous motion; thus called, because effected by means of the contraction and dilatation of the muscles.

The mechanism of a *muscle* we have delivered at large; but how this mechanism is employed to produce motion in animals, is matter of endless doubt. — The generality of writers suppose the belly of the *muscle* to be swelled, and thus its extremities brought nearer; and consequently the part it is fixed to, moved.

The structure of a *muscle* we have shewn to be such as renders it capable of being swelled and contracted, and by that means of having its extremities brought nearer each other, which is its proper action: but how the contraction is effected, is the point in dispute.

The generality account for it from the influx of some fluid into the muscular fibres. — Others solve it from the natural elasticity of those fibres. — And the retainers to a fluid, are sub-divided as to the particular fluid employed for this purpose.

From the structure and phenomena of the *muscles* above laid down, we may gather the properties of the hidden cause that moves the *muscles*; *viz.* 1st, That it may either be present or absent in a *muscle*; and therefore, 2^{dly}, May enter into it, and go out again: *i. e.* 3^{dly}, It is derived to it from some other place, and passes from it elsewhere: and, 4^{thly}, All this, by an instantaneous direction of the will: 5^{thly}, And in the same moment of time, wherein the *muscle* is contracted, it must pass from within outwards to every point of the surface of the *muscle*; that is, 6^{thly}, It must be at once equally distributed throughout the whole belly of the *muscle*: and therefore, 7^{thly}, It must fill and dilate the membranes of the fibres, change them from an oblong into a more spherical figure, lengthen their less diameter, and diminish their longer, and so draw the tendons nearer to each other: 8^{thly}, That it must have its rise from the cerebrum and cerebellum, the origin of the nerves, and be powerful enough to overcome those obstacles which here strongly resist it. — On the whole, then, it must be a most fluid, subtle, active body, and must be applied with some energy within the *muscle*. Now all the fluids in the body that have any pretensions to these properties, that are any way qualified to produce the phenomena above, or that have been alleged as the cause of *muscular motion*, are the *animal spirits* (or, as our later writers call it, the *nervous juice*) and the *blood*: but as each of these singly scarce appears adequate to the effect, our authors have supposed them to mix in the *muscles*, and each to contribute to the action of the other. — But the *animal spirits* seem to have the greatest number of advocates, though their existence was never yet fully proved; besides that, the manner of their action, as assigned by authors, seems to be arbitrary and precarious.

Some, with the learned Dr. Willis, make the tendons a receptacle for the spirits, which are raised at the instigation of the will, and sent thence into the belly of the *muscle*; where meet-

ing with the active particles of the blood, they ferment, and cause an intumescence, and so contract the *muscle*.

Others, among whom are Des Cartes and his followers, allow no receptacle for them but the brain, and send them thence through the nerves like lightning at every summons of the will; because they cannot allow the tendons to be a proper lodgment, on account of the closeness of their texture, nor can believe that the *animal spirits* should remain there unactive.

Others, among whom is M. du Verney, imagine this intumescence may be without fermentation, by the *animal spirits*, and a juice from the arteries running into the tendons and fleshy fibres, and extending them; as ropes, &c. swell in moist weather. Dr. Chirac, and others, maintain, that every muscular fibre, besides its vein, artery, and nerve, has also from space to space, several little cavities, or pores of an oblong figure, when the *muscle* is slack or flaccid; and that the blood circulating thro' the *muscle*, is continually depositing into those pores a sulphurous recement, abounding with alkaline salts; which meeting with the spirits that flow by the nerves into those same oval pores, their nitro-aereal particles ferment with the saline ones of the sulphurous recement, and, by a kind of explosion, do distend the pores, as to change the long oval figure into a round one: and thus the *muscle* is contracted.

Borelli takes the fibres of a *muscle* to consist of a chain of rhombus's or lozenges, whose areas are enlarged or contracted as the nervous juice, with the lymph and blood, is let into, or forced out of them, at the instance of the soul.

Dr. Croon supposes every fleshy fibre to consist of a chain of little bladders, or globules, communicating with each other; into which the nutritious juice, and one or two more liquors entering, do, by means of the natural heat, make an effervescence; by which the body of the *muscle* is extended, &c.

Dr. Cheyne takes the small fibrillae of the *muscles* to be so many slender elastic canals, bound about by small transverse parallel threads, which divide the hollow fibrillae into so many elastic cysts or vesiculae, which are orbicular, being formed of two concave segments of a sphere; into every one of which vesiculae, an artery, vein, and nerve enter; the two first to carry and bring back the blood, the last to carry either the liquidum nervosum, or nervous juice, which mingling in the vesiculae, with the blood, does, by its acid pointed particles, prick and break the globules of the blood, so as to let out the imprisoned elastic air (contained in the globules) into those little vesiculae; whereby the elastic cells of the fibres will be blown up, and thereby their longitudinal diameters from cell to cell strained: and this must contract the length of the whole fibre, and so move that organ to which one of the tendons is fixed.

Dr. Keil, not contented with this theory, sets up another, wherein the same structure of the *muscle* is supposed, and the same fluids: *viz.* the blood and nervous juice, are allowed the agents or instruments of contraction: but instead of the pungent particles of the nervous juice piercing the globules of blood, and setting at liberty the imprisoned elastic aura, he resolves the whole into the power of attraction.

According to this author, the distension of the vesicles of the fibres is not owing to their being filled with a greater quantity of blood and *animal spirits* than before their contraction; but to a rarefaction arising from the mixture of those two fluids, by means whereof they come to possess a greater space.

To account for this rarefaction of the blood and spirits in the vesicles of the muscular fibres, he supposes a small globule of air between the particles of a fluid, which particles have a strong attractive force, whereby they endeavour to come together: by pressing every way equally on the globule of air, they will hinder its escape from between them. But the force whereby they endeavour to come together, being vastly greater than that of gravity, the globule of air must be considerably condensed; but the force of elasticity being proportional to that of its condensation, the force wherewith the airy globule endeavours to expand itself, will likewise be vastly great: so that if the nifus of the particles of the fluid to come together should be taken off, the air between them would expand itself with a considerable force. Now, if upon the mixing of another fluid, the particles of the first fluid be more strongly attracted to the particles of this other fluid, than they were before to one another, their nifus to one another will then cease, and give the inclosed globule of air liberty to expand itself; so that the whole fluid will take up a greater space than it did before: but when the particles of the two globules come to be united together, they will again inclose the globule of air that lies between them; and, by their mutual attraction, soon bring it to its former state of condensation.

Now, that the blood contains a great number of globules of air, is evident from the great quantity that it yields in the air-pump; and that the particles of the blood have a strong attractive force, cannot well be denied. — Upon the meeting, then, of these two fluids in the vesicles of the fibres, the nervous juice, consisting of smaller particles than the blood, must, from what Sir I. Newton has proved of the rays of light, attract the particles whereof they are composed more strongly than

than those do one another; and, consequently, the nifus of those particles to one another ceasing, the condensed globule of air will expand itself with a considerable force; whereby each vessel of the fibre will be distended, and consequently, therefore, shortened; *i. e.* the whole *muscle* will be contracted: but when the particles of the blood are well mixed with the nervous fluid, they will both together inclose the globule of air again, and compress it into as small a space as it was before: and the contraction of the *muscle* must immediately cease, till fresh blood and spirits, still succeeding one another, continue the inflation of the vessels. But when a *muscle* has been strongly attracted for some time, the quantity of spirits spent being more than can be prepared in the space of time by the glands which supply its nerves, the inflation of the vessels must fall, and the *muscle* grow feeble and weak.—And thus that ingenious author conceives the vessels to be distended without any ebullition or effervescence; and their distention to cease without any precipitation, or flying-off of the aerial globules through the pores of the *muscles*.

He proceeds to shew how artfully the mechanism of the fibres is contrived for the necessary contraction.—It is a known experiment, that a bladder blown up and distended as to its capacity, but contracted as to length, will raise a weight to some determined height: two bladders, therefore, thus blown up, and communicating with each other, he argues, will raise the weight double the height, and three bladders thrice the height, &c. so that if there were a string of bladders joined together, of equal bulk, and like figures, the space through which the weight would rise would be proportionable to the number of bladders, *i. e.* to the length of the string.—Now each fibre of a *muscle* consisting of an infinite number of small vessels, resembles a chain or string of bladders; so that the contraction of the *muscle* is always proportionable to the length of its fibres. Farther, the vessels whereof the fibres consist being very small, though one large bladder might raise a weight as high as several small ones, yet the quantity of elastic fluid used in the inflation would, in that case, be much greater than where the weight is raised by a string of small ones.

For, supposing two bladders of similar figures, but the diameter of the one to be triple that of the other; then will the one require twenty-seven times the quantity of elastic fluid to expand it that the other does, and will also expand to twenty-seven times the space; and yet three of the less bladders joined together (he goes on) will raise the weight to the same height that the bigger one does; but with nine times less expence of elastic fluid, and take up but a ninth part of the space.—By diminishing, therefore, the bigness of the vessels, and increasing their number, the force required to distend them, and the distention itself, may be diminished in any given proportion, and may come at last to be insensible. Suppose a bladder, *v. gr.* of a determinate bigness, can raise a weight a foot; an hundred bladders, whose diameters are each an hundredth part of the former, being blown up, will raise the weight to the same height; but the force required to inflate them, and the swelling of all put together, will be ten thousand times less than of the large one.

Again, if a weight, of a determined bigness, can be raised to a certain height by a bladder, or one string of bladders, to which the weight is tied; twice that weight may be raised by two such bladders, or strings; thrice by three, &c. and, consequently, the weight a *muscle* can raise will be always as the number of its fibres, *i. e.* as its thickness, supposing the distention of the vessels equal, and the absolute strength of one *muscle* to that of another, as their bulks.—Thus much for the once flourishing system of the chain of bladders; which being liable to very great difficulties as to the geometricality of it, has of late given way to others.

Dr. Boerhaave, finding all the requisites before laid down for the action of the *muscles* in the nervous juice, or animal spirits, and in no other fluid in the body, thinks it needless to have recourse to a mixture of several liquors where one will do; and therefore makes no scruple to attribute the whole business to it alone.—The manner of action he conceives thus:

Suppose the spirit, from any cause, to be moved more swiftly from the origin of some one nerve, than through the rest; the influx will here be greater into the *muscular* fibre open to this nerve than into another: this will therefore be more dilated, and the other phenomena, mentioned above, will succeed: the same cause continuing, the effect will be increased; so that, in a moment of time, the whole will be swelled up, and, while the same determination lasts, will remain contracted: and this obtaining in an infinite number of fibrillæ at once, the whole *muscle* will be inflated.

Hence it necessarily follows, that, as the celerity is increased in one nerve, the motion will be less in another: this, therefore, being relaxed, the effort in contraction will be the stronger: for which reason, all the turgid fibres of a *muscle* will compress the intermediate spaces and blood with a great force; whence the veins will be emptied, and the arteries, being compressed, will repel the grosser, that is, the red parts of the blood, but will drive the more subtil parts, by the force of the heart, and their own, into the most minute canals; and thus the

cruror-being expelled, the whole body of the *muscle* will be found to act by a subtil humour concurring from the nerves and arteries.

Thus are all the phenomena accounted for, without any other assumption than an accelerating force in the origin of the nerves; which is common to all hypotheses, and which cannot be traced any farther.

All other systems, therefore, Boerhaave absolutely rejects; nor makes the least account of Galen's incorporeal power inflating the *muscles*; the nitrous spirit of the nerves mixing with the oil of the blood, and so rarefying it; the acid parts of the nervous juice mixing with the alkalious ones of the blood; the ebullition of the air, and the arterious juice; and the increase or diminution of attractive force of the minute corpuscles of the humours; as repugnant to sense, experience, the laws of matter, and of mixture, and to the phenomena of the *muscles*.

Dr. Astruc has gone a good way towards proving the nervous juice alone concerned in *muscular motion*; and that the blood has no share at all in it; by the following experiment, which he tried several times with the same success.

Cutting open the abdomen of a live dog, and removing the intestines out of the way, he bound up the aorta, where it divaricates into the iliac arteries, with a thread, so as to constrict each iliac and the hypogastric artery very closely; then, sewing up the epigastric *muscles*, he found the sensation and motion still as brisk and vivid in the dog's posteriors, as before: so that, when once set at liberty, he stood on all four, and walked with his usual ease and firmness; though, it is certain, there could not be one drop of blood conveyed to those hind parts.

Astruc, however, differs from Boerhaave in the manner wherein this nervous juice acts; nor will he allow that celerity, where-with the *muscles* act at the command of the will, to be owing to the velocity of the juice sent through the nerve; but to an impression given to one extremity of the thread, and communicated through all the intermediate parts to the other extremity; supposing the nerves, in their natural state, to be turgid, and full of spirits: so that, if the extremity in the sensory be ever so little pressed by the accession of any new spirit, as much will be instantly expelled at the other extreme; and, *vice versa*, a small impression given to the outer extremity of the nerve will immediately move the other extreme open to the sensory, so that part of it will drop out: which accounts for sensation, as well as *muscular motion*. See SENSATION.

Lastly, Dr. Lower, and Mr. Cowper, and after them Dr. Morgan, and others of the latest writers on that subject, setting aside all adventitious fluids, account for *muscular motion* from the intrinsic elasticity of the nervous fibrillæ contracting and restoring themselves against the stretching force of the circulating blood.

This system Morgan endeavours to evince from the following considerations.—1^o. All the vessels in an animal, consisting of flexible, distensible fibres, are in a state of tension, *i. e.* are both stretched transversely and longitudinally by their contained fluids: thus, *e. gr.* let a vein or artery be cut, and the opposite sides of the vessel will contract, and come nearly to a contact about the axis; while the two ends, receding both ways, leave a chasm: which shews that the vessel, while in its natural state, was distended both ways; and, consequently, that contraction, in all their dimensions, is the natural intrinsic action of the vessels or fibres.

And the same might be deduced, *a priori*, from the growth of animals: for, by the increased quantity of the accumulated blood, the vessels must necessarily be enlarged every way. Now, against this distending power of the fluids, the solid *muscular fibrillæ* will continually exert a contractive or restitutive force, by which they are kept in their proper state of tension.

2^o. That this contractive power of the *muscular* fibres is a natural intrinsic property of the fibres themselves, and does not depend on any mixture, or mutual action of fluids, is evident from hence, that these fibres retain the same property, after they are taken out of the body, and dried, as we see in thongs, cat-gut, and other such-like cords or strings cut out of the *muscular* coats and skins of animals, which may be stretched out to a considerable length beyond their natural state; and when the stretching force or weight is taken off, they will immediately contract again by their native spring.

3^o. While a *muscle* contracts, the blood is squeezed out; and, during its state of contraction, it is more hard and solid than before; that is, it contains less blood, when contracted, than when stretched; which shews, that the contraction cannot be by the addition of another fluid from the nerves mixing with the blood in the *muscles*.

4^o. No such fluid in the nerves could ever be found, as, being mixed with the blood, would occasion such fermentation or expansion: but, supposing the *muscular* cells thus inflated, no such effect could follow as shortening the *muscle* in length, and swelling it in thickness; but the consequence must be, that the *muscle* would be lengthened, as well as thickened; that is, it must increase its dimensions proportionably every way, which is the proper action of fluids on the solids.

If, then, it be said, that these bladders, when the muscle is stretched, are drawn into oblong spheroids; and when inflated, by the mixture of the nervous fluid, reduced to a spherical figure, by which means their axes are shortened, and their conjugate diameters enlarged; it is answered, that those small vesicles are soft, flexible, distensible, and equally yielding every way: and hence an included expansive fluid must press its containing vessels equally yielding every way, and equally expansive; a vessel, notwithstanding such distention, must retain its natural figure, and be equally stretched in all directions.

Again, Since the blood circulates freely through these muscular cells, it is plain, that, as soon as they begin to inflate, it must be immediately pushed forward with an increased velocity in the course of its circulation, which must prevent any such inflation in the muscles. Before these vesicles, therefore, can be distended in the manner supposed, the exit of the fluid must be hindered; that is, the circulation must be stopped. If any one doubt of this, let him try whether he can blow up a bladder, or other vessel, that is open at both ends, and where the expansive fluid has as free an egress as ingress.

Thus much premised, the natural action of a muscle will be easily explained. From its structure it follows, that, on the contraction of its transverse and spiral fibres, which are the ramifications of the nerves, the longitudinal, red, and fleshy fibres, or blood-vessels, which constitute the body of the muscle, must necessarily be squeezed and drawn together, as being compelled to follow the motion of these elastic cords; by which means the blood, being compressed, must be forced, with some impetuosity, through the muscle, and propelled forward in the course of its circulation.

Now if the blood should hereupon stop, and return no more to the muscle, it is plain the muscle must for ever remain in this contracted state, as its proper and natural state of quiescence, to which it tends, and where it would rest: but the blood, having received a fresh impetus by the contraction, and returning upon the muscle, in the course of its circulation, again rushes into the blood-vessels; which being enlarged in all their dimensions by the force of the returning blood, the transverse and spiral nervous fibres must be hereby stretched, and the muscle extended; till, by this means, the blood-vessels being brought to their natural extent, and, consequently, the distending force of the blood ceasing, the contractive power of the nerves begins to act again, and restore them, with the same force by which they were extended; till the returning blood re-enters the muscle, and stretches it again.

MUSCULAR consumption. See the article CONSUMPTION.

MUSCULAR is also an appellation given to several veins; two whereof come from the skin and the hind-muscles of the thigh, and terminate in the subclavians.

There are three others in the loins, also, called *musculares*, and distinguished into *upper*, *middle*, and *under*: the first terminates in the trunk of the vena cava, and the two others open into the external iliac vein.

MUSCULI aliformes.

MUSCULI amatorii.

MUSCULI annuantes.

MUSCULI vermiformes, &c.

MUSCULOUS. See the article MUSCULAR.

MUSEUM, MOTION, was originally used to signify a place in the palace of Alexandria, which took up, at least, a fourth part of the city; so called, as being destined and set apart to the *musæ*, and the sciences.

Here were lodged and entertained a great number of learned men, who were divided into companies or colleges, according to the sciences or sects whereof they were professors.—And to each house or college was allotted a handsome revenue.—This establishment is attributed to Ptolemy Philadelphus, who here fixed his library.

MUSEUM has hence passed into a general denomination, and is now applied to any place set apart as a repository for things that have some immediate relation to the arts, or to the musæ. See **REPOSITORY**, and **CABINET**.

The Museum at Oxford, called the *Ashmolean museum*, is a noble pile erected at the expence of the university, for the promoting and carrying on several parts of curious and useful learning.—It was begun in 1679, and finished in 1683, at which time a valuable collection of curiosities was presented to the university by Elias Ashmole, Esq; and the same day there repositied, and afterwards digested and put in a just order by Dr. Plott, who was constituted first keeper of the *museum*.

Divers considerable accessions have been since made to the *museum*; as of hieroglyphics, and other Egyptian antiquities, by Dr. Huntington; and of an intire mummy, by Mr. Goodyear; of a cabinet of natural rarities, by Dr. Lister; also, of divers Roman antiquities, altars, medals, lamps, &c.

Over the entrance of the *museum* is this inscription: **MUSEUM ASHMOLEANUM, SCHOLA NATURALIS HISTORIÆ, OFFICINA CHYMICA.**

MUSES*, **MUSÆ**, ΜΟΥΣΑΙ, fabulous divinities of the ancient heathens, who were supposed to preside over the arts and sciences.

* The word, according to Phornutus, is derived from the Greek, *μῦσαι*, which signifies the same with *ἡντιν*, to search: others

derive it from *μῦσος*, similar, or alike; all the sciences being bound and united together. Eusebius derives it from *μῦσα*, to initiate, to instruct; Plato and Scaliger from *μαῖος δαι*, *ὀφειτρίαν*, because to them are attributed the invention of arts: and it is they who produced them. Lastly, Heinsius and Vossius derive it from the Hebrew, מוֹשֶׁה *mosar*, science, *disciplina*.—The *musæ* are called by various names; *Camene*, *Heliconiades*, *Parnassides*, *Amidæ*, *Pierides*, *Pegafides*, *Aganippides*, *Thespiades*, *Libetrades*, and *Castaliades*.

The antients admitted nine *musæ*, and made them the daughters of Jupiter and Mnemosyne, or Memory. At first, indeed, their number was but three; viz. *Melete*, *Mneme*, and *Aeode*; Greek words signifying memory, singing, and meditation: but a certain sculptor of Sicyon, having orders to make three statues of the three *musæ* for the temple of Apollo, and mistaking his instructions, made three several statues of each *musæ*: these, however, were found so beautiful, that they were all set up in the temple, and from that time, they began to reckon nine *musæ*: to whom Heliod afterwards gave names; viz. *Calliope*, *Clio*, *Erato*, *Thalia*, *Melpomene*, *Terpsichore*, *Euterpe*, *Polyhymnia*, and *Urania*.

Each of these were supposed to preside over their respective art: Calliope over heroic poetry; Clio over history; Melpomene over tragedy; Thalia over comedy; Euterpe over wind-music; Urania over astronomy; Terpsichore over the harp; Erato the lute; Polyhymnia rhetoric.

They are painted as young, handsome, and modest; agreeably dressed, and crowned with flowers. Their usual abodes were about mount Helicon in Boeotia, and mount Parnassus in Phocis. Their business was, to celebrate the victories of the gods, and to inspire and assist the poets; and hence the custom of invoking their aid at the beginning of a poem.

It must not, however, be imagined that the deities, thus invoked, are considered, even by the antient poets themselves, as divine persons, from whom they expect any real help. Under the name of *musæ* they pray for the genius of poetry, and all the talents and circumstances necessary for a happy execution of their undertaking.

Their addresses to the *musæ* are mere allegories, and manners of expressing themselves poetically: as when they make gods of sleep, of fame, of revenge, and other natural and moral things.

Accordingly, the *musæ* are of all ages, countries, and even of all religions: there are christian as well as heathen *musæ*; Latin, Greek, English, and French *musæ*. There are also *new musæ*, which appear every day in favour of those who, disdaining things too trite and common, chuse to strike out of the road.

When Virgil wrote his eclogues, he invoked the Sicilian *musæ*, because he imitated Theocritus: and the Sicilian poet having succeeded, the Roman begged for a genius as happy as that of this islander.

The *musæ* of the poet Lucretius had never inspired any person before him. It is plain, from the doctrine of his book, what kind of divinity it was he invoked. He addresses himself to Venus; but, at the same time, tells us, that none of the deities trouble themselves with human affairs. His *musæ*, therefore, must of necessity be mere allegories.

MUSHROOM, or Mushrom, in natural history, a plant of a form and structure very different from that of all other plants; long supposed to have neither seeds nor flowers.

There are various kinds of mushrooms; and the vulgar call by this name all that come under the general head of fungus's, by the Greeks called *μυσῆς*.

They are all used with some suspicion, though some are more harmless, as well as more delicious, than others. Those used among us are, mushrooms of the wood, called *morilles*; and of the meadows, called *champignons*; which are gathered in autumn, and esteemed for their whiteness above, their carnation underneath, and the sweetness of their smell.

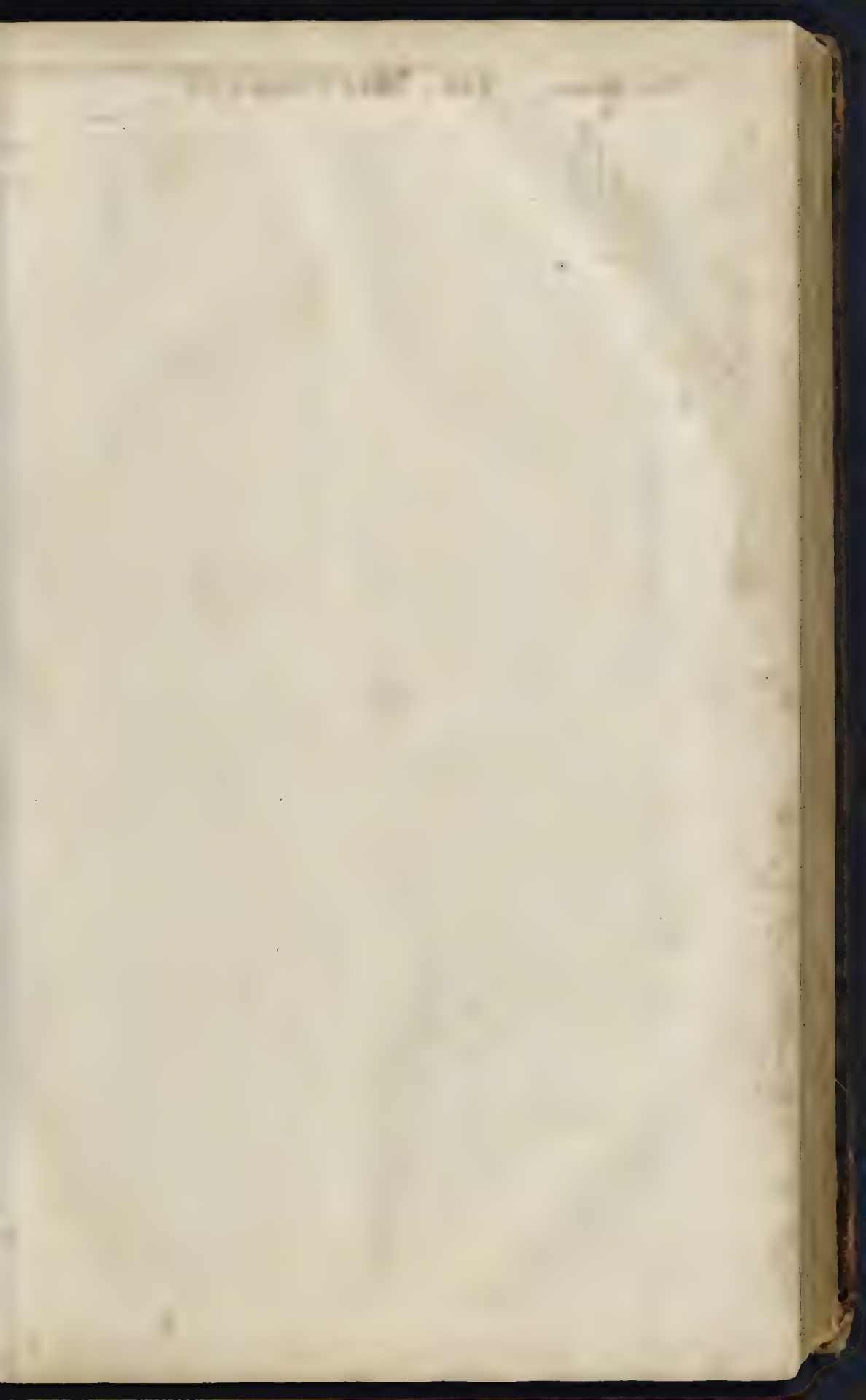
Mr. Bradley mentions an hundred kinds of mushrooms which he has seen in England, besides those very numerous small ones which constitute the mouldiness of liquors, fruits, &c. which last are such quick growers, that they arrive at perfection in less than twelve hours.

The fungoides only differs from the fungus in its external form; the coralloides are also of the same species, though of a different name, as being branched like coral; and truffles come also under the same kind.

Matthiolus mentions mushrooms which weighed thirty pounds each, and were as yellow as gold; Fer. Imperatus tells us, he saw some which weighed above an hundred pounds apiece; and, to add no more, the *Journal des sçavans* furnishes us with an account of some, growing on the frontiers of Hungary, which made a full cart-load.

The origin and production of mushrooms has extremely puzzled the botanists: how a plant should be produced without a seed, was a mystery; and yet the best microscopes of a long time were not able to discover any appearance of a seed; and the manner of cultivating this plant seemed also to make it still more probable, that it had not any.

M. Tournefort gives a very curious account of their culture, in



TAB. MISCELLANY

Fig. 1. Marquetry

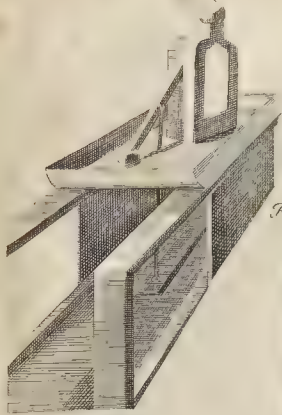
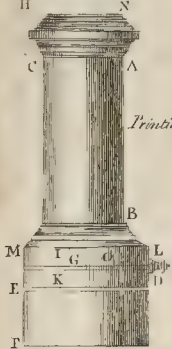


Fig 5
Fountainpen



Fig. 7 Rocket



Thos.
Printing Press

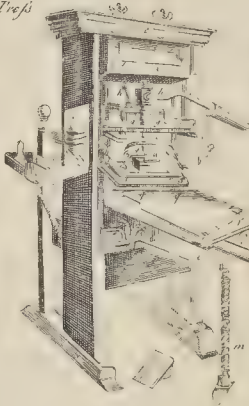


Fig 9 Composing Stick



Fig. 6. Pentagraph



Fig. 14. girardinii



Fig 13 Grundung.



Fig 15 Organ.

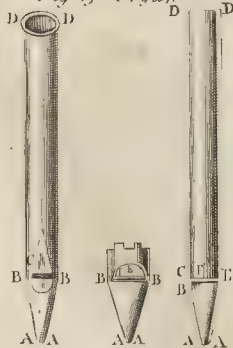


Fig 16 Organ

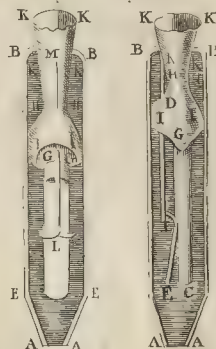


Fig 17. *Gammul. or Guido's Scale.*

[illegible]

in the *Memoirs of the royal academy*, with the substance of which we shall here present the reader.—All the secret of bringing up *mushrooms* speedily and in abundance, consists in ranging balls of horse-dung about the bigness of the fist, in lines, at the distance of about three feet from each other, and at the depth of one foot under ground, and covering these over with mould, and that again with horse-dung.

If this be done in April, in the beginning of August the pieces of dung will begin to whiten, and grow mouldy, being covered all over with little hairs, or fine white threads, branched, and woven about the straws whereof the dung is composed. The dung now loses its former excrementitious smell, and spreads an admirable odour of *mushrooms*.

According to all appearance, these white threads are no other than the open seeds or buds of *mushrooms*, which seeds were before inclosed in the dung, but in so small a compass, that they could not be perceived till after they had shot themselves into little hairs.

By degrees the extremity of these hairs grows round into a kind of button, which swelling by little and little, at length opens itself into a *mushroom*, whereof the lower part is a kind of pedicle bearded in the place where it enters the ground, and at the other end loaden with a roundish capital or head, in the manner of a calotte, which expands itself without producing either seeds or flowers that are sensible; the bottom is spread with laminae, which proceeding from the centre to the circumference, may be called the *leaves of the mushrooms*.

At the foot of each *mushroom* are found an infinite number of little ones, not bigger than the head of a pin, when the others are at their growth. The buds of the *mushrooms*, or the white hairs of the dung, preserve themselves a long time without rotting, if kept dry; and if laid again in the ground, will produce new *mushrooms*.

Mushrooms, then, seem nothing else but the produce of what we call the *mouldiness of horse-dung*: but what analogy is there between these two things? or how should so artful and delicate a structure as this of a plant result from the mere fortuitous concourse of a few juices, differently agitated?

It seems past doubt then, that *mushrooms*, like all other plants, have their origin in seeds: now we know that the seeds of plants cannot vegetate every-where; there are first required certain juices proper to penetrate their coats, to excite a fermentation, and to join themselves to the little parts thereof, and increase them. Hence arises that infinite diversity of places, wherein different species of this plant are produced. There are some which will only grow on some other particular plants, whose trunk, bark, or roots, alone have the juices proper for them.

What M. Tournefort mentions from Mess. Lemery and Mery, is still more surprising: there is a species of *mushrooms* which grow on the fillets and bandages applied to the fractures, &c. of the patients in the Hôtel-Dieu. After which it will not be at all surprising, that horse-dung, prepared in the manner M. Tournefort mentions, should be a soil or matrix capable of making common *mushrooms* grow.

Hence it seems to follow, that the seeds of *mushrooms* should be spread in an infinite number of places where they do not vegetate, and, in a word, throughout the whole earth; and the same may be said of a great number of other plants.

It must be owned, the imagination is shocked at such a prodigious multitude of different seeds thrown every-where at random, and in many places to no purpose; but a little reasoning will put the matter of fact past doubt.

Dioscorides tells us, he was assured, that pieces of the bark of the poplar-tree being laid in the ground over horse-dung, there would grow out of them very good *mushrooms*. Ruel says, that by boring the trunk of a white poplar-tree near the root, and washing it with heaven steeped in water, *mushrooms* spring out of it, as it were, instantly. He adds, that the hillocks produce several kinds of *mushrooms*, if the stubble be burnt on them in the rainy season.

M. Tournefort tells us, on his own knowledge, that where the stubble is burnt, as in Provence, Languedoc, and the islands of the Archipelago, there arise great quantities of black poppies in the first autumnal rains, which disappear the year following; so that they are never found but on burnt lands. And we know, that after the burning of London, the ground, as far as the fire reached, shot up with vast quantities of crysum latifolium majus glabrum. One of the chief reasons, if not the only one, why mountains produce plants different from the plains or valleys, and places become fenny, from the same places when they were dry, is the difference in the nutritious juices found in those places. Without this, how shall we account for the origin of mistletoe, or hypocyfytus, which are never known to grow in the earth, at least without adhering to some other plant; but the one grows on trees, and the other to the root of the cythus? why do the ivy and vine of Canada, pellitory, polypody, the species of capillaries, grow only on the trunks of trees, on walls, and in the clefts of rocks, unless it be, that the juices of those places are the best adapted to them?

These and other incontestable facts prove plainly both the vast multitude of seeds dispersed every-where, and the necessity of certain circumstances to make them vegetate.

If to this speculation on the invisible seeds of plants, we join that of the invisible eggs of insects, which must be allowed equal thereto, the earth will be found full of an inconceivable infinity of animals and vegetables, perfectly formed, and designed, as it were, in miniature, and only waiting for certain favourable circumstances to enable them to make their appearance in large. How rich then must the hand be, that has sown with so much profusion!

We have been the more particular on this head, on account of the oddness of the phenomena; and because what is here said of *mushrooms*, will give light into the generation of all other vegetables, &c. whose seeds are yet undiscovered.

Dr. Lister at length found out the seeds of these *mushrooms*: he instances particularly in the fungus porosus crassus magnus I. B. the texture of whose gills is like a paper pricked full of pin-holes. These gills, he makes no doubt, are the very flower and seed of this plant; when it is ripe, the gills are easily separable from the rest of the head, each seed being distinct from the others, and having its impression in the head of the *mushroom*, just as the seed of an artichoke hath in the bottom of it: the bigger end of the seeds is full and round, and they are disposed in a spiral order like those of the artichoke: and the same he thinks will hold of all other *mushrooms*, however differently figured. If it happen that these, when sown, prove sterile, and do not produce their kind, it is no wonder, there being whole genus's of plants that come up, and flower, and seed, yet their seed was never known to produce plants of their kind, being in wrong ground, no more than a barren, volatile dust, as that of all the orchides, or bee-flowers, is said to be. See Supplement, article FUNGUS.

MUSIC*, ΜΟΥΣΙΚΗ, the science of sound, considered as capable of producing melody, or harmony; or, the art of disposing and conducting sounds, considered as grave and acute; and of proportioning among themselves, and separating them by just intervals, pleasing to the sense.

* The word is supposed originally formed from *musa*, muse; the muses being supposed to be the inventors thereof. Kircher, however, will have it take its name from an Egyptian word, as supposing its reformation after the flood to have begun there, by reason of the reeds, &c. on the banks of the Nile. Hefychius tells us, the Athenians gave the name *muse*, μουσική, to every art.

Mr. Malcolm defines *music* a science, that teaches how sounds, under certain measures of tune and time, may be produced, and so ordered or disposed, as that either in consonance, or succession, or both, they may raise agreeable sensations.

Music naturally divides itself into *speculative* and *practical*.

Speculative Music is the knowledge of the *materia musica*, or how to produce sounds in such relations of tune and time, as shall be agreeable in consonance or succession, or both.

By which we do not mean the actual production of these sounds by an instrument or voice, which is merely the mechanical or effective part; but the knowledge of the various relations of tune and time, which are the principles out of which the pleasure sought derives.

Practical Music is that which shews how these principles are to be applied; or how sounds, in the relations they bear to *music* (as those are determined in the speculative part) may be ordered, and variously put together in succession and consonance, so as to answer the end.

And this we call the art of *composition*, which is properly the practical part of *music*.

Some add a third branch, *viz. instrumental music*, or the knowledge of instruments; but as this depends altogether on the first, and is only an application or expression of it, it cannot come regularly under the definition, and consequently is no part of the division of the science.

The first branch, which is the contemplative part, divides itself into these two, *viz. the knowledge of the relations and measures of tune*, and the *doctrine of time*.

The former is properly what the antients call *harmonica*, or the doctrine of harmony in sounds, as containing an explication of the grounds, with the various measures and degrees of the agreement of sounds, in respect of their tune.

The latter is what they called *rhythmica*, because it treats of the number of sounds or notes with respect to time; containing an explication of the measures of long and short, or swift and slow, in the succession of sounds.

The second branch, or the practical part of *music*, as naturally divides into two parts, answering to the parts of the first.

That corresponding to the *harmonica*, the antients called *melopœia*, because it contains the rules of making songs, with respect to tune, and harmony of sounds; though we have no reason to think the antients had any thing like composition in parts.

That which answers to the *rhythmica*, they call *rhythmopœia*, containing rules for the application of their numbers and time.

We

We find a strange diversity in the antient writers, as to the nature, office, extent, division, &c. of *music*.

Hermes Trismegistus defines *music* to be the knowledge of the order of all things; which is also the doctrine of the Pythagorean school, and of the Platonists, who teach, that every thing in the universe is *music*.—Agreeable to which wide sense, some divide *music* into *divine* and *mundane*.

Divine Music is that respecting the order and harmony which obtains among the celestial minds.

Mundane Music is that which respects the relations and order of every thing else in the universe.

Though Plato, by *divine music* understands that which exists in the divine mind, viz. those archetypal ideas of order and symmetry, according to which God formed all things.—And as this order exists in the mundane creatures, he calls it *mundane music*.

This last species the antients again subdivided into four, viz. *Elementary Music*, or the harmony of the elements of things.

Celestial Music, or the *music of the spheres*; comprehending the order and proportions in the magnitudes, distances and motions of the heavenly bodies, and the harmony of the sounds resulting from those motions.

Human Music, which consists chiefly in the harmony of the faculties of the human soul, and its various passions; and is also considered in the proportion, temperament, and mutual dependence of the parts of the body.—Lastly,

Music, properly so called, which has for its object, motion, considered as under certain regular measures and proportions, by which it affects the senses in an agreeable manner.

Now as motion belongs to bodies, and as sound is the effect of motion, and cannot be without it, but all motion does not produce sound; hence this last branch of *music* became farther subdivided.

Where the motion is without sound, or as it is only the object of sight, it was either called *musica orchestrica*, or *saltatoria*, which contains the rules for the regular motions of dancing.—

Or *musica hypocritica*, which respects the motions and gestures of the pantomimes.

When the motion is perceived only by the ear, i. e. when sound is the object of *music*, there were three species; viz.

Harmonica, which considers the differences and proportions with respect to grave and acute.—*Rhythmica*, which respects the proportion of the sounds as to time, or the swiftness and slowness of their successions.—And *Metrica*, which belongs properly to the poets, and respects the art of making verses.

Aristides Quintilianus, Bacchius, and some other antient writers, define *music* the knowledge of singing, and of the things belonging thereto; which they explain by the motions of the voice and body: as if the singing consisted only in the different tones of the voice.

The same Aristides, considering *music* in the largest sense of the word, divides it into *contemplative* and *active*. The first, he says, is either *natural* or *artificial*.—The *natural* is either *arithmetical*, which considers the proportion of numbers; or *physical*, which examines the order of the things of nature.

The *artificial* he divides as above, into *harmonica*, *rhythmica*, and *metrica*.

The *active*, which is the application of the *artificial*, as either *enuntiative* (as in oratory); *organical* (or instrumental performance); *edical* (for voice and singing); *hypocritical*, in the motions of the pantomimes.—To which some add *hydraulic*, though in reality no more than a species of the *organical*; in which water is used, for the producing or modifying of sound.

Porphyry makes another division of *music*, taking it in the limited sense, as having motion both dumb and sonorous for its object; and without distinguishing the speculative and practical, he makes its parts these six, viz. *rhythmica*, for the motions of dancing; *metrica*, for the cadence and recitation; *organica*, for the practice of instruments; *poetica*, for the numbers and feet of verses; *hypocritica*, for the gestures of the *pantomimes*; and *harmonica*, for singing.

The *musical faculties*, as they call them, are *melopœia*, which gives rules for the tones of the voice or instrument; *rhythmopœia*, for motions; and *poësis*, for making verses. See POETRY.

Music appears to have been one of the most antient of arts: and of all others, *vocal music* must undoubtedly have been the first kind.—For man had not only the various tones of his own voice to make his observations on, before any other art or instrument was found out, but had the various natural strains of birds, to give him occasion to improve his own voice, and the modulations of sounds it was capable of. See VOCAL.

Of many antient authors who agree in this conjecture, we shall only mention Lucretius, who says,

At liquidas avium voces imitator ore

Ante fuit multo, quam levia carmina cantu

Concelebrare homines possent, aureisque juvare.

The first invention of stringed instruments the same poet ascribes to the observation of the winds whistling in the hollow reeds.

As for other kinds of instruments, there were so many occasions for cords or strings, that men could not be long in observing their various sounds, which might give rise to stringed instruments.

And for the pulsatile instruments, as drums and cymbals, they might arise from the observation of the naturally hollow noise of concave bodies.

Plutarch, in one place, ascribes the first invention of *music* to the god Apollo; and, in another, to Amphion, the son of Jupiter and Antiope. This last, however, is pretty generally allowed to have been the first who brought *music* into Greece, and to have been the inventor of the lyre.—The time he lived in is not agreed upon.

To him succeeded Chiron, the demi-god; Demodocus; Hermes Trismegistus; Olympus; Orpheus, whom some make the first introducer of *music* into Greece, and the inventor of the lyra; to whom add Phemius, and Terpander, who was contemporary with Lycurgus, and set his laws to *music*. To him some attribute the first institution of *musical* modes, and the invention of the lyre: lastly, Thales; and Thamyris, who is said to have been the first inventor of instrumental *music* without singing.

These were the eminent musicians before Homer's time: others, of a later date, were, Lasus Hermionensis, Melanippides, Philoxenus, Timotheus, Phrynis, Epigonius, Lyfander, Simmicus, and Diodorus; who were all considerable improvers of *music*.—Lasus is said to have been the first author who wrote on *music* in the time of Darius Hystaspis; Epigonius invented an instrument, of forty strings, called the *epigonum*; Simmicus, also, invented an instrument, called *simmicium*, of thirty-five strings; Diodorus improved the *tibia*, by adding new holes; and Timotheus the *lyre*, by adding a new string; for which he was fined by the Lacedæmonians.

As the accounts we have of the inventors of *musical* instruments among the antients are very obscure; so are also the accounts what those instruments were; we scarce knowing any thing of most of them besides the bare name.

The general division of instruments is, into *stringed instruments*, *wind instruments*, and those of the *pulsatile* kind.—Of *stringed instruments*, we hear of the *lyra* or *cithara*, the *psalterium*, *trigonum*, *sambuca*, *pelitis*, *magas*, *barbiton*, *testudo*, *epigonum*, *simmicium*, and *pandoron*, which were all struck with the hand, or a *plestrum*; and which see in their places.

Of *wind instruments*, we hear of the *tibia*, *fistula*, *hydraulis organa*, *tuba*, *cornua*, and *lituus*.

The *pulsatile instruments* were, the *tympantum*, *cymbalum*, *crepitaculum*, *tintinnabulum*, *cratulum*, and *sistrum*.

Music has ever been in the highest esteem in all ages, and among all people; nor could authors express their opinion of it strongly enough, but by inculcating, that it was used in heaven, and was one of the principal entertainments of the gods, and the souls of the blessed.

The effects ascribed to it by the antients are almost miraculous: by means hereof, diseases are said to have been cured, unchastity corrected, seditions quelled, passions raised and calmed, and even madness occasioned.—Athenæus assures us, that antiently all laws, divine and civil, exhortations to virtue, the knowledge of divine and human things, lives and actions of illustrious men, were written in verse, and publicly sung by a chorus to the sound of instruments; which was found the most effectual means to impress morality, and a right sense of duty, on the mind.

Music made a very considerable part of the discipline of the antient Pythagoreans, and was used by them to draw over the mind to laudable actions, and settle in it a passionate love of virtue. It was their doctrine, that the soul itself consists of harmony; and therefore, by *music*, they pretended to revive the primitive harmony of its faculties.—By this primitive harmony they meant that which, according to their dogma, was in the soul in its pre-existent state in heaven.

Dr. Wallis has endeavoured to account for the surprising effects ascribed to the antient *music*; and charges them principally on the novelty of the art, and the hyperbolas of the antient writers: nor does he doubt but the modern *music*, ceteris paribus, would produce effects, at least, as considerable as the antient.—The truth is, we can match most of the antient stories of this kind in the modern histories. If Timotheus could excite Alexander's fury with the Phrygian mode, and soothe him into indolence with the Lydian; a more modern musician is said to have driven Eric, king of Denmark, into such a rage, as to kill his best servants. Dr. Nieuwentijt tells us of an Italian, who, by varying his *music* from brisk to solemn, and so *vice versa*, could move the soul so, as to cause distraction and madness. And Dr. South has founded his poem, called *Musica incantans*, on an instance he knew of the same thing.

Music, however, is not only found to exert its force on the affections, but on the parts of the body also: witness the Gaffcon knight, mentioned by Mr. Boyle, who could not contain his water at the playing of a bag-pipe; the woman, mentioned by the same author, who would burst out in tears at the hearing

ing of a certain tune, with which other people were but little affected.—To say nothing of the trite story of the tarantula: we have an instance in the history of the academy of sciences, of a musician's being cured of a violent fever, by a little concert occasionally played in his room. See TARANTULA. Nor are our minds and bodies alone affected with sounds, but even inanimate bodies are so.—Kircher tells us of a large stone, that would tremble at the sound of one particular organ-pipe; and Morhoff mentions one Petter, a Dutchman, who could break rummer-glasses with the tone of his voice. Merfenne also tells us of a particular part of a pavement, that would shake and tremble, as if the earth would open, when the organs played. Mr. Boyle adds, that seats will tremble at the sound of organs; that he has felt his hat do so under his hand, at certain notes both of organs and discourse; and that he was well informed, every well-built vault would thus answer to some determinate note.

There is a great dispute among the learned, whether the antients, or moderns, best understood and practised *music*? Some maintain that the antient art of *music*, by which such wonderful effects were performed, is quite lost; and others, that the true science of harmony is now arrived to much greater perfection, than was known or practised among the antients. This point seems no other way to be determinable but by comparing the principles and practice of the one with those of the other.—As to the theory or principles of harmonics, it is certain we understand it better than the antients; because we know all that they knew, and have improved considerably on their foundations.—The great dispute then lies on the practice: with regard to which it may be observed, that, among the antients, *music*, in the most limited sense of the word, included *harmony*, *rhythmus*, and *verse*; and consisted of verses sung by one or more voices alternately, or in choirs, sometimes with the sound of instruments, and sometimes by voices only. Their musical faculties, we have already observed, were *melopæia*, *rhythmopæia*, and *poësis*. The first whereof may be considered under two heads, *viz.* *Melody* and *symphony*. As to the latter, it seems to contain nothing but what relates to the conduct of a single voice, or making what we call *melody*. The antients do not appear to have ever thought of the concert, or harmony of parts; which is a modern invention, for which we are beholden to Guido Aretine a Benedictine friar.

We would not, however, be here understood to mean, that the antients never joined more voices or instruments than one together in the same symphony; but, that they never joined several voices so as that each had a distinct and proper melody, which made among them a succession of various concords, and were not in every note unisons, or at the same distance from each other as octaves.—This last indeed agrees to the general definition of the word *symphony*; yet it is plain that in such cases there is but one long, and all the voices perform the same individual melody.—But when the parts differ, not by the tension of the whole, but by the different relations of the successive notes, this is the modern art, which requires so peculiar a genius, and on which account the modern *music* seems to have much the advantage of the antient. For further satisfaction on the subject, see Kircher, Perrault, Dr. Wallis, Mr. Malcolm, the Jesuit Cereau, and others; who unanimously agree, that after all the pains they have taken to know the true state of the antient *music*, they could not find the least reason to think there was any such thing in their days as *music* in parts.

The antient musical notes are very mysterious and perplexed: Boethius and Gregory the Great first put them into a more easy and obvious method.—In the year 1204, Guido Aretine, a Benedictine of Arezzo in Tuscany, first introduced the use of a staff with five lines, on which, with the spaces, he marked his notes by setting a point up and down upon them, to denote the rise and fall of the voice; though Kircher mentions this artifice to have been in use before Guido's time. Another contrivance of Guido's was to apply the fix musical syllables *ut, re, mi, fa, sol, la*, which he took out of the Latin hymn,

UT queant laxis RESonare fibris
MIRA gestorum FAMAli tuorum,
SOLVE polluti LABii reatum,
O Pater Alme.

Besides his notes of *music*, by which, according to Kircher, he distinguished the tones, or modes, and the seats of the semi-tones, he also invented the scale, and several musical instruments, called *polypletra*, as spinets and harpsichords.

The next considerable improvement was in 1330, when Johannes Muria, or de Muris, doctor at Paris (or as Bale and Gesner make him, an Englishman), invented the different figures of notes, which express the times or length of every note, at least their true relative proportions to one another, now called *longs*, *brevets*, *semi-brevets*, *crotchets*, *quavers*, &c.

The most antient writer of *music*, we have already observed, was Iasus Hermionensis; but his works, as well as those of

many others both Greek and Roman, are lost. Aristoxenus, disciple of Aristotle, is the eldest author extant on the subject: after him came Euclid, author of the elements: Aristides Quintilianus wrote after Cicero's time. Alypius stands next; after him Gaudentius the philosopher, and Nicomachus the Pythagorean, and Bacchius.—Of which seven Greek authors, we have a fair copy, with a translation and notes, by Meibomius.

Ptolemy, the celebrated mathematician, wrote in Greek of the principles of harmonics, about the time of the emperor Antoninus Pius. This author keeps a medium between the Pythagoreans and Aristoxenians. He was succeeded at a considerable distance by Manuel Bryennius.

Of the Latins, we have Boethius, who wrote in the time of Theodoric the Goth; and one Cassiodorus, about the same time: Martinius, and St. Augustine, not far remote. Of the moderns, are Zarlino, Salinas, Vincenzo Galileo, Doni, Kircher, Merfenne, Paron, De Caux, Perrault, Wallis, Des Cartes, Holder, Malcolm, &c.

Diatonic Music.	} See the article	DIATONIC.
Recitative Music.		RECITATIVE.
Academy of Music.		ACADEMY.
Characters in Music.		CHARACTERS.
MUSICAL faculties.	} See the article	MUSIC.
MUSICAL notes.		NOTE.
MUSICAL proportion.		PROPORTION.
MUSICAL sound.		SOUND.
MUSICAL string.		STRING.

MUSK *, MOSCHUS, a kind of perfume, of a very strong scent; only agreeable when moderated by the mixture of some other perfume.

* The word comes from the Arabic, *muscha*, *musk*: whence was formed the common Greek, *μοσχον*, *musk*.

Musk is found in a kind of bag, or tumour, growing about the bigness of an hen's egg under the belly towards the genital parts of a wild beast of the same name; and appears to be nothing else but a kind of bilious blood there congealed, and almost corrupted.

The animal which produces it is pretty common in the kingdoms of Boutan, Tonquin, and some others, as Cochinchina, &c. But the most esteemed are those in the kingdom of Tibet.

They inhabit the woods and forests, where the natives hunt them down: when the beast is killed, they cut out the bladder under the belly, separate the coagulated blood, and dry it in the sun, where it is reduced into a light friable substance almost of the nature of a powder, and of a dusky reddish colour; and acquires a very strong and disagreeable smell. It is then tied up again in bladders, and exported to other countries; and this is the *musk* which we use.

What the antients have written of *musk* is fabulous, *viz.* that it comes from the testicles of a castror, which, to stop the pursuit of the hunter, castrates itself. The occasion of their error may be owing to this, that among the Indians the *musk* animal goes by the name of *castror*.

Musk is in considerable use among the perfumers and confectioners; though much less now than it was formerly. It is supposed to fortify the heart and brain; and is good against deafness; but is little used in medicine, as being apt to occasion the vapours.

MUSKET, or MUSQUET, properly a fire-arm borne on the shoulder, and used in war; to be fired by the application of a lighted match.

The length of the *musket* is fixed to three feet eight inches from the muzzle to the touch-pan, and its bore is to be such as may receive a ball of sixteen in a pound.

Muskets were antiently borne in the field by the infantry: at present they are little used save in the defence of places; fuses, or fire-locks, having taken their place.

MUSKETOON, a *musket* shorter, though thicker, than the ordinary *musket*.—It is fired by the collision of a steel and flint in the lock; whereas the *musket* is fired by a match. Its bore is a thirty-eighth part of its length; and carries five ounces of iron, or seven and an half of lead, with an equal quantity of powder.

MUSLIN, or MUSSLIN, a fine sort of cloth, wholly cotton; so called, as not being bare, but having a downy nap on its surface resembling moss, which the French call *mouffe*.

There are various kinds of *muslins* brought from the East-Indies; chiefly Bengal; betelles, tarnatans, mulmuls, tanjees, terrindams, doreas, &c.

MUSSA *mora*. See the article MOOR.

MUSSLIN. See the article MUSLIN.

MUSSULMAN *, or MUSULMAN, a title by which the Mahometans distinguish themselves; signifying, in the Turkish language, true believer, or orthodox.

‡ In Arabic, the word is written *muslem*, *mosliman*, or *mosliman*.

The appellation was first given to the Saracens; as is observed by Leunclavius.—There are two kinds of *muslimans*, very averse to each other; the one called *Sunnites*, and the other *Shiites*.—The *Sunnites* follow the interpretation of the alcor-

ran given by Omar; the Shiites are the followers of Ali. The subjects of the king of Persia are Shiites; and those of the grand signor, Sunnites. See SONNA, and ALCORAN.

Some authors will have it, that the word *mussulman* signifies *saved*, that is, predestinated; and that the Mahometans give themselves the appellation, as believing they are all predestinated to salvation.—Martinus is more particular as to the origin of the name; which he derives from the Arabic **مسلم** *musalām*, *saved*, snatched out of danger: the Mahometans, he observes, establishing their religion by fire and sword, massacred all those who would not embrace it, and granted life to all that did, calling them *mussulmans*; q. d. *erēpti e periculo*, whence the word, in course of time, became the distinguishing title of all those of that sect, who have affixed to it the signification of *true believer*.

MUST, **MUSTUM**, sweet wine newly pressed from the grape; or the new liquor pressed from the fruit before it has worked or fermented.

MUSTARD, a preparation of a seed of that name, ground or beaten up with water, vinegar, or the *must* of wine; whence its name.

MUSTARD-seed, in Latin *sinapi*, a warm biting seed, which gives the denomination to a species of topical medicines called *sinapisms*.

Mustard-seed is also used in preparing flagreen.

MUSTER *, a review of a body of military forces under arms, in order to take account of their numbers, condition, accoutrements, arms, &c.

* The word is formed of the French, *moustre*, specimen. See REVIEW.

Falso-MUSTER. See the article FALSE.

MUSTER-master general, or *commissary general of MUSTERS*, is an officer in the army, who takes account of every regiment, their number, horses, arms, &c. See COMMISSARY.

MUSTER-rolls are lists of the soldiers in every troop, company, regiment, &c. delivered by the captains to the commissary: by which they are paid, and the strength of the regiment known.

MUSTERED of record (*Stat. 18. Hen. vi.*) denotes a being enrolled in the number of the king's soldiers.

MUTABILITY. See the article IMMUTABILITY.

MUTARE arma. See the article ARMA.

MUTATION, the act of changing; or, sometimes, the change itself.

It is one of the laws of nature, that the *mutation* of motion is ever proportional to the moving force impressed. See NATURE, and MOTION.

MUTATION, in the ancient music, is applied to the changes or alterations that happen in the order of the sounds which compose the melody.

Aristoxenus represents *mutation* as a kind of passion in the order of the melody.

The changes are, 1°. in the genera; when the song begins in one, as the chromatic; and passes into another, as the diatonic.

2°. In the system; as when the song passes out of one tetra-chord, as meson, into another, as diazeugmenon; or more generally, when it passes from a high place of the scale to a lower, or contrarily; i. e. part of it is sung high, and part low. 3°. In the mode or tone, as when the song begins in one, as the Doric; and passes into another, as the Lydian.

4°. In the melopœia, that is, when the song changes the very air, so as from gay and sprightly, to become soft and languishing; or from a manner that expresses one passion or subject, to the expression of some other.

MUTE, *dumb*, denotes a person that cannot speak, or has not the use of speech.

Mutes and dwarfs make their fortune in the grand signor's seraglio. The *mutes* serve as executioners to take off persons of the first rank.

MUTE, in law, is he that stands dumb, or speechless; when he ought to answer, or plead.

A prisoner may stand *mute* two ways: 1°. When he speaks not at all: in which case it is inquired, whether he stand *mute* of malice, or by the act of God: if by the latter, then the judge, *ex officio*, ought to inquire whether he be the same person; and of all other pleas, which he might have pleaded if he had not stood *mute*. 2°. When he pleads not directly, or will not put himself upon the inquest to be tried.—The punishment of standing *mute*, is pressing, even to death. See PAINE *fort & dure*.

MUTE, in grammar, a letter which is not sounded, or heard in the pronunciation; or, a letter which yields no sound of itself, and without a vowel.

The consonants are ordinarily distinguished into *mutes*, and *liquids* or *semi-vowels*. See CONSONANT, LIQUID, &c.

The *mutes* in the English alphabet are eleven, viz. B, C, D, F, G, J, K, P, Q, T, V. They are called *mutes*, because a liquid cannot be sounded in the same syllable before them, as *rpo*; but a *mute* may be pronounced in the same syllable before a liquid, as *pro*.

MUTILATED corniche. See the article CORNICHE.

MUTILATED medals. See the article MEDAL.

MUTILATED roof. See the article ROOF.

MUTILATION, the retrenching, or cutting away any member of the body.

The use of the word is also extended to statues, and buildings, where any part is wanting, or the projection of any member, as a cornice, or an impost, is broken off.

MUTILATION is sometimes also used in a more immediate manner for *castration*. See CASTRATION.

MUTUAL, a relative term, denoting something that is reciprocal between two or more persons.

Thus we lay *mutual assistance*, *mutual aversion*, &c.—There are *mutual* or reciprocal duties, offices, &c. between superiors, and inferiors; the king and his subjects; the master and his servants, &c.

Vaugelas makes a distinction between *mutual* and *reciprocal*: *Mutual*, according to him, is understood of what is between two only; and *reciprocal* of what is between more than two: but this decision is little regarded in common use.

MUTUAL testament is that made by two persons who leave their effects reciprocally to the survivor.

MUTULE, **MUTULUS**, in architecture, a kind of square modillion in the Doric frieze.

The chief difference between *mutule* and modillion consists in this, that the former is used in speaking of the Doric order, and the latter in the Corinthian, &c. See DORIC, &c.

The *mutules* in the Doric answer to the triglyphs, which are under them; whence some make *gutta* or drops to hang.

MUTUUM, in the civil law, denotes a loan simply so called; or a contract introduced by the law of nations, whereby a thing consisting in weight, as suppose bullion; in number, as money; or in measure, as corn, timber, wine, &c. is given to another, upon condition that he shall return another thing of the same quantity, nature, and value, on demand.

This, therefore is a contract without reward: so that where use or interest arises, there must be some particular article in the contract whereon it is founded.

MUZZLE-ring, of a gun, the moulding, or circle, which incompasses and strengthens the mouth of it.

MY.—*Per My & per tout*. See the article PER MY.

MYLOGLOSSUM, in anatomy, a pair of muscles, thus called because arising about the backside of the molars, or grinding-teeth, and inserted into the ligament of the tongue; helping to pull it upwards.

These are the same with what Mr. Cowper calls *styloglossum*. See STYLOGLOSSUM.

MYOLOGYDEUM, in anatomy, a broad, but short muscle lying immediately under the biverter muscle of the jaw, and which, springing from the lower margin on each side the under jaw, is inserted into the basis of the os hyoides. See HYOIDES.

Besides the common use ascribed to this muscle, which is to move the hyoides, the tongue, and the larynx both upwards, inwards, and side-ways; its series of transverse fibres have a further use when it is at rest; and that is to compress the glands under the tongue, and by this means promote the discharge of saliva into the mouth from the lower salivary ducts. Whence it is we use this muscle when we want saliva in the mouth.

MYOCEPHALON *, in medicine, a little part of the tunica uvea, protended over the fight of the eye; occasioned by an ulceration of the part: so called, as resembling the head of a fly.

* The word is Greek μυοκεφαλον, formed of μυα, fly, and κεφαλη, head.

MYOLOGY *, in anatomy, a description of the muscles; or the knowledge of what relates to the muscles of the human body.—See *Tab. Anat. (Myol.)* See also MUSCLE.

* The word is formed of μυς, mouse, a muscle, and λογος, discourse.

MYOMANCY, a kind of divination, or method of foretelling future events, by means of mice.

Some authors hold *myomancy* to be one of the most ancient kinds of divination; and think it is on this account that Isaiah, lxvi. 17, reckons mice among the abominable things of the idolaters. But, beside that it is not certain, that the Hebrew word **עכבר** used by the prophet, signifies a *mouse*; it is evident it is not the divination by that animal, be it what it will, is here spoken of; but the eating it.

MYOPS *, **MYOPIS**, a person who is short-sighted; or, as we popularly call it, *purblind*.

* The word is Greek, μυωψ, compounded of μυς, mouse; and ωψ, eye: by reason, we suppose, the same confirmation of the eye is observed in mice.

Myopes are properly such as see remote objects confusedly, and near ones distinctly. Those who labour under the opposite defect, are called *presbyta*.

The defect of *myopes* is not in the optic nerve, the pupil, or the like; but in the form of the crystalline, or the distance of the retina from the same. The crystalline being rounder or more convex than ordinary, the rays will be rendered more convergent than ordinary in passing through the same. (See REFRACTION) By this means they will be brought to meet or concur at the less distance from the crystalline; so that if

the retina be at its usual distance, they will concur ere they reach it. It is the too great nearness, then, of the retina to the crystalline, that constitutes the *myopia*.

MYOPIA, or **MYOPIAS**, *short-sightedness*, a confusion or obscurity of sight, when directed to remote objects.

The *myopia* is owing to the too great convexity of the ball of the eye, and particularly of the crystalline; whence it happens, that the visual rays concur before they reach the retina. For this reason, to see an object distinctly, they must either apply it close to the eye, or use a concave glass.

The *myopia* wears off by time, the eye growing flatter and flatter as persons draw towards old age.

MYOTOMY, **MYOTOMIA**, an anatomical dissection, or demonstration of the muscles. See **MUSCLE**.

MYRIAD, the number of ten thousand.—Whence *myriarcha*, a captain or commander of ten thousand men.

MYRMECIA, in medicine, a kind of wart, by Latin writers called *formica*. See **FORMICA**.

MYRMIDONS, **MYRMIDONES**, in antiquity, a people of Thessaly, fabled to have arose from ants, or pismires, upon a prayer put up for that purpose, by king *Æacus*, to Jupiter, after his kingdom had been dispeopled by a severe pestilence.—In Homer and Virgil the *myrmidons* are Achilles's soldiers.

MYRMILLONES*, a kind of gladiators in ancient Rome; called also *murmiones*. See **GLADIATOR**.

* Turnebus derives the name from the *myrmidons*.

MYROBALANS*, **MYROBALANI**, a kind of medicinal fruit, brought from the Indies; much more used in the Arabic than the Greek pharmacy; and more among the ancients than the moderns; and still more abroad than in England.

* The word comes from the Greek *μύρον*, medicament; and *βλάστησις*, acorn; as being somewhat in form of acorns, and used in medicine.

There are five kinds of *myrobalans*, or *purging Indian plums*: the first called *citrini*, of a yellowish red, hard, oblong, and the size of an olive.—The second called *black* or *Indian myrobalans*, of the bigness of an acorn, wrinkled, without stone.—The third, *chebulic myrobalans*, the size of a date, of a yellowish brown, pointed at the end.—The fourth *emetic*, round, rough, the size of a gall, of a dark brown.—The last called *bellerici*, hard, yellow, round, the size of an ordinary prune, less angular than the rest.—*Myrobalans* of each kind are slightly purgative, and astringent.

MYRRH*, **MYRRHA**, a kind of gum or resin, issuing, by incision, and sometimes spontaneously, from the trunk, and larger branches of a tree growing in Arabia, Egypt, and especially in Abyssinia.

* The word comes from *μύρρα*, of *μύρω*, I run, or trickle.

Authors are not agreed about the tree which produces this gum: It is true, they all make it small and thorny; but they disagree about the form of its leaves.

The incisions are made twice a year, and the *myrrh* oozing out is received on rush-mats, disposed underneath.

The druggists sell two kinds of *myrrh*, viz. *myrrh in tears*, which they call *stacte*; the other *ungulata*, or in nails.

Of the first kind, the best is bright, yellow, and in transparent drops, friable, light, of a strong disagreeable smell: But this is very rare; and most of that in use is the *ungulata myrrh*, so called from little white spots observed thereon, much like those on the nails of the fingers.

The best is in little masses, or tears, redish, and transparent; the finest pieces of *myrrh*, when broken, are sometimes found to contain a kind of unctuous liquor, the most precious part of the *myrrh*, and the real *stacte* of the antients.

This gum enters a great number of medicinal compositions. Its bitterness renders it good for the stomach, and against worms; and it is chewed to prevent infection from contagious distases. Dr. Quincy says, it is excellent to cleanse and strengthen the womb, and against tickling rheums; a good detergent; and as such, much used externally in unguents for the healing of wounds: it makes the principal ingredient in embalming. The chymists draw from it oils, spirits, tinctures, &c. to which they attribute extraordinary virtues.

MYRRHINE vessels.—Vase **MYRRHINA**. See **MURRHINE**.

MYRRHINE glands. see the article **GLAND**.

MYRTIFORMES caruncles, in anatomy, little caruncles, or fleshy knots adjoining to, or rather in the place of the hymen in women.—See *Tab. Anat. (Splanchn.) fig. 9. lit. f. f.*

They are about the bigness of myrtle-berries, whence they take their name; and are supposed by some to be largest in maids, and by degrees to grow less through the use of venery. Others, and with more probability, derive them from the broken membrane of the hymen, whose fragments, thrunk up, they take them to be.

MYRTLE-berries, the fruit of a shrub well known under the name of *myrtle*, *myrtus*, growing common in Spain, especially in the mountains of Sierra Morena, &c.

There are two kinds of *myrtle*, male and female; the latter whereof produces the best berries, and in the greatest quantity.

The fruit is at first green, but becomes black gradually: within it is a white seed in form of a crescent, solid, hard, and of an astringent taste; while the fruit continues on the trees, it is succulent and smooth, and only becomes hard and wrinkled, because dried in the sun for the convenience of carriage.

Myrtle-berries are rough and astringent, and are chiefly used in the way of syrup, as a strengthener against fluxes and abortion.

They are also an ingredient in several of the strengthening plasters.

The perfumers likewise use them in their perfumes, and draw an essence from them. The German dyers make a blue colour from them. In some places the leaves and branches are also in the tanning of leather.

MYSTERY*, **MYSTERIUM**, something secret, or hidden; impossible or difficult to be comprehended.

* The word comes from the Greek *μυστήριον*; and that, according to some etymologists, from *μύω*, *claudio*, *taceo*, I shut, I am silent; and *σῆμα*, *mouth*; but then whence comes the *r*? Must the *m* of *σῆμα* be converted into an *r*? The word seems derived, with more propriety, from the Hebrew *סֵתֶר*, *secret*, to hide; whence is formed *סֵתֶר* *mishtar*, a hidden thing.

Mystery is primarily used in speaking of certain truths revealed in scripture; into the full understanding whereof human reason cannot penetrate.—Such are the doctrines of the *trinity*, the *incarnation*, &c.

We have an epitome of the *mysteries of faith*, or the *mysteries of christianity*, in the symbols, or creeds, compiled by the apostles, the council of Nice, and St. Athanasius. See **CREED**. In all these, mention is made of the *mystery of the trinity*; the *mysteries of the incarnation* of the son of God, his death and passion, and his descent into hell for the redemption of mankind: Of his resurrection the third day, his ascension to heaven, his sitting at the right-hand of God, and his coming again to judge the world: Of the divinity, and co-equality of the Holy Ghost with the Father and the Son: Of the unity of the church: Of the community of saints; the participation of the sacraments; and the general resurrection.—Such are the principal *mysteries of faith*; which the church declares necessary to be known and believed, in order to salvation.

From the earliest ages there have been particular festivals instituted in honour of these *mysteries*; to return thanks to God for having revealed them, and to oblige the ministers and pastors to instruct the people therein.

Such are the feast of the *mystery of the incarnation*, called also *Christmas*; those of the *circumcision*, *passion*, *resurrection*, &c. See **INCARNATION**, **CIRCUMCISION**, **EASTER**, and **EPHANY**.

The heathens also had their *mysteries*, particularly those of *Ceres*, the *bona Dea*, &c. The Egyptian priests concealed the *mysteries* of their religion and philosophy under hieroglyphics. Those who revealed the *mysteries* of the *bona Dea* were severely punished; and none were trusted with them but those solemnly initiated, and sworn to secrecy.

But these were not called *mysteries*, as being incomprehensible, or raised above the power of reason; but because they were covered and disguised under types and figures, to raise the greater veneration in the people.—The *mysteries* of paganism were usually celebrated in caves and grottoes, fitter to conceal crimes than to celebrate *mysteries* in.

MYSTERY, in scripture-language, is used with some latitude.—Sometimes it denotes any thing not to be known without divine revelation.

In this sense we are to understand those texts: “He that reveals secrets (or *mysteries*), makes known to thee what shall come to pass;” *Dan. ii. 29.* “There is a God in heaven that reveals *mysteries*,” *ib. ver. 28.*

MYSTERY is also used to denote the secret things, which God has discovered by his ministers the prophets, Jesus Christ, and the apostles.

In which sense it is St. Paul says, “We speak the wisdom of God in a *mystery*, which God had resolved before all ages to reveal for our glory.” *1 Cor. ii. 7.* We are to be accounted as “ministers of Christ, and dispensers of the *mysteries* of God,” *1 Cor. iv. 1.* Though I understand all *mysteries*, and have the knowledge of all things, if I have not charity, I am nothing,” *1 Cor. xiii. 2.* Behold I shew you a *mystery*, *1 Cor. xv. 51.* By reading my epistle, you may understand my knowledge in the *mystery* of Christ, *Ephes. iii. 4.* And in the following verses he adds, that this *mystery* is, that the Gentiles are fellow-heirs, and make but one body with the Jews, being sharers with them in the promises of God in the gospel. “Holding the *mystery* of the faith in a pure conscience,” *1 Tim. iii. 9.* “When the seventh angel begins to sound his trumpet, the *mystery* of God shall be finished, as he has declared to his servants the prophets,” *Revel. x. 7.*

Additions of **MYSTERY**. See the article **ADDITION**.

MYSTES. See the article **HYDROMYSTES**.

MYSTICAL, **MYSTICISM**, **MYSTIC**, something *mysterious*, or allegorical. See **MYSTERY**, **ALLEGORY**, &c.

The commentators on the scripture, besides a literal, find also a *mystical*, and a moral meaning.—The Bible, they contend,

is a book written both within-side, and without-side.— Within-side, in respect to the *mystical*, internal, sublime, and hidden sense; and without-side, in respect to the literal and grammatical sense, immediately expressed by the words. In effect, several of the antient fathers, and doctors of the church, understand the books mentioned in Ezek. ii. 10. and in the Apocalypse, v. 1. *which were wrote both within-side, and without*, of the scriptures: and take the literal and *mystical* sense to be here fairly intimated.

The sense of scripture, say they, is either that immediately signified by the words and expressions in the common use of language: or it is mediate, sublime, typical, and *mystical*; wherein the things themselves signified are made to signify still other and further things, according to the particular design and intention of God, and of the prophets and apostles inspired by him.

The literal sense they again divide into *proper* literal, which is contained in the words taken simply and properly:

And *metaphorical* literal, where the words are to be understood in a figurative and metaphorical sense: as, *where the right eye is commanded to be plucked out*, &c.

Where-ever the proper literal sense contains any thing absurd or indecent, there recourse must be had to the metaphorical literal sense.

All scripture has a true literal sense, but it has not always a *mystical* one. We must ever understand it in the literal sense, when it speaks immediately of any of the laws of nature, of charity, of doing good, when it gives us instructions for the conduct of life, for regulating our manners; and when it relates any matter of fact, or point of history.

The same passage of scripture has sometimes several senses, expressed and signified immediately by the words taken in their proper, and their figurative sense, and which appear to have been all intended by the inspired person who spoke them, as having been so understood by others likewise inspired.—As those words in Psalm ii. *Thou art my son, this day have I begotten thee*; which St. Paul understands according to the strict letter in Heb. i. 5. of the generation of Jesus Christ in time: And in Acts xiii. 33. he takes them in a metaphorical sense, and applies them to our Saviour's resurrection.—Thus, in Hosea xi. 1. the words of the prophecy, *I have called my son out of Egypt*, are understood literally of the children of Israel, whom God brought out of Egypt under the conduct of Moses; and yet in Matth. ii. 15. they are understood metaphorically of Jesus Christ.

The *mystical* sense of scripture is that which the things expressed by the words do further signify; or it is a second signification held forth or signified by the first: this second being expressed immediately by the first, and mediately by the words themselves.

Writers allow of three kinds of *mystical* senses in the word of

God: The first corresponding to faith, and called *allegorical*; the second to hope, called *anagogical*; and the third to charity, called the *tropological* sense. See ANAGOGICAL. The four senses, and their applications, are included in the Latin distich,

*Littera gesta docet, quid credas allegoria,
Moralis quid agas, quo tendas anagogia.*

Sometimes the same word in scripture is to be taken in all the four senses.—Thus the word *Jerusalem* literally signifies the capital of Judea; allegorically, the church militant; tropologically and morally, a believer; and anagogically, heaven. So, that passage in Genesis, *Let there be light, and there was light*; signifies, according to the letter, corporeal light; by allegory, the messiah; in the tropological sense, grace; and anagogically, beatitude, or the light of glory.

MYSTIC theology, denotes a refined and sublime kind of divinity, professed by the *mystics*.

It consists in a knowledge of God, and divine things, not acquired in the common way, but infused immediately by God, and which has the power to move the soul in an easy, calm, devout, affective manner; to unite it intimately to God; to illumine the understanding, and to warm and enliven the will in an extraordinary manner.

Among the writings attributed to Dionysius the areopagite, is a discourse of *mystic* theology. Several others have wrote on the same subject, both antients and moderns.

MYSTICS, MYSTICI, a kind of religious sect, distinguished by their professing pure, sublime, and perfect devotion, with an intire disinterested love of God, free from all selfish considerations.

The *mystics*, to excuse their fanatic extasies, and amorous extravagancies, allege that passage of St. Paul; *The spirit prays in us by sighs and groans that are unutterable*. Now, if the spirit, say they, pray in us; we must resign ourselves to its motions, and be swayed and guided by its impulse, by remaining in a state of mere inaction.

Passive contemplation is that state of perfection to which the *mystics* all aspire.

MYTHOLOGY *, ΜΥΘΟΛΟΓΙΑ, the history of the fabulous gods and heroes of antiquity; with the explanation of the mysteries or allegories couched therein.

* The word is Greek, and signifies a discourse or description of fables; from *μυθος*, *fabula*; and *λογος*, *sermo*, discourse.

MYURUS *, ΜΥΡΟΣ, in medicine, denotes a pulse which is continually weakening by insensible degrees; so that the second beat is fainter than the first; the third than the second, &c. See PULSE.

* The word is compounded of *μυς*, mouse, and *υρς*, tail; the diminution of the pulse being supposed like that of the thickness of the tail of that animal, which grows less from the root to the tip.



N.

N A D

N A I

N, A liquid consonant, and the thirteenth letter of the Greek, Latin, English, &c. alphabets.

The *N* is a nasal consonant: its sound is that of a *d*, passed through the nose; so that when the nose is stopped by a cold, or the like, it is usual to pronounce *d* for *n*. M. l'Abbé de Dangeau observes, that in the French the *n* is frequently a mere nasal vowel, without anything of the sound of a consonant in it. — He calls it the Slavonic vowel. The Hebrews call their *N*, *Nun*, which signifies child, as being supposed the offspring of *M*; partly on account of the resemblance of sound, and partly on that of the figure. — Thus from the *m*, by omitting the last column, is formed *n*: and thus from the capital *N*, by omitting the first column, is formed the Greek minuscule *n*. — Hence, for *Bien-nius*, &c. the Latins frequently use *Bimus*, &c. And the same people convert the Greek *ν* at the end of a word into an *m*; as, *καρμυζων*, pharmacum, &c. See *M*.

N before *p*, *b*, and *m*, the Latins change into *m*, and frequently into *l* and *r*, as in *ludo*, *illudo*; in *rigo*, *irrigo*, &c. — in which they agree with the Hebrews, who in lieu of *Nun*, frequently double the following consonant; and the Greeks do the same, as when for *Manlius*, they write *Μαννιλος*, &c. The Greeks, also, before *κ*, *χ*, *ζ*, *ψ*, changed the *ν* into *γ*: in which they were followed by the ancient Romans, who for *Angulus* wrote *Aggulus*; for *anceps*, *agceps*, &c. The Latins retrench the *n* from Greek nouns ending in *ων*; as *λεων*, *leo*; *δρακων*, *draco*. — On the contrary, the Greeks add it to the Latin ones ending in *o*; as *Κατων*, *Nεπω* for *Cato*, *Nero*.

N, among the antients, was a numeral letter, signifying 900; according to the verse in *Baronius*,

N queque Nongentos numero designat habendos.

And when a line was struck over it, *N*, nine thousand. Among the ancient lawyers, *N. L.* stood for non liquet, i. e. the cause is not clear enough to pass sentence upon.

N, or *Nº*, in commerce, &c. is used as an abbreviation of number, number. — Thus also in medicine, caryophyllorum, *Nº vi.* signifies six cloves.

NAAM, **NAMIUM**, in law, the taking, or distraining another man's moveable goods.

This is either *lawful*, or *unlawful* and prohibited.

Lawful NAAM, is a reasonable distress, proportionable to the value of the thing distrained for; and was antiently called either *vif* or *mort*, as it was made of quick, or dead chattel. **Lawful Naam**, is so either by the common law; as when a man takes another's beasts doing damage in his ground; or by a man's particular fact, as on account of some contract, &c.

Unlawful NAAM, **Vetium Namiun**. See **NAMIUM**, and **VE-TITIUM**.

NABONASSAR. The *Æra* of *NABONASSAR* is famous: we know but little of the history of the man; only that he was king of Babylon, and was also called *Beleus*; though some will have him the *Baladan* mentioned in *Isaiah xxxix. 1.* and *2 Kings xx. 12.* Some even conjecture that he was a *Mede*; and that he was set on the throne by the Babylonians, upon their rising and shaking off the subjection of the *Medes*.

The beginning of this prince's reign is of great importance in chronology; by reason *Ptolemy* assures us, there were astronomical observations made by the Chaldeans from *Nabonassar* to his time: and *Ptolemy*, and the other astronomers, account their years from that epocha. See **ASTRONOMY**.

From the observations quoted by *Ptolemy*, it follows, that the first year of this æra is the 747th year before *Jesús Christ*; and the 3967th of the Julian period. See **EPOCHÆ**.

The years of this epocha are Egyptian years, of 365 days each; commencing on the 29th of February, and reckon'd, according to the computation of astronomers, from noon.

NADIR *, in astronomy, a point in the heavens diametrically opposite to the Zenith. See **ZENITH**.

* The word is pure Arabic, where it signifies the same.

The *Nadir* is that point directly under our feet; or a point in a right line drawn from our feet through the centre of the earth, and terminating in the under-hemisphere.

The Zenith and *Nadir* are the two poles of the horizon, each being 90° distant from it, consequently each in the meridian.

Sun's NADIR, is the axis of the cone projected by the shadow of the earth; thus called, in regard that axis being prolonged, gives a point in the ecliptic diametrically opposite to the sun.

NEVI, or **NEVI**, in the animal oeconomy, marks made on the fœtus, by the imagination of the pregnant mother, in longing for any thing.

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See these accounted for under the article **MONSTER**. See also **FOETUS**, and **IMAGINATION**.

NAIADS *, or **NAIDS**, **NAIADES**, a sort of nymphs, or heathen divinities, supposed to preside over fountains, and rivers.

* The word comes from the Greek, *ναω*, *fluo*, I flow; or from *ναω*, I inhabit, abide.

Strabo says, the *Naiades* were priestesses of *Bacchus*. See **GOD**.

NAIANT, or **NATANT**, *q. d.* swimming; a term in heraldry, used in the blazoning of fishes, when drawn in an horizontal posture, fess-wise, or transversely, across the escutcheon; that being their natural swimming posture.

NAILING of cannon, the driving of a nail, or iron spike, by force, into the touch-hole of a piece of artillery; so as to render it for some time useless to the enemy.

NAILS, in the animal body, a kind of horny excrescences, growing over the ends of the fingers, and toes of men, and several other animals; much of the same nature with the hoofs of others.

Hoofs are nothing else but a number of small husks, answering to so many papillæ of the skin; and it may be concluded, that *nails* are no more than the covers or sheaths of the papillæ pyramidales of the skin, on the extremities of the fingers and toes, which dry, harden, and lie upon one another.

Their use is to strengthen and defend the ends of the fingers in handling any hard and rugged bodies; that part being exceedingly sensible, by reason of the great number of nerves which terminate here for the sensation of feeling.

The *nails* are formed, and grow after the same manner as the rest of the body; their nourishment they receive from their roots, as is easily observable from the white specks sometimes seen on them, and which constantly recede from the root.

The Romans were very curious in the cutting and forming their *nails*, and had it done by artists, who made an employment of it.

The Chinese doctors and literati pique themselves on the excessive length of their *nails*. *F. le Comte* says, some of them wear *nails* near as long as their fingers.

NAILS, in building, &c. are little metaline members, serving to bind, or fasten the parts together, &c.

The several kinds of *nails* are very numerous. — As *back* and *bottom nails*; made with flat shanks to hold fast, and not open the wood. — *Clamp nails*, those proper to fasten the clamps in buildings, &c. — *Clasp nails*, whose heads clasping and sticking into the wood, render the work smooth, so as to admit a plane over it: they are of two kinds, *viz.* *long*, proper for fine buildings of fir, &c. and *strong*, fit for oak, and other hard wood. — *Clench nails*, those used by boat, barge, &c. builders; proper for boarded buildings, that are to be taken down, because they will drive without splitting, and draw without breaking. — *Close nails*, those ordinarily used for nailing on of cloths to axletrees. — *Deck nails*, those proper for fastening of decks in ships, doubling of shipping, and floors laid with planks. — *Deg nails*, proper for fastening of hinges to doors, &c. — *Flat points* are of two kinds, *viz.* *longs*, much used in shipping, and proper where there is occasion to draw, and hold fast, yet no necessity of clenching. — *Jobent nails*, those commonly used to nail thin plates of iron to wood. — *Lead nails*, used to nail lead, leather, and canvas to hard wood. — *Port nails*, commonly used to nail hinges to the ports of ships. — *Pound nails*, are four-square in the shank; and are much used in Norfolk, Suffolk, and Essex, though scarce elsewhere, except for paling. — *Ribbing nails*, used to fasten the ribbing, to keep the ribs of ships in their place in building. — *Rise-nails* are drawn four-square in the shank; and commonly in a round tool. — *Rother nails*, chiefly used to fasten rother-irons to ships. — *Round-head nails*, proper to fasten on hinges, or other uses, where a neat head is required. — *Scupper nails*, much used to fasten leather and canvas to wood. — *Sharp nails*, much used, especially in the West-Indies, made with sharp points, and flat shanks. — *Sheathing nails*, used to fasten sheathing-boards to ships: the rule for their length, is to have them full three times as long as the board is thick. — *Square nails*, of the same shape as *sharp nails*; chiefly used for hard woods. — To which may be added *tacks*; the smallest serving to fasten paper to wood; middling, for wool-cards and oars; and larger, for upholsterers, and pumps.

In lathing, 500 *nails* are ordinarily allowed to a bundle of five-foot laths. — In flooring, 200, i. e. 240, are allowed for a square of flooring.

Nails are said to be toughened, when too brittle, by heating them in a fire-shovel, and putting some tallow or grease among them.

NAIL is also a sort of long measure, chiefly used in the commerce of cloths; containing the sixteenth part of a yard.

NAIRANGIA *, a kind of divination, in use among the Arabs, drawn from several phenomena of the sun and moon.

* The word is formed from the Arabic *Nairan*, the plural of *Nair*, light.

NAISSANT, in heraldry, is applied to a lion, or other animal, shewing only the head, shoulders, fore-feet, and legs, with the tip of the tail; the rest of the body lying hid under the shield, or some charge, or ordinary thereon; from which it appears to be issuing or arising.—See *Tab. Herald. fig. 28*.

Naissant differs from *Issuant*, in that the animal in the former case issues out at the middle, and in the latter, at the bottom of the shield, or charge. See **ISSUANT**.

F. Menestrier says, *naissant* is only used for animals, which shew the bare head as arising out of the extremity of the chief, or from above the fesse.

NAKED, in architecture. **NAKED** of a wall, &c. is the surface, or plain, from whence the projectures arise; or which serves as a ground to the projectures. See *Tab. Archit. fig. 24. lit. r.*

Thus, we say, a pilaster ought to exceed the *naked* of the wall by so many inches; and that the foliage of a capital ought to answer to the *naked* of the column. See **COLUMN**, &c.

NAKED Fire, is a term used by chymists for an open fire; or one where the containing vessel is immediately exposed to the fire. See **FIRE**, and **HEAT**.

NAKED Seeds, in botany, are such seeds of plants as are not inclosed in any pod, or case.

NAMATION, **NAMATIO**, in law, the act of distraining, or taking a distress. See **DISTRESS**.

In Scotland the word is particularly used for impounding. See **POUND**.

NAME, denotes a word whereby men have agreed to express some idea; or which serves to denote, or signify a thing, or subject spoken of.

This the Grammarians usually call a *noun*, *nomen*, though their *noun* is not of quite so much extent as our *name*. See **NOUN**.

Seneca, lib. II. *de Beneficiis*, observes, that there are a great number of things which have no *name*; and which, therefore, we are forced to call by other borrowed *names*. *Ingens est, says he, verum copia sine nomine, quas cum propriis appellationibus signare non possumus, alienis accommodatis utimur*: which may shew why, in the course of this dictionary, we frequently give divers senses to the same word.

It was Adam that first gave things their names, Gen. ii. 19. *Formati, igitur, Dominus Deus, de bono cunctis animantibus terræ, & universis volatilibus cæli, & omnibus bestijs terræ, adduxit ea ad Adam, ut videret quid vocaret ea; omne enim quod vocavit Adam animæ viventi ipsam est nomen ejus.* Ver. 20. *Appellavitque; Adam nominibus suis cuncta animantia, & universa volatilia cæli, & omnes bestias terræ.*

Names are distinguished into *proper* and *appellative*.

Proper NAMES are those which represent some individual thing, or person; so as to distinguish it from all other things of the same species.—As *Socrates*, which represents a certain philosopher.

Appellative, or **general NAMES**, are those which signify common ideas; or which are common to several individuals of the same species,—as, horse, animal, man, oak, &c.

Proper names are either called *Christian*, as being given by us at baptism; or *surnames*: the first, imposed for distinction of persons; answering to the Roman *prænomen*.

The second, for the distinction of families, answering to the *nomen* of the Romans, and the *patronymicum* of the Greeks.

Originally every person had but one *name*; as among the Jews, Adam, &c. among the Egyptians, Busris; among the Chaldees, Ninus; the Medes, Astyages; the Greeks, Diomedes; the Romans, Romulus; the Gauls, Divitiacus; the Germans, Arivisilus; the Britains, Cassibelan; the English, Hengist, &c. And thus of other nations, except the savages of mount Atlas, whom Pliny and Marcellinus represent as *anonymi*, nameless.

The Jews gave the *name* at the circumcision, viz. eight days after the birth: the Romans to females the same day, and to males on the ninth; at which time they held a feast, called *nominalia*.

Since christianity has obtained, most nations have followed the Jews, baptizing, and giving the *name* on the eighth day after the birth; except our English ancestors, who, till of late baptized, and gave the *name* on the birth-day.

The first imposition of *names* was founded on different views, among different people; the most usual was to mark the good wishes of the parents, or to intitle the children to the good fortune a happy *name* seemed to promise.—Hence, Victor, Castor, Faustus, Statorius, Probus, &c.

Accordingly, we find such *names*, by Cicero called *bona nomina*, and by Tacitus, *fausta nomina*, were still first enrolled, and ranged in the Roman musters; first called to serve at the first sacrifices in the foundation of colonies, &c. — And, on the contrary, Livy calls Atrius UMBER, *abominandi ominis nomen*: and Plautus, on occasion of a person named Lyco, i. e. Greedy wolf, says;

*Vosmet nunc facite conjecturam cæterum
Quid id sit hominis, cui Lyco nomen flet.*

Hence, Plato recommends it to men to be careful in giving happy *names*; and the Pythagoreans taught expressly, that the minds, actions, and successes of men, were according to their *names*, genius, and fate. — Thus, Panormitan, *Ex bono nomine oritur bona præsumptio*; and thus the common proverb, *Bonum nomen bonum omen*: and hence the foundation of the Onomomantia.

Hence Camden takes it for granted, that the *names*, in all nations and languages, are significative, and not simple sounds, for mere distinction sake. — This holds not only among the Jews, Greeks, Latins, &c. but even the Turks; among whom, Abdalla signifies God's servant; Soliman, peaceable; Mahomet, glorified, &c. And the savages of Hispaniola, and throughout America, who, in their languages, *name* their children, Glistering Light, Sun Bright, Fine Gold, &c. And they of Congo, by the *names* of precious stones, flowers, &c.

To suppose *names* given without any meaning, however by the alteration of languages their signification may be lost, that learned author thinks, is to reproach our ancestors; and that contrary to the sense of all ancient writers.—Porphyry notes, that the barbarous *names*, as he calls them, were very emphatical, and very concise: and accordingly, it was esteemed a duty to be *σεμνολογος*, or *sui nominis homines*: as Severus, Probus, and Aurelius, are called *sui nominis imperatores*.

And it was the usual way of giving *names*, to with the children might discharge their *names*. — Thus when Gunthram, king of France, named Clotharius at the font, he said, *Crescat puer, & hujus sit nominis executor*.

The ancient Britains, Camden adds, generally took their *names* from colours; because they painted themselves; but these *names* are now lost, or remain hid among the Welsh.—When they were subdued by the Romans, they took Roman *names*; some of which still remain, corrupted; though the greatest part are become extinct, upon the admission of the English Saxons, who introduced the German *names*, as Cridda, Penda, Oswald, Edward, &c.—The Danes, too, brought with them their *names*; as Suayne, Harold, Knute, &c.

The Normans, at the conquest, brought in other German *names*, as originally using the German tongue; such as Robert, William, Richard, Henry, Hugh, &c. after the same manner as the Greek *names*; Alpaidus, Boethius, Symmachus, &c. were introduced into Italy, upon the division of the empire.—After the conquest, our nation, which had ever been averse to foreign *names*, as deeming them unlucky, began to take Hebrew *names*; as Matthew, David, Samson, &c.

The various *names* antiently, or at present obtaining among us, from what language or people soever borrowed, are explained by Camden in his *Remains*.—

Of late years it has obtained among us to give *surnames* for *Christian names*; which some dislike, on account of the confusion it may introduce. — Camden relates it as an opinion, that the practice first began in the time of Edward VI. by such as would be godfathers, when they were more than half fathers. Upon which, some were persuaded to change their *names* at confirmation; which, it seems, is usual in other countries.—Thus, two sons of Henry II. of France, christened Alexander and Hercules, changed them at confirmation into Henry and Francis.

In monasteries, the religious assume new *names* at their admittance; to shew they are about to lead a new life, and have renounced the world, their family, and even their *name*: v. g. Sister Mary of the incarnation, Brother Henry of the holy sacrament, &c.

The popes also change their *name* at their exaltation to the pontificate; a custom first introduced by pope Sergius, whose *name*, till then, as Platina informs us, was Swine-snout. But Baronius refers it to pope Sergius I. and Onuphrius to John XII. or XIII. and at the same time, adds a different reason for it from that of Platina, viz. that it was done in imitation of St. Peter and St. Paul, who were first called Simon and Saul.—Indeed pope Marcellus, of late, refused to change his *name*.

In Italy, it is frequent to join the *name* of some saint, in a kind of devotion, to the christian *name*; as Joannes Baptista Spinosa, &c.

Among the antients, those deified by the heathen consecrations had new *names* given them; as Romulus was called Quirinus; Melicertes, Portunus, or Portumnus, &c.

N A R

New names were also given in adoptions, and sometimes by testament; thus L. Æmilius, adopted by Scipio, took the name of Scipio Africanus; and thus Augustus, who at first was called C. Octavius Thurinus, being adopted by the testament of Julius Cæsar into his name and family, took the name of Caius Julius Cæsar Octavianus.

Names were also changed at enfranchisements into new cities.—Thus Lucumo, at his first being made free of Rome, took the name Lucius Tarquinius Priscus, &c. and slaves, when made free, usually assumed their masters names.

Those called to the equestrian order, if they had base names, were always new named, *nomine ingeniorum veterumq; Romanorum*. — And among the primitive Christians, it was the practice to change the names of the catechumens: thus the renegade Lucianus, till his baptism, was called Lucius.

Of the NAME, is a phrase, frequent among historians, and genealogists, to denote persons of the same quality, and name. — It is near nine hundred years since the emperors of the west first began to distinguish themselves in this manner by their number: and in the *Italia Sacra* of Ughellus, we meet with a charter of the emperor Louis le Debonnaire, anno 818. wherein that prince styles himself the first of the name. Le Blanc mentions a charter of the year 1084. wherein the emperor Henry III. styles himself king of Italy, the fourth of the name; and emperor the third of the name. Some French writers observe, that in a manuscript preserved in the king's library, their Louis XI. is only styled the ninth of the name; Louis the Debonnaire, and Louis the Stammerer, not being then reckoned in the number, by reason they were emperors, as well as kings of France: on which footing, the present king, instead of the fifteenth, should only be the thirteenth of the name.

NAMIMUM, NAAM, in law. See NAAM.

NAMUM VETITUM, or Prohibited NAAM, is an unjust taking the cattle of another, or driving them to an unlawful place, pretending damages done by them.

In such case, the owner of the cattle may demand satisfaction for the injury, which is called *placitum de namis vetito*. See VETITUM.

NAPE is used for the hind-part of the neck; by reason, perhaps, of the soft short hair growing thereon, like the knap of a cloth.

NAPELLUS. See the article ACONITE.

NAPHTHA *, *Nazba*, a kind of Iquid bitumen, very oily and inflammable; exuding out of the earth in several places in Chaldea; particularly the place where stood the ancient Babylon: and found also in some provinces of Italy and France, particularly Auvergne, and near Ragusa.

* The word in the original Chaldee signifies *stills*, to ooze, or drop; *naphtha*, according to Pliny, running like a kind of bitumen.

Naphtha is found swimming on the surface of the water of some springs. It is usually of a black colour; though that found in certain springs about Babylon is said to be whitish.

That of France is soft and black, like liquid pitch, and of a fetid smell; that of Italy is a kind of petrol, or a clear oil, of various colours, oozing out of a rock, situate on a mountain in the duchy of Modena.

Naphtha is esteemed penetrating, resolute, and vulnerary; but its virtues are but little known in medicine: its chief use is in lamps, &c. on account of its inflammability.

The Turks call the *naphtha*, *carab sakiz*, black mastic, to distinguish it from pitch. Vossius has an express treatise on *naphtha*, ancient and modern: he says, it is a flower of bitumen, and of more virtue than any other bitumen.

NAPIERS, or NEPERS bones. See NEPERS bones.

NARCOTICS *, in medicine, opiates, or medicines that excite drowsiness and sleep. See OPIATES.

* The word comes from the Greek *ναρκωτικός*, of *ναρκωσις*, drowsiness.

Narcotics, called also *hypnotics*, and *seporifics*, act by calming, and diminishing the motion of the blood and spirits.

Authors are of various opinions as to the manner wherein *narcotics* operate: the ancients tell us, it is by their being cold in nature, whereby they stupefy and deaden the sense. Etymologer, after Willis, takes the animal spirits to be composed of a fluid, volatile salt; and thinks they are dissolved by the mixture of sulphur and oils, wherewith *narcotics* abound. — M. Andry's opinion is, that the salt of *narcotics* dissolves in any liquor whatever, and that their ramous branches becoming thus disengaged from the salts, are embarrassed among one another, and thus stop the course of the blood and spirits. — Others think, that *narcotics* close the orifices of the nerves, and thus block up the passage of the spirits. — Lastly, Linden, in his treatise de *Veneris*, thinks, that the operation of *narcotics* is not the same in all; drowsiness being pro-

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ducible from a great variety of different causes. See SLEEP.

NARRATION, in oratory and history, a recital, or rehearsal of a fact as it happened, or as it is supposed to have happened.

Narration is of two kinds: either *simple*, and *historical*; as where the auditor or reader is supposed to hear or read of a transaction at second hand. — Or *artificial*, and *fabulous*; as where their imaginations are raised, and the action, is as it were, re-acted before them.

The *narration*, according to the writers of rhetoric, makes the second part of a just speech, or harangue; viz. that immediately following the exordium.

It makes the whole of a history; abating for the occasional reflections, episodes, and digressions.

Cicero requires four virtues in a *narration*; viz. perspicuity, probability, brevity, and sweetness.

The *narration* is rendered perspicuous, by observing the order of time, by using none but proper and known terms, and by reciting the action uninterruptedly.

It is rendered probable, by the credibility of the narrator, by the simplicity and openness of the *narration*, by avoiding every thing far remote from the common sense and opinion of mankind, and by a precise detail of circumstances.

It is rendered brief, by taking it up no higher than is just necessary; nor fetching it back, as that impertinent author in Horace, *Qui gemino bellum Trojanum orditur ab ovo*: and by avoiding trivial circumstances.

Lastly, it is rendered sweet, by using smooth, numerous, and well-sounding words; by arranging them, so as to avoid any hiatus, or clashing. By the greatness, novelty, and unexpectedness of the things related; and by enriching it with tropes and figures: as, frequent admirations, exclamations interrogations, expostulations, suspenses, surprising events; by grief, joy, fear, &c. See NUMBERS, CADENCE, and TROPE.

NARRATION, in poetry, is used more particularly for the action, or event, that makes the subject of an epic poem.

F. Bossu observes, that the actions in poetry are equally susceptible of the two kinds of oratorical *narration*; and that each constitutes a particular species of poetry.

Those under the artificial, or active form, are now called *dramatic*.

And those only related by the poet, who here personates an historian, are called *epic*.

In the drama, the *narration* is the whole of the piece; in the epopeia, it is only a part, though in effect it is the principal part, and the main body of the poem. — It is preceded by the proposition and invocation, which Bossu calls the preludes; and is frequently interrupted by the poet's speaking in person, demanding pardon, favour, &c.

The *narration* includes the whole action, episodified, with all its circumstances and its ornaments.

It is in this part that the action is to be begun, carried on, and ended. It is this, which is to shew the causes of all that is related: in this the difficulties are to be proposed and resolved, and the persons, both human and divine, are here to shew their interests, their manners, and their qualities, by their actions and their discourse: and all this is to be described with the beauty, the majesty, and force of verse, style, sentiments, comparison, and other ornaments proper to the subject in general, and to each thing in particular.

The qualities of the epic *narration* are, that it be agreeable, probable, moving, surprising, and active.

Horace speaks of the utile and dulce as on the same footing. Bossu looks on the utile as an essential property; and the dulce as no more than an additional quality.

NASAL, something belonging to the nose, *nasus*. — As, the nose-piece of an helmet, antiently called the *nasale*.

NASAL, in grammar, &c. is applied to those sounds, or letters, in whose formation the nose is the principal organ; and particularly where the sound formed is passed through the nose.

In most English words, the sounds expressed by the characters an, en, in, on, un, are simple sounds, and proper nasal vowels. See M, N, &c.

NASALIA, in medicine, a sort of remedies to be taken by the nose; called also *errhines*. See ERRHINES.

NASI OI, in anatomy, a thin bone, making the upper part of the nose. See NOSE.

NATALIS, NATALIS Dies, or NATALITIUM, properly signify a man's birth-day. See NATIVITY.

The word was first used among the heathens, to signify the feast held on the anniversary of the birth day of an emperor; whence it came, in time, to signify any sort of feast. And, accordingly, in the Fasti, we meet with *natalis Solis*, *natalis Inventi*, &c.

The primitive Christians, finding the word thus established, used it in the same manner; and hence we meet in the antient

tient martyrologists with *natalis calycis*, for the feast of the supper, or Maunday-Thursd^y: *natalis cathedrae*, for the pontificate of St. Peter: *natalis*, or *natalitium*, of such a church, for the feast of the dedication.

The word Genethlion is used by the Greeks in the same sense as *natalis*, or *natalitium*, among the Latins.

Ludi NATALITII, **NATAL Games**, were games introduced on the anniversaries of the birth-days of great men.

NATAL Ring, **Annulus NATALITIUS**, was a ring only worn on the birth-day.

NATES, in anatomy, a term expressing those two fleshy posterior parts of the body, popularly called the *buttocks*: by the Latins *clunes*, or *nates*.

NATES Cerebri, are two circular protuberances of the brain, situate on the back-side of the medulla oblongata near the cerebellum. See **BRAIN**, and **MEDULLA**.

NATION, a collective term, used for a considerable people, inhabiting a certain extent of ground, inclosed within fixed limits, and under the same government.

Each nation has its particular character: and it is proverbially said, Light as a Frenchman, Waggiſh as an Italian, Grave as a Spaniard, Serious as an Englishman, Fierce as a Scotchman, Drunken as a German, Idle as an Irishman, Deceitful as a Greek, &c.

NATION is also used in some universities, for a distinction of the scholars, and professors of colleges.

The faculty of Paris consists in four nations; viz. that of France, that of Normandy, that of Picardy, and that of Germany; which are again, excepting that of Normandy, distinguished into tribes; and each tribe has its deacon.

The German nation comprehends all foreign nations, English, Italian, &c.

When the procureur of the French nation speaks in public, his style is, *Honoranda Gallorum Natio*: he of Picardy says, *Fidelissima Picardorum Natio*: he of Normandy, *Veneranda Normannorum Natio*: he of the nation of Germany, *Constantissima Germanorum Natio*.

NATIONAL Synod. See the articles **SYNOD**, and **COUNCIL**.

NATIVE is applied to a person considered as born in a certain place; or deriving his origin therefrom.

The more accurate writers distinguish between a *native* of a place, and one *born* there. Born signifies no more than the having been there produced, or brought into the world, whether that were the proper country, or habitation of the parents, or whether they were there only by accident, as strangers, &c.—Whereas *native* refers to the proper mansion, or residence of the parents and the family; and where the person has his education.

And hence a person may be a *native* of one place, and born at another: thus Jesus Christ is called a Nazarene, and Galilean, as a *native*; though he was born at Bethlehem in Juda.

NATIVE, **NATIVUS**, in our antient law-books, signified a person who was born a slave or villain.

By which he differed from one who had sold himself, or became a slave by his own deed, who was called *bondman*. See **VILLAIN**.

NATIVE Tenentes, in our old law-books, are those freemen, who hold *native* land; i. e. land subject to the services of *natives*. Spelm.

NATIVI de Stripte, were villains or bond-men by birth or family.—There were also *nativi conventionarii*, who were villains by contract or covenant. *Servi enim alii natura, alii facti, alii emptione, alii redemptione, alii sua vel alterius donatione*. LL. Hen. I. cap. 76.

In Cornwall it was a custom, that if a freeman married *nativam* (that is a neif) and brought her *ad liberum tenementum* & *liberum thorum*, and had two daughters, one of them was free, and the other a villain. Bract. l. 4. c. 21. See **NEIF**.

NATIVITY, **NATIVITAS**, or **Natal-Day**; the day of one's birth.

The term is chiefly used in speaking of saints, &c. The *nativity* of St. John Baptist, &c.—When we say absolutely the *nativity*, it is understood of that of Jesus Christ, or the feast of Christmas. See **FEAST**, **CHRISTMAS**, &c.

It is commonly held, that pope Telephorus was the first who decreed the feast of the *nativity* to be held on the 25th of December. John, archbishop of Nice, in an epistle upon the *nativity* of Jesus Christ, relates, that at the instance of St. Cyril of Jerusalem, pope Julius procured a strict inquiry to be made into the day of our Saviour's *nativity*; which being found to be on the 25th of December, they began thenceforth to celebrate the feast on that day. See **INCARNATION**.

NATIVITY, **Nativitas**, in antient law-books, signifies bondage, or servitude.

NATIVITY, in astrology, the theme, or figure of the heavens, and particularly of the twelve houles, at the moment when a person was born: called also the *horoscope*.

Casting the *nativity*, or by calculation seeking to know how long the queen should live, &c. was made felony, an. 23. Eliz. c. 2.

NATRON, or **ANATRON**, in natural history, a brownish kind of salt, taken out of a lake of stagnant water, in the desert of Nitria, in Egypt.

It is much of the nature of nitre, whence it is by many called *Egyptian nitre*, and is supposed to be the proper nitre of the antients.

It is a popular error, that all bones or stones thrown in this lake, are by degrees converted into *natron*.—It makes a great ebullition, when mixed with acids; whence it is ranked among the alkali kind.

It is used in the whitening of linen; but it burns them, if not corrected by a mixture of ashes.

The *natron* of Egypt, as described by Pliny, Matthiolus, and Agricola, is an alkali salt perforated in manner of a sponge, and of a lixivial taste.

Its principles Dr. Leigh takes to be chiefly two; viz. a sea-salt, and an urinous salt. The first, he takes it for granted, it receives from from the earth; the second, from air.

Dr. Huntington, who was on the spot, says the *natron* is thought to rise from the bottom of the lake; where, by the heat of the sun, it is condensed, and hardened into the form we see it in: but his opinion is, that it is rather separated by the sun from the water.

M. de la Chambre adds, that three or four days before the Nile begins to overflow, there falls a certain dew, of a fermentative virtue, inasmuch as to leaven a paste exposed to it; and that at the same time the *natron* rises.

Hippocrates, Galen, Matthiolus, Dioscorides, &c., mention it as of use in physic; and M. de Clois is even of opinion, that all the mineral waters of France are impregnated with this kind of nitre; and that it is hence they derive their medicinal virtues.

It is of singular efficacy in fertilizing of ground; which Dr. Leigh accounts for, by supposing its volatile particles heated by some subterraneous fire, or by the warmth of the sun; and thus readily made to ascend up the minute tubes of plants, and carry with them the juices of the earth.

Pliny derives the invention of glass from some of this *natron* accidentally melted down into the sand, where it ran into streams of glass.

This nitre is distinguished from the common nitre, or saltpetre, by its fermenting with acids, which saltpetre will not do; by its volatile spirit, its lixivial smell, and the clammy insipid substance it yields, &c.—It agrees with saltpetre, in that, by dropping spirit of sulphur upon it, it shoots into pyramidal crystals. Dr. Leigh thinks it comes nearer sal armoniac than saltpetre.

Dr. Lister conjectures, that most of the salt water of the lakes of Egypt, having passed through the bodies of those vast animals wherewith they are stocked, as crocodiles, hippopotami, &c. must of consequence be rendered urinous, or salino-urinous; which is a part of the composition of sal armoniac. See Supplement, article **NATRON**.

NATTA *, or **NATA**, in medicine, a large fleshy excrescence, or tumour arising in several parts of the body.

* The word is also written *nassa*, *nafsa*, and *nafsa*.

Blancard defines it, a large, soft, painless, colourless, tumour, arising usually on the back, sometimes on the shoulders, and other parts.—Its root is very small; yet it grows so prodigiously, that it sometimes equals a melon, or gourd.

Natte ofteneſt appear on the neck, much after the manner of talpæ.

They are of the oedematous kind, and are to be extirpated by incision, and their return prevented by red precipitate, vitriol, or burnt alum, strewed on the place.

Bartholine mentions a lady, who cured herself of a *natta*, by biting it off.

NATURAL, something that relates to nature; that arises from a principle of nature; or is conformable to the ordinary course and order of nature.

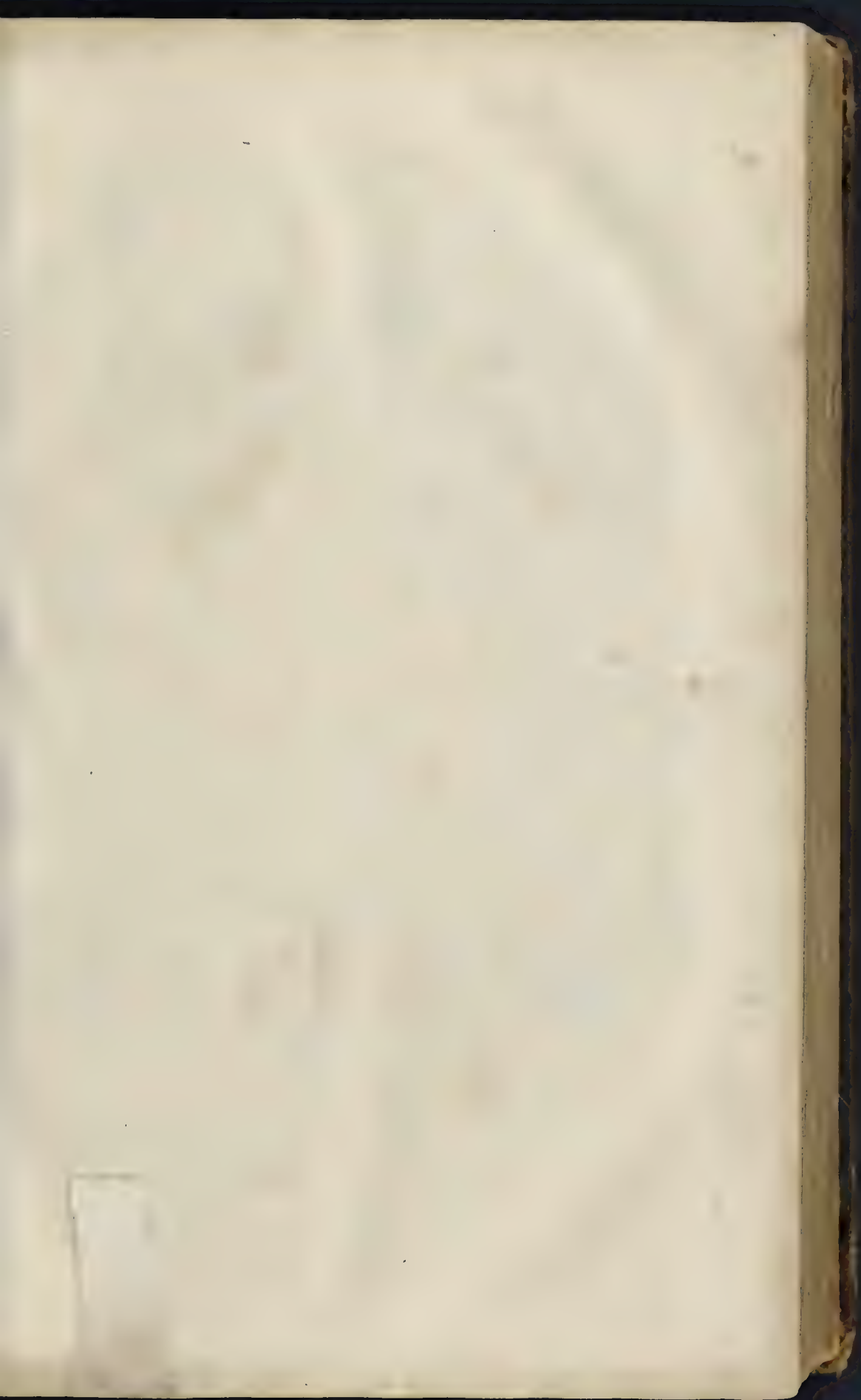
When a stone falls downwards, we vulgarly say it does it by a *natural* motion; but if it be thrown upwards, its motion is said to be violent.

Water suspended in a sucking pump is said to be out of its *natural* place; cures wrought by medicines, are *natural* operations; but the miraculous ones wrought by Christ, *supernatural*. See **MIRACLE**, &c.

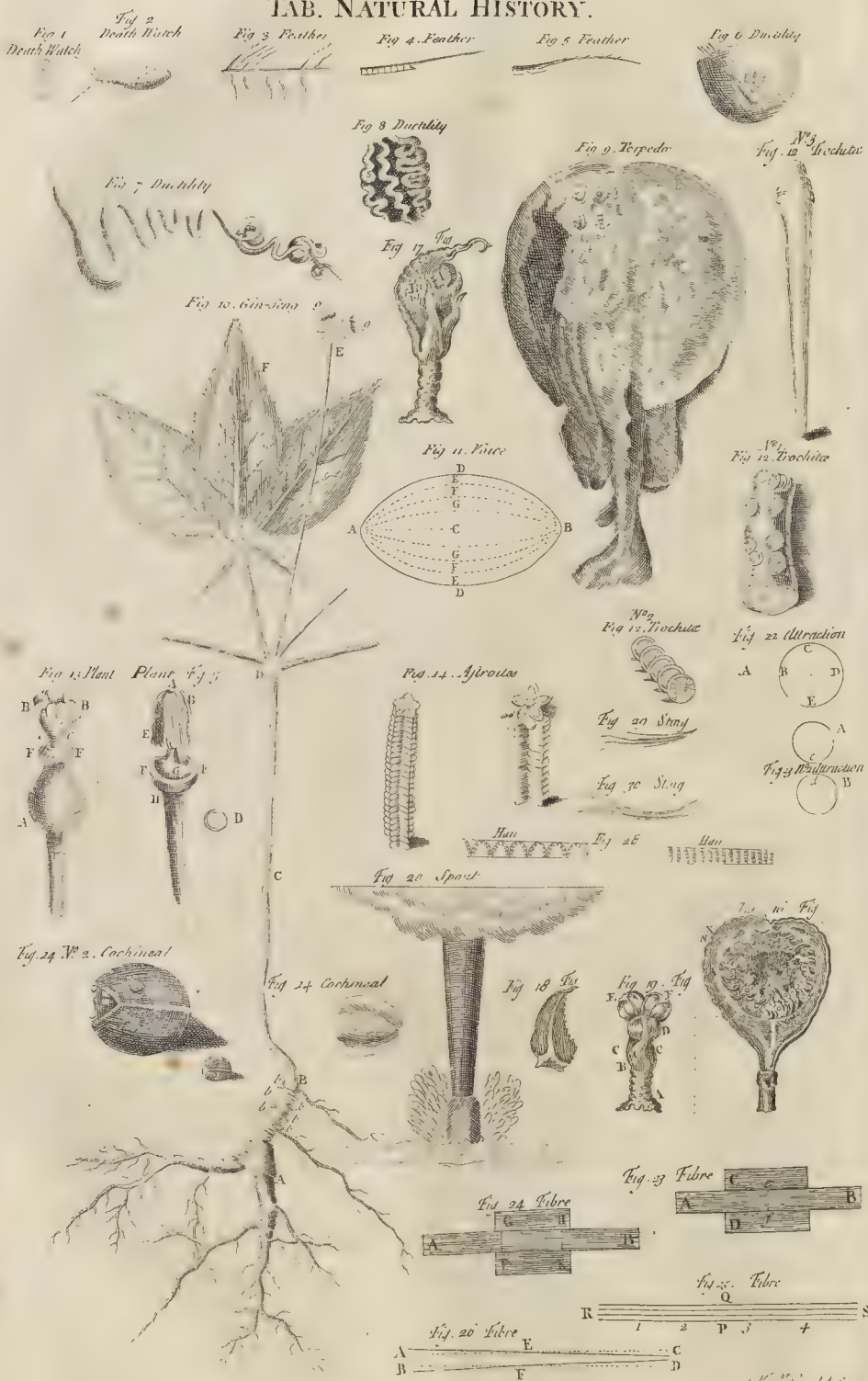
NATURAL Children are those born out of lawful wedlock. See **BASTARD**.

NATURAL Horizon, is the sensible or physical horizon. See **HORIZON**.

NATURAL Law. See **LAW OF NATURE**.



TAB. NATURAL HISTORY.



NATURAL Day. } See the article { DAY.

NATURAL Year. } See the article { YEAR.

NATURAL Faculty. See the article FACULTY.

Quincy defines *Natural Faculty* to be that power arising from the blood's circulation, which is conspicuous in all the secretions performed within the body; that secretion alone excepted, which is made at the origin of the nerves.

NATURAL Functions, in the animal economy, are those actions whereby things taken into the body are changed, and assimilated, so as to become parts of our body.

These are the actions of the viscera, the vessels that receive, retain, move, change, mix, secrete, apply, excrete, and spend the humours of the body.

NATURAL Inclinations are those tendencies or motions of the mind, towards things seemingly good, which are common, in a greater or less degree, to all mankind.

Natural Inclination, according to F. Mulebranche, is the same thing, with regard to minds, that motion is with regard to bodies: and as all the varieties in the material world arise from the several motions of bodies; so do all those of the intellectual world from inclinations: and as all motions are the results of impressions immediately communicated by the finger of the Creator; so all inclinations are certainly nothing else but continual impressions of the will of the Creator on that of the creature; and must therefore, of necessity, be agreeable to his; and therefore can naturally have no principal end but his glory; nor any secondary one but their own preservation, and that of others, both still with regard to his will, who gave them being.

Now as, properly speaking, there is but one love in God; viz. that of himself: so he only impresses one love or desire in us; which is that of good in the general. It is this general love, or desire, is the principle of all our particular ones; as, in effect, it is the will itself; the will being defined to be a continual impression of the author of nature, which carries the mind of man to good in general.

But the impression towards good in the general doth not only proceed from God, but also all our inclinations to particular goods; as, v. gr. self-preservation, &c.

NATURAL History, a description of the natural products of the earth, water, or air; v. gr. beasts, birds, fishes, metals, minerals, and fossils; together with such extraordinary phenomena as at any time appear in the material world; as meteors, monsters, &c.

Besides *General Natural Histories*, as those of Pliny, &c. there are *particular ones*; and those of two kinds.—The first, those which only consider one kind of things; such as the History of Shells, by Dr. Lister; of Fishes, by Willoughby; that of Birds, by the same; that of Plants, by Ray; those of Insects, by Swammerdam, and Mouffet; that of Animals, by Gesner; that of Fossils, by Agricola, Mercatus, &c.

The second, those which consider the several kinds of natural things found in particular countries, or provinces: as the *Natural History of Dauphiné*, by Chorier; the *Natural History of the Antilles*, by F. Du Tertre, and M. Louvillers De Poincy; those of Oxfordshire and Staffordshire, by Dr. Plott; that of Lancashire, by Leigh; of Northamptonshire, by Morton; and that of the same county expedited from Mr. Bridges; that of the Western Islands, by Martin, &c.

NATURAL Philosophy, that science which considers the powers of nature, the properties of *Natural bodies*, and their mutual action on one another: this is otherwise called *physics*.

NATURAL Magic is that which only makes use of natural causes. See MAGIC.

NATURAL Cause. See the article CAUSE.

NATURAL, in heraldry, is used where animals, fruits, flowers, &c. are blazoned with the colours they naturally have, though different from the common colours of heraldry: and this is to prevent the armory's being accused of falsity, when blazoned with the names of colours unknown in heraldry.

NATURAL, in music, is sometimes used for diatonic. See DIATONIC.

NATURAL is also sometimes used for physical.—In which latter sense, *Natural music* is that performed by *Natural organs*, i. e. vocal music; in contradistinction to artificial, or instrumental. See MUSIC.

NATURAL Harmony is that produced by the natural and essential chords of the mode. See HARMONY.

NATURAL Note is used in opposition to flat and sharp notes, which are called *artificial notes*. See NOTE, SCALE, &c.

NATURAL is also used for something coming immediately out of the hands of nature.—In which sense it stands opposed to factitious, or artificial; which signifies something wrought by art.

Bishop Wilkins observes, that there appears a world of difference between *Natural* and artificial things, when viewed

with microscopes: the first ever appear adorned with all imaginable elegance and beauty; the latter, though the most curious in their kind, infinitely rude, and unheaven. The finest needle appears a rough bar of iron, and the most accurate engraving, or imboisement, as if done with a mattock or trowel.

NATURALIST, a person who has studied nature, and is well versed in natural bodies, especially in what relates to metals, minerals, stones, vegetables, and animals.

Aristotle, Ælian, Pliny, Solinus, and Theophrastus, were the greatest *Naturalists* among the antients; but they fell into abundance of errors, which have been corrected by the happy industry of the moderns.—Aldrovandus is the most copious, but not the most accurate, of the modern *Naturalists*: his work is in thirteen volumes in folio.

NATURALIZATION, in law, the act of naturalizing an alien, or putting him into the condition of a natural-born subject, and intitling him to the rights and privileges thereof.

In France, *Naturalization* is the king's prerogative: in England, it is only done by act of parliament.

In France, Swiss, Savoyards, and Scots, need not any *Naturalization*; being reputed regnicoles, or natives.

NATURALIS, *Res NATURALES*, in medicine.—In every animal, howsoever sick and diseased, there is still remaining some degree of life, and strength; and the causes and effects of each.—These are called *Naturals*, natural things, or things according to nature; and sometimes barely nature; in contradistinction to *Non-Naturals*.

NATURE, *NATURA*, is a term variously used. Aristotle has a whole chapter wrote expressly to enumerate the various acceptations of the Greek word *φύσις*, rendered, in English, *Nature*: and, among Latin writers, the different acceptations are so many, that a certain author reckons up fourteen, or fifteen. Mr. Boyle, in a precise treatise of the vulgarly-received notion of *Nature*, gives us eight principal ones.

NATURE, then, is sometimes used for the system of the world; the machine of the universe; or the assemblage of all created beings.

In which sense we say, the author of *Nature*: the sun is called the eye of *Nature*, because he illuminates the universe; and the father of *Nature*, because he warms the earth, and makes it fruitful. And thus we say of the phoenix, or a chimera, that there is no such thing in *Nature*.

Instead of the word *Nature* in this sense, Mr. Boyle, to avoid ambiguity, and abuse of the word, wishes to have *world*, or *universe*, substituted. See WORLD.

NATURE, in a more confined sense, is applied to each of the several kinds of beings, created and increate; spiritual and corporeal.

In which sense, we say, human *Nature*, meaning all men together who possess the same spiritual, reasonable soul; angelical *Nature*; the divine *Nature*, &c.

In this sense, the school divines say, *natura naturans*, & *natura naturata*, speaking of God, who is the *natura naturans*, as giving being and *Nature* to all others; in opposition to the creatures, who are the *natura naturata*, as receiving their *Nature* from the hands of another.

NATURE, in a still more restrained sense, is used for the essence of a thing; or that which the schoolmen call the quiddity thereof, that is, the attribute which makes it what it is.

In which sense, the Cartesians say, it is the *Nature* of the soul to think; and that the *Nature* of matter consists in extension.

And here the word *essence* Mr. Boyle would have obtain, in lieu of *Nature*.

NATURE is more particularly used for the established order and course of material things; the series of second causes; or the laws which God has imposed on the motions impressed by him.

In which sense it is we say, physics is the study of *Nature*; *Nature* makes the night succeed the day; *Nature* has rendered respiration necessary to life, &c.

Thus St. Thomas defines *Nature* a kind of divine art, communicated to beings, which carries them to the end they are determined for.—In which sense, *Nature* is nothing else but that concatenation of causes and effects, or that order and economy which God has established in the parts of his creation.

In this sense, too, we say, miracles are effects above the powers of *Nature*: art is said to force or surpass *Nature*, by means of machines; in regard these produce effects which exceed what we find in the common course of things.

NATURE, again, is taken for an aggregate of powers belonging to any body, especially a living one.

In which sense physicians say, *Nature* is strong, weak, or spent; or that, in such a disease, *Nature* left to herself will perform the cure:

NATURE is still more strictly used for the action of providence, the principle of all things; or that spiritual power, or being, which is diffused throughout the creation, and moves and acts in all bodies, and gives them certain properties, and produces certain effects.

In this, which Mr. Boyle considers as the most usual sense, *Nature* is nothing else but God, acting himself, and according to certain laws he himself has fixed. See **GOD**.

This seems pretty agreeable to the opinion of many of the ancients, who made *Nature* the God of the universe, *To Ilav*, who presides over, and governs all things; though others owned this an imaginary being, and by *Nature* meant no more than the qualities, or virtues, which God has given his creatures, and which their poets and orators took occasion of personifying.

F. Malebranche says, that the *Nature* so much talked of in the schools is fit for nothing but to lead us back to idolatry; the ancient heathens were understanding something, which, without being God, acts continually throughout the universe. Thus the idol *Nature* must be an actual principle, which, in concurrence with God, is the next and immediate cause of all the changes which befall matter. Which seems to fall in with the opinion of the *Anima mundi*; as if *Nature* were a substitute of God, or a collateral cause with God, or a middle being between God and created things.

Aristotle defines *Nature*, *Principium & causa motus & ejus in quo est primo per se, & non per accidens*: a definition so obscure, that none of his commentators, with all their glosses, have been able to render it intelligible.

This principle, which the Peripatetics called *Nature*, they supposed to act necessarily; and to be therefore destitute of knowledge, or liberty. See **NECESSITY**.

Thus, also, the Stoics conceived *Nature* as a certain spirit or virtue diffused throughout the universe, which gave every thing its motion; so that all must be dragged away by the invariable order of a blind *Nature*, and an inevitable necessity.

In speaking of the action of *Nature*, no more is to be understood, but that bodies act on one another, in a manner agreeable to the general laws of motion which the Creator has established.

In this lies the mystery of that great word, which is only a compendious way of expressing the action of all bodies: but the mechanism of bodies would, perhaps, better express what is here meant by *Nature*.

Some, Mr. Boyle observes, will have the *Nature* of a thing to be only the law that it receives from the Creator, and according to which it acts on all occasions.—But this is an improper and figurative expression.

The same author proposes a notion of *Nature* as more fit, than any yet given, to pass for the principal one of *Nature*; with regard to which many axioms and expressions relating to that word may be conveniently understood. In order to this, he distinguishes between *general* and *particular Nature*.

General NATURE he defines the aggregate of the bodies which make up the world in its present state, considered as a principle by virtue whereof they act and suffer, according to the laws of motion prescribed by the author of all things.

Particular NATURE of any subordinate, or individual, consists in the general *Nature* applied to a distinct portion of the universe.—Or it is a convention of the mechanical properties (as magnitude, figure, order, situation, and local motion) of parts convenient and sufficient to constitute, or intitle to its particular species or denomination, the particular body they make up; the concurrence of all these being considered as the principle of motion, rest, &c.

Laws of NATURE are axioms, or general rules, of motion and rest, observed by natural bodies in their actions on one another; and in all the changes which befall them in their natural state.

The *Laws of Nature*, and of motion, are, in effect, the same: custom, indeed, has made some difference; and we find authors call the particular cases of motion, laws of motion; which see under **MOTION**. The more general, or catholic ones, and those from which, as from axioms, the others are deduced, they call *Laws of Nature*.

Of these, Sir Isaac Newton has established three.

1. That every body perseveres in the same state, either of rest, or uniform rectilinear motion; except so far as it is forced to change that state by some foreign force.

Thus projectiles persevere in their motions, except so far as they are retarded by the resistance of the air, and the cause of gravity: and thus a top, whose parts, by their cohesion, are continually drawing one another out of their rectilinear motion, only ceases to run round because resisted by the air, and the friction of the plane whereon it moves. And thus the larger bodies of the planets and comets preserve their progressive and circular motions a long time undiminished in regions void of all sensible resistance. See **VIS INERTIA**, **RESISTANCE**, and **MEDIUM**.

2. The change of motion is ever proportional to the moving force whereby it is effected, and in the direction of the right line wherein that force is impressed.

If a certain force produce a certain motion, a double force will produce double the motion; a triple force triple the motion; whether it be impressed all at once, or successively, and by degrees. And this motion (since it is ever directed to the same point with the generating force), if the body were in motion before, is either to be added to it, as where the motions conspire; or subtracted from it, as where contrary; or added obliquely, as where oblique: and is compounded with it, according to the determinations of each.

3. Reaction is always contrary and equal to action; or the actions of two bodies upon one another are always mutually equal, and directed contrary ways.

Whatever presses or pulls another, is equally pressed or pulled thereby. Thus, if I press a stone with my finger, the finger is equally pressed by the stone: if a horse draw a weight by a rope, the horse is equally drawn back towards the weight: for the rope, being equally stretched each way, will, with an equal endeavour to relax itself, drive the horse toward the stone, and the stone toward the horse; and will hinder the progress of the one, as much as it promotes that of the other.

Again, if any body, by striking on another, do in any manner change its motion, it will, itself, by means of the other, undergo also an equal change in its own motion, by reason of the equality of the pressure.

In these actions the changes are equal; not those, we mean, of the velocities, but those of the motions, the bodies being supposed free from any other impediments. For the changes of velocities, which are likewise made contrary ways, inasmuch as the motions are equally changed, are reciprocally proportional to the bodies.

This law also obtains in attractions. See **ATTRACTION**.

NATURE, in prosody.—A syllable is said to be long or short by *Nature*, to signify that it is so originally, and independently of any rule of grammar which might render it so by position, or otherwise.

NAVAL, something relating to ships, or navigation. See **SHIP**, and **NAVIGATION**.

In this sense we sometimes say, *Naval* strength, a *Naval* combat, &c.

Naval Crown, *Corona Navalis*, among the ancient Romans, a crown adorned with figures of prows of ships, conferred on persons who, in sea-engagements, first boarded the enemy's vessel.

Though A. Gellius seems to speak in the general, where he says the *Naval Crown* was adorned with prows of ships; Lipsius distinguishes two kinds of *Naval Crowns*: the one he calls *simple*, the other *ornate*.

The first he supposes plain, and given to the common soldiers, &c.—The latter, much more glorious, adorned with prows of ships, and only given to generals, or admirals, who had gained some important victory at sea.

NAVE, in architecture, *Navis Ecclesiae*, denotes the body of a church; or the place where the people are seated; reaching from the rail, or balustrade, of the choir, to the chief door.

* Baldus derives the word from the Greek, *vass*, temple; which Salmasius brings farther from *vass*, ship; by reason the vault or roof of a church bears resemblance to a ship.

The ancient Greeks called the *Nave*, *Pronaos*: the Latins frequently call it *Cella*.

The *Nave* of the church belongs to the parishioners: it is they are to repair it, &c.

NAVEL, a part in the middle of the belly, by anatomists called *Umbilicus*.—See *Tab. Anat. (Splanchn)* fig. 3. lit. c. fig. 16. lit. c. See also **UMBILICUS**.

NAVEL-String by anatomists is called *Funiculus Umbilicalis*. See **UMBILICAL**.

NAVICULARE * *Os*, in anatomy, the third bone in the foot, between the astragalus and the ossa cuneiformia.

* It is thus called from *Navis*, a ship, to which it bears some resemblance; for which reason, likewise, it is sometimes called *Cymbiforme*, from *Cymba*, a boat; and *Scaphoideus*, from a Greek word of the like import.

The *Os Naviculare* has behind it a large sinus, which receives the anterior convex head of the first bone; and before, it is convex. It is divided into three heads, which are received into the sinus's of the ossa cuneiformia.

NAVIGATION, the art or act of sailing, or of conducting a vessel from one place to another, the safest, shortest, and most commodious way.

This art, in the last latitude of the word, comprehends three parts: 1^o. The art of constructing and building ships. 2^o. The loading of ships. And, 3^o. The conducting and guiding of ships through the sea; which is, in a peculiar sense, called *Navigation*, or sailing. See **SAILING**.

In this restrained sense of the word, *Navigation* is either common, or proper.

Common NAVIGATION, usually called *Coasting*, is where the ports are on the same, or very neighbouring coasts; and where the vessel is seldom out of sight of land, or out of reach of founding.

In this little else is required but an acquaintance with the lands, the compass, and sounding-line; each of which see in its place, **COMPASS**, and **SOUNDING**.

Proper NAVIGATION is where the voyage is long, and out in the main ocean.

In this, besides the requisites in the former, are likewise required use of the Mercator's chart, azimuth and amplitude compasses, log-line, and other instruments for celestial observations, as quadrants, forestaffs, &c. See each instrument, &c. in its place.

Navigation turns principally on four things; two whereof being known, the rest are easily found from them by the tables, scales, and charts.

These four things are, the difference of latitude, difference of longitude, the reckoning or distance run, and the course, or rhumb sailed on.

The latitudes are easily found, and that with sufficient accuracy. See **LATITUDE**.

The course and distance are had by the log-line, or dead reckoning, and the compass. See **LOG**, **COMPASS**, **COURSE**, and **DISTANCE**.

Nor is there any thing wanting to the perfection of *Navigation*, but to determine the longitude.—The mathematicians of many ages have applied themselves with the utmost assiduity to supply this grand desideratum, but hitherto in vain; notwithstanding the magnificent rewards of several princes and states to the discoverer.

For the various methods that now occasionally obtain at sea for this purpose, see **LONGITUDE**.

The poets refer the invention of the art of *Navigation* to Neptune, some of the ancients to Bacchus, others to Hercules, others to Jason, others to Janus, who is said to have made the first ship. See **SHIP**. Historians ascribe it to the Æginetes, the Phœnicians, Tyrians, and the ancient inhabitants of Britain. Some will have it, the first hint was taken from the flight of the kite; others, as Oppian de Piscibus, lib. I. from the fish called Nautilus: others ascribe it to accident.—Scripture refers the origin of so useful an invention to God himself, who gave the first specimen thereof in the ark built by Noah under his direction. For the raiillery the good man underwent on account of his enterprize, shews evidently enough the world was then ignorant of any thing like navigation; and that they even thought it impossible.

However, history represents the Phœnicians, especially those of their capital Tyre, as the first navigators; being urged to seek a foreign commerce by the narrowness and poverty of a slip of ground they possessed along the coasts; as well as by the convenience of two or three good ports; and by their natural genius to traffick.

Accordingly, Lebanon, and the other neighbouring mountains, furnishing them with excellent wood for ship-building, in a short time they were masters of a numerous fleet, with which constantly hazarding new *Navigations*, and settling new trades, they soon arrived at an incredible pitch of opulence and populousness; inasmuch as to be in a condition to send out colonies, the principal of which was that of Carthage; which keeping up their Phœnician spirit of commerce, in time not only equalled Tyre itself, but vastly surpassed it; sending its merchant-fleets through Hercules's Pillars, now the freights of Gibraltar, along the western coasts of Africa and Europe; and even, if we believe some authors, to America itself; the discovery whereof so many ages afterwards, has been so glorious to the Spaniards.

Tyre, whose immense riches and power are represented in such lofty terms both in sacred and profane authors, being destroyed by Alexander the Great, its *Navigation* and commerce were transferred by the conqueror to Alexandria, a new city, admirably situated for those purposes, proposed for the capital of the empire of Asia, which Alexander then meditated.—And thus arose the *Navigation* of the Egyptians, which was afterwards so cultivated by the Ptolemies, that Tyre and Carthage (which last, after having a long time disputed empire with the Romans, was at length subdued) were quite forgot.

Egypt being reduced into a Roman province after the battle of Actium, its trade and *Navigation* fell into the hands of Augustus; in whose time Alexandria was only inferior to Rome: and the magazines of the capital of the world were wholly supplied with merchandizes from the capital of Egypt.

At length, Alexandria itself underwent the fate of Tyre and Carthage; being surprised by the Saracens, who, in spite of the emperor Heraclius, overspread the Northern coasts of Africa, &c. whence the merchants being driven, Alexandria has ever since been in a languishing state, though

still it have a considerable part of the commerce of the Christian merchants, trading to the Levant.

The fall of Rome, and its empire, drew along with it not only that of learning, and the polite arts, but that of *Navigation*; the Barbarians, into whose hands it fell, contenting themselves with the spoils of the industry of their predecessors.

But no sooner were the more brave among those nations well settled in their new provinces; some in Gaul, as the Franks; others in Spain, as the Goths; and others in Italy, as the Lombards; but they began to learn the advantages of *Navigation* and commerce, and the proper methods of managing them, from the people they subdued; and this with so much success, that in a little time some of them became able to give new lessons, and set on foot new institutions for its advantage.

Thus it is to the Lombards we usually ascribe the invention and use of banks, book-keeping, exchanges, rechanges, &c.

It does not appear which of the European people, after the settlement of their new masters, first took themselves to *Navigation* and commerce.—Some think it began with the French; though the Italians seem to have the justest title to it, and are accordingly ordinarily looked on as the restorers hereof, as well as of the polite arts, which had been banished together, from the time the empire was torn asunder.

It is the people of Italy, then, and particularly those of Venice and Genoa, who have the glory of this restoration; and it is to their advantageous situation for *Navigation*, they in great measure owe their glory.

In the bottom of the Adriatic were a great number of marshy islands, only separated by narrow channels, but those well screened, and almost inaccessible, the residence of some fishermen, who here supported themselves by a little trade of fish and salt, which they found in some of these islands.—Thither, then, the Veneti, a people inhabiting that part of Italy along the coasts of the Gulph, retired, when Alaric, king of the Goths, and afterwards Attila, king of the Huns, ravaged Italy.

These new islanders, little imagining that this was to be their fixed residence, did not think of composing any body politic; but each of the seventy-two islands of this little Archipelago continued a long time under its several distinct masters, and each made a distinct commonwealth.—When their commerce was become considerable enough to give jealousy to their neighbours, they began to think of uniting into a body: and it was this union, first begun in the sixth century, but not completed till the eighth, that laid the sure foundation of the future grandeur of the state of Venice.

From the time of this union, their fleets of merchantmen were sent to all the parts of the Mediterranean; and at last to those of Egypt, particularly Cairo, a new city, built by the Saracen princes on the eastern bank of the Nile, where they traded for their spices, and other products of the Indies.

Thus they flourished, increased their commerce, their *Navigation*, and their conquests on the terra firma, till the famous league of Cambray in 1508. when a number of jealous princes conspired to their ruin; which was the more easily effected by the diminution of their East-India commerce, of which the Portuguese had got one part, and the French another.

Genoa, which had applied itself to *Navigation* at the same time with Venice, and that with equal success, was a long time its dangerous rival, disputed with it the empire of the sea, and shared with it the trade of Egypt, and other parts both of the East and West.

Jealousy soon began to break out; and the two republics coming to blows, it was three centuries almost continual war, ere the superiority was ascertained; when towards the end of the fourteenth century, the fatal battle of Chioza ended the noble strife; the Genoese, who till then had usually the advantage, having now lost all: and the Venetians, almost become desperate, at one happy blow, beyond all expectation, secured to themselves the empire of the sea, and superiority in commerce.

About the same time that *Navigation* was retrieved in the Southern parts of Europe, a new society of merchants was formed in the North, which not only carried commerce to the greatest perfection it was capable of, till the discovery of the East and West-Indies, but also formed a new scheme of laws for the regulation thereof, which still obtain under the name of *Uses and Customs of the Sea*. See **USES**.

This society is that famous league of the Hans towns, commonly supposed to have begun about the year 1164. See **HANS TOWN**.

For the modern state of *Navigation* in England, Holland, France, Spain, Portugal, &c. see **COMMERCE**, **COMPANY**, &c.

We shall only add, that in examining the reasons of commerce's passing successively from the Venetians, Genoese, and

and Hans-towns, to the Portuguese and Spaniards; and from those again to the English and Dutch; it may be established as a maxim, that the relation between commerce and Navigation, or, if we may be allowed to say it, their union, is so intimate, that the fall of the one inevitably draws after it the other; and that they will always either flourish or dwindle together.

Hence so many laws, ordinances, statutes, &c. for its regulation; and hence particularly that celebrated act of Navigation, which an eminent foreign author calls the Palladium, or tutelary deity, of the commerce of England; which is too important not to be here mentioned; as it is the standing rule, not only of the English among themselves, but also of other nations with whom they traffick.

Act of English Navigation is a statute whereby the parliament of England have settled divers matters relating to the Navigation and commerce of this kingdom.

Till this act, all nations were at liberty to import into England all kinds of merchandizes, whether of their own growth, or laden elsewhere, and that on board their own vessels. Cromwell, first, perceiving the prejudice this liberty did to the English commerce, which was now almost wholly in the hands of foreigners, chiefly the Dutch, whom he hated, animated the English, by several acts of parliament, to resume their trade into their own hands; and particularly passed an act prohibiting the Dutch from importing any merchandizes, except those of their own growth or manufacture, which were very few.

Upon the restoration, the first parliament Charles II. called, distinguishing in Cromwell the politician from the parricide, condemned the memory of the one, and followed the plan of the other with regard to Navigation and commerce, by passing that celebrated Bill or Act for the encouraging and increasing of shipping, and of Navigation, which still subsists in its full latitude, and its antient vigour. Its date is from the first of December, 1660. 12 Car. II. c. 18.—Its chief articles follow.

1. That no goods or commodities shall be imported or exported to or from any of the English colonies in Asia, Africa, or America, but on vessels built within the dominions of England, or really belonging to Englishmen, and whose masters, and at least three-fourths of the crew are English*, on pain of forfeiture of the goods and vessel.

* Under the name *English* here, are comprehended all the king's subjects of England, Ireland, and the plantations; as was explained in a subsequent Act 13 and 14 Car. II. c. 11.

2. That no person born out of the subjection of England, or not naturalized, shall exercise any commerce in those colonies for himself or others.

3. That no merchandizes of the growth of Asia or America shall be imported into any of the dominions of England on any other than English vessels.

4. That no goods of foreign growth or manufacture that shall be brought into England, Wales, Ireland, islands of Jersey or Guernsey, or town of Berwick on Tweed, in English-built shipping, or other shipping belonging to the fore-said places, and navigated by English mariners, as aforesaid, shall be shipped or brought from any other place or country, but only from those of the growth or manufacture thereof.

5. That all kinds of dried and salted sea-fish, train-oils, blubber, and whale-fins, not caught by English vessels, imported into England, shall pay double duties.

6. That the commerce from port to port in England and Ireland shall be carried on wholly by English vessels, and English merchants: the crew to be always three-fourths English.

7. That none but English vessels shall reap the benefit of the diminutions made, or abatements to be henceforth made, in the customs.

8. All vessels are prohibited importing into England and Ireland any of the commodities of Muscovy, or even any masts or other timber, foreign salt, pitch, resin, hemp, raisins, prunes, oil of olive, any kind of corn or grain, sugars, ashes, and soap, wine, vinegar, or brandy, except vessels, whereof English are owners or part-owners, and where the master and three-fourths of the mariners are English.—And that no currans, or other commodities, the growth or manufacture of the Turkish empire, shall be imported, but in vessels of English build, and navigated as aforesaid; except only such vessels as are of the build of the country or place whereof such commodities are the growth or manufacture, or of such part where such goods are usually shipped for transportation, and unless the master and three-fourths of the crew be natives of the country where they are laden.

9. All timber, masts, boards, salt, pitch, tar, resin, hemp, flax, raisins, figs, prunes, olive-oils, corn or grain of any kind, sugar, pot-ashes, brandies, and wines, and all goods of the growth and manufacture of Muscovy, all currans and Turkish goods imported into England, &c. in other than such shipping, and so navigated, shall be deemed aliens goods, and shall pay accordingly.

10. That, to prevent frauds in buying and disguising foreign

vessels, the proprietors shall take an oath, that they really belong to them, and that no alien has any part in them.

11. That English vessels, and navigated by English, may import into the dominions of England, any merchandizes of the Levant, though not taken up in the places where they grow, or are manufactured; provided it be in some part of the Mediterranean beyond the freights of Gibraltar. And the same is understood of commodities brought from the East-Indies; provided they be taken up in some port beyond the Cape of Good-Hope; and those from the Canaries, and other colonies of Spain; and the Azores, and other colonies of Portugal; which are allowed to be shipped, the one in Spanish ports, the other in Portuguese.

12. These penalties, prohibitions, and confiscations, not to extend to goods taken by way of reprisal from the enemies of England, nor to fish caught by the Scots, or their corn, and salt, which may be imported into England by the Scotch-built ships.

13. Five shillings per ton duty is imposed on every French vessel arriving in any port of England, so long (and even three months longer) as 50 sols per ton lies on the English vessels in France.

Lastly, That sugars, tobacco, and other commodities of the growth of the English colonies, shall not be imported into any other part of Europe, but the dominions of England. And that vessels going out of the ports of the same crown for the English colonies, shall give 1000 l. security, if under one hundred tons, and 2000 l. if above, ere they depart, that they will import their cargo into some port in the said dominions; and the like, ere they quit those colonies, that they will land their whole cargo in England.

NAVIS, *Argo Navis*, or the ship *Arge*, in astronomy a constellation of the Southern hemisphere. See *ARGO*.

NAUMACHIA*, *NAUMACHY*, a spectacle or shew among the antient Romans, representing a sea-fight.

* The word comes from the Greek *ναυς*, ship, vessel, and *μαχη*, pugna, fight.

NAUMACHIA is also used by some for a circus compassed with seats and porticoes; the pit whereof serving as an arena, was filled with water by means of pipes, for the exhibiting of sea-fights.

There were several of these *Naumachias* at Rome; three built by Augustus, one by Claudius, and another by Domitian. Nero's *Naumachia* served for the reverse of his medals.

NAUSEA*, *Nausea*, in medicine a retching, or propensity and endeavour to vomit; arising from a loathing of food, excited by some vicious humour that irritates the stomach, and urges it to discharge itself; and accompanied with anxiety about the præcordia, and salivation of the mouth.

* The word is Latin, formed from the Greek *ναῖσθαι*, of *ναῦς*, *Navis*, ship: in regard, people, at the beginning of their voyages, are usually liable to this disorder.

A *Nausea* is when the thoughts or sight of proper food create a sickness in the stomach, and a tendency to vomit.

Nausea and vomiting only differ from one another, as more or less violent.—The *Nausea* is properly the effort the stomach makes to vomit, which has not always the effect.

Boerhaave defines a *Nausea* anatomically, to be a retrograde spasmodic motion of the muscular fibres of the oesophagus, stomach, and intestines; attended with convulsions of the abdominal muscles, and the septum transversum.

The usual causes of a *Nausea*, and anorexia, are hard drinking, great heat, a fever, consumptions, laxness of the stomach occasioned by tea, &c. also narcotics, as tobacco, passions of the mind, suppression of evacuations inducing a plethora, foul stomach, tenacious humours lodged therein, and certain swimming or undulatory motions.

NAUTICAL Planisphere, a description of the terrestrial globe upon a plane, for the use of mariners. See *PLANISPHERE* and *Sea-CHART*.

NAUTICAL Chart. See the article *Sea-CHART*.

NAUTICAL Compass. See the article *COMPASS*.

NAUTICUS, in anatomy a muscle, called also *Tibialis posterior*. See *TIBIALIS*.

NAUTILUS*, *Nautilus*, a species of turbinated sea-shell, of a compressed figure, and having the whorl or volute latent or hid within the body; frequently dug up at land, and often found petrified.

* It takes its name from a testaceous animal, whose habitation it was, called *Nautilus*, or the sailor; of which naturalists distinguish divers species. See Supplement, article *NAUTILUS*.

NAVY, the fleet or shipping of a prince or state. See *FLEET*.

The direction of the *Navy Royal* of England is in the lord high-admiral, and under him in the principal officers and commissioners, who hold their places by patent.

Principal Officers of the NAVY are four, viz. The *Treasurer*, whose business is to receive moneys out of the exchequer, and to pay all the charges of the *Navy*, by warrant from the principal officers.—*Comptroller*, who attends and controls all payment of wages, is to know the rates of stores, to examine and

and audite all accounts, &c.—*Surveyor*, who is to know the state of all stores, and see wants supplied, to eliminate repairs, charge boatwains, &c. with what stores they receive; and at the end of each voyage, to state and audite accounts.—*Clerks of the Acts*, whose business is to record all orders, contracts, bills, warrants, &c.

Commissioners of the NAVY are five.—The first executes that part of the comptroller's duty which relates to the victuallers accounts. The second another part of the said comptroller's duty relating to the accounts of the storekeepers of the yard. The third has the direction of the *Navy* at the port of Portsmouth. The fourth has the same at Chatham.

The *Navy* was antiently victualled by contract; but the victualling is now under commissioners, who keep their office on Tower-hill. See **VICTUALLING-OFFICE**.

The ordinary expences of the *Navy* in times of peace, continuing in harbour, is so well regulated, that it amounts to scarce 130000*l.* per annum.

The number of ships and vessels in the *Navy*, as it stood in the year 1710, was 7 first-rates, 13 second-rates, 48 third-rates, 65 fourth-rates, 68 fifth-rates, 40 sixth-rates, 5 fire-ships, 7 bomb-vessels, 18 yachts, 1 advice-boat, 2 brigantines, 7 floops, 4 store-ships, 13 hulks, 26 hoys, 2 fmacks.

NAZAREATE, or **NAZARITESHIP**, the state and condition of a Nazarete or Nazarean among the Jews. See **NAZARITE**.

The *Nazareate* was a state of separation from the rest of mankind; particularly in three things; 1. In that the persons devoted hereto drank no wine. 2. In that they did not shave their heads, but let the hair grow. 3. In avoiding the touch of dead people, which they held a defilement.

The *Nazareate* was of two kinds; the one temporary, or for a certain number of days; the other for life.—The rabbins inquire what the term of the temporary *Nazareate* was, and determine it by the Cabbala: for since, in scripture, Numbers vi. 5. where it is said, *Domino sanctus eris*, the Hebrew verb, *erit*, consists of four letters; the first and third whereof taken as numeral letters, do each make 10, and the rest each 5, all together 30; the term of the *Nazareate*, say they, was 30 days.

NAZARITE*, or **NAZARENE**, in the Old Testament, is used for a person distinguished and separated from the rest, by something extraordinary, either his sanctity, dignity, or vows.

* The word comes from the Hebrew נָזַר *Nazar*, to distinguish, separate; in which it differs from Nazarean, an inhabitant of the country called *Nazareth*, which comes from נָצַר *natzar*, or netzer, to save, preserve.

In the book of Numbers, ch. vi. we find the vow of a *Nazarete* described; i. e. the vow whereby a man or woman separated themselves to the Lord; and the conditions or effects thereof as to abstinence, &c.

NAZARITES, **NAZARENES**, or **NAZAREANS**, were likewise a kind of sectaries in the church, in the first ages thereof. S. Epiphanius tells us, the *Nazareans* were the same with the Jews in every thing relating to the doctrine and ceremonies of the *Old Testament*; and only differed from them in this, that they added Christianity thereto; professing to believe that Jesus Christ was the Messiah.

There were two kinds of *Nazareans*; the one *pure*, who kept the law of Moses and Christianity together; the other, real Ebionites.

Ecclesiastical writers tell us, that S. Matthew preached the gospel to the Jews at Jerusalem, and the rest of Palestine, in their own language; and that accordingly they had his gospel written in the Hebrew of that time. And S. Epiphanius adds, that this gospel was preferred intire among the *Nazareans*; only he doubts whether they might not have retrenched the genealogy of Jesus Christ, which was not in the copy of the Ebionites. S. Jerom, who translated it out of Hebrew into Greek and Latin, says, a great many people took the Hebrew gospel used by the *Nazareans* and Ebionites, to be the original of S. Matthew.

Hence Baronius, in his *Annals*, says, if the vulgate Latin version were to be reformed; it should rather be done by the Hebrew original, than by the Greek, which is but a copy. Casaubon treats this opinion of Baronius as highly impious; as not being able to conceive how the authority of the Greek version should depend on a text quite lost.—He adds, That it was never used by any but the *Nazareans*, Ebionites, and some other heretics; and that it was full of fables, as having been altered and corrupted by those heretics.

NE ADMITTAS, a writ directed to the bishop, in behalf of the plaintiff, or defendant, in a cause where a quare impedit, or affize of daren presentment is depending; when either party fears, that the bishop will admit the other's clerk during the suit between them.

NEALING, or rather **ANNEALING**, a term used for the pre-pairing of several matters by heating or baking them in an oven, or the like. See **ANNEALING**.

NEALING of Glass is the baking of glass, to dry, harden, and give it the due consistence, after it has been blown, and fashioned into the proper works.

This is usually performed in a kind of tower, called the *Leer*, built over the melting-furnace.

NEALING of Glass, is also used for the art of staining glass with metalline colours.

NEALING of Steel, is the heating it in the fire to a blood-red heat; and then taking it out, and letting it cool gently of its self.

This is done to make it softer, in order to engrave or punch upon it. See **TEMPERING** and **ENGRAVING**.

NEAP, or **NEEP Tides**, are those tides which happen when the moon is in the middle of the second and fourth quarters.

The *Neap Tides* are low tides, in respect of their opposites the spring-tides.

As the highest of the spring-tides is three days after the full or change, so the lowest of the *Neap* is four days before the full or change.—On which occasion the seamen say, That it is *deep Neep*. See **TIDE**.

NEAPED, when a ship wants water, so that she cannot get out of the harbour, off the ground, or out of the dock; the seamen say, *She is Neaped, or benaped*.

NEAT, or **NET Weight**, the weight of a commodity alone, clear of the cask, bag, cask, and even filth. See **NET** and **WEIGHT**.

NEBULOUS, *Cloudy*, in astronomy, a term applied to certain of the fixed stars, which shew a dim, hazy light; being less than those of the sixth magnitude; and therefore scarce visible to the naked eye, to which, at best, they only appear like little dusky specks or clouds.

Through a moderate telescope, these *Nebulous* stars plainly appear to be congeries or clusters of several little stars.

In the *Nebulous* star, called *praesepe*, in the breast of cancer there are reckoned 36 little stars, three of which Mr. Flamsteed gives us in his catalogue.

In the *Nebulous* star of orion are reckoned 21. *F. le Compte* adds, that in the pleiades are 40; 12 in the star in the middle of orion's sword; in the extent of two degrees of the same constellation, 500; and 2500 in the whole constellation. See **ORION**, &c.

NEBULY, **NEBULE's**, in heraldry, when a coat is charged with several little figures, in form of clouds, running within one another, or, when the out-line of a bordure, ordinary, &c. is indented or waved; as represented in *Tab. Herald.* fig. 32.

NECESSARY, in a philosophical sense, that which cannot but be, or cannot be otherwise.

The schoolmen make a great many kinds, or divisions hereof: As,—*Necessary in causing*: when there is a cause from which an effect must necessarily follow: *Necessary in predicating*: *Necessary in being*, &c.

There is also a *logical Necessary*: *physical Necessary*: and there are *meta-physical*, and *moral Necessaries*.

NECESSITY, what is done by a necessary cause, or a power that is irresistible.

In this sense necessity stands opposed to liberty.

Necessity is usually confounded with constraint; yet, in God, the *Necessity* of being good is not any constraint, but a perfection.—In effect, *Necessity*, according to Rochefoucault, differs from constraint in this, that the former is joined with the pleasure and inclination of the will, to which constraint is contrary.

Simplicius, after Plato and Epictetus, distinguishes two kinds of *Necessity*: the one *violent* or *coactive*, which is opposite to liberty; the other *spontaneous* or *voluntary*, very consistent with it: This latter, adds he, is that which necessitates all things to act according to their nature, as being connatural to them; since *autokineto*, a thing that is self-moved must of *Necessity* be moved according to its own nature, i. e. spontaneously.—This distinction is admitted by many of the divines, particularly by S. Augustine, who urges it against the Pelagians, as is shewn by Janfenius.

The schools distinguish a *physical Necessity*, and a *moral Necessity*; and a simple, absolute *Necessity*, and a relative one.

Physical NECESSITY, is the want of a principle, or of a natural means necessary to act; which is otherwise called a *physical* or *natural impotence*.

Moral NECESSITY, is only a great difficulty; such as that arising from a long habit, a strong inclination, or violent passion.

Simple, or *absolute NECESSITY*, is that which has no dependence on any state, or conjuncture, or any particular situation of things, but is found every where, and in all the circumstances in which the agent can be supposed.

Such is in a blind man the *Necessity* he is under of not distinguishing colours.

Relative NECESSITY is that which places a man in a real incapacity of acting, or not acting, in those circumstances, and

and that situation he is found in; though in other circumstances, and another state of things, he might act, or not act.

Such, in the opinion of the Janfenists, is the *Necessity* of doing evil in a man, who, with a violent passion, has only a feeble grace to resist it; or the *Necessity* of doing well in a man, who having grace of seven or eight degrees of strength, has only concupiscence of two or three degrees to withstand.

All these kinds of *Necessity* are opposite to liberty; since even in the last, it is as impossible for the man to act, or not act, as if he were in a state of *absolute, simple, and physical Necessity*.

The schoolmen admit other species of *Necessity*; antecedent, concomitant, consequent, &c.

Antecedent Necessity is that arising from an antecedent cause, necessarily operating.—Such is the *Necessity* of the sun's rising to-morrow morning.

Concomitant Necessity arises from an antecedent and necessary cause, but depends on the circumstances of the effect; the effect all the while being free.—Thus it is necessary Peter sit, supposing he is sitting.

NECK, a part in the human body, and in that of several other animals, between the head and the thorax, or trunk of the body.—See *Tab. Anat. (Osteol. fig. 3. n. 1. i. fig. 7. n. 14. 14.)*

All animals have *Necks*, which have lungs and voice, excepting frogs, and one class of fishes, whose characteristic it is, vocem aliquam emittere.

The upper part before is called the *Throat*; and the lower part the *Ponum Adami*.—The hole between the two clavicles is called the *Jugulum*, by the Greeks *σάγμα*, murder; it being very easy to kill in this part.—The hind part of the *Neck* is called *Cervix*; and the hole between the first and second vertebra, the *Nape*; and that underneath, *Epomis*.

Its lateral parts commence from the bottom of the ears, and are called *paratides*.

The inner parts of the *Neck* are seven vertebrae, the trachea, larynx, jugular veins, carotid arteries, the intercostal nerve, that of the eighth pair, with the recurrent, and several muscles. See each part under its proper article.

The *Necks* of *Quadrupeds*, Mr. Derham observes, are always equal to the length of their legs; this is contrived by nature, to enable them to reach the ground for their food, without stooping the body.

Indeed, the elephant is an exception from the rule; its *Neck* is very short; but then it has a peculiar provision by a proboscis, or trunk.

Another thing remarkable in the *Necks* of graminivorous quadrupeds is a strong, tendinous and inflexible aponeurosis, or ligament, braced from the head to the middle of the back; by means whereof they are enabled constantly to hold down the head, though very heavy, to gather their food without pain or labour.

NECROLOGY *, **NECROLOGIUM**, a book antiently kept in churches, and monasteries; wherein were registred the benefactors to the same, the time of their deaths, and the days of their commemoration; as also the deaths of the priors, abbots, religious, canons, &c.

* The word comes from the Greek νεκρός, dead, and λογος, discourse, enumeration.

This was otherwife called *calendar*, and *obituary*.

NECROMANCY *, the art or act of communicating with devils, and doing surprizing feats by their assistance; particularly of calling up the dead, and extorting answers from them. See **MAGIC**.

* The word is formed from νεκρός, dead, and μαντεία, enchantment, divination.

NECROSIS *, in medicine, a complete mortification of any part; called also *fideratio*, and *sphacelus*.

* The word is from νεκρός, where it has the same signification.

NECTAR, *Νέκταρ*, among the antient poets, the drink of the fabulous deities of the heathens. See **AMBROSIA**.

NEEDLE, a very familiar little instrument, or utensil, made of steel, pointed at one end, and pierced at the other; used in sewing, embroidery, tapestry-work, &c.

Needles make a very considerable article in commerce; and the consumption thereof is almost incredible.—The sizes are from N^o 1, the largest: to N^o 25, the smallest.

There is scarce any commodity cheaper than *Needles*; which will appear something extraordinary to the reader, after he has been shewn the great number of operations they undergo ere brought to perfection.

Manufacture of NEEDLES. German and Hungarian steel is of most repute for *Needles*. The first thing is, to pass it through a coal fire, and under a hammer, to bring it out of its square figure, into a cylindrical one. This done, it is drawn through a large hole of a wire-drawing iron; returned into the fire, and drawn through a second hole of the iron,

smaller than the first: and thus successively from hole to hole, till it have acquired the degree of fineness required for that species of *Needles*; observing every time it is to be drawn, that it be greased over with lard, to render it the more manageable.

The steel, thus reduced into a fine wire, is cut in pieces of the length of the *Needles* intended. These pieces are flattened at one end, on the anvil, in order to form the head and eye.

They are then put into the fire, to soften them farther, and thence taken out, and pierced at each extreme of the flat part, on the anvil, by force of a punchion of well-tempered steel, and laid on a leaden block, to bring out, with another punchion, the little piece of steel remaining in the eye.

The corners are then filed off the square of the heads, and a little cavity filed on each side the flat of the head. This done, the point is formed with a file; and the whole filed over.

They are then laid to heat red-hot, on a long, flat, narrow iron, crooked at one end, in a charcoal-fire; and when taken out thence, are thrown into a basin of cold water, to harden.—On this operation a good deal depends; too much heat burns them; and too little leaves them soft; the medium is only to be learnt by experience.

When they are thus hardened, they are laid in an iron-shovel, on a fire more or less brisk, in proportion to the thickness of the *Needles*; taking care to move them from time to time. This serves to temper them, and take off their brittleness; great care, here, too, must be taken of the degree of heat. They are then straitened, one after another, with the hammer; the coldness of the water used in hardening them having twisted the greatest part of them.

The next process is the polishing. To do this, they take twelve or fifteen thousand *Needles*, and range them in little heaps against each other, on a piece of new buckram, sprinkled with emery dust. The *Needles* thus disposed, emery dust is thrown over them, which is again sprinkled with oil of olives. At last, he whole is made up into a roll, well bound at both ends.

This roll is then laid on a polishing table, and over it a thick plank loaden with stones, which two men work backwards and forwards a day and half, or two days successively. By which means, the roll thus continually agitated by the weight and motion of the plank over it, the *Needles* within-side being rubbed against each other, with oil and emery, are infensibly polished.

In Germany, instead of hands, they polish with water-mills.

After polishing, they are taken out, and the filth washed off them with hot water and soap: they are then wiped in hot bran, a little moistened, placed, with the *Needles*, in a round box, suspended in the air by a cord, which is kept stirring till the bran and the *Needles* be dry.

The *Needles*, thus wiped in two or three different brans, are taken out, and put in wooden vessels, to have the good separated from those whose points or eyes have been broken either in polishing or wiping: the points are then all turned the same way, and smoothed with an emery-stone, turned with a wheel.

This operation finishes them; and there remains nothing but to make them into packets of two hundred and fifty each.

Chirurgeons NEEDLES are made crooked, and their points triangular. They are of different sizes, and bear different names, according to the purposes they are used for.

The largest are *Needles for amputation*; the next, *Needles for wounds*; the finest, *Needles for sutures*.—They have others very short and flat, for tendons; others, still shorter, and the eye placed in the middle, for the tying together of vessels, &c.

Magnetical NEEDLE, in navigation, denotes a *Needle* touched with a load-stone, and sustained on a pivot or centre, on which, playing at liberty, it directs itself to certain points in or under the horizon. See **MAGNET**.

Magnetical *Needles* are of two kinds, viz. *Horizontal* and *Inclinator*.

Horizontal NEEDLES are those equally balanced on each side the pivot which sustains them; and which, playing horizontally, with their two extremes, point out the North and South points of the horizon.—For their application and use, see **COMPASS**.

Construction of an Horizontal NEEDLE. A piece of pure steel is provided, of a length not exceeding six inches, left its weight impede its volubility; very thin, to take its verticity the better; and not pierced with any holes, or the like, for ornament sake, which prevent the equable diffusion of the magnetic virtue.

A perforation is then made in the middle of its length, and a brass cap or head foldered on, whose inner cavity is conical, so as to play freely on a style or pivot, headed with a fine steel point.

The North point of the *Needle* in our hemisphere is made a little lighter than the Southern, the touch always destroy-

ing the balance, if well adjusted before; and rendering the north end heavier than the south, and thus occasioning the Needle to dip.

Now to give the Needle its verticity, or directive faculty, it is to be rubbed leisurely on each pole of a magnet, from the fourth pole towards the north; first beginning with the northern end, and going back at each repeated rub, towards the south.—A rub in a contrary direction takes away the power communicated by the former.

If after touching, the Needle be out of its equilibrium, something must be filed off from the heavier side, till it balance evenly.

Needles in sea-compasses are usually made of a rhomboidal, or oblong form.—See their structure under the article COMPASS.

A Needle, on occasion, may be prepared without touching it on a load-stone: for a fine steel Needle, gently laid on the water, or delicately suspended in the air, will direct itself to the north and south.

Thus, also, a Needle heated in the fire, and cooled again in the direction of the meridian, or even only in an erect situation, acquires the same faculty.

The Needle is not found to point precisely to the north, except in very few places; but deviates from it, more or less, in different places, and that too at different times; which deviation is called the Declination.

Declination of the NEEDLE is the variation of the horizontal Needle from the meridian; or the angle it makes with the meridian, when freely suspended in a horizontal plane. See DECLINATION, and COMPASS.

Cleopatra's NEEDLES. See PORPHYRY.

Inclinator, or Dipping-Needles. See DIPPING-Needle.

NEEP Tides. See the article NEAP Tides.

NEFASTUS, a Latin term.—The Romans used the appellation *dies nefasti*, for those days wherein it was not allowed to administer justice, or hold courts; nor for the pretor to pronounce the three solemn words or formula's of the law, *do, dico, addico*, I give, I appoint, I adjudge. See FASTUS. These days were distinguished in the calendar by the letter N, or by N. P. *Nefastus primo*, as when the day was only *Nefastus* for the first part thereof.

NEGATION, in logic, an act whereby the mind separates one idea from another; or affirms the one to be different from the other. As, the soul is not the body.

NEGATIVE, a term that denies, or implies a denial of any thing.

Logicians, &c. say, A Negative cannot be proved but by converting it into an affirmative.

NEGATIVE Heretics, in the language of the inquisition, are those, who being accused of heresy, by witnesses whose evidence they do not deny, still keep on the negative, make open profession of the Catholic doctrine, and declare their abhorrence of heresy.

There are also *Negative Schisms*, as well as positive ones.—In the Negative, it is sufficient to reject the errors of a church without separating from it, or setting up a distinct society.

NEGATIVE Penalties, the laws whereby certain persons are excluded from honours, dignities, &c. without inflicting any direct, and positive pains on them.

NEGATIVE Quantities, in algebra, those affected with the sign— and which are supposed to be less than nothing.

Negative quantities are the effects of positive ones: where positive end, there Negative ones commence.

NEGATIVE Pregnant, in law, a Negative which implies or brings forth an affirmative.

As if a man being impeached to have done a thing on such a day, and in such a place, denies he did it, *modo & forma declarata*; which implies nevertheless that he did it in some sort.

NEGATIVELY, NEGATIVE, in the school philosophy, is variously used in contradistinction to positively. See POSITIVE.

NEGRO'S, a kind of black slaves, which make a considerable article in the modern commerce.

The *Negro's*, also called *Blacks* and *Moors*, are a people of Africa, whose country extends on each side the river *Niger*, and is called *Nigritia*: though, whether the people communicated their name to the river, &c. or received it therefrom, is not easily determined.

The origin of *Negro's*, and the cause of that remarkable difference in complexion from the rest of mankind, has much perplexed the naturalists; nor has any thing satisfactory been yet offered on that head.

They are brought from Guiney, and other coasts of Africa, and sent into the colonies in America, to cultivate sugar, tobacco, indigo, &c. and in Peru and Mexico to dig in the mines.

This commerce, which is scarce defensible on the foot either of religion, or humanity, is now carried on by all the nations

that have settlements in the West-Indies; particularly by the English, Dutch, Spaniards, and Portuguese.

The Spaniards, indeed, have few *Negro's* at first hand; but have always treated with other nations to furnish them therewith: thus they were formerly furnished by the company of the Grilles, established at Genoa; since, by the Assiento in France; and since the peace of Utrecht, by the English South-sea company.

The best *Negro's* are brought from Cape Verd, Angola, Senegal, the kingdom of Joloffes, that of Galland, Damel, the river Gambia, &c.

A *Negro* between 17 or 18, and 30 years of age, was antiently only valued at about 45 s. in the commodities proper for that country, which are brandies, iron, linnen, paper, brass-pots, basons, &c.—But their value is now much enhanced, and it is seldom they meet with a good *Negro* for five pounds: they frequently give seven or eight.

There are various ways of procuring them: some, to avoid famine, sell themselves, their wives, and children, to their princes, or great men, who have wherewithal to subsid them. Others are made prisoners in war; and great numbers seized in excursions made for that very purpose by the petty princes upon one another's territories; in which it is usual to sweep away all both old and young, male and female.

The *Negro's* make a frequent practice of surprizing one another while the European vessels are at anchor, and dragging those they have caught to them, and selling them in spite of themselves; and it is no extraordinary thing to see the son sell, after this manner, his father or mother, and the father his own children, for a few bottles of brandy, or a bar of iron.

As soon as the ship has its complement, it immediately makes off; the poor wretches, while yet in sight of their country, falling into such deep grief and despair in the passage, that a great part of them languish, fall into sickness, and die: others of them dispatch themselves by refusing their food; others by stopping their breath, in a manner peculiar to themselves, by turning and folding their tongue, which immediately strangles them; others dash out their brains against the ship; and others jump over-board.

The only sure means to preserve them, is to have some musical instrument play to them, be it ever so mean. But this excessive love for their country abates as they get farther off.

At their arrival in the colonies, each *Negro* is sold for 38 or 40 pounds. They make the chief riches of the inhabitants of the islands, &c. A man, *v. g.* who has twelve *Negro's*, is esteemed a rich man.

NEIF, *Nativa*, in our antient customs, a bond-woman, or the villain, born in one's house.

Antiently, Lords of manors sold, gave, or assigned their *Neifs*, and natives. See SLAVE, VILLAIN, &c.

Writ of NEIFTY is an antient writ, whereby the lord claimed such a woman for his *Neif*.

NE INJUSTE *vexes*, a writ which lies for a tenant against the lord, forbidding him to distress on the tenant, who has formerly prejudiced himself by doing or paying more than he needed.

NEMEAN, or NEMEAN Games, one of the four great kinds of games, or combats, celebrated among the antient Greeks.

Some say, they were instituted by Hercules, on occasion of his killing the *Nemean* lion; and that it was hence they took their name, as also the place of celebration, the forest of *Nemæa*.

Others relate, that the seven chiefs sent to Thebes, under the conduct of Polynices, being extremely pinched in their journey with thirst, met with Hyppyle of Lemnos, who had in her arms Opheltes, son of Lycurgus, priest of Jupiter, and Euridice. They begging her to shew them some water, she laid the child down on the grass, and conducted them to a well. In her absence, a venomous serpent killed the child; upon which the nurse, out of an excess of grief, grew desperate. The chiefs, at their return with her, killed the serpent, buried the young Opheltes, and to divert Hyppyle, instituted the *Nemean Games*.

Ælian says, it was indeed the seven chiefs going to the siege of Thebes, that instituted them; but he adds, that it was in favour of Pronax.

Pausanias refers the institution of them to Adrastus, and their restoration to his descendents.

Lastly, Hercules, on his victory over the *Nemean* lion, augmented the games, and consecrated them to Jupiter *Nemæus*.

The games were opened with sacrificing to *Nemean* Jove, appointing him a priest, and proposing rewards for such as should be victors in the games.

They were held every three years, in the month called *Panemos* by the Corinthians, and *Boedromion* by the Athenians.

The Argians were the judges, and sat clothed in black, to express the origin of the games. As they were instituted by warriors, none at first were admitted to them but military men, and the games themselves were only equestrian and gymnastic; at length they were open to the people, and other kinds of sports were introduced.

The conquerors were crowned with olive, till the time of the war with the Medes; when a blow they received in that war, occasioned them to change the olive for the smallage, a funeral plant: though others maintain, that the crown was originally smallage, on account of the death of Opheltes, otherwise called *Archemorus*; this plant being supposed to have received the blood, which ran from the wound made by the serpent.

NEMINE *Contradictente*, i. e. none contradicting it, a term chiefly used in parliament, when any matter is carried with universal consent of all the members.

NENIA*, or **NÆNIA**, in the ancient poetry, a kind of funeral song, sung to the music of flutes, at the obsequies of the dead.

* The word comes from the Greek, *neniase*; on which Scaliger observes, that it should be written in Latin *Nenia*, not *Nenia*.

Authors represent them as sorry compositions, sung by hired women-mourners, called *præficae*. The first rise of these *Nenia* is ascribed to the Phrygians.

Guichart notes, that *Nenia* was antiently the name of a song, sung by nurses to lull children asleep; and conjectures it to come from the Hebrew *Nîn*, child.

In the heathen antiquity, the goddess of tears and funerals was called *Nenia*, whom some suppose to have given that name to the funeral song; and others to have taken her name from it.—Some will have the one, and some the other, formed, by onomatopœia, from the sound or voice of those that weep.

NEOMENIA, in chronology, &c. a term used for the new moon.

Some say, the Jews reckoned two kinds of *Neomenia*; or new moons; the first on the day of her conjunction with the sun; the second on that of her apparition or phasis; and add, that they celebrated two passovers, by reason of the uncertainty which of these days it should be held on.

F. Hardouin, on the contrary, maintains, they had no other *Neomenia* but that of the moon's conjunction with the sun; which it was easy to ascertain by astronomical calculation: whereas the other was liable to mistakes; the moon sometimes not shewing herself till four or five days after conjunction.

NEOPHYTES*, *Νεοφυτοι*, in the primitive church, were new christians; or the heathens newly converted to the faith.

* The word signifies a new plant; being formed of the Greek *neo*, new, and *phos*, I produce, *q. d.* newly born; baptism; whereby they commenced *Neophytes*, being a kind of new birth.

The fathers never discovered the mysteries of their religion to the *Neophytes*.

The term *Neophyte* is still applied to the converts which the missionaries frequently make among the infidels.—The Japanese *Neophytes*, in the latter end of the sixteenth, and beginning of the seventeenth century, are said to have shewn prodigies of courage and faith, equal to any known in the primitive church. See **CATECHUMEN**.

NEOPHYTES has formerly likewise been used to denote new priests, or those first admitted into orders; and sometimes, the novices in monasteries.

NEPENTHE*, or **NEPENTHES**, in antiquity, a kind of magic potion, which made persons forget all their pains and misfortunes.

* The word is Greek, *Νηπενθης*, formed of the privative, *νη*, non, or *absque*, and *πενθος*, *luctus*, sorrow.

The *Nepenthe* mentioned in antient authors, was the juice or infusion of a plant, now unknown: Homer says it was a plant of Egypt; and adds, that Helena made use of it to charm her hosts, and make them forget their pains.

Some authors say it was the plant we call *Helenium*; others, *Bugle*, whose juice infused in wine has this effect.—M. Petit has a dissertation on the antient *Nepenthe*.

NEPENTHE, in pharmacy, is a name given to a kind of opiate, contrived by Theo. Zwingerus; from the great opinion he had of its giving ease in all manner of pain.

NEPER'S, **NAIPER'S**, or **NAPIER'S Bones**, an instrument, whereby multiplication and division of large numbers are much facilitated and expedited; so called from its inventor J. Neper, baron of Merchiston in Scotland.

Construction of NEPER'S Bones. Five rods, plates, or lamellæ, are provided of wood, metal, horn, pastboard, or other matter, (*Tab. Algebra*, fig. 11.) of an oblong form, and divided each into nine little squares; each of which is resolved into two triangles by diagonals.

In these little squares are written the numbers of the multiplication table; in such manner as that the units, or right hand figures, are found in the right-hand triangle; and the tens, or the left-hand figures, in the left-hand triangle; as in the figure.

Use of NEPER'S Bones in multiplication. To multiply any given number by another; dispose the lamellæ in such manner, as that the top figures may exhibit the multiplicand; and to these, on the left-hand, join the lamellæ of units; in which seek the right-hand figure of the multiplier: and the numbers corresponding thereto, in the squares of the other lamellæ, write out, by adding the several numbers occurring in the same rhomb together, and their sums.—After the same manner write out the numbers corresponding to the other figures of the multiplier; let them be disposed under one another, as in the common multiplication: and lastly, add the several numbers into one sum.

For example; suppose the multiplicand 5978, and the multiplier 937. From the outermost triangle on the right-hand (*Tab. Algebra*, fig. 12.) which corresponds to the right-hand figure of the multiplier 7, write out the figure 6, placing it under the line. In the next rhomb, towards the left, add 9 and 5; their sum being 14, write the right-hand figure, *viz.* 4, against 6; carrying the left-hand figure, 1, to 4 and 3, which are found in the next rhomb. The sum 8, join to 4, already put down; after the same manner, in the last rhomb, add 6 and 5, the latter figure of the sum 11, put down as before, and carry 1 to the 3 found in the left-hand triangle; the sum 4 join as before on the left of 1846: thus will you have the factum of 7 into 5978; and after the same manner will you have the factum of the multiplicand, into the other figures of the multiplier: the whole added together gives the whole product.

Use of NEPER'S Bones in division.—Dispose the lamellæ so, as that the uppermost figures may exhibit the divisor; to these, on the left-hand, join the lamellæ of units. Descend under the divisor, till you meet those figures of the dividend, wherein it is first required, how oft the divisor is found, or at least the next less number, which is to be subtracted from the dividend; the number corresponding to this, in the place of units, write down for a quotient. By determining the other parts of the quotient after the same manner, the division will be completed.

For example; suppose the dividend 5978)5601386(937
5601386, and the divisor 5978; since it is first asked how often 5978 is found in 56013, descend under the divisor (*Tab. Algebra*, fig. 12.), till in the lowest series you find the number 53802, approaching nearest to 56013; the former whereof is to be subtracted out of the latter, and the figure 9 corresponding thereto in the lamellæ of units write down for the quotient. To the remainder 22118, join the following figure of the divisor 8; and the number 17934 being found, as before, to be the next less number thereto, the corresponding number in the lamellæ of units, 3, is to be written down for the quotient; and the subtraction to be continued as before. After the same manner the third and last figure of the quotient will be found to be 7; and the whole 937.

NEPHEW*, a term relative to uncle and aunt; signifying a brother's or sister's son, who, according to the civil law, is in the third degree of consanguinity; but according to the canon law, in the second.

* The word is formed from the Latin *Nepos*; which in the corrupt ages of that language signified the same: though antiently and properly it denoted a grandson.

NEPHRITIC*, **NEPHRITICUS**, something that relates to the kidneys. See **KIDNEY**.

* The word is Greek, *Νεφριτικος*, formed of *νεφρος*, rein, kidney. **NEPHRITIC Colic**, is a sort of colic, or pain arising from a stone or gravel in the reins, &c.

This is the most cruel of all colics. See **COLIC**.

NEPHRITIC Wood, **Lignum NEPHRITICUM**, a kind of medicinal wood growing in New Spain, chiefly in the kingdom of Mexico; called by the Indians *Cauit* and *Talapacypatli*, as being reputed sovereign against Nephritic pains.

It must be chosen well cleared of its bark and rind; it is of a bitter taste, and a dusky yellow colour: but when infused in cold water, gives it a sky-blue tincture, when viewed by a false light, and a gold colour by a true one: a little of any acid being mixed with the tincture, both these colours disappear; but a little oil of Tartar restores its sky-blue.

Some substitute ebony, and others red Brazil wood, for **Lignum Nephriticum**; but the deceit becomes apparent by infusing it in water. See Supplement, article **NEPHRITICUM LIGNUM**.

NEPHRITIC Stone, **Lapis NEPHRITICUS**, a sort of precious stone; so called from its extraordinary virtues against the stone and gravel in the kidneys.

It is a species of jasper, commonly of an uniform dusky green colour; but sometimes variegated with white, black, or yellow.—It seems only to differ from jasper in its being harder, and always without any thing of red.

It is brought chiefly from New Spain, where it is sometimes found in pieces large enough to make moderate cups. There is some, likewise, found in Old Spain, and Bohemia.

This stone was once very dear, by reason of the wonderful virtues ascribed to it. A cup made of it was sold for 1600 crowns in the time of the emperor Rudolphus II.—The best for medicinal use is of a greyish green, fat and unctuous, like talc of Venice.

The Indians of New Spain, who first discovered its use, and taught it the Europeans, wear it hung about their necks, after having cut it in various figures, chiefly of the beaks of birds: whence some Charletans take occasion to counterfeit it, by cutting other green stones into like figures; and sell them, at great prices, to those who have an opinion of their *Nephritic faculty*. See Supplement, article NEPHRITICUS LAPIS.

NEPHRITICS, *Nephritice*, medicines proper for diseases of the kidneys, particularly the stone.

Such, particularly, are, the roots of althea, dogs-grass, asparagus, fago, pelitory of the wall, mallows, pimpinella, red chich-peas, peach-kernels, turpentine, lapis nephriticus, and lignum nephriticum; which see.

NEPHRITIS*, or NEPHRITICUS Dolor, in medicine, a name given to a painful disease occasioned by the stone or gravel in the kidneys.

* The word is Greek, νεφριτις, *q. d.* disease of the reins; formed from νεφρος, rein.

The Greeks also give the name νεφριτις to the first vertebra of the loins, from its neighbourhood to the kidneys. See Supplement, article NEPHRITIS.

NEPOTISM, a term used in Italy, in speaking of the authority which the pope's nephews and relations have in the administration of affairs, and of the care the popes take to raise and enrich them.

Many of the popes have endeavoured to reform the abuses of *Nepotism*: at present *Nepotism* is said to be abolished. Leti has wrote expressly on this subject, *De Nepotismo*.

NEPTUNALIA, feasts held among the antients in honour of Neptune.

The *Neptunalia* differed from the consualia, in that the latter were feasts of Neptune considered particularly as presiding over horses, and the manage.

Whereas the *Neptunalia* were feasts of Neptune in general, and not considered under any particular quality.—They were celebrated on the 10th of the calends of August.

NEREIDS, NEREIDES, sea-nymphs; or fabulous deities of the antients, supposed to inhabit the sea.

The *Nereids* were fifty in number, all the daughters of Nereus, by the nymph Doris.—Their names and genealogies are described by Hesiod. See NYMPH.

NERVE, NERVUS, in anatomy, a round, white, long body, like a cord, composed of several threads, or fibres; deriving its origin from the brain, or the spinal marrow; and distributed throughout all parts of the body: serving for the conveyance of a peculiar juice, by some called *animal spirits*, for the performance of sensation, and motion.

Origin of the NERVES.—From every point of the cortex of the brain there arise minute medullary fibres, which, in their progress, uniting together, at length become sensible; and thus constitute the medulla of the brain, and the spine.

Hence they are continued, and, in their farther progress, become distinguished or separated by coats which are detached to them, from the dura and p. mater, into several distinct fasciculi, or *Nerves*, resembling, in the position of their component fibrillæ, so many horses tails, wrapped up in a double tunic.

It is probable, that the medullary fibres of the cerebellum, rising up towards the fore-parts of the medulla oblongata, do, part of them, join the *Nerves* arising thence, but so as still to retain their separate origin, progress, and functions: the rest of the fibres of the cerebellum are so mixed with those of the brain, as that there is, perhaps, no part of the whole medulla oblongata, or spinalis, where there are not found the fibres of each kind; and thus, to constitute the body of each *Nerve*, both kinds of fibres contribute, though the end and effect of each be quite different.

The *Nerves*, thus formed, and sent from the medulla oblongata and spinalis, while within the cranium, are ten pair; though very improperly so accounted; inasmuch as most of them do, in reality, consist of several distinct, very large *Nerves*: from the spinal marrow, continued without the cranium, there arise, after the like manner, thirty pair; to which may be added another pair sent from the vertebra of the neck, augmented in its progress by branches from the second and third pair, and at last joined to the eighth pair.

All these, while within the medulla, are pulposus; as soon as they quit it, they acquire a sheath, or case, wherewith being

defended, they proceed to the dura mater, which is perforated into an open vagina, reaching as far as the foramina of the cranium, destined for the transmission of the *Nerves*; where the nine first pair, and the accessory pair, assuming this vagina or case, pass safely out of the cranium.

The other thirty and one pair descend through spaces between the commissures of the apophyses of the vertebrae; whence, firm, hard, and well clothed as they are, they are dispersed through all, even the smallest points of the solid parts of the body yet known.

The coats, or covers, of these *Nerves*, are every-where invested with blood-vessels, lymphatics, and other vesicles of a very tight texture, which serve to collect, strengthen, and contract the fibrillæ; and from which many of the phenomena of the *Nerves*, and of diseases, are accountable.

As soon as the last extremities of the *Nerves* are about to enter the parts to which they belong, they again lay aside their coats, and become expanded either into a kind of thin membranula, or into a soft pulp.

Now upon considering, first, that the whole vascular medulla of the brain goes to the constituting of the fibrillæ of the *Nerves*; nay, is wholly continued into, and ends in them: secondly, that, upon compression, tearing, dispersion, putrefaction, &c. of the medulla of the brain, all the actions used to be performed by the *Nerves* arising thence, are immediately abolished, even though the *Nerves* continue intire, and untouched: thirdly, that the *Nerves* themselves are every-where found lax, pendulous, crooked, retrograde, and oblique; yet effect motion and sensation almost instantaneously: fourthly, that, when close bound or compressed, though in all other respects intire, they lose all their faculty in those parts between the ligature and the extremities to which they tend, without losing any in those parts between the ligature and the medulla of the brain, or cerebellum: it evidently appears, that the nervous fibrillæ do continually take up a humour or juice from the medulla of the brain, and transmit it, by so many distinct canals, to every point of the whole body; and by means hereof, alone, perform all their functions in sensation, muscular motion, &c. which humour is what we

popularly call *animal spirits*, or the *nervous juice*.

Nor does there appear any probability in that opinion maintained by some; viz. that the *Nerves* perform all their action by the vibration of a tense fibrilla; which is inconsistent with the nature of a soft, pulposus, flaccid, crooked, wavy *Nerve*, and with that nice distinctness wherewith the objects of our senses are represented, and muscular motions performed.

Now after the same manner as the arterial blood is perpetually carried into all the parts of the body furnished with those vessels; so we conceive a juice prepared in the cortex of the brain and cerebellum, conveyed thence every moment through the *Nerves* to every point of the solid body. The smallness of the vessels in the cortex, as exhibited in Ruysch's injections, which yet are only arterious, and therefore incredibly thicker than the last emiliary derived thence, shew how slender these hollow nervous stamina must be: but the great bulk of the brain, compared with the exceeding smallness of each fibrilla, shews, that their number must be great beyond the limits of all imagination.

And again; the great quantity of juice constantly brought hither, and violently agitated, will occasion a constant plenitude, openness, and action of these little canals.

But as fresh juice is every moment prepared, and the last is continually protruding the former; as soon as it has done its last office it seems to be driven out of the last filaments into the smallest lymphatic venulæ, both about the glands, and elsewhere; thence into the lymphatics somewhat larger; and again from these to the common lymphatic vessels with the valves of veins, and, at length, into the veins and the heart: and thus, like the other juices of the body, does it make its circuit round the body.

Upon the whole; if we consider the great bulk of the brain, cerebellum, medulla oblongata, and medulla spinalis, with regard to the bulk of the rest of the solids of the body; the great number of *Nerves* distributed hence throughout the whole body; that the brain and carina, that is, the spinal marrow, are the basis of an embryo, whence, according to the great Malpighi, the other parts are afterwards formed; and, lastly, that as there is scarce any part of a body but what feels, or moves; it will appear very probable, that all the solid parts of the body are woven out of nervous fibres, and consist wholly of them.

The antients only allowed of seven pairs or conjugations of *Nerves* proceeding from the brain; which, with their functions, they comprised in these two Latin verses:
Optica prima, oculus movet altera, tertia gustat
Quartag; quinta audit, voga sexta est, septima linguae.

But the moderns, as before observed, reckon ten, which are as follow:

NERVES of the brain, or cerebrum, are, the

Auditory NERVES. See SEVENTH pair.

Olfactory NERVES, par olfactorium, which arise in the fore-part of the brain, just below the os frontis: these, being pretty thick near the os cribriform, are therefore called *processus papillares*, which Dr. Drake takes to be a proper name, in that place, than that of *Nerves*; they appearing rather productions of the medulla oblongata, whence the olfactory *Nerves* arise, than distinct *Nerves*. As soon as they have made their way through the os cribriform, they are distributed throughout the membranes of the nose: their use is in the sensation of smelling.—See *Tab. Anat. (Osteol.) fig. 5. lit. h. h.*

Optic NERVES. These pass the skull, through two perforations in its basis, a little above the sella equina, and are thence conveyed to the tunics of the eye; whereof the retina, supposed to receive the objects of vision, is an extension of the inner or medullary part alone.—See *Tab. Anat. (Osteol.) fig. 5. lit. i.*

NERVES which move the eyes, oculorum motorii, arise from the crura of the medulla oblongata, near the annular protuberance; whence they march out between two branches of the cervical artery; and, passing out of the skull at an irregular oblong hole, immediately under the former, are spent on those muscles of the eyes called *attolent, depriment, adducens, and obliquus inferior*; except some small fibres spent in the muscles of the upper palpebra.—See *Tab. Anat. (Osteol.) fig. 5. lit. k. k.*

Pathetic NERVES arise behind the testes, and, passing out of the skull at the same foramen with the former pair, spend themselves wholly on the trochlear muscle.—See *Tab. Anat. (Osteol.) fig. 5. lit. m. m.*

Fifth pair of NERVES, the largest of all those coming from the brain, has its use, as well as distribution, more extensive; serving both for sense and motion, for touch and taste.—It sends branches not only to the eyes, nose, palate, tongue, teeth, and most parts of the mouth and face; but also to the breast, lower venter, præcordia, &c. by means of the intercostals, which are partly composed of branches of this *Nerve*; whence arises a consent or sympathy between those several parts of the body.—See *Tab. Anat. (Osteol.) fig. 5. lit. n. n.*

It arises from the annular protuberance near the processus cerebelli, and is, at its origin, very large; but, before its egress from the dura mater, it is divided into two branches, each consisting of innumerable nervous fibres, whereof those of one branch are pretty tough and firm, the other soft and lax: a little beyond the sella it forms a plexus called *gangliiformis*, near which each *Nerve* is divided into an *anterior* and *posterior* branch.

The *anterior*, or fore-branch, after a few twigs sent to the dura mater, enters the receptacle on each side the sella; whence it sends off one or two twigs to the intercostal; and, as soon as it emerges thence, is again subdivided into three nearly-equal branches: the *uppermost*, passing the foramen lacrum into the orbit of the eye, is immediately subdivided into three less branches; the *first* of which, after sending twigs to the tunica adnata, glandula lachrymalis, the muscles that draw up the nose, and the orbicular muscles running over the muscle which draws up the upper eye-lid, is spent on the muscles of the forehead, and the common integuments of the fore-part of the head.

The *second* branch, running over the pathetics and motorii, is divided into two; whereof the outer and smaller sends off several fibrillæ into the fat that envelopes the optic *Nerve*, and, joining with others from the third pair, forms a sort of plexus on the trunk of the optic *Nerve*; whence fibrillæ are detached into the musculus deprimens, adducens, and the tunica sclerotica. The inner and bigger slip is subdivided into four twigs; the *first*, running over the optic *Nerve*, enters the sclerotica, and is spent in that membrane: the *second*, returning into the skull by a peculiar perforation, pierces the dura mater; and, sometimes turning back again, passes out of the skull through one of the holes of the cribriforme, and is distributed into the interior membrane of the nose: the third twig is spent partly on the eye-lids, and their orbicular muscles, the external integument of the nose, and the muscles which draw it upwards: the fourth is distributed, by several twigs, into the eye-lids, and orbicular muscles. The third slip of the upper branch is spent on the glandula innominata, and tunica adnata.

The *inferior* branch, ere it leaves the skull, enters the orbit of the eye, and, running along the outside of the musculus abducens, goes out again at a little perforation peculiar to it; after which it divides into several fibres, some of which go to the integuments of the cheeks, and the rest to the muscles that raise the upper lip. As soon as it quits the skull at the third foramen, it is subdivided into three little branches; the *first* of which, after some twigs bestowed on the masseter, the teguments of the face, the gums, and upper teeth, enters a peculiar sinus of the bone making a lower part of the orbit,

and goes out at a hole peculiar to it; after which, it divides into several fibrillæ, which go to the teguments of the face, the upper lip, the muscle that draws the lower part of the nose laterally, and the inner muscle of the nose.

The *second small* branch, running downwards behind the ducts which go from the nose to the fauces, is divided into two; the upper whereof is distributed, by many twigs, into the membrana pituitaria: the lower, passing a peculiar hole on the hind and lateral part of the bone of the palate, is distributed into that spongy flesh that lines the palate, and the tough membrane that covers it.

The *third little* branch is spent on that part of the membrana pituitaria that lines the fauces upon the uvula and muscles thereabouts, and upon the tonsils.

The *posterior*, or *greater* branch, after sending a few twigs to the dura mater, passes the skull through the fifth foramen; and, having sent off some twigs to the buccinator, masseter, and the muscles of the lower jaw, is divided into three considerable branches.

The *first* passes to the root of the tongue, and, thence proceeding forwards, sends several branches to the maxillary glands: it sends others along the inner substance of the tongue, which end in capillaries at its extremity; and, joining everywhere with the branches of the ninth pair, serve both the muscles, and the papillary glands; and contribute to the taste, as well as the motion, of the tongue.

The *second*, or middle branch, after distributing a twig into the maxillary glands, and the muscles styloglossus and myloglossus, enters the sinus of the lower jaw, along which it runs accompanied with branches of the carotid arteries, and little veins, which return to the internal jugulars; and, besides sending off a twig to each tooth, with the membranes of the forehead vessels, contributes to form a membrane, which lines the whole sinus. At the fourth grinder it divides into two, the less whereof runs to the joining of the jaw; the bigger, passing out at a peculiar perforation, is divided into several fibres, which are disposed into the muscles of the lower lip and chin.

The *third*, or exterior branch, is spent on the parotid glands.

Sixth pair of NERVES, or the Gustatorii, rise from the medullary tracts of the centrum ovale, below the annular process; and, proceeding forwards, enter the same receptacle or sinus of the skull, on the side of the sella, as the fifth pair does; whence, sending off a twig to join those of the fifth pair in their passage to the intercostals, it goes out of the skull at the same hole with the motorii oculorum, and ends in the abducent muscles of the eye; sending, withal, some twigs to the tongue.—See *Tab. Anat. (Osteol.) fig. 5. lit. o. o.*

The seventh pair, or auditory NERVES, arising from the medullary tract of the fourth ventricle, and passing out of the skull through a hole of the os petrosum, divides into two branches, or portions, a *hard* and a *soft* one.

The *hard* portion, entering a little sinus in the upper part of the bone, that constitutes the barrel of the ear, sends off a twig, which distributes itself into the dura mater, except some small twigs, which go to the membrane that lines the ear, to the internal muscles that line the ear, and the fine membrane that clothes the inside of the cavity of the apophysis mamillaris: after this, the hard branch sends off two other twigs; one to the eighth pair, the other to the tympanum, whose cord it forms; whence, creeping over the malleolus, it goes out of the ear, and sends a ramification to the tongue.—See *Tab. Anat. (Osteol.) fig. 5. lit. p. p.*

The same hard branch, coming out of the processus mamillaris, sends some twigs to the masseter, and others to the glands about the ear, where it divides into two other ramifications; the interior bestowed on the glands, the cheek, and the upper lips; the rest on the lower palpebra, and the external part of the face. The exterior ramification, bestowing some fibrillæ on the glands, out of which it issues, divides into two; the upper distributed into the quadratus, and outer parts of the under jaw; the lower spent on the integuments of the fore and lateral part of the neck, some muscles of the lower jaw, and the mastoid muscle.

The *soft* and larger portion of this pair divides into three ramifications, the upper whereof passes through a small foramen into the concha, where, expanding, it forms a fine membrane, which lines its inner surface: the *second* and *third* ramifications are also spent on the inner parts of the concha and semicircular ducts, which they furnish with membranes, the immediate organs of hearing.

Eighth pair of NERVES, or the par vagum, springs from the medulla oblongata a little above the olivary corpora, and passes out of the skull through the same perforations with the lateral sinus's of the dura mater.—See *Tab. Anat. (Osteol.) fig. 5. lit. q. q.*

This, in its progress, is joined by the par accessorium, and a little farther by a twig of the hard part of the seventh pair; and, at the second vertebra of the neck, by the *Nerves* that issue from the cervical marrow; and detaches several twigs to the

the muscles of the larynx, gula, neck, &c. particularly from a gangliiform plexus, formed by its union with a branch of the intercostal. Hence descending to the thorax, it makes another plexus under the clavicle, whence arises the recurrent nerve on the right side, as on the left it has its rise from the trunk of the nerve itself. The right recurrent is reflected at the axillary artery; the left at the descending branch of the aorta; each, running aside the trachea, impart some twigs to it, and terminate in the muscles of the larynx. Their use is in the formation and modulation of the voice.

Against the origin of the aorta it sends off a branch towards the heart, which dividing into two, the lesser twists about the pulmonary vein; the bigger proceeds to the pericardium, and heart, after having sent off a twig, which, with others from the intercostals, makes the plexus cardiacus superior: proceeding still farther, it sends it out several ramifications, which, meeting together, make the plexus pneumonicus, whence arise fibres that constrict the vessels and vesicles of the lungs. In its passage downwards it distributes several branches of the oesophagus, along which it runs.

About the lower vertebrae of the neck the trunk divides into two branches, the external and internal, communicating all along by several ramifications, and at length reuniting. The rest of this pair joins with the intercostals in the formation of several plexus's in the lower venter, and in them seems to terminate.

Along with these, and wrapped up in the same coat from the dura mater, pass the

Accessory NERVES, par Accessorium, which has its origin from the medulla contained in the vertebrae of the neck. Soon after its return out of the skull, it leaves the par vagum again, and is distributed into the muscles of the neck and shoulders.—See *Tab. Anat. (Ofteol) fig. 5. lit. r r.*

Intercostal NERVES consist of nervous filaments, derived partly from the brain, viz. the branches of the fifth and sixth pair; and partly from the spinal marrow, by those branches they receive from the vertebral nerves.

In each trunk of these nerves, ere it arrives at the thorax, are two cervical plexus's; the upper whereof receives a branch from each trunk of the par vagum; the under sends out several ramifications to the oesophagus, and aspera arteria, and particularly a large one to the recurrent nerve. From the same plexus descend two other ramifications to the cardiac plexus; which are joined a little lower by a third, from which the intercostal nerve descending to the clavicles, divides into two, and embraces and constricts the subclavian artery; thence entering the thorax, it receives three or four twigs from the upper vertebral nerve, together with which it constitutes the intercostal plexus; and thence descending along the sides of the vertebrae, and receiving a nervous twig from each of them, to the os sacrum, and entering the abdomen, it forms several considerable plexus's; viz. the lienaris, hepaticus, the two renales, mesentericus magnus, and two little ones in the pelvis.

Ninth pair of NERVES, motorii linguae, arise from the middle of the centrum ovale, by three or four small twigs, and go out of the skull near the process of the occiput; and send their branches to the tongue.—See *Tab. Anat. (Ofteol) fig. 5. lit. f f.*

They may be likewise called *Gustatorii*, as they contribute, together with the branches of the fifth and sixth pair, to the sensation of tasting.

Tenth pair of NERVES arises by two or three branches from the medulla oblongata, just below the corpora pyramidalia and olivaria, or rather at the beginning of the medulla spinalis; whence reflecting a little backwards, it goes out of the skull between the first vertebra of the neck, and the process of the occiput.—See *Tab. Anat. (Ofteol) fig. 5. lit. t t.*

It is spent on the external muscles of the head and ears.

NERVES from the spinal marrow.—The *spinal NERVES*, (i. e. those springing from the medulla after its egress out of the skull, where it lays aside the name *oblongata*, and assumes that of *spinalis*) are thirty pair: of which, some are reckoned as belonging to the neck, as having their origin thence, and called *cervical nerves*; others to the dorsum, or back, and called *dorsal nerves*; others to the loins, called *lumbal nerves*, and the rest to the os sacrum.—See *Tab. Anat. (Ofteol) fig. 6. lit. b b.*

Cervical NERVES. Of these there are seven pair: the first pair arise between the first and second vertebra of the neck, and, contrary to the rest, come out before and behind; whereas the other six pair come out laterally from the junctures of the vertebrae, through particular perforations near the transverse processes. These go to the muscles of the head and ear.—See *Tab. Anat. (Ofteol) fig. 6. lit. d d.*

The second pair contributes the main branch towards the formation of the diaphragmatic nerves, which, according to Vieussens, spring only from the fourth and sixth pair.

The three last pair of the neck joining with the two first of the dorsum, or thorax, make the *brachial nerves*.

All the *cervical nerves* send innumerable branches to the muscles, and other parts of the head, neck, and shoulders.

Dorsal NERVES are in number twelve: these, excepting what the two upper pair contribute to the *brachial nerves*, are generally distributed into the intercostal and abdominal muscles, the pleura, and external parts of the thorax.—See *Tab. Anat. (Ofteol) fig. 6. lit. f f.*

Lumbal NERVES are five pair: the first of which sends two branches to the lower side of the diaphragm; the second, some twigs to the genital parts, and others, as well as the three following; to give the first roots to the *crural nerves*: the rest of the branches of the *lumbal nerves* are distributed into the muscles of the loins, and adjacent parts.—See *Tab. Anat. (Ofteol) fig. 6. lit. g g.*

NERVES of the os sacrum are six pair; the first three or four pair whereof are bestowed wholly on the *crural nerves*, the rest on the muscles of the anus, vesica, and genital parts.

Brachial NERVES are the offspring, partly, of the cervicals, and partly of the dorsals: these, after the several branches whereof they are composed have been variously complicated and united, run but a little way in a trunk ere they divide again into several branches, variously distributed into the muscles of the skin and arms.—See *Tab. Anat. (Ofteol) fig. 6. lit. e e.*

Diaphragmatic NERVES are likewise the offsprings of the cervicals: these, after joining in a trunk, run through the mediastinum undivided, till they arrive near the diaphragm, into which they send off several branches; some into the muscular, others into the tendinous part of it.

Crural NERVES consist of an union of six or seven pair; viz. the three last of the lumbal, and three or four first of the os sacrum: these, after having spent their upper branches on the muscles of the thigh and skin, as far as the knee, proceed in a trunk downwards, which sends its branches to the extremities of the toes, supplying, as it goes, the muscles and skin of the leg and foot: this is the largest and firmest nervous trunk in the body.

Capillaments of the NERVES. See the article *CAPILLAMENT*.

NERVES, in botany, are long, tough strings, running either across, or lengthwise of the leaves of plants.

NERVES, in architecture, denote the mouldings of projecting arches of vaults, or those arising from the branches of ogives, and crossing each other diagonally in Gothic vaults; serving to separate the pendentives.

NERVINES. See the article *NEURITICS*.

NERVOSA corpora, in anatomy. See *CAVERNOSA corpora*.

NERVOUS colic. See the article *COLIC*.

NERVOUS spirit, or *juice*, denotes a pure, subtil, volatile humour, better known by the name of *animal spirit*; secreted from the arterious blood in the cortical part of the brain, collected in the medulla oblongata, and thence driven, by the force of the heart, into the cavities of the nerves; to be conveyed by them throughout the body, for the purposes of sensation, and animal motion.

NEST. See the article *NIDUS*.

NESTORIANS, a sect of ancient heretics, still said to be subsisting in some parts of the Levant; whose distinguishing tenet is, that Mary is not the mother of God.

They take their name from Nestorius, who, of a monk, became a priest, and a celebrated preacher; and was at length, after the death of Sisinnius in 428. raised by Theodosius to the see of Constantinople.

At first he shewed a great deal of zeal against heresy, in his sermons before the emperor: but at length, taking the liberty to say, that he found in Scripture, that Mary was the mother of Jesus; but that he no-where found, that Mary was the mother of God; his auditory was shocked, and a great part of them retired from his communion.

His writings were soon spread through Syria and Egypt, where he made many converts, notwithstanding the vigorous opposition of St. Cyril.

His capital tenet was, that there are two persons in Jesus Christ; and that the Virgin was not his mother as God, but only as man. See *PERSON*.

This doctrine was condemned in the council of Ephesus, at which assisted above 200 bishops; and Nestorius was anathematized, and deposed from his see.

Nestorius was not the author of this error, but borrowed it at Antioch, where he had studied. Theodorus Mopsuestanus had taught the same before him.

It is something difficult to determine whether or no the Chaldee Christians, who still profess *Nestorianism*, have precisely the same sentiments with Nestorius, whom they still esteem as their patriarch. They have made several re-unions with the Romish church; but none of them have subsisted long. The most considerable was that under the pontificate of Paul V.

Till the time of pope Julius III. they acknowledged but one patriarch,

patriarch, who assumed the quality of patriarch of Babylon.—But a division arising among them, the patriarchate became divided, at least for a time, and a new patriarch was appointed by that pope, who made his residence at Caramit in Mesopotamia; whose successor, however, unable to withstand the power of the patriarch of Babylon, was obliged to retire within the confines of Persia.—Thus matters stood till the pontificate of Paul V. under whom there was a solemn re-union with the Romish church, whom their patriarch solemnly owned for the mother, &c. of all churches; sending his ministers to Rome to negotiate the union, and composing an explication of the articles of religion, wherein their disputes with the Romish church were represented as only verbal, &c.

NET, NEAT, in commerce, something pure, and unadulterated with any foreign mixture.

Thus, wine is said to be *net*, when not falsified or sophisticated; and coffee, rice, pepper, &c. are *net*, when the filth and impurities are separated from them.

A diamond is said to be *net*, when it has no stains or flaws; a crystal, when transparent throughout.

NET is also used for what remains after the tare has been taken out of the weight of any merchandize; *i. e.* when it is weighed clear of all package.

Thus we say, a barrel of cochineal weighs 450 pounds; the tare is 50 pounds, and there remains *net* 400 pounds.

NET-PRODUCE, a term used to express what any commodity has yielded, all tare and charges deducted.

The merchants sometimes use the Italian words *netto proceduto*, for *net produce*.

NET-MASONRY. See the article **MASONRY**.

Tramel-NET. See the article **TRAMEL**.

NETE hyperbolean*, in the antient music, the name of the highest and most acute of the chords of the lyre, or the antient scale, or diatagma.

* The word is Greek, composed of *νιη*, and *υπερβολω*, *q. d.* the last of the highest, where is understood the word *chords*.

It answered to the A, mi, la, of the third octave of the organ, or the modern system.

NETE diazeugmenon*, in the antient music, was one of the chords of the lyre, or system of the antients.

* The word comes from the Greek *νιη*, and *διαzeugmenon*, last of the separate; where is understood the word *chords*.

It answers to the E, fi, mi, of the third octave of the organ, or modern system.

NETE synmenon*, in the antient music, the name of the highest chord of a tetrachord of the Greek system; added to make the b mollis fall between the mese and paramese, *i. e.* between la and fi.

* The word comes from the Greek, *νιη*, and *συνμενον*, the last of the added; where is understood the word *chords*.

The chord had the same found with the *paranete diazeugmenon*, or our la by b mollis.

NETHER vert. See the article **VERT**.

NEVELLI testa. See the article **TESTA**.

NEURITICS*, or **NERVINES**, in medicine, remedies proper for diseases of the nerves, and nervous parts; as the membranes, ligaments, &c.

* The word is formed from the Greek, *νευρις*, *nervus*.

Such are betony, lavender, rosemary, sage, laurel, marjoram, and others among the cephalics. See **CEPHALIC**.

NEUROGRAPHIA, in anatomy, a description of the nerves. Raim. Vieussens, a physician of Montpellier, has an excellent treatise in Latin, under the title *Neurographia Universalis*; where he shews, that there are more ramifications of the nerves in the skin, than in the muscles, and all the other parts.

Duncan, another physician of the same place, has also a treatise called *Neurographia Rationalis*.

NEUROLOGY, *νευρολογία*, a discourse of the nerves.

Neurology seems to be of less extent than *neurography*, inasmuch as the latter may be understood not only of discourses on the nerves, but also of figures and engravings, representing them; whereas the former is restrained to discoursing alone.

—Willis has given a fine *neurology*, in his *Anatome Cerebri*.

NEUTER, a person indifferent, who has espoused neither party, and is neither friend, nor foe.

A judge ought to be *neuter* in the causes he judges. In questions where reason appears *neuter*, a man should ever incline to the side of the unhappy.

NEUTER, in grammar, denotes a sort of gender of nouns which are neither masculine, nor feminine.

The Latins have three kinds of genders; masculine, feminine, and *neuter*: in English, and other modern tongues, there is no such thing as *neuter* nouns.

Verbs NEUTER, by some grammarians called *intransitive verbs*, are those which govern nothing, and that are neither active nor passive.

When the action expressed by the verb has no object to fall upon, but the verb alone supplies the whole idea of the action; the verb is said to be *neuter*: as, I sleep, thou yawnest, he sneezes, we walk, ye run, they stand still.

Some divide *verbs neuter* into, 1st, Such as do not signify any action, but a quality; as *albet*, it is white; or a situation, as *sedet*, he sits; or have some relation to place, as *adest*, he is present; or to some other state or attribute, as *regnat*, he rules, &c.

And, 2^{dly}, Those that do signify actions, though those are such as do not pass into any subject different from the actor; as *to dine*, *to sup*, *to play*, &c.

But this latter kind sometimes cease to be *neuter*, and commence active, especially in Greek and Latin, when a subject is given them; as *vivere vitam*, *ambulare viam*, *pugnare pugnam*. Thus the old French poets say, *Soupirer son tourment*; the English, *To sigh his woes*, &c.

But this is observed only to obtain where something particular is to be expressed, which is not contained in the verb: as *vivere vitam beatam*, to live a happy life; *pugnare bonam pugnam*, to fight a good fight, &c.

According to the abbot De Dangeau, *verbs neuter* may be divided into *active* and *passive*: the first, those that form their tenses in English by the auxiliary verb *to have*; in French, by *avoir*: the second, those that form them, in English, with the verb *to be*; in French, *être*.

Thus, to sleep, to yawn, dormir and éternuer, are *neuters actives*.—To come, and to arrive, are *neuters passives*.

NEUTRAL salts, among chymists, are a sort of intermediate salts between acids and alkalis; partaking of the nature of both. See **Supplement**, article **NEUTRAL SALTS**.

Mr. Boyle also gives the appellation *neutral* to a sort of spirits, differing, in divers qualities, both from vinous, acid, and urinous spirits.—These he also calls *anonymous* and *adiapherous* spirits.

NEUTRALITY, the state of a person, or thing, that is *neuter*.

NEW. See the articles **ANTIENT**, **MODERN**, &c.

NEW algebra. See the article **ALGEBRA**.

NEW astronomy. See the article **ASTRONOMY**.

NEW moon, neomenia, that state of the moon a little before, and a little after, her conjunction with the sun.

NEW style. See the article **STYLE**.

NEW tables. See the article **TABLES**.

NEWEL, in architecture, the upright post which a pair of winding stairs turn about; being that part of the stair-case which sustains the steps.

The *newel* is, properly, a cylinder of stone, which bears on the ground, and is formed by the ends of the steps of the winding stairs.

There are also *newels* of wood, which are pieces of timber placed perpendicularly, receiving the tenons of the steps of wooden stairs into their mortices; and wherein are fitted the shafts and rests of the stair-case, and the flights of each story.

NEWTONIAN philosophy, the doctrine of the universe, and, particularly, of the heavenly bodies; their laws, affections, &c. as delivered by Sir Isaac Newton.

The term *Newtonian philosophy* is applied very differently; whence divers confused notions relating thereto.

Some authors, under this *philosophy*, include all the corporeal philosophy, considered as it now stands corrected and reformed by the discoveries and improvements made in several parts thereof, by Sir Isaac Newton.

In which sense it is that Gravefande calls his elements of physics, *Introductio ad Philosophiam Newtonianam*.

And in this sense the *Newtonian* is the same with the new philosophy; and stands contradistinguished to the Cartesian, the peripatetic, and the antient corporeal.

Others, by *Newtonian philosophy*, mean, the method or order which Sir Isaac Newton observes in philosophizing; *viz.* the reasoning, and drawing of conclusions directly from phenomena, exclusive of all previous hypotheses; the beginning from simple principles; deducing the first powers and laws of nature from a few select phenomena, and then applying those laws, &c. to account for other things. See **Laws of NATURE**. And, in this sense, the *Newtonian philosophy* is the same with the experimental philosophy; and stands opposed to the antient corporeal.

Others, by *Newtonian philosophy*, mean, that wherein physical bodies are considered mathematically; and where geometry and mechanics are applied to the solution of phenomena.

In which sense, the *Newtonian* is the same with the mechanical, and mathematical philosophy.

Others, again, by *Newtonian philosophy* understand, that part of physical knowledge which Sir Isaac Newton has handled, improved, and demonstrated, in his *Principia*.

Others, lastly, by *Newtonian philosophy*, mean, the new principles

principles which Sir Isaac Newton has brought into philosophy; the new system founded thereon; and the new solutions of phenomena thence deduced; or that which characterizes, and distinguishes his philosophy from all others.—Which is the sense we wherein shall chiefly consider it.

As to the history of this philosophy we have but little to say: it was first made public in the year 1686, by the author, then a fellow of Trinity-college, Cambridge; and in the year 1713, republished, with considerable improvements.—Several other authors have since attempted to make it plainer; by setting aside many of the more sublime mathematical researches, and substituting either more obvious reasonings, or experiments, in lieu thereof; particularly Whiston in his *Prælect. Phys. Mathematicæ*. Gravefande in *Element. & Instit.* and Dr. Pemberton in his *View*.

Notwithstanding the great merit of this philosophy, and the universal reception it has met with at home, it gains ground but slowly abroad; *Newtonianism* has scarce two or three adherents in a nation; but *Cartesianism*, *Huygenianism*, and *Leibnitzianism* remain still in the chief possession.

The philosophy itself is laid down principally in the third book of the *Principia*. The two preceding books are taken up in preparing the way for it, and laying down such principles of mathematics as have the most relation to philosophy: such are the laws and conditions of powers. And these, to render them less dry and geometrical, the author illustrates by scholia in philosophy, relating chiefly to the density and resistance of bodies, the motion of light, and sounds, a vacuum, &c.

In the third book he proceeds to the philosophy itself; and from the same principles deduces the structure of the universe, and the powers of gravity, whereby bodies tend towards the sun and planets; and from these powers, the motions of the planets and comets, the theory of the moon and the tides.

This book, which he calls *De Mundi Systemate*, he tells us, was first written in the popular way; but considering, that such as are unacquainted with the said principles, would not conceive the force of the consequences, nor be induced to lay aside their ancient prejudices; for this reason, and to prevent the thing from being in continual dispute, he afterwards digested the sum of that book into propositions, in the mathematical manner; so as it might only come to be read by such as had first considered the principles. Not that it is necessary, a man should master them all. Many of them, even the first-rate mathematicians, would find a difficulty in getting over. It is enough to have read the definitions, laws of motion, and the three first sections of the first book; after which, the author himself directs us to pass on to the book *de Systemate Mundi*.

The several articles of this philosophy, are delivered under their respective heads in this dictionary; as SUN, MOON, PLANET, COMET, EARTH, AIR, CENTRIFUGAL Force, RESISTANCE, MEDIUM, MATTER, SPACE, ELASTICITY, &c. A general idea, or abstract of the whole, we shall here gratify the reader with; to shew in what relation the several parts stand to each other.

The great principle on which the whole philosophy is founded, is the power of gravity. This principle is not new: Kepler, long ago, hinted it in his *Inventio ad Mot. Martis*. He even discovered some of the properties thereof, and their effects in the primary planets; but the glory of bringing it to a physical demonstration was reserved to the English philosopher. See GRAVITY.

His proof of the principle from phenomena, together with the application of the same principle to the various other appearances of nature, or the deducing those appearances from that principle, constitute the *Newtonian* system; which, drawn in miniature, will stand thus.

1^o. The phenomena are, 1. That the satellites of Jupiter do, by radii drawn to the centre of the planet, describe areas proportional to their times; and that their periodical times are in a sesquialterate ratio of their distances from its centre: in which the observations of all astronomers agree. 2. The same phenomenon holds of the satellites of Saturn, with regard to Saturn; and of the moon with regard to the earth. 3. The periodical times of the primary planets about the sun, are in a sesquialterate ratio of their mean distances from the sun. But, 4. The primary planets do not describe areas any-way proportional to their periodical times, about the earth; as being sometimes seen stationary, and sometimes retrograde with regard thereto.

2^o. 1. The powers whereby the satellites of Jupiter are constantly drawn out of their rectilinear course, and retained in their orbits, do respect the centre of Jupiter, and are reciprocally as the squares of their distances from the same centre.

2. The same holds of the satellites of Saturn with regard to Saturn; of the moon with regard to the earth: and of the primary planets with regard to the sun.

3^o. The moon gravitates towards the earth, and by the power of that gravity is retained in her orbit: and the same holds

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of the other satellites with respect to their primary planets; and of the primaries with respect to the sun. See MOON.

As to the moon, the proposition is thus proved: The moon's mean distance is 60 semidiameters of the earth; her period, with regard to the fixed stars, is 27 days, 7 hours 43 minutes; and the earth's circumference 123246600 Paris feet. Now, supposing the moon to have lost all its motion, and to be let drop to the earth, with the power which retains her in her orbit; in the space of one minute she will fall $15\frac{1}{2}$ Paris feet; the arch she describes in her mean motion at the distance of 60 semidiameters of the earth being the versed sine of $15\frac{1}{2}$ Paris feet. Hence, as the power, as it approaches the earth, increases in a duplicate ratio of the distance inversely; so as, at the surface of the earth, it is 60×60 greater than at the moon: a body falling with that force in our region must, in a minute's time, describe the space of $60 \times 60 \times 15\frac{1}{2}$ Paris feet; and $15\frac{1}{2}$ Paris feet in the space of one second.

But this is the rate at which bodies fall, by gravity, at the surface of our earth; as Huygens has demonstrated, by experiments with pendulums. Consequently, the power whereby the moon is retained in her orbit, is the same with that we call gravity: for if they were different, a body falling with both powers together, would descend with double the velocity, and in a second of time would therefore describe $50\frac{1}{2}$ feet. See DESCENT of Bodies.

As to the other secondary planets, their phenomena with respect to their primary ones, being of the same kind with those of the moon about the earth; it is argued by analogy, they depend on the same causes: it being a rule or axiom which all philosophers agree to, that effects of the same kind have the same causes. Again, attraction is always mutual, i. e. the reaction is equal to the action. Consequently, the primary planets gravitate towards their secondary ones; the earth towards the moon, and the sun towards them all. And this gravity, with regard to each several planet, is reciprocally as the square of its distance from its centre of gravity.

4^o. All bodies gravitate towards all the planets; and their weights towards any one planet, at equal distances from the centre of the planet, are proportional to the quantity of matter in each.

For the law of the descent of heavy bodies towards the earth, setting aside their unequal retardation from the resistance of the air, is this; that all bodies fall equally in equal times: but the nature of gravity or weight, no doubt, is the same on the other planets, as on the earth.

Suppose, e. g. such bodies raised to the surface of the moon, and together with the moon deprived at once of all progressive motion, and dropped towards the earth: it is shewn, that in equal times they would describe equal spaces with the moon; and, therefore, that their quantity of matter is to that of the moon, as their weights to its weight. Add, that since Jupiter's satellites revolve in times that are in a sesquialterate ratio of their distances from the centre of Jupiter, and consequently at equal distances from Jupiter their accelerating gravities are equal; therefore, falling equal altitudes in equal times, they will describe equal spaces; just as heavy bodies do on our earth. And the same argument will hold of the primary planets with regard to the sun. And the powers whereby unequal bodies are equally accelerated, are as the bodies; i. e. the weights are as the quantities of matter in the planets. And the weights of the primary and secondary planets towards the sun, are as the quantities of matter in the planets and satellites. And hence are several corollaries drawn relating to the weights of bodies on the surface of the earth, magnetism, and the existence of a vacuum. Which see under the articles VACUUM, WEIGHT, and MAGNETISM.

5^o. Gravity extends itself towards all bodies, and is in proportion to the quantity of matter in each.

That all the planets gravitate towards each other, has been already shewn; likewise, that the gravity towards any one considered apart, is reciprocally as the square of its distance from the centre of the planet: consequently, gravity is proportional to the matter therein. Farther, as all the parts of any planet, A, gravitate towards another planet, B; and the gravity of any part is to the gravity of the whole, as the matter of the part, to the matter of the whole; and reaction equal to action: the planet B will gravitate towards all the parts of the planet A; and its gravity towards any part, will be to its gravity towards the whole, as the matter of the part to the matter of the whole.

Hence, we derive methods of finding and comparing the gravities of bodies towards different planets; of finding the quantities of matter in the several planets, and their densities; since the weights of equal bodies revolving about planets, are as the diameters of their orbits directly, and as the squares of the periodical times, inversely; and the weights at any distance from the centre of the planet are greater or less in a duplicate ratio of their distances, inversely: and since the quantities of matter in the planets are as their powers at equal distances from their centres: and, lastly, since the weights of equal

and homogeneous bodies towards homogeneous spheres are, at the surface of the spheres, as the diameters of those spheres; and, consequently, the densities of heterogeneous bodies are as the weights at the distances of the diameters of the spheres.

6°. The common centre of gravity of the sun, and all the planets, is at rest: and the sun, though always in motion, yet never recedes far from the common centre of all the planets.

For, the matter in the sun being to that in Jupiter as 1033 to 1; and Jupiter's distance from the sun to the semidiameter of the sun in a ratio somewhat bigger; the common centre of gravity of Jupiter and the sun will be found a point a little without the sun's surface. And, by the same means, the common centre of Saturn and the sun will be found a point a little within the sun's surface: and the common centre of the earth, and all the planets will be scarce one diameter of the sun distant from the centre thereof. But the centre is always at rest: therefore, though the sun will have a motion this and that way, according to the various situations of the planets, yet it can never recede far from the centre. So that the common centre of gravity of the earth, sun, and planets, may be esteemed the centre of the whole world.

7°. The planets move in ellipses that have their foci in the centre of the sun; and describe areas proportional to their times.

This we have already laid down à posteriori, as a phenomenon: and now, that the principle of the heavenly motions is shewn, we deduce it therefrom à priori. Thus: Since the weights of the planets towards the sun are reciprocally as the squares of the distances from the centre of the sun; if the sun were at rest, and the other planets did not act on each other; their orbits would be elliptical, having the sun in their common umbilicus; and they would describe areas proportional to the times; but the mutual actions of the planets are very small, and may be well thrown aside. Therefore, &c.

Indeed, the action of Jupiter on Saturn is of some consequence; and hence, according to the different situations and distances of those two planets, their orbits will be a little disturbed.

The sun's orbit too is sensibly disturbed by the action of the moon: and the common centre of the two describes an ellipsis round the sun placed in the umbilicus; and with a radius drawn to the centre of the sun, describes areas proportional to the times.

8°. The aphelia and nodes of the planets are at rest; excepting for some inconsiderable irregularities arising from the actions of the revolving planets and comets.—Consequently, as the fixed stars retain their position to the aphelia and nodes, they, too, are at rest.

9°. The axis, or polar diameter, of the planets is less than the equatorial diameter.

The planets, had they no diurnal rotation, would be spheres, as having an equal gravity on every side: but by this rotation, the parts receding from the axis endeavour to rise towards the equator, which, if the matter they consist of be fluid, will be effected very sensibly. Accordingly Jupiter, whose density is found not so much to exceed that of water on our globe, is observed by the astronomers to be considerably less between the poles, than from east to west. And on the same principle, unless our earth were higher at the equator than towards the poles, the sea would rise under the equator, and overflow all near it.

But this figure of the earth Sir Isaac Newton proves likewise à posteriori; from the oscillations of pendulums being slower, and smaller, in the equatorial, than the polar parts of the globe.

10°. All the moon's motions, and all the inequalities in those motions, follow from these principles: *s. gr.* her unequal velocity, and that of her nodes, and apogee in the syzygies and quadratures; the differences in her eccentricity, and her variation, &c. See MOON, QUADRATURE, SYZYG, &c.

11°. From the inequalities in the lunar motions, we can deduce the several inequalities in the motions of the satellites.

12°. From these principles, particularly the action of the sun and moon upon the earth, it follows, that we must have tides; or that the sea must swell and subside twice every day.

13°. Hence likewise follows the whole theory of comets; as, that they are above the region of the moon, and in the planetary spaces; that they shine by the sun's light reflected from them; that they move in conic sections, whose umbilici are in the centre of the sun; and by radii drawn to the sun, describe areas proportional to the times; that their orbits, or trajectories, are very near parabolas; that their bodies are solid, compact, &c. like those of the planets, and must therefore acquire an immense heat in their perihelia; that their tails are exhalations arising from them, and encompassing them like atmospheres. See COMET.

The objections raised against this philosophy are chiefly aim-

ed at the principle, gravity; which some condemn as an *occult quality*, and others as a *miraculous*, and preter-natural cause; neither of which have any longer room in sound philosophy. Others, again, set it aside, as destroying the notion of vortices; and others, as supposing a vacuum. But these are all abundantly obviated under the articles GRAVITY, ATTRACTION, VORTEX, VACUUM, and QUALITY.

NEXUS of Matter. See the article COHESION.

NICHE*, in architecture, a cavity, or hollow place, in the thickness of a wall; to place a figure, or statue in.

* The word comes from the Italian *nicchia*, sea-shell; in regard the statue is here inclosed in a shell; or, perhaps, by reason of the shell wherewith the tops of some of them are adorned.

The larger niches serve for groups of figures; the small ones for single statues, and sometimes only for busts.

Great care must be taken to proportion the niches to the figures; and that the pedestals of the figures be proportioned to the niches.

Niches are sometimes made with rustic-work, sometimes with shell-work, and sometimes of crailed, or arbour-work.

Round NICHE is that whose plan and circumference are circular.

Square NICHE, that where they are square.

Angular NICHE, that formed in a corner of the building.

Ground NICHE, that which, instead of bearing on a massive, has its rise from the ground; as the niches of the portico of the pantheon at Rome.—Their ordinary proportion is to be two diameters in height, and one in width.

Capital of a NICHE. See the article CAPITAL.

Cul de four of a NICHE. See the article CUL.

NICHED Column. See the article COLUMN.

NICHILS. See the article NIHILIS.

Clerk of the NICHILS. See the article CLERK.

NICOLAI Catholicon. See the article CATHOLICON.

Argonauts of St. NICOLAS. See ARGONAUTS.

NICOLAITANS, or NICOLAITES, one of the most ancient sects in the Christian church; thus denominated from Nicolas, a person ordained a deacon of the church of Jerusalem together with St. Stephen.

The distinguishing tenet of the *Nicolaitans*, as represented by ecclesiastical historians, is, that all married women should be common; to take away all occasion of jealousy.

Other authors tax Nicolas with other impurities; but Clemens Alexandrinus imputes them all to his disciples, who, he says, abused their master's words.

Nicolas, it seems, having a very beautiful wife, was suspected by the apostles as jealous of her, and as being a lascivious man.—To remove this suspicion, he called his wife; and to shew he was not at all attached to her, offered any of them the liberty of espousing her. This is confirmed by Eusebius, who adds, that Nicolas never had more than one wife.

Other things charged on the *Nicolaitans*, are, that they made no scruple of eating meats offered to idols: that they maintained that the Father of Jesus Christ was not the Creator: that some of them adored one Barbelo, who inhabited the eighth heaven, and who proceeded from the Father, and was the mother of Jaldabaoth; or, according to others, of Sabaoth, who had forcibly taken possession of the seventh heaven. Others of them gave the name Pronicous to the mother of the heavenly powers; but all ascribed infamous actions to her, and with hers authorized their own impurities. Others shewed books, and pretended revelations under the name of Jaldabaoth. Irenæus and Epiphanius relate these and several other extravagancies; and represent the *Nicolaitans* as the authors of the sect of Gnostics. See Gnostics.

Cocceius, Hoffman, Vitringa, and Maius, take the name *Nicolaitan* to be coined, to signify a man addicted to pleasure and debauchery; adding, that it has nothing to do with Nicolas one of the seven deacons. And, as the doctrine of the *Nicolaitans* is mentioned in the Apocalypse, immediately after mention made of Balaam, and his doctrine, they compare the two names *Balaam* and *Nicolas*, which, in their originals, the one in Greek, the other Hebrew, have nearly the same signification, *viz.* prince, or master of the people.

Maius adds, that it was probable enough the *Nicolaitans* might value themselves on being the disciples of one of the seven deacons; but that it was without any ground: notwithstanding what the antients, who were ever too credulous, have represented to the contrary.

NICOTIANA, or *herba nicotiana*, a name given to tobacco; from Nicot the French ambassador at the court of Portugal, who first sent it into France in 1560, and gave it his own name, as he himself tells us in his dictionary. See TOBACCO.

NICHTATING Membrane, in anatomy, a thin membrane which covers the eyes of several creatures, and shutters them from dust, or too much light; yet is so thin, that they can see indifferently well through it.

This *nidulating membrane* is chiefly found in the bird and fish kind.

This *membrane*, in the eagle's eye, is remarkably close and firm, inasmuch as to be accounted as a second eye-lid: and hence that remarkable firmness of the eagle's sight in viewing the sun.

NIDUS*, *Nest*, a repository, wherein certain animals, particularly fowls, insects, and reptiles lodge their eggs, for incubation; and wherein, when hatched, they nurse their young till they become able to shift for themselves.

* The word is Latin, and is supposed to be derived from *nidor*, a rank, or ill smell; in regard the nests of animals usually stink.

Mr. Derham says, he has often wondered how wasps, hornets, and other insects that gather dry materials (as the dust of wood scraped off for that purpose) should find a proper glutinous matter to cement and glue their combs, and line their cells: but he adds, that in all probability it is in their own bodies: as in the *tinea vestivora*, the cadworm, &c.

Goedart observes of his *crucas* that fed on leaves, that they made their cells of leaves glued together with their own spitte.

NIECE, a term relative to uncle, and aunt; signifying a brother's or sister's daughter; which, in the civil law, is the third degree of consanguinity, and in the common law, the second.

NIENT *Comprise*, in law, an exception taken to a petition as unjust; because the thing desired is not in that act or deed whereon the petition is grounded.

Thus, a person desiring of the court to be put in possession of a house formerly adjudged to him among other lands; — the adverse party pleads that this petition is not to be granted; by reason though the petitioner had a judgment for certain lands and houses, yet this house is *nient comprise*, not comprized therein.

NIGHT, that part of the natural day, during which the sun is underneath the horizon.

Or *nights*, is that space of time wherein the sun is out of our hemisphere.

Under the equator, the *nights* are always equal to the days. — Under the poles, the *night* holds half the year.

The antient Gauls and Germans divided their time not by days, but *nights*; as appears from Tacitus and Cæsar. And the people of Iceland and the Arabs do the same at this day.

The same is also observed of our Saxon ancestors. Thus, in the council of Clivehoe, anno 824, we read, *Ibi finita & proscripta continentie crum episcopo post 20 Noctes, illon iuramentum ad Westminster deductum &c.* — Whence our custom of saying, *seven-nights, fortnight, &c.*

Signals by NIGHT. See the article **SIGNALS**.
Third-NIGHT-own-kind. See the article **THIRD**.

NIGHT-MARE*, a popular name for a disease by the Greek physicians called *ephalies*, and the Latins, *incubus*; to which people lying asleep on their backs, and having their stomach charged with heavy food, difficult of digestion, are very liable.

* The sleeping patient appears to himself as if oppressed with a huge weight on the breast; and frequently imagines some spectre or phantom, stopping his breath: whence the appellations, *night-mare*, and *bag-iadau*.

The disease does not arise, as was antiently imagined, from gross vapours filling the ventricles of the brain; but rather from a too great repletion of the stomach, which prevents the motion of the diaphragm, and, of consequence, the dilatation of the breast necessary to respiration. — Though others take it to be produced by a convulsion of the muscles of respiration.

The Arabs, Etmuller observes, call this disease a *nocturnal epilepsy*; since upon its prevailing much, it degenerates into an epilepsy; and is in effect the prodromus hereof in young people, as in old ones of an apoplexy.

NIHIL, NIHILUM, *nothing*, among the school philosophers, is, what has no real esse, and which is only conceived negatively, and denominated by a negative.

NIHIL Capiat per Billam, or *per Breve*, is a form used when judgment is given against the plaintiff, so as to bar his action, or overthrow his writ, or bill.

NIHIL Dicit, is a failing of a defendant to put in an answer to the plaintiff's plea by the day assigned: on which omission judgment is given against him of course, *quod nihil dicit*, because he alleges nothing to the contrary.

NIHIL, or NIHILI Album. See the article **POMPHOLYX**.

NIHILS, or NICHILS, *idues*, which the sheriff that is appointed in the exchequer says are nothing worth, and illeivable; from the insufficiency of the parties that should pay them.

Clerk of the NICHILS, Nihiliteram Clericus, is an officer of the

exchequer who makes a roll of the sums which are *nichiled* by the sheriffs. See **EXCHEQUER**.

NILOMETER*, or **NILOSCOPE**, an instrument used among the antients, to measure the height of the water of the river Nile, in its overflowings.

* The word comes from the Greek *Nilos*, Nile (and that from *νῆα ἰνῆν*, *new mud*, or, as some others will have it, from *νῆα*, I flow, and *ἰνῆς*, *mud*), and *μετρον*, *measure*. — The Greeks more ordinarily call it *Νεῖλοςδοπιον*.

In the French king's library is an Arabic treatise on *nilometers*, entitled *Neil fi abal al Nil*; wherein are described all the overflowings of the Nile from the first year of the Hegira to the 875th.

Herodotus mentions a column erected in a point of the island Delta, to serve as a *nilometer*: and there is still one of the same kind in a mosque of the same place.

As all the riches of Egypt arise from the inundations of the Nile, the Egyptians used to supplicate them at the hands of their Serapis, and committed the most execrable crimes, as actions, forsooth, of religion, to obtain the favour. This occasioned Constantine expressly to prohibit these sacrifices, &c. and to order the *nilometer* to be removed into the church; whereas till that time it had been in the temple of Serapis. Julian the apostate had it replaced in the temple, where it continued till the time of the great Theodosius. See on the subject of *nilometers*, the *Acta Eruditorum Lipsi*, anno 1686. p. 147.

NIMBUS, in antiquity, a circle observed on certain medals, around the heads of some emperors; answering to the aureole, or circles of light, drawn around the images of saints.

The *nimbus* is seen on the medals of Maurice, Phocas, and others, even of the upper empire.

NIMETULAHITES, a kind of religious among the Turks; so called from *Nimetulahi* their institutor.

When a Turk would be admitted into the order, he is to shut himself up close in a chamber forty-days, tied down to four ounces of food per day. The term expired, the *Nimetulabites* take him by the hand, and lead him a Moorish dance, accompanied with an infinity of ridiculous gesticulations; till the violence of the exercise, with his former regimen, throw him down on the ground. This fall is construed an extasy, during which he is supposed to have a vision.

The *Nimetulabites* meet every Monday in the night-time, and sing hymns to God, &c.

NINTH pair of nerves. See the article **NERVE**.

NIPPLE. See the articles **PAPILLA** and **BREASTS**.

NISI PRIUS, in law, a writ judicial, which lieth in cases where the jury being impanelled and returned, before the justices of the bank, one of the parties requests to have such writ, for the ease of the country, whereby to will the sheriff to cause the inquest to come before the justices in the same county, at their coming thither.

It is called a writ of *Nisi Prius*; and its effect is, that the sheriff is hereby commanded to bring to Westminster the men impanelled at a certain day, before the justices, *Nisi Prius justie domini regis ad assisas capiendas venerint*, that is, unless the justices go before that day into such county to take assizes.

NITRE, *Niter*, in natural history, a bitter sort of salt; thus called by the antients; by the moderns, more usually, *saltpetre*.

Naturalists differ as to the point whether our saltpetre be the *nitre* of the antients, but it certainly is not. G. C. Schellhammer has a particular treatise on the subject, *de nitro, tum veterum tum nostro, commentarius*.

Most authors hold the antient *nitre* to have been mineral or fossil; whereas our saltpetre is in great measure artificial. — Serapion says, the antient mines of *nitre* were like those of common salt, and that it was formed out of running water congealed in its progress into a sort of stone: he adds, that their *nitre* was of four kinds, distinguished by the countries whence it came; viz. the *Armenian*, *Roman*, *African*, called *Aphrontire*, and by *Avicenna*, *Barach*; and the *Egyptian*, which was the most famous, giving name to all the rest, itself denominated from *nitria*, a province in Egypt, where it was found in great abundance. He assures us, too, that their *nitre* was of divers colours, viz. white, red, and livid; that some masses of it were cavernous, like a sponge; others close and compact; others transparent like glass; and others scaly.

Schellhammer gives a different account: The antients, he observes, distinguished between *Niter*, *nitre*, *Azzendion*, *aphrontire*, and *Azop nitre*, *spuma nitri*, or *foam of nitre*. He adds, that Agricola, &c. is mistaken in asserting that there were antiently mines in Lydia, Magnesia, Cadia, &c. out of which *nitre* was dug like stones out of a quarry: and that the *nitre* used by the antients was brought out of several

several countries mentioned by Pliny, l. xxxi. c. 10. — A lake in Macedonia, whose waters were *nitrous*, and in the middle whereof, however, was a spring of fresh water, furnished the greatest quantity and the best: it was called *Chalybeum* from a neighbouring cape in the gulf of Thraciæ, and was formed like a crust on the surface of the water during the dog days. The waters of the lake Alcanius in Bithynia, and those of certain springs near Chalcis, were sweet and potable towards the surface, yet *nitrous* at bottom. There was also *nitre* gathered on the ground near Philippi, in Thracæ; but it was little, and of no great value.

The valleys of Media also furnished some. And there were *nitre-pits* in Egypt, as there are still among us.

The chief virtue the ancients ascribe to their *nitre*, is, that of drying, detaching, and attenuating; and, as such, it was used in ulcers, discharges of the eyes, the itch, the bites of serpents, the gout, &c. They also took it inwardly to resolve and attenuate viscid humours: but its cooling quality, whereof the modern physicians make so much use, they were unacquainted withal. — It is found excellent in diseases of the stomach, accompanied with a propensity to vomit. See Supplement, articles *NITRUM* and *NATRUM*.

Aereal NITRE. Many of our physicians are full of the notion of a *volatile nitre* abounding in the air; and a world of phænomena they account for from the operation of the particles thereof.

That the atmosphere abounds with saline particles, is most certain; for being filled continually with exhalia from the earth and sea, it must needs have from both a great quantity of saline corpuscles; and these will be of different kinds, according to the variety of those salts from whence they are derived.

But why these should be mostly supposed of a *nitrous* nature, is not so easy to prove; for saltpetre is by no means found in greater quantity than the other salts, especially common salt; nor is it of a much more volatile nature than they, nor capable of being raised more easily, or by a lesser heat. But since foot, and that which produces it, smoke, is found to abound very much with a truly volatile salt; and since such a kind of salt is produced frequently by the putrefaction of animal and vegetable bodies; it is probable the air may abound with salts of this kind, among many other decomposed ones of different natures and names.

Diaphoretic NITRE of Antimony. See *ANTIMONY*.

Fixed NITRE. See the article *FIXED*.

Spirit of NITRE. See the article *SPIRIT*.

NOBILIARY, a collection, or historical account of the noble families of a province, or nation.

Chorier has published a *nobiliary* of Dauphiné; and Caumartin, another of Provence. The Germans are particularly careful of their *nobiliaries*, to keep up the purity of their families.

NOBILISSIMUS, in antiquity, a title, or quality given to the princes of the Imperial family.

F. Doucine advances, that the title *Nobilissimus* was first given under the emperor Justin; others find the title *Nobilis Cæsar*, or *N. C.* that is, *Nobilissimus Cæsar*, on medals long before that time, even as early as Trajan. Spanheim and Jombert indeed set this title on medals no higher than the time of Philip the younger: though it appears earlier in some inscriptions: so that even M. Tillemont is mistaken where he says, the quality of *Nobilissimus* is not to be found in history before the time of Constantine the Great, who first gave it to his two brothers; after which it was attributed to such of the emperors children as were not Cæsars. See *CÆSAR*.

Tillemont adds, that the Cæsars bore the title of *Nobilissimi* in all ages; but that the *Nobilissimæ* first became a distinct independent dignity in the time of Constantine the Great.

NOBILITY, a quality that dignifies, or renders a thing noble; particularly, that raises a person possessed thereof above the rank of a peasant or commoner.

In England, indeed, the term *nobility* is restrained to degrees of dignity above knight-hood. — Every where else, *nobility* and gentility, or gentry, are the same. See *GENTLEMAN*.

Some refer the origin of *nobility* in Europe to the Goths; who, after they had seized a part of Europe, rewarded their captains with titles of honour, and called them *nobles*; *nobiles*, to distinguish them from the common people.

Nobility, in England, is only conferred by the king, and that by patent, in virtue whereof it becomes hereditary. In other countries there are other ways of acquiring it.

Thus, in France, *v. gr.* there are several offices which convey perfect *nobility*, and such as descend to posterity. Such are all offices of the crown, those of counsellor of state, &c. Others they have which only communicate an accessory, or partial *nobility*, which dies with the person. Thus, a counsellor in parliament enjoys all the rights and exemptions of

nobility; yet his son is never reputed noble; unless there have been a succession of them, and both father and grandfather have been noble; which they call *patre & avo can-fubant*.

They have a third kind of *nobility*, called *nobility of the bell*, *de la cloche*; which is what the mayors and sheriffs of certain cities, as Lions, Bourges, Rochel, Poitiers, &c. acquire in virtue of their magistracy.

The *nobility* of England is called the *peerage of England*.

Its degrees are only five, *viz.* that of a duke, marquis, earl or count, viscount, and baron. See each under its proper article, *DUKE*, *MARQUIS*, &c.

The privileges of the English *nobility* are very considerable: they are all esteemed as the king's hereditary counsellors, and are privileged from all arrears, unless for treason, felony, breach of peace, condemnation in parliament, and contempt of the king. No supplicavit can be granted against them; no capias, or exigent, sued against them for action of debt, or trespass; and no obli-gations against them: in criminal cases, they are only to be tried by a jury of peers, who are not put to their oath; but their verdict upon their honour suffices. In their absence, they are allowed a proxy to vote for them; and in all places of trust they are allowed to constitute deputies, by reason of the necessity the law supposes them under of attending the king's person.

Guillem observes, that if an appeal of murder, or felony, be sued by a commoner, against a peer, he shall be tried by commoners, not peers. See *APPEAL*.

No peer may go out of the kingdom without the king's leave: if any have leave, he is to return upon the king's writ, or to forfeit goods and chattels.

Anton. Mattheus observes, that *nobility* among the Romans was a quite different thing from what it is among us. The nobles among the Romans were either those raised to the magistrature, or descended from magistrates: there was no such thing as *nobility* by patent.

Bartoli says, that doctors, after they have held a professor's chair in an university for twenty years, become *noble*; and are entitled to all the rights of counts.

But this claim is not admitted at court, &c. though Bartoli's sentiments be backed with those of several other authors, particularly Caspianus in his *Consuetudin. Burgundicæ*; Boer for *la Coutume de Berry*; Faber C. *de dig. def. 9.* &c. which last, however, restrains Bartoli's rule to doctors in law, and princes physicians.

By an edict of the French king, in 1669, it is declared, that trade shall not derogate from *nobility*, provided the person do not sell by retail.

In Bretagne, by ancient custom, a nobleman loses nothing by trading even in retail: but he assumes all his rights as soon as he ceases traffic; his *nobility* having slept all the time.

In Germany, a woman, not *noble* by birth, doth not become *v. gr.* a countess, or baroness, by marrying a count, or baron.

A lady of the higher degree, indeed, becomes a princess by marrying a prince; but this doth not hold of a lady of the lower *nobility*.

On the coast of Malabar, children are only capable of being *noble* by the mother's side; it being allowed them to take as many husbands as they please, and to quit them whenever they think good.

NOBLE*, *NOBILIS*, a person who has a privilege which raises him above a commoner, or peasant, either by birth, by office, or by patent from his prince.

* The word comes from the Latin, *notabilis*, formed from the ancient *notabilis*, distinguishable, remarkable.

In England, the word *noble* is of a narrower import than in other countries, being confined to persons above the degree of knights; whereas, abroad, it comprehends not only knights, but what we simply call *gentlemen*.

The *nobles* of England are also called *pares regni*, as being nobilitate pares, though gradu impares.

The Venetian *noblesse* is famous: it is in this that the sovereignty of the state resides. It is divided into three classes.

The first only comprehends 24 families.

The second includes the descendants of all those who were entered in the golden book, in 1289, and destined to govern the state, which then began to be aristocratic.

The third consists of such as have bought the dignity of *noble* Venetians.

This last class is only admitted to the inferior employ; the two former, to all indifferently.

The title of *noble* Venetians is sometimes also given to foreign kings, princes, &c.

NOBLE also denotes a money of account, containing six shillings and eight pence. See *MONEY*.

The *noble* was antiently a real coin, under the denomination of *rose-noble*. See *COIN*, and *ROSE*.

Authors observe, that there has not been any piece of gold or silver of this name, coined with us, since 9 Hen. V. They were first coined by Edw. III. in 1334.

The *Nox* contained 80 d. the fane with the present money of account. — Its half was called *Obolus*, containing 40 d. its fourth part the quadrans, or farthing in those days, 20 d.

NOCTAMBULI *, or **NOCTAMBULONES**, a term of equal import with *semnambuli*, applied to persons who have a habit of rising, and walking about, in their sleep.

* The word is a compound of the Latin, *nox*, night, and *ambulo*, I walk.

Schenckius, Horfius, Clauderus, and Hildanus, who have wrote of sleep, give us divers unhappy histories of such *Noctambuli*.

The disorder seems to consist in this, that the proper organs of muscular motion are at liberty, while the organs destined for sensation are firmly bound up, or in a state of inaction.

To conceive the cause, it is to be observed, that the laws of the union of the soul and body are such, as that certain ideas follow upon certain motions of the fibres of the brain; and certain motions of those fibres upon certain ideas. Now, by much thinking on any one thing, the fibres acquire some permanent situation, which gives a freer passage to the spirits towards a certain part of the body than ordinary. — If then the animal spirits become too copious, or too much agitated, or consist of parts too solid; they throw themselves into the passages they find the most open, glide into the nerves and muscles corresponding to those passages, and there produce the motions proper to those muscles.

Accordingly, the body rises and walks; though the soul be excluded from thinking on the objects that use to employ it on such occasions.

The bilious, according to Horfius; the melancholic, according to Salius; and the sanguine persons, according to Libavius, are most subject to those nocturnal vagaries.

The remedies are all such things as temper the agitation of the spirits, and relax the fibres; as bleeding, and all coolers, either internally or externally: Aperitives too have a good effect; but the best remedy, according to some, is cold-bathing.

NOCTILUCA, among naturalists, a species of phosphorus, so called, because it shines in the night, without any light being thrown on it: such is the phosphorus made of urine. By which it stands distinguished from some other species of phosphorus, which, ere they shine, must be exposed to the sun-beams; such as is the bolonian-stone, &c. See **BOLONIAN-STONE**.

Mr. Boyle, in a particular treatise on the subject, gives an account of three *Noctilucæ*. — The first, invented by Kraft, he calls the *consistent*, or *gummosus Noctiluca*, as being of a texture not unlike that of a cherry-gum. This, on account of its uninterrupted action, was, by the Germans, called the *constant Noctiluca*; among us it is now known under the denomination of the *solid phosphorus*.

The second is liquid, invented by the said Kraft: this is only a dissolution of the former in a convenient liquor. — The third kind was prepared by Mr. Boyle himself: and was of a different nature from both the other; for it would not shine of itself, like either of them, but required the contact of the air (though not any external rays or heat) to make it produce light, which would be very durable, in a well stopped vessel. Add, that it was not the body that shone, but an exhalation, or effluvia mixed with the air; on which accounts the inventor gives it the denomination of the *aereal Noctiluca*.

The same Mr. Boyle, afterwards, prepared another sort; which, from the little pellucid fragments or crystals therein, he denominated the *icy Noctiluca*.

NOCTURNAL, something that relates to night, *nox*; in contradistinction to diurnal. In this sense we say, *Nocturnal assemblies*; *Nocturnal walks*; *Nocturnal pollutions*, &c. See **POLLUTION**, **NOCTAMBULI**, &c.

NOCTURNAL Pains are a frequent concomitant of venereal disorders, which can only be palliated with narcotics: nothing but a mercurial course, or a long continued use of diet-drinks can entirely remove them.

NOCTURNAL Arch, in astronomy, the arch of a circle described by the sun, or a star, in the night. See **ARCH**.

Semi-NOCTURNAL Arch of the Sun is that portion of a circle he passes over between the lower part of our meridian, and the point of the horizon wherein he arises; or between the point of the horizon wherein he sets, and the lower part of our meridian.

NOCTURNAL, or **NOCTURNALIBUM**, is more particularly used for an instrument, chiefly used at sea, to take the altitude or depression of some of the stars about the pole, in order to find the latitude, and the hour of the night.

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There are *Nocturnals* of various contrivances, some of them projections of the sphere; such as the hemispheres, or planispheres, on the plane of the equinoctial: those ordinarily used by the seamen are two; the one adapted to the polar star, and the first of the guards of the little bear; the other to the pole-star, and the pointers of the great bear.

Construction of the NOCTURNAL. — The instrument consists of two circular plates (*Tab. Navigation, fig. 13.*) applied on each other. The greater, which has a handle to hold the instrument, is about $2\frac{1}{2}$ inches diameter, and is divided into 12 parts, agreeing to the 12 months; and each month subdivided into every fifth day: and so, as that the middle of the handle corresponds to that day of the year, wherein the star here regarded has the same right ascension with the sun.

If the instrument be fitted for two stars, the handle is made moveable. The upper left circle is divided into 24 equal parts, for the 24 hours of the day, and each hour subdivided into quarters, as in the figure. These 24 hours are noted by 24 teeth; to be told in the night. Those at the hours 12 are distinguished by their length. In the centre of the two circular plates, is adjusted a long index A, moveable upon the upper plate. And the three pieces, viz. the two circles and index, are joined by a rivet which is pierced through the centre, with a hole two inches in diameter for the star to be observed through.

Use of the NOCTURNAL. Turn the upper plate till the longest tooth, marked 12, be against the day of the month on the under plate; then, bringing the instrument near the eye, suspend it by the handle, with the plane nearly parallel to the equinoctial; and viewing the pole-star through the hole of the centre, turn the index about, till, by the edge coming from the centre, you see the bright star or guard of the little bear (if the instrument be fitted to that star): then that tooth of the upper circle, under the edge of the index, is at the hour of the night, on the edge of the hour circle: which may be known without a light, by accounting the teeth from the longest, which is for the hour 12.

NOCTURNAL Pollution. See the article **POLLUTION**.

NOCUMENTI Affisa. See the article **ASISIA**.

NODATED Hyperbola, a kind of hyperbola, which, in turning round, decussates or crosses itself. See **CURVE** and **HYPERBOLA**.

NODE, **Nodus**, in chirurgery, denotes a tumour arising on the bones; and usually proceeding from some venereal cause. *Node* amounts to the same with what is otherwise called *exostosis*.

It seems generated of a thick, cold, viscid humour, which is often found very difficult to resolve. — They frequently apply to it a leaden plate, covered with mercury.

The cure is frequently also attempted by *emplastr. de ranis cum mercurio*; which failing, some mercurial unguent is now and then rubbed on them; and afterwards mercurial plaisters made of cinnabar, &c. are applied.

Some give the denomination *Nodes* to all tumours formed by a coagulation of vicious matter in the external parts of the body.

NODE is more particularly applied to the tumours or protuberances arising on the joints of old gouty people; called also *tophi*.

They are supposed to be formed of a thick, crude, heavy, viscid, indigested matter, mixed with a hot, sharp, bilious juice, the grosser and more terrestrial part whereof being detained, grows into a stony sort of concretion.

NODES, in astronomy, the two points wherein the orbit of a planet intersects the ecliptic.

Such are the two points C and D, (*Tab. Astron. fig. 33.*) — whereof the *Node C*, where the planet ascends Northwards above the plane of the ecliptic, is called the *ascending Node*, the *Northward Node*, and the *head of the dragon*, and is thus marked ♂.

The other *Node D*, where the planet descends to the South, is called the *descending Node*, the *Southward Node*, or the *dragon's tail*; thus marked ♀. See **DRAGON'S HEAD and TAIL**. The right line DC, wherein the two circles intersect, is called the *line of the Nodes*.

It appears from observation, that the line of the *Nodes* of all the planets constantly changes its place, and shifts its situation in *antecedentia*; i. e. from East to West, contrary to the order of the signs.

Thus, by retrograde motion, the line of the moon's *Nodes* finishes its circuit in 19 years; in which time, after having receded from any point of the ecliptic, it returns to the same.

When the moon is in the *Node*, she is also in the ecliptic, viz. twice in each period; when she is at her greatest distance from the *Nodes*, viz. in the points E, F, she is said to be in her limits.

The moon must be in one of the *Nodes* when there is an eclipse, either of the sun or moon.

NODULE, **NOBULUS**, in pharmacy, a bag of medicinal ingredients put into beer, or wine, to give its tincture there-to.

Nodules are sometimes also parcels of odoriferous simples, tied up in a piece of silk, for the patient to be frequently smelling to.

NODUS, **KNOT**. See the article **KNOT**.

Nodus in Poetry, &c. See **INTRIGUE**, and **PLOT**.

Nodus, or **NODE**, in dialing, denotes a point or hole in the gnomon of a dial, by the shadow or light whereof, either the hour of the day in dials without furniture, or the parallels of the sun's declination, and his place in the ecliptic, &c. in dials with furniture, are shewn.

Nodus is also used for a hole in the ceiling of a room, or in the window, for the making of a dial on the floor, wall or the like.

NOETIANS, a sect of antient heretics, disciples of Noetius, an Ephesian, the master of Sabellius.

They only allowed of one person in the godhead; viz. the father; and accordingly taught, that it was God the father that suffered on the cross.—An error, says Epiphanius, who wrote an hundred years after Noetius, never heard of before; though it is certain there had been other Patripassians in the church before him.

Being reprehended by his superiors, Noetius made them this answer: What harm have I done? I adore only one God; I own none but him. He was born, suffered, and is dead.

NOLI me tangere, *q. d. touch me not*, a malignant eruption in the face; occasioned by an extremely sharp, corrosive humour: thus called, either because it infects those who touch it, or because the more it is touched, the worse it grows, and the farther it spreads.

The *Noli me tangere* is a species of herpes exedens; by some referred to the cancer, by others to the lepra.

NOLI me tangere is chiefly used among us for an external ulcer in the alæ of the nose; proceeding often from a venereal cause, though sometimes the effect of a scrophulous constitution. See **ULCER**.

It does not always confine itself to the alæ, but will spread and corrode the very substance of the nose. The cure is difficult, especially when it rises from a bad constitution.

NOLI me tangere, among botanists, is a name of a plant so denominated from a singular property it has, of darting out its feed when ripe, upon the first approach of the hand to touch its pods.

NOMADES *, *Nomades*, a name given, in antiquity, to several nations, or people, whose whole occupation was to feed and tend their flocks; and who had no fixed place of abode, but were constantly shifting, according to the conveniences of pasturage.

* The word comes from the Greek *νομᾶν*, *pasco*, I feed.

The most celebrated among the *Nomades* were those of Africa, who inhabited between Africa, properly so called, to the East, and Mauritania to the West.—They are also called *Nomides*, or *Numidians*.—Sallust says, they were a colony of Perians brought into Africa with Hercules.

The *Nomades* of Asia inhabited the coasts of the Caspian sea.—The *Nomades* of Scythia were the inhabitants of little Tartary; who still retain the antient manner of living.

NOMANCY *, a name given to the art of divining the fates of persons by means of the letters that form their names.

* The word is a compound of the Latin, *nomen*, name, and *magia*, divination.

Nomancy, or, as it should rather be called, *Nominomancy*, or *Onomatomancy*, seems to be nothing else but the cabbalistic gematria.

NOMARCHA, in antiquity, the governor or commander of a nome, or nomos.

Egypt was antiently divided into several regions, or quarters, called *Nomes*, from the Greek *νομος*, taken in the sense of a division; and the officer who had the administration of each *Nome*, or *Nomos*, from the king, was called *Nomarcha*, from *νομος*, and *αρχη* command.

NOMBRIL Point, in heraldry, is the next below the fess-point; or the very centre of the escutcheon. See **POINT**.
Supposing the escutcheon divided into two equal parts below the fess; the first of these divisions is the *Nombril*; and the lower the base.

NOME, or **NAME**, in algebra, denotes any quantity with a sign prefixed, or added to it, whereby it is connected with some other quantity; upon which the whole becomes a binomial, trinomial, or the like.

Thus $a + b$ is a binomial, whose *Names*, or *Nomes*, are a and b ; and $a + b + c$ a trinomial, whose *Names* are a , b , and c , &c. See **BINOMIAL**, **TRINOMIAL**.

NOMEN. See the articles **PRÆNOMEN**, **NAME**, and **AGNOMEN**.

NOMENCLATOR, or **NOMENCULATOR**, among the Romans, was usually a slave, who attended persons that flood

candidates for offices, and prompted or suggested to them the names of all the citizens they met, that they might court them, and call them by their names; which among that people was the highest piece of civility.

NOMENCLATOR of the Roman Church was an ecclesiastic whose business it was to call the persons whom the pope invited to dinner.

He also listened to those who were admitted to audience, in the same manner as those now retained by the cardinals, called *Auditors*.

NOMENCLATURE, **NOMENCLATURA**, a catalogue of several of the more usual words in any language, with their significations; compiled in order to facilitate the use and retaining of such words to those who are to learn the tongue.

We have Latin, Greek, French, &c. *Nomenclatures*.

NOMINA Villarum, an account of the names of all the villages, and the possessors thereof, in each county, drawn up by the several sheriffs, at the instance of king Edward II. and returned by them into the exchequer; where it is still preserved.

NOMINAL Character. See the article **CHARACTER**.

NOMINALS, or **NOMINALISTS**, a sect of school-philosophers, the disciples and followers of Occam, or Ockham, an English Cordelier, in the 14th century.

The *Nominalists* were great dealers in words; whence they were vulgarly denominated *word-sellers*.

They had the denomination *Nominalists*, because in opposition to the *Realists*, they maintained, that words, not things, were the object of dialectics. See **REALISTS**, &c.

This sect had its first rise towards the end of the eleventh century, and pretended to follow Porphyry and Aristotle; but it was not till Ockham's time that they bore the name.

The *Nominals* were the founders of the university of Leipsic: There are many yet abroad, who pique themselves on being *Nominals*.

The *Nominals*, with the Stoics, admit the formal conceptions, or ideas of things, as the subject and foundation of universality; but to this they add names, which represent and signify, after the same univocal manner, and without any distinction, a great variety of single things alike in genus and species.

Whence it is that they are called *Nominals*; as pretending, that to become learned, it is not enough to have just ideas of things, but it is likewise required to know the proper names of the genera and species of things, and to be able to express them clearly and precisely, without confusion, or ambiguity.

NOMINATION, the act of naming and appointing a person for some function, employ, or benefice.

The word is chiefly used for the right of presenting to a benefice, &c.

In common law, however, there is a difference between *Nomination*, and presentation; the former being properly a power which a man has, by virtue of a manor, or otherwise, to appoint or name a clerk to a patron of a benefice, to be by him presented to the ordinary. See **PRESENTATION**.

NOMINATIVE, in grammar, the first case of nouns which are declinable.

The simple position, or laying down of a noun, or name, is called the *Nominative case*: yet it is not so properly a case, as the matter or ground whence the other cases are to be formed, by the several changes and inflexions given to this first termination. See **NOUN**.

Its chief use is to be placed in discourse before all verbs, as the subject of the proposition, or affirmation, as, *Dominus regit me*, the Lord governs me; *Deus exaudit me*, God hears me.

NOMINATOR, he who names or presents a person to an office, or benefice.

Hence *nominees*, the person named or presented.

Error observes, there are some customs where the *Nominator* is responsible for the solvibility of the nominee.

NOMINIS Identitate. See the article **IDENTITATE**.

NOMOCANON *, a collection of canons, and of imperial laws relative or conformable thereto. See **CANON**.

* The word is compounded of the Greek *νομος*, *lex*, law; and *κανων*, *canon*, rule.

The first *Nomocanon* was made by Johannes Scholasticus in 554.—Photius, patriarch of Constantinople in 883, compiled another *Nomocanon*, or collation of the civil laws with the canons: This is the most celebrated.—Balsamon wrote a commentary on it, in 1180.

NOMOCANON also denotes a collection of the antient canons of the apostles, councils, and fathers; without any regard to imperial constitutions.

Such is the *Nomocanon* published by M. Cotelier.

NOMOCANON is sometimes also used for a penitential book of the Greeks. See **PENITENTIAL**.

NON

NON

NON-ACILITY, in law, an exception taken against the plaintiff in a cause, on some just ground why he cannot commence a suit in law: as, *præmunire*, outlawry, being professed in religion, excommunicate, or a franger born. This last holds only in actions real, and mixed; and not in personal, except he be both a franger, and an enemy.

The civilians say, that such man hath *non personam standi in judicio*.

NON-ADMITTAS. See the article **NE-ADMITTAS**.

NON-APPEARANCE, a default in not appearing in a court of judicature. See **APPEARANCE**.

NON-CLAIM, in law, the omission or neglect of him who challenges not his right within the time limited by law: as, within a year and a day, where continual claim ought to be made.

By such neglect he is either barred of his right; as upon *Non-claim* within five years after a right accrued to him; or of his entry by descent, for want of a *claim* within five years after the difficulty.

NON-COMPOS mentis, a phrase denoting a person not to be of sound memory, or understanding.

Of this, in common law, there are said to be four kinds.—First, an idiot born; secondly, he that by accident loseth his memory, and understanding; thirdly, a lunatic, that has *lucida intervalla*, sometimes understanding, and sometimes not; fourthly, he that by his own act, for a time, depriveth himself of his right senses, as a drunkard.—But this last kind shall give no privilege to him, or his heirs.

A descent takes away the entry of an idiot, though the want of understanding were perpetual.

NON-EST Culpabilis, *Non-Cul. q. d. he is not guilty*, in law, the general plea to an action of trespass, whereby the defendant absolutely denies the fact charged on him by the plaintiff: whereas, in other special pleas, the defendant grants the fact to be done, but alleges some reasons in his defence, why he lawfully might do it.

As *Non-Cul.* is the general answer in an action of trespass, *i. e.* a criminal action civilly prosecuted; so is it in all actions criminally followed, either at the suit of the king, or others, wherein the defendant denies the crime objected to him.

NON-EST factum, in law, is an answer to a declaration, whereby a man denieth that to be his bond or deed, whereupon he is implicated.

NON-JURIDICI Dies. See the article **DIES**.

NON-LIQUET, it does not appear, a verdict given by a jury, when a matter is to be decided to another day of tryal. See **VERDICT**, and **JURY**.

The same phrase was used among the Romans: after hearing a cause, such of the judges as thought it not sufficiently clear to pronounce upon, cast a ballot into the urn with the two letters *N. L.* for *Non Liquet*.

NON-MOLESTANDO, a writ which lies for him who is molested contrary to the king's protection granted him.

NON-OBSTANTE, *notwithstanding*, in law, a clause frequent in statutes, and letters patent; importing a licence from the king to do a thing, which at common law might be lawfully done; but, being restrained by act of parliament, cannot be done without such licence.

All grants of such pensions, and every *Non obstante* therein contained, shall be void.—Henry III. took up the clause, *Non obstante* (first introduced by the pope), in his grants.

NON-OBSTANTES, in the Roman canon law, make the third part of the provisions of the court of Rome beginning with *Non obstantibus*, and comprising absolutions from censures, reabilitations, and necessary dispensations for the enjoyment of benefices. None inferior to the pope can use the clause *Non obstante*.

NON-OMITTAS, a writ which lies where the sheriff having delivered a writ or process to a bailiff of a franchise in which the party it is to be served on dwells, and the bailiff having refused or neglected to serve it, upon the sheriff's returning that he delivered it to the bailiff, this second writ shall be directed to the sheriff, charging him to enter the franchise, and execute the king's command, either by himself or officer.

NON-PLEVIN, *Non plevinis*, a default in not replevying of land in due time. See **REPLEVIN**.

In *Hengam magna*, it is said, that the defendant should be sure to replevy his lands seized by the king, within fifteen days; and that if he neglects, then, at the instance of the plaintiff at the next court-day, he shall lose his seisin, *sicut per defaultum post defaultum*.—But, by Stat. 9 Edward III. it was enacted, that no person should lose his land thenceforward because of *Non Plevin*.

NON-PONENDO in Assis, & *Juratis*, a writ granted on divers occasions to men for freeing them from serving, on assizes and juries; as by reason of old age, charter of exemption, or the like.

NON-PROCEDENDO ad Assisum Rege inconsulto, a writ to stop the tryal of a cause appertaining to one who is in the king's service, &c. till the king's pleasure be farther known.

NON-RESIDENCE, in law, is applied to such spiritual persons as are not resident on, but do absent themselves, for one month together, or two at several times of the year, from their benefices, or dignities. See **BENEFICE**.

Regularly, personal residence is required of ecclesiastical persons upon their cures; though there are some exceptions in favour of particular persons, as king's chaplains, bishops, &c. See **RESIDENCE**.

NON-RESIDENTIA pro Clericis Regis, is a writ directed to the ordinary, charging him not to molest a clerk employed in the king's service, on account of his *Non-Residence*.

NON SANE Memoriae, or *Non sane Memoire*, is an exception taken to an act declared to be done by another, importing that it was done at a time when the party that did it was mad, or not in his proper senses. See **NON-COMPOS**.

NON-SUIT, in law, the dropping or letting fall a suit or action. *Non suit* is a renunciation of a suit, by the plaintiff or defendant; most commonly upon the discovery of some error, or defect, when the matter is so far proceeded in, as that the jury is ready at the bar, to deliver their verdict.—The civilians term it *Liis renunciatio*.

NON SUM Informatus. See **INFORMATUS non sum**.

NON-TENURE, a plea in bar to a real action, whereby the party urges that he holdeth not the land mentioned in the count, or at least some part of it.

West distinguishes *Non-Tenure* into *general* and *special*. The first, where one denies himself ever to have been tenant to the land in question.—The second, where he only alleges, that he was not tenant on the day whereon the writ was purchased.

NON-TERM, the time of vacation between term and term. See **VACATION**.

It was antiently called *the time or days of the king's peace*. See **PEACE of God** and *the church*.

Among the Romans it was called *Feriae*, or *Dies Nefasti*. See **FERIÆ** and **NEFASTI**.

NON-ENTITY, whatever has no real being, or is only conceived negatively, or claims only a negative denomination. See **ESSE**, **ESSENCE**, &c.

NON-ESSENTIAL Modes. See the article **MODES**.

NON-NATURALS, in medicine, *res non naturales*, are the causes and effects of diseases, whether near or remote.

Physicians have digested all the causes of diseases into fix classes, which they call the *fix Non-naturals*.—These are, 1. Air. 2. Meat and drink. 3. Motion and rest. 4. The passions of the mind. 5. Excretions and retentions. 6. Sleep and waking. See each under its proper article.

They are thus called, because, by their use, or abuse, they become either good, *naturals*, or evil, *contra-naturals*.

But the division, in effect, is of no great use; the causes of diseases being much more commodiously laid down otherwise.

NONÆ and *Decime* were payments antiently made to the church by those who were tenants of church-farms.

The *Nonæ* were a rent or duty claimed for things belonging to husbandry: the *Decime* were claimed in right of the church.

NONAGE, in law, an incapacity of doing certain things from a want of age.

The term of *Nonage* is different, with regard to different things.—In matters of inheritance, a man is in his *Nonage* till twenty-one years; for marriage only till fourteen, &c. See **MINORITY**.

NONAGE, **NONAGIUM**, also denotes the ninth part of a man's moveable goods, antiently paid in the nature of a mortuary; being claimed by the clergy upon the death of those of their parish.

At first this was a third part of the goods, and was called *Ter-tiagium*; till by a bull of Clement VI. it was reduced to a ninth.

NONAGESIMAL, in astronomy, the ninetieth degree of the ecliptic, reckoned from its eastern term, or point.

The altitude of the *Nonagesimal* is equal to the angle of the east; and, if continued passes through the poles of the ecliptic: whence the altitude of the *Nonagesimal*, at a given time, under a given elevation of the pole, is easily found.

If the altitude of the *Nonagesimal* be subtracted from 90°, the remainder is the distance of the *Nonagesimal* from the vertex.

NONAGON, a figure having nine angles and sides.

NONCONFORMISTS, the name of a religious sect, or rather of a number of sects, in England.

The term was antiently confined to the Puritans, or rigid Calvinists; at present it extends to all who dissent from the established church, the Romanists alone excepted. See **DISSENTER**, **PURITAN**, **PRESBYTERIAN**, **INDEPENDENT**, &c.

The word is said to have had its rise from a declaration of king Charles I. who appointed that all the churches of England and Scotland should have the same ceremonies and discipline; the

the acquiescence wherein, or dissenting from which, determined conformity, and nonconformity.

NONE, or **NONES**, **NONÆ**, one of the seven canonical hours, in the Romish church. See **HOUR**.

NONE, or the ninth hour, is the last of the lesser hours, that is said before Vespers; and answers to three a-clock in the afternoon.

The single office, and that for the dead, ends at **Nones**, which father Rosweyde observes, was antiently the hour for the breaking up of the synaxis, or usual meetings at church of the primitive christians.

The hour of **None** was also the usual time for taking the repast on fast-days; though some would keep the fast till night.

NONES*, **NONÆ**, in the Roman Calendar, the fifth day of the months January, February, April, June, August, September, November, and December; and the seventh of March, May, July, and October: these four last months having six days before the **Nones**, and the others only four.

* The word apparently has its rise hence, that the day of the **Nones** was nine days before the ides, and might be called *Nonidus*.

March, May, July, and October had six days in their **Nones**; by reason thereof alone, in the antient constitution of the year by Numa, had 31 days apiece; the rest having only 29, and February 30.—But when Cæsar reformed the year, and made other months contain 31 days, he did not likewise allot them six days of **Nones**.

NOMUS Humeri Placentini, in anatomy, a muscle, called also *Rotundus minor*. See **ROTUNDUS**.

NORMANNORUM Terra. See the article **TERRA**.

NORMAL Line, in geometry, is used for a perpendicular line. See **PERPENDICULAR** and **SUBNORMAL**.

NORROY, *North Roy*, *q. d.* Northern king; the title of the third of the three kings at arms, or provincial heralds. See **KING at Arms**, and **HERALD**.

His jurisdiction lies on the North side of Trent, whence his name; as Clarencieux, on the South.

NORTH, in cosmography, one of the four cardinal points of the horizon, being that intersection of the horizon and meridian which is nearest our pole.

NORTH Latitude of the Moon. See **LATITUDE**.

NORTH Company. See the article **COMPANY**.

NORTH Dial. See the article **DIAL**.

NORTH East, a rhumb, or point, in the middle between the East and North.

NORTH North East, **North East** and by **East**, are subdivisions of the compass between the North and East. See **WIND**.

NORTH Pole. See the article **POLE**.

NORTH Sea. See the article **SEA**.

NORTH Star, the last in the tail of the little bear; called also the *Pole Star*. See **POLE-STAR**.

NORTH Wall. See the article **WALL**.

NORTH West, is a point, or rhumb, in the middle between the North and West. See **WEST**, &c.

NORTH Wind. See the article **WIND**.

NORTHERN Aspect, or *Exposure*. See **EXPOSURE**.

NORTHERN Light, or *Aurora Borealis*. See **AURORA Borealis**.

NORTHERN Ocean. See the article **OCEAN**.

NORTHERN Signs are those six on the North side of the equator. See **SIGN**.

NORTHERN Hemisphere. See the article **HEMISPHERE**.

NORTHING, in navigation, the difference of latitude, which a ship makes in sailing towards the North pole.

NOSE, the external organ of smelling; or that part in men which stands prominent, in the middle of the face.

The *Nose* is usually divided by anatomists into *external* and *internal*; a division of very little service.

It is farther subdivided into several parts which make up its external figure.

First is the *dorsum*, or ridge, running along the whole length of it; one part whereof, about the middle, more prominent than the rest, is called the *Spine*; and the extreme, which in many is turned round, *Orbicular*.—The sides are called the *Alæ*, or *Pinnæ*.

The teguments of the *Nose* are common to the rest of the face. Under there appear the muscles of the *Nose*, which are three pair, *viz.* the *Elevatoræ Alæ Nasæ*, serving to pull the alæ upwards, and turn them outwards; the *Dilatatoræ Alæ Nasæ*, which draw them from each other, and widen the external apertures of the nostrils; and the *Constrictoræ Alæ Nasæ*, which draw them downwards nearer each other; and at the same time the upper lip also downwards. See each muscle described under its proper head, **ELEVATOR**, **DILATATOR**, &c.

The frame of the *Nose* is chiefly supported by two bones, which end in cartilages of a triangular figure, and are di-

vided in the middle by a third, called *Septum*, into two partitions, called the *Nares*, or *Nasæ*. See **NOSTRIL**.

This septum likewise ends in a cartilage; by means of which cartilages, the lower part of the *Nose* is rendered moveable, which, the upper being perfectly osseous, is not. The cartilages of the alæ are tied to the others by ligaments, which loose connexion renders them moveable.

The bones of the *Nose* are either *proper*, or *common*.—The first of the *proper*, are the two external ones that constitute the dorsum, and are joined to the ossa frontis, the fourth bone of the upper jaw, and to each other, usually *per harmoniam*.

In the concave of the arch of these two bones, at their union internally, is placed the bony part of the septum. Its upper part joins the os ethmoides; but in adults is continued so as the ethmoides, and its process, called *Crista Galli*, appear as a piece with the septum. The septum is thinnest in the middle, and divides the right nostril from the left; though its position is seldom perpendicular. It is capped with another thin bone, from its figure called *Vomer Aratri*, and is joined to the fourth bone of the upper jaw, and to the ossa palati.

The other proper bones are the turbinata, or spongiosa, two of which are usually found in each nostril, sometimes three, placed one over the other.

The middlemost, when there are three, is so placed as to shelter the perforation of the antrum maxillæ superioris into the nostril, and prevent the sudden rushing in of air from the nostril into the antrum. They are all very porous, and turned, not unlike the shell concha veneris. In quadrupeds, these bones are very numerous.

The common bones of the *Nose* are such as make fences for the foramina narium, and help to compose the parts adjacent. The largest of these is the fourth bone of the upper jaw, which has the greatest share in framing the foramina.

These fourth bones, with the septum and ossa turbinata, chiefly frame the internal paries of the foramina. In the upper part, a portion of the os frontis, the inside of the os unguis, the os cribrosum, with part of the sphenoides; and backwards towards the fauces, the ossa palati, help to compose the foramina.

Besides the cavities circumscribed by the bones now mentioned, the foramina have several collateral cavities, that open into them: the largest is that called *Antrum Genæ*; by Dr. Highmore, *Antrum maxillæ superioris*, framed in the fourth bone of the upper jaw, near two inches long, and an inch broad; the bony parts of which, with the sphenoides, make the foramen lacerum externum. Its lower surface makes a thin covering for all the roots of the molares, and canini, which frequently upon drawing a tooth, to which it sticks, is taken along with it, whereby this cavity is opened into the alveolus, and consequently into the mouth.

All these cavities of the *Nose* and cheek, as also the ossa turbinata, septum, &c. are invested with a membrane furnished with large arteries from the carotides; and veins, which empty themselves into the jugulars; and nerves, from the fifth pair, as well as the olfactory nerves.

In this membrane are a great number of small glands, placed very near each other, from whence flows all that pituita, commonly discharged at the nostrils.

By means of this mucus or pituita is the membrane kept soft, and defended from the injuries of extraneous bodies, especially those of the air, which must pass this way in inspiration, when the mouth is shut.

By this means also, the olfactory nerves, here diffused, are rendered capable of the perception of odoriferous effluvia; which the driness of the part would be apt to destroy. See **SMELLING**.

Besides this use of the *Nose*, which is the principal, nature has made it, as it were, a diverticulum to the eyes; there being a considerable passage into each nostril that empties itself under the middle os turbinatum, arising from two apertures, called *Puncta Lacrymalia*, at the great canthus.

By this way, the superfluous moisture of the eyes is carried off, which would otherwise incommode the cheeks; as in effect it does, when those parts are affected with any disorder; as in the æglops, and fistula lacrymalis.

The diseases to which the *Nose* is subject, are a coryza, ozæna, polypus, farcoma, and noli me tangere, beside sneezing, and a loss of smelling. See each in its place.

Amb. Pare, in his 23d book, mentions an Italian surgeon, who had the art of restoring lost *Noses*, or making them come again after they were cut off. His method was to make an aperture in the patient's arm, and there to engraft the mutilated *Nose*; the arm being bound up for 24 days, the *Nose* took root in the wound, and glued itself with the flesh of the arm, and grew to its bulk; which done, he cut off the flesh of the arm, and fashioned the *Nose* to his liking, applied it in its place, and healed the wound at leisure.

This operation we see burlesqued in Hudibras: *So learned Tacticius from—* &c. and also in the *Acta Eruditorum Lipsiæ*, anno M.DC.LXXXIII.

Hagarup, a Dane, maintains, that the *nose* is, in some measure, fitted for an organ of sight; and that a man may see through it; grounding his opinion on the authority of Smeatius: who, in his fifth book of *Medicinal miscellanies*, relates, of his own knowledge, that a youth, quite blind in other respects, could see the light, and was able to discern the whiteness of flowers, by the nose.

But, for our part, we should rather account for these sensations from the faculties of feeling and smelling, than those of seeing: not but there is a very great resemblance between the various organs of sense, enough to give ground to the opinion, that they only differ as more or less delicate; for which reason, we do not absolutely reject the instance given, by Grimaldi, of a man who could distinguish colours by his feeling.

The nerves, whose texture and constitution, for any thing we know, is the same throughout the whole body, are confessedly the vehicles of all the sensations from without; and those are all deposited in the same sensory, whether they be brought from the eye, the ear, or the nose, &c. and that singular apparatus, observable in each organ, seems rather intended for the bene effect, than the effect, of that sense; rather to stop and detain the transient effluvia, to collect them where too scanty, disperse them where too copious, soften them where too rude, and break their force where too violent; and, by this means, to proportion them to the several degrees of fineness, tension, &c. of the nerves of the respective organs, in order to render the sensations adequate to the ends, than really to produce them.

In Tartary, the greatest beauties are those who have the least noses. Ruysbrock mentions the wife of the great Jinghichan, the mother of Tamerlane, as a celebrated beauty, because she had only two holes for a nose. In most other countries, China excepted, great noses are in honour.

The Crim-Tartars break the noses of their children while young, as thinking it a great piece of folly to have their noses flat before their eyes.

NOSOCOMIUM, *Νοσοκομειον*, an hospital, or infirmary, for the reception of the diseased.

NOSOLOGY *, *Νοσολογια*, a discourse or treatise of diseases; otherwise called *pathology*. See **PATHOLOGY**.

* The word is compounded of *νους*, malady, disease; and *λογος*, discourse, reason.

NOSTRILS, *nares*, the two apertures or cavities of the nose, through which the air passes, and which serve to convey odours, and to carry off the pituita separated in the sinus of the base of the cranium.

The nostrils are separated by a cartilage called *septum narium*, and lined with a very sensible membrane. See **SMELLING**.

Cicero observes, that the situation of the nostrils so near the mouth is very convenient, as the judging of the smells of meats and drinks is a great part of their office: he adds, that their erect position argues the Creator's wisdom; in regard all odours rise from below upwards.

NOT guilty, the general issue or plea of the defendant, in any criminal action. See **NON EST CULPABILIS**.

NOT putrid fever. See the article **FEVER**.

NOT vital action. See the article **ACTION**.

NOTABILLIA bona. See the article **BONA**.

NOTARICON, the third part or species of the Jewish cabala.

Rabbi Nathan, in his Great Aruch, says, that *notaricon* is when a single letter is taken for the sign of a thing, i. e. for a whole name.—He adds, that the word comes from the Latin *notarius*, a person who writes in notes, or short-hand: and R. Elias Levita gives the same account in his Thebites; except that, in lieu of one letter for a word, he mentions two or three.

But, after all, neither the one nor the other seems alone sufficient: for as a single letter frequently makes a word; so, in the *notaricon*, a whole word sometimes stands for a single letter.

There are, therefore, two principal kinds of *notaricon*: the first is, when, by apheresis, or apocope, the first or last letters of several words are joined to make a single word, or phrase; which, therefore, is of two kinds; the one initial, the other final; and each is done several ways; viz. either by taking the letters the common way, or backwards: though there is also a third kind made, as the Rabbins call it, by leaps, i. e. by skipping over some letters. The first of these kinds, which the Rabbins call *Rashe Theboth*, appears very antient; and is supposed by some, well versed in the Hebrew, to have taken its origin from the psalms, and other places of Scripture, proceeding alphabetically, i. e. the first verse beginning with א, the first letter of the alphabet; the second with ב, the second letter, &c. See **ABCDARY**.

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The second kind is also very common, and is called *Sophe Theboth*, i. e. the end of words. For instance; by telling the last letters of the words מִיבִי מִיבִי מִיבִי, *Mibi quodnam nomen est?* Quodnam? they find the name of God, Jehovah. This becomes still more puerile, when they take the letters backwards.

The third kind is more modern, and is more gross, and perplexed: here a letter gives a whole word, instead of a word's only giving a letter; so that a word shall furnish a whole phrase.

Thus, for an example, in the first word of Genesis, בְּרֵאשִׁית, *bereschit*, is found, he created the heaven and the earth, the sea, the abyss, &c.

NOTARY, **NOTARIUS**, primarily denotes one who takes notes, or short draughts, of contracts, or other instruments. From the 44th novel of Justinian it appears, that contracts were first wrote in notes, or abbreviations, by the *notarii*, or clerks of the tabelliones; and were not yet obligatory.—Afterwards they were ingrossed, or wrote at length, by the tabellio himself, and then signed and sealed. See **TABELLIO**.

NOTARY is more particularly used to denote an officer who draws and keeps notes and minutes of contracts, obligations, and other instruments, executed before him; and delivers out authentic copies, &c. thereof.

Ragutau distinguishes between *notarii* and *tabelliones*: *notarii*, he says, in several cities, are only to receive and pass the minutes of contracts, and to deliver them to the parties in brief; being obliged to carry them to the tabelliones to be kept, and to have ingrossed copies delivered out to the parties.

He adds, that the *notaries* were antiently clerks of the tabelliones; and that, separating, by degrees, from their masters, they at length erected offices of their own; and, at last, took place of the tabelliones, who were suppressed.

They had their name *notarii* from *note*; because antiently they wrote in notes, or short hand.

Notaries are now little used among us, except in mercantile affairs; though in France they still subsist in their legal capacity.—The *notaries* of the chatelet are called the king's counsellors, and note-keepers.

NOTARY public, among us, is a person who draws, and publicly attests, deeds, or writings, between merchants, to make them authentic in another country.

Notaries have the drawing, passing, keeping, issuing, &c. of all deeds, contracts, charter-parties, &c. in the mercantile world. In their books are registred protests, remonstrances, &c.

Ecclesiastical NOTARIES were officers in the first ages of the church, whose business was, to collect and preserve the acts of the martyrs.

They are supposed to have been first instituted by St. Clement. Their number was seven, and they were disposed in the seven quarters or regions of Rome.

Pope Fabian, judging the short-hand of the *notaries* too obscure for common use, added seven subdeacons to them, to transcribe at length what the *notaries* drew in short.

At length these *notaries* were laid aside, and two other kinds were established in their stead; viz. *apostolical notaries*, and *episcopal notaries*; whose business lies in spiritual and beneficiary instruments.

NOTATION, in arithmetic, the art of characterizing numbers, or of representing them by proper figures.

The choice of arithmetical characters is arbitrary; hence, in various nations, they are various: but, perhaps, there are none so commodious as those commonly used in Europe, usually said to have been invented by the Arabs; and thence called *Arabic characters*: though Dr. Wallis observes, that Altepdi, an Arab, refers the invention to the Indians.

The Greeks, Hebrews, and other eastern nations; as, also, the Romans; expressed numbers by the letters of their common alphabet. See **CHARACTER**.

NOTATION, in algebra, is the representing of quantities by letters of the alphabet; or calling them by those names. See **QUANTITY**, **CHARACTER**, &c.

NOTE, **NOTA**, is used for a character, or abbreviation, serving to denote or express something in a little compass.

The antient notaries wrote all in notes, or short-hand; whence they were sometimes denominated *cursores*, quia notis cursim verba expediebant.

NOTES, in music, are characters which mark the tones, i. e. the elevations and fallings of the voice, or sound; and the swiftness or slowness of its motions. See **SOUND**.

In the general, under *notes* are comprehended all the signs, or characters, used in music, for the marking harmony of sounds.

But, in propriety, the word only implies the marks which denote the degree of gravity, or acuteness, to be given each sound.

NOT

The Greeks used the common letters of their alphabet for musical notes; and, in regard more notes were needed than they had letters, the defect was supplied by the different situation of the letters; viz. by placing them upright, inverted, &c. and by cutting off, or doubling some strokes.

Thus the same letter *pi* expressed different notes in all the following forms; Π , Λ , Γ , Δ , Σ , Φ , Ψ . For every several mode they had no less than 18 signs.

Now Alypius gives us signs for 15 different modes, which, with the differences of the genera, and the distinction between voice and instrument, Mr. Malcolm observes, make, in all, 1620 notes. Not that they had so many distinct characters; but the same character has different significations, on different occasions. Thus ϕ , in the Diatonic genus, is lycanous hypaton of the Lydian mode; and a hypate melon in the Phrygian.

The Latins, in the time of Boethius, had eased themselves of so needless a burden; and only used the first 15 letters of their alphabet for notes: these, pope Gregory, considering that the octave was the same, in effect, with the first; and that the order was the same in the upper and lower octave of the gamut; afterwards reduced to seven; which were to be repeated in a different character.

At length, in the 11th century, a Benedictine, one Guido Aretine, in lieu of the letters, substituted the six syllables, *ut, re, mi, fa, sol, la*; placing them on different lines, and marking them with points. Lastly, it was thought proper to add notes, likewise, in the spaces. See GAMUT.

Of the seven musical notes, *ut, re, mi, fa, sol, la, si*, the first six are ascribed to Aretine, who is said to have invented them at Pomposa, in the duchy of Ferrara: the seventh, *viz. si*, was added, according to some, by Vander Putten; according to others, by De Muris. It serves very good purposes, in avoiding the difficulty of the divisions remaining in Guido's scale.

Indeed Vossius will not allow Guido to have the honour of inventing any of them; but shews, that the Egyptians had used them long before him: in which he is confirmed by the testimony of Halicarnassus. However, common sense ascribes to him not only the notes, but also the lines, letters, or clefs, flats, and sharps.

The notes *ut, re, mi, &c.* he is said to have taken from an hymn, in the vespers of St. J. Baptist; *Ut quant laxis respirare fibris, &c.*

Hitherto the notes only served to express the degree of tune: they were all of equal value, as to time, till about the year 1330. when John De Meurs, or De Muris, a doctor of Paris, gave different figures to the several points, to express the quantity of time each was to be dwelt upon. See TIME.

There are three things to be considered in these notes: 1. The quantity, i. e. the size and figure of the head. 2. The quality, i. e. the colour of the head; whether it be white or black, or full or open. 3. The properties, as the Italians express themselves; viz. whether the note is accompanied with a virgula, or comma, or not. It must likewise be considered, whether the notes be separate and distinct, or bound together.

The several musical notes are, the *large*, which contains 8 measures, though Merfennus makes it 12 (see its figure under CHARACTER); the *long*, containing 4 measures; the *breve*, containing 2; the *semibreve*, containing 1; the *minim*, $\frac{1}{2}$; the *crotchet*, $\frac{1}{4}$; the *quaver*, $\frac{1}{8}$; the *semiquaver*, $\frac{1}{16}$; and the *demisemiquaver*, $\frac{1}{32}$.

Usually we only distinguish six principal notes, represented by as many different characters; viz. the *semibreve*, equal to two minims; the *minim*, equal to two crotchets; the *crotchet*, equal to two quavers; the *quaver*, equal to two semiquavers; and the *semiquaver*, equal to two demisemiquavers. See each under its proper article, SEMIBREVE, MINIM, CROTCHET, &c.

The mathematicians compute, that one may make 720 changes, or varieties, with six notes, without ever repeating the same twice; and that of the notes of each octave one may make 40320 different tunes, or songs.

NOTE is also used for a mark made in a book, or writing, where there occurs something remarkable, and worthy of particular notice.

NOTE is also used for an observation, or explication of some passage in an author, added in the margin, at the bottom of the page, or elsewhere, by an editor.

In this sense, note stands contradistinguished to text.

The notes make the principal difference in the editions of classic, &c. authors.—We have Virgil, Horace, Terence, &c. with Ruæus's notes, the Dauphin's notes, Dacier's notes, Bentley's notes, Hare's notes; with *notis variorum*, &c. See VARIORUM.

NOTE is also a minute, or short writing, containing some article of business.

NOT

In which sense we say, a *promissory note*, a *note under hand*, a *bank note*, &c.

To NOTE a bill, is when a public notary goes as a witness, or takes notice, that a merchant will not accept or pay it. See PROTEST.

NOTE of a fine is a brief of a fine made by the chirographer, before it be ingrossed. See FINE, and CHIROGRAPHER.

NOTÆ maternæ, mother's spots. See NÆVUS.

Natural NOTE. See the article NATURAL.

NOTHÆ costæ, in anatomy, denote the five lowest ribs on each side. They are called *bastard*, or *spurious* ribs, in regard they do not join with the breast-bone, as the other ribs do; nor are they, as the others are, bony, but cartilaginous. See RIBS.

NOTHING, *nihil, nibilum, or non ens.*

The schoolmen distinguish between *nothing* taken *strictly*, which is what is impossible, or implies a contradiction; and *nothing* taken more *generally*, which is both applied to what is possible, and impossible.

Again, they distinguish *nothing* into *negative*, which is the absence of reality in any subject; and *privative*, which is the absence of reality in a subject capable thereof, or wherein it ought to be found.

NOTHUS, *Nobor*, a Latin term, properly signifying a *bastard*, or a person of spurious birth.

Hence it is applied figuratively, by physicians, &c. to such diseases as, though, in respect of a multitude of symptoms, &c. they have the same denomination as some others; yet are of a different origin, seat, or the like, from the same.

NOTHUS is sometimes also used for the back-part of the chest, or thorax.

NOTION, *Notio*, in logic, an idea, or representation of any thing, in the mind.

M. Leibnitz is very accurate in the distinction of notions, in the *Acta erudit. Leip.* anno 1684.

A clear notion, he defines to be such an one as suffices us to recollect the object; v. gr. that a given figure is reckoned in the number of triangles.

An obscure NOTION is that which doth not suffice to recollect the object: such, v. gr. is that of a plant, which, upon seeing, you are in doubt whether or no it be the same you had seen elsewhere, and which is called by this or that name.

Distinct NOTION is that wherein you are able to assign the very marks, or characters, by which you recollect the thing: v. gr. that a circle is a figure terminated with a curve line returning into itself, the several points whereof are equally distant from one and the same intermediate point. See the article DISTINCT.

A confused NOTION is that wherein you are not able to assign the very marks or characters whereby you recollect the object, though it be resolvable into them. Such, v. gr. is the notion of red colour.

An adequate NOTION, that wherein you have distinct notions of the marks or characters whereof it is composed. Such, v. gr. is the notion of a circle above instanced; where you have distinct notions of the curve returning into itself, of the intermediate point, and of the equal distance and termination. See the article ADEQUATE.

An inadequate NOTION that wherein you have only a confused notion of characters that enter a distinct one.

Some confused notions are admitted into mathematics; viz. such whose resolution is of no great consequence to any demonstrations.

Thus, Euclid does not resolve the notion of equality, though it enter the notion of an equilateral triangle, a rhombus, &c. inasmuch as the propositions, for whose demonstration it should be used, are easily granted, without such a detail: as, v. gr. that things equal to the same third, are equal to one another, &c. but no notions are admitted into the number of mathematical definitions, except distinct ones, and those too as adequate as possible, or as occasion requires.

The schoolmen distinguish notions into *formal*, and *objective*; and each of these they subdivide into *first*, and *second*.

A first formal NOTION is the knowledge we have of any thing according to what it is, or has in itself: as the knowledge of fire, *quatenus* fire; of a light body, *quatenus* light, &c.

A first objective NOTION is the thing itself known, according to what it is, or has in itself: as the fire known as fire, &c.

Second formal NOTION is the knowledge of a thing according to what it receives from the understanding: as, of fire, that it is the subject, and not the predicate.

Second objective NOTION is what agrees to the thing by means of the operation of the intellect, or what it receives from the intellect.

Common NOTIONS, called also *Prenotions*, *απορροήσεις*, and *καὶνοίαι*, are certain principles supposed to be innate, and which therefore are self-evident, *i. e.* appear, or are known by their own light, without the intervention of any medium, or proof; being impressed, as it were, by the finger of God; to serve as the foundations of all our conclusions in the sciences, which are to be demonstrated hereby.

These common notions, considered as the foundations of sciences, are called *axioms*.

They are called *common*, not as if so actually and necessarily perceived by every person, that nobody could be ignorant of, or deny them; but because they are judged to be true and certain, by all persons of sound reason. For the same reason as we say, such a food is wholesome; not that it is so to all men, but to all that are of a sound body and constitution. Aristot. *Topic. c. 4.*

There are two kinds of common notions, *viz.* *theoretical*, which lay the ground-work for speculation; such are, every thing either is, or is not; nothing can be made by itself; the whole is greater than a part; equal things being added to equal, the sums are equal: and *practical*, which lay the foundation for honesty, and good morals; such are, God is to be beloved and worshipped; our parents to be honoured; to give every-body their due; to do as we would be done by.

Some philosophers, however, and those even of best note, deny the reality of any innate, or common notions; urging, that the mind does not need any actual notions to prepare it to think, but that an innate faculty of thinking may suffice; as appears in an infant, from its perception of pain, taste, colour, &c. They add, that the common organs of sense, if they have but objects presented to them, and the faculty we have of reflecting on, and variously combining or ordering the ideas received thereby, are sufficient to furnish us with all the flock of knowledge we have.

NOTIONAL Quantity. See the article *QUANTITY*.

NOTITIA, *NOTICE*, something that has come under a person's knowledge or observation.

Hence *notification*, the action of giving notice, &c.

NOTITIA is also the title of certain books, composed for giving a particular knowledge of the places, roads, &c. of a province, kingdom, diocese, or the like.

Such is the *notitia imperii*, &c. M. Valois has given a *notitia galliarum*, being a collection of the several names which the cities and provinces of that kingdom bore at different times.

The *notitia dignitatum imperii*, both eastern and western, are of the utmost use both in the Roman, and in ecclesiastical history; yet are they of little service, at least to young people, without good notes; such are those of Pancirollus, &c. and unless the text, which is strangely corrupted and mutilated, be supplied.

NOTORIOUS, something known, manifest, and public.

Hence,

ARS NOTORIA, a chimerical kind of art, or science, whereby it is pretended that a person may arrive at the knowledge of all things, all sciences, &c. And this by infusion, without any labour or trouble, beside that of performing a few ceremonies.

NOTRE Dame, *Our Lady*, a term frequently used for the Holy Virgin.—Hence, feasts of *notre dame*; the office of *notre dame*; congregations, nunneries, and orders of *notre dame*.

NOVALE*, in our ancient customs, denotes land newly ploughed, and converted into tillage; and which had not been tilled within the memory of man before.

* *Quod novale semel fuit, semper erit novale quoad decimarum retentionem vel solutionem.* What was once *novale*, will ever remain so, as to the paying, or non-paying of tithes. *Excepta decima novallium cuiusdam terræ quam de novo excoluerunt.* Pat. 6 Edward III.

NOVALE is sometimes also used for fallow land, *i. e.* land which has been ploughed for two years, and rests, or lies fallow, one more; or that lies fallow every other year.

NOVATIANS†, *NOVATIANI*, a sect of ancient heretics, so called from *novatus*, an African bishop; or from *novatianus*, a priest of Rome.

† They were called also *catbari*, from *καθαίρεται*, pure, *g. d.* Puritans.

Novatian first separated from the communion of pope Cornelius, on pretence of his being too easy in admitting to repentance those who had fallen off in times of persecution.

Novatus coming to Rome, joined himself to the faction of *Novatian*; and both maintained, that there was no other admission into the church but by the repentance in baptism; grounding their opinion on that of St. Paul: it is impossible for those once enlightened, and who have tasted

the heavenly gift—if they fall away, to renew themselves by repentance.

Not that they denied but a person fallen into any sin, how grievous soever, might obtain pardon by repentance; for they themselves recommended repentance in the strongest terms: but their doctrine was, that the church had it not in its power to receive sinners into its communion; as having no way of remitting sins but by baptism; which, once received, could not be repeated.

In process of time the *novatians* softened and moderated the rigour of their master's doctrine, and only refused absolution to very great sinners.

The two leaders were proscribed, and declared heretics, not for excluding penitents from communion, but for denying that the church had a power of remitting sins.

NOVATION, *INNOVATION*, in the civil law, denotes a change, or alteration of an obligation, whereby it becomes extinguished, or annihilated.

Thus when an obligation is discharged without receiving any money, but a simple promise is accepted in its stead; this occasions a *novation*.

There are two kinds of *novations*; the one *voluntary*, the other *necessary* and constrained.

Necessary NOVATION is that made in consequence of a sentence, or decree of justice.

Voluntary NOVATION is made three ways; *viz.* by changing the cause of the obligation without the intervention of any other person; by changing the nature of the obligation; and by delegation; as when the debtor makes over a debt to the creditor for his satisfaction.

In all these cases there is a will to innovate. Accordingly, Justinian says, *Voluntate, non lege, novandum.*

NOVEL, *NOVELLA*, in jurisprudence, is a term used for the constitutions of several emperors; *viz.* Justin, Tiberius II. Leo, and particularly Justinian.

Most of Justinian's *novels* were originally Greek, and afterwards were translated into Latin. Their number is 165, comprized in nine collections, or chapters. See *CIVIL LAW*.

They had their name *novel*, either from their making a great alteration in the face of the ancient law; or, as Cujas rather thinks, because made on new cases not yet considered; and, after the revival of the code, compiled by order of the emperor.

Where-ever Accursius speaks of *novels*, he means those published in Greek by Justinian: the Latin version of them, made in the time of Bulgarus, he calls *authentics*, by reason of its exactness and fidelity.

NOVEL assignment, in an action of trespass, is an assignment of time, place, or the like, in a declaration, otherwise or more particularly than it was in the writ.

NOVEL disseisin. See *ASSISE of novel disseisin*.

NOVEMBER, the eleventh month in the Julian year, but the ninth in the year of Romulus; whence its name. See *MONTH*, and *YEAR*.

NOVEMSILES, in mythology, a species of gods worshipped among the ancient Romans.

The *dii novemsiiles* were the gods of the Sabines, adopted by Romulus; and had a temple built to them, in consequence of a vow, by king Tatius.

Some antiquaries take the name to have been given to those which were last placed among the number of the gods; as Hercules, Vesta, Sanctity, Fortune, &c.

NOVEMVIRI, an order of magistrates at Athens, nine in number.

The *novemviri* were the chief magistrates of the city: their office only held for one year. Their chief was called *archon*, whose name was recorded in the Athenian feasts; as, at Rome, that of the consuls.

The second bore the title of *basileus*, the third of *polemarcha*, *i. e.* chief of the troops; and the remaining six, of *thesmothetes*.

NOVENDIALE*, or *NOVEMDIALE*, in antiquity, a solemn sacrifice among the Romans, held on occasion of any prodigies appearing to menace them with ill fortune. See *SACRIFICE*.

* It had its name from the term of its celebration; *viz.* *novem dies*, nine days.

NOVICE, a person not yet skilled, or experienced, in an art or profession.

In the ancient Roman militia, *novicii*, or *novitii*, were the young raw soldiers, distinguished by this appellation from the veterans.

In the ancient orders of knighthood there were *novices*, or clerks in arms, who went through a kind of apprenticeship ere they were admitted knights.

NOVICE is more particularly used, in monasteries, for a religious yet in his, or her, year of probation, and who has not made the vows.

In some convents the superior has the direction of the *novices*.—In nunneries the *novices* wear a white veil, the rest a black one.

A *Novice* is not esteemed dead in law, but is capable of inheriting till the time of actual profession; nor can his benefices be taken away during the year of probation, without his consent.

The council of Trent prohibits a *Novice* from assigning over his benefices, till two months before the expiration of his year of probation; and he may even resume them if the profession be null.

A *Novice* is not allowed to make any donation to his superior, by reason of the dependence he is under.—*Novices* may either quit the convent during their *noviciate*, or may be turned off by the convent.

NOVICIATE, a year of probation, appointed for the trial of religious, whether or no they have a vocation, and the necessary qualities for living up to the rule; the observation whereof they are to bind themselves to by vow.

The *noviciate* lasts a year at least; in some houses more. It is esteemed the bed of the civil death of a *novice*, who expires to the world by profession.

NOVICIATE is also used for the houses or places where *novices* are instructed.

In this sense the *noviciate* is frequently a cloister separate from the grand dormitory.

NOUN, **NOMEN**, in grammar, a name or word which expresses the subject spoke of; or expresses a subject whereof something is, or may be affirmed; as man, food, whiteness, Henry, &c.

A *noun* therefore, in language, answers to an idea in logic.

The generality of subjects spoke of have particular names; yet there are others, which, without being attached to the same particular subject, are yet real *nouns*.

Thus, besides the particular name which each person bears, and whereby others denote him, he gives himself another when he speaks of himself; as, *I*, or *myself*.

It is only the more particular names that in grammar have retained the quality of *nouns*; the more general ones are called *pronouns*.

Nouns, again, are to be viewed in another light, viz. as divided into *nouns substantive*, and *nouns adjective*.

They are called *substantives* when the objects they design are considered simply in themselves, and without any regard to their qualities.

They are called *adjectives*, when their objects are considered as clothed with any qualities.

Thus, when I say simply, *the heart*, the word *heart* is called a *noun substantive*, inasmuch as it does not express any of its qualities: but if I say, *the generous heart*, or *the perfidious heart*, I then consider the heart as accompanied with the quality of *generous*, or the quality *perfidious*. For this reason the words *generous* and *perfidious* are called *nouns adjective*, because they add a quality to the object.

But, in effect, the object is alone designed by the *nouns substantive*; which, in this view, are alone the proper *nouns*.

Adjectives, at the bottom, are only the modificatives of *nouns*; though in one view they may be considered as *nouns*; viz. as they do not so much represent a quality or circumstance of the object, as the object itself, clothed with that quality or circumstance. Nor must it be omitted, that a *noun adjective* frequently becomes a *substantive*: for as its nature is to express the quality of an object, if that quality happen to be the object itself spoke of, then, according to our first definition, it becomes a *substantive*.

Thus, if I say *a good intention*, the word *good* is here an adjective, representing the intention as clothed with the quality of goodness; but if I say, *the good is to be chosen*, it is evident that *good* is here the subject spoken of, and of consequence is a *noun substantive*. Nor are there cases wanting, wherein *nouns substantives* become adjectives.

It is true, that in the common use of grammar, many *nouns* that are really adjectives, are not reckoned as such; none being esteemed adjectives but those which without any, or at least any considerable change in their inflexion and termination, are joined indifferently to *nouns substantives* of different genders.

Nouns are again divided into *proper* and *appellative*.

Nouns proper are those which express a particular thing or person, so as to distinguish it from all other things of the same kind; as, Socrates.

Nouns appellative are those common to several individuals of the same kind; as man, angel, &c.

Heterogeneous Nouns are such as are of one gender in the singular number, and of another in the plural. See **HETEROCLITE**.

NOURISHING *Clysters*. See the article **CLYSTER**.

NOURISHMENT. See the article **NUTRITION**.

NOWED, **NOWE**, i. e. *knotted*, in heraldry, is applied to the tails of such creatures as are very long, and sometimes represented in coat-armour, as if tied up in a knot.

NUBECULA, *little cloud*, in medicine, a term sometimes used for a disease in the eye, wherein objects appear as through a cloud, or mist.

The *Nubecula* seems to arise from certain gross particles detained in the pores of the cornea, or swimming in the aqueous humour, and thus intercepting the rays of light.

NUBECULA, or **NUBES**, is also used for what we otherwise call *Albugo* and *Pannus*. See **PANNUS**.

NUBECULA is also used for a matter in form of a cloud, suspended in the middle of the urine—This they sometimes also call *Enaorema*. See **URINE**.

NUBILES *Anni*. See the article **ANNI**.

NUCHA, the hinder part or nape of the neck; called also *Cervix*. See **CERVIX**.

NUCIFEROUS, an appellation given by botanists to trees which bear nuts.

NUCKIANÆ * *Glandule*, in anatomy, a number of small glands, situate in that part of the skull wherein the orbits of the eyes are, between the abducent muscle of the eye, and the upper part of the os jugale. See **GLAND**.

* They were thus denominated from their inventor, Ant. Nuck, professor of physic at Leyden.

The same author gave his name to a salival duct, *ductus Nuckianus*. See **SALIVAL**.

NUCLEUS, a Latin word, literally denoting the kernel of a nut, or stone-fruit; or, more strictly, the edible part contained within the skin of the kernel.

NUCLEUS is also used by botanists, in a larger sense, for any fruit or seed contained within a husk, or shell.

NUCLEUS is also used by Hevelius, and some other astronomers, for the body of a comet, which others call its *head*, in contradistinction to its tail, or beard.

NUCLEUS is also applied by some to the central parts of the earth, and other planets, as supposing them to be loose from the exterior part, which they consider as a cortex, or shell.

NUCLEUS, in architecture, denotes the middle part of the flooring of the antients, consisting of a strong cement, over which they laid the pavement, bound with mortar.

NUDE *Compact*, *Nudum Pactum*, a bare contract, engagement, or promise of a thing without any consideration: *Ex quo*, say the lawyers, *non oritur actio*. See **CONTRACT**.

NUDE Matter denotes a bare allegation of a thing done. See **MATTER**.

NUDITIES, in painting and sculpture, denote those parts of a human figure not covered with any drapery; or those parts where the carnations appear.

NUEL, or rather **NEWEL** of a stair-case. See **NEWEL** and **STAIR-case**.

NULLITY, the quality of a thing null, that is, void, and of no effect, by reason of something contrary to law, custom, or form.

There are two kinds of *nullities* to invalidate a contract, or other instrument, viz. *de facto*, and *de jure*.—The former where the thing commences *null, ipso facto*, as soon as the thing is proved: in the latter the act does not immediately become *null*, but a handle is given thereby to have it intirely annulled or set aside.

NUMBER, in arithmetic, a collection or assemblage of several units, or several things of the same kind.

Stevinus chuses to define *number* as that whereby the quantity of any thing is expressed: agreeably to which Sir Isaac Newton conceives *number* to consist, not in a multitude of units, as Euclid defines it, but in the abstract ratio of a quantity of any kind to another quantity of the same kind which is accounted as unity. And on this view he divides *number* into three kinds, viz. *Integers*, *Fractions*, and *Surds*. See each under its proper article, **INTEGER**, **FRACTION**, and **SURD**.

Wolffius defines *number* to be something which refers to unity, as one right line refers to another.—Thus, assuming a right line for unity, a *number* may likewise be expressed by a right line.

A less general definition of *number* that author thinks will not comprehend the several kinds of whole numbers, fractions, rationals, and surds.

The schoolmen, keeping to Euclid's definition, hold *number* to consist of *matter* and *form*: the *matter* is the things numbered; e. gr. coins: the *form*, the idea whereby comparing the several pieces, we bring them into one sum, as ten: so that *number* depends altogether on the mind of the person that numbers; whence, changing the idea at pleasure, an hundred men shall only be called one, or it shall be two, or four, &c.

Hence, say they, the form of a *number* is not any thing added to the things numbered; for the idea is a mere mode of the mind, not any thing superadded to the things. And hence, though there may be some efficacy in *number*, considered

sidered with respect to the matter, as when we say, A triple rope is not easily broken; yet there is none in respect to form: For what alteration should my idea make? And hence the folly of the philosophy of Numbers.

The same philosophers call *Number* a discrete Quantity: Quantity, as it admits of more and less; and discrete, since the several units it consists of are not united, but remain distinct.

For the manner of designing or characterizing NUMBERS. See NOTATION.

For that of expressing or reading those already characterized. See NUMERATION.

For the measure of a NUMBER. See the article MEASURE. Mathematicians, considering *Number* under a great many circumstances, different relations, and accidents, make many kinds of *Numbers*.

A determinate NUMBER is that referred to some given unit; as a ternary, or three: which is what we properly call a *Number*.

Indeterminate NUMBER is that referred to unity in the general; which is what we call *quantity*. See QUANTITY.

Homogeneous NUMBERS are those referred to the same unit. See HOMOGENEAL.

Heterogeneous NUMBERS, those referred to different units.

For every *Number* supposes some determinate unit, which is determined by the notion to which we have regard in numbering: *e. gr.* it is a distinguishing property of a sphere, that the several points of its surface are equidistant from its centre: If then, this be laid down as a note of unity, all bodies to which it agrees will have the nature of unity; and are the same unit, *quatenus* contained under this notion. But if spheres be distinguished, *e. gr.* with regard to the matter they are composed of, then those which before were the same units, commence different. Thus, fix golden spheres, and three silver spheres are *homogeneous Numbers* among themselves; and three brass spheres and four silver ones are *heterogeneous Numbers*.

Whole NUMBERS, called also *natural Numbers*, and *integers*, or simply *Numbers*, are all the various assemblages of unity, or the ideas we have of several multitudes; or, according to Wolfius, all those which, in the manner of expressing, refer to unity, as a whole does to a part.

Broken NUMBERS, or *Fractions*, are those consisting of several parts of unity; or those which refer to unity as a part to the whole. See FRACTION.

Rational NUMBER is that which is commensurable with unity.

Rational whole Number is that whereof unity is an aliquot part. — *Rational broken Number*, that equal to some aliquot part or parts of unity. — *Rational mixed Number*, that consisting of a whole *Number* and a broken one, or of unity and a fraction.

Irrational NUMBER, or *Surd*, a *Number* incommensurable with unity. See SURD.

Even NUMBER, that which may be divided into two equal parts, without remainder or fraction; as 4, 6, 8, 10, &c. The sum, as also the difference, and the factum or produce of any number of even *Numbers*, is always an even *Number*.

An even *Number*, multiplied by an even *Number*, produces an evenly even *Number*.

An even *Number* is said to be evenly even, when it may be measured or divided without any remainder by another even *Number*.

Thus, twice four being eight, eight is an evenly even *Number*.

A *Number* is said to be unevenly even, when it may be equally divided by an uneven *Number*; as 20, which may be divided by 5.

Uneven NUMBER, that which exceeds an even *Number* at least by unity; or which cannot be divided into two equal parts. Such are 3, 5, 9, 11, &c.

The sum, or the difference, of two uneven *Numbers*, makes an even *Number*; but the factum of two makes an uneven one.

If an even *Number* be added to an uneven one, or if the one be subtracted from the other; in the former cases, the sum, in the latter the difference, is an uneven *Number*. But the factum of an even and uneven *Number*, is even.

The sum of any even *Number* of uneven *Numbers* is an even *Number*; and the sum of any uneven *Number* of uneven *Numbers*, is an uneven *Number*.

Primitive or prime NUMBER is that which is only divisible by unity; as 5, 7, 11, &c. See PRIME and INCOMPOSITE.

Prime NUMBERS among themselves are those which have no common measure beside unity; as 12 and 19.

Compound NUMBER is that divisible by some other *Number* besides unity; as 8, divisible by 4 and by 2.

Compound NUMBERS among themselves, those which have some common measure besides unity; as 12 and 15.

Perfect NUMBER, that whose aliquot parts added together, make the whole *Number*; as 6, 28, &c. The aliquot parts

of 6, being 3, 2, and 1=6. And those of 28, being 14, 7, 4, 2, 1, which together make 28.

Imperfect NUMBERS, those whose aliquot parts added together make either more or less than the whole, whereof they are parts.

Imperfect NUMBERS are distinguished into abundant and defective.

Abundant NUMBERS are those whose aliquot parts, added together, make more than the *Number* whereof they are parts; as 12, whose aliquot parts, 6, 4, 3, 2, 1, make 16. See ABUNDANT.

Defective NUMBERS are those whose aliquot parts, added together, make less than the *Number* whose parts they are; as 16, whose aliquot parts, 8, 4, 2, and 1, only make 15.

Plain NUMBER, that arising from the multiplication of two *Numbers*; *e. gr.* 6, which is the product of 3 multiplied by 2. The *Numbers*, which thus multiplied, produce a plain *Number*, as here, 2 and 6 are called the *sides* of the plane.

Square NUMBER, the product of any *Number* multiplied by itself; thus 4, the factum of 2 by 2, is a *square Number*. See SQUARE.

Every *square Number*, added to its root, makes an even *Number*.

Cubic NUMBER, the product of a *square Number*, multiplied by its root; *e. gr.* 8, the product of the *square Number* 4, multiplied by its root 2.

All *cubic Numbers*, whose root is less than 6, *v. gr.* 8, 27, 64, 125, being divided by 6, the remainder is their root itself. Thus 8 being divided by 6, 2, the remainder of the division is the cube root of 8. For the *cubic Numbers* beyond 125; 216, the cube of 6, divided by 6, leaves no remainder; 343, the cube of 7, leaves a remainder 1, which added to 6, gives the cube root of 343. And 512, the cube of 8, divided by 6, leaves 2, which added to 6, makes the cube root of 512. So that the remainders of the divisions of the cubes above 216, divided by 6, being added to 6, always give the root of the *cubic Number* divided; till that remainder be 5, and of consequence 11 the cube root of the *Number* divided: But the *cubic Number* above this, being divided by 6, there remains nothing, the cube root being 12. Thus, if you continue to divide the higher cubes by 6, you must not add the remainder of the division to 6, but to 12, the first multiple of 6; and thus coming to the cube of 18, the remainder of the division must not be added to 6, nor to 12, but to 18: and so in infinitum.

Monf. de la Hire, from considering this property of the *Number* 6, with regard to *cubic Numbers*, found that all other *Numbers* raised to any power whatsoever, had each their divisor, which had the same effect with regard to them, that 6 has with regard to cubes. And the general rule he has discovered is this: If the exponent of the power of a *Number* be even, *i. e.* if that power be raised to the 2d, 4th, 6th, &c. power, it must be divided by 2; and the remainder, if there be any, added to 2, or to a multiple of 2, gives the root of the *Number* corresponding to its power, *i. e.* the 2d or 6th root, &c. But if the exponent of the power of the *Number* be uneven, *i. e.* if it be raised to the 3d, 5th, 7th, &c. power, the double of that exponent will be the divisor, which shall have the property here required.

Polygonous NUMBERS, the sums of arithmetical progressions beginning with unity. These, where the common difference of terms is 1, are called *triangular Numbers*. See TRIANGULAR. Where 2, *square Numbers*; where 3, *pentagonal Numbers*; where 4, *hexagonal Numbers*; where 5, *heptagonal*. See HEPTAGONAL and POLYGONAL.

Pyramidal NUMBERS. The sums of polygonous *Numbers*, collected after the same manner as the polygons themselves are gathered out of arithmetical progressions, are called *first pyramidal Numbers*.

The sums of the first pyramids are called *second pyramids*. The sums of the second pyramids are called *third pyramids*, and so on.

In particular, they are called *triangular pyramidal Numbers*, if they arise out of *triangular Numbers*. *First pentagonal pyramidal*, if they arise out of *pentagons*, &c.

Cardinal NUMBERS, those which express the quantity of units; as 1, 2, &c.

Ordinal NUMBERS, those which express their order or rank; as 1st, 2d, 3d, &c.

Absolute NUMBER. See the article ABSOLUTE.

Abstract NUMBERS. See the article ABSTRACT.

Amiable NUMBERS. See the article AMIALE.

Artificial NUMBERS. See the article ARTIFICIAL.

Binary NUMBER. See the article BINARY.

Circular NUMBERS. See the article CIRCULAR.

Concrete NUMBERS. See the article CONCRETE.

Linear NUMBERS. See the article LINEAR.

Mixt NUMBER. See the article MIXT.

Similar NUMBERS. See the article SIMILAR.

GOLDEN NUMBER, in chronology. See **GOLDEN NUMBER**.

M. Callini defines the *Golden Number* by the number of years elapsed since that which had the new moon on its first day; as that of the year 1500, whose *Golden Number* was 0; which he takes for his epocha.

GOLDEN NUMBER is also used with somewhat less propriety, for a period of 19 years, invented by Meton the Athenian; at the end whereof, the same lunations return in the same days, though not precisely in the same hour and minute of the day.

In which sense, *Golden Number* amounts to the same with what we otherwise call *lunar cycle*, or *metonic year*.

Hence this period, called by the Greeks *Enneadecaeteris*, is not perfectly just; there being a proemptions, or leap, at the end of each 312 years, i. e. in that time, the lunations fall out a day sooner than the *Golden Number* expresses them.

This, among other things, was what engaged pope Gregory XIII. to reform the calendar, to throw out the *Golden Number*, and substitute the cycle of epacts instead of it. For the use of the *Golden Number*, which, in the Julian calendar, serves to find the new moons, only serves in the Gregorian to find the cycle of epacts.

This *Number* is said to have had its name, *Golden*, from the greatness of its use; or otherwise because the Athenians received it with so much applause, that they had it wrote in the public market in letters of gold.

NUMBER, in grammar, is a modification of nouns, verbs, &c. to accommodate them to the varieties in their objects, considered with regard to *Number*.

Nouns or names agreeing to several things may be considered either as applied to one of those things singularly, or to a *Number* of them; and those either considered as several, or as united.—To distinguish these cases, two *Numbers* have been invented, the *singular* and *plural*.

When a noun indicates an object considered as single, or alone, or a number of them considered as united together, it is said to be of the *singular Number*: as, a tree, a troop, a temple.

When it indicates several objects, and those as distinct, it is of the *plural Number*: as trees, or temples.—Thus when I speak of myself, as making part of several others, instead of I, I say, we, &c.

The Greeks have a third *Number*, which they call the *dual Number*, as signifying two.—The Hebrews have something like it; but then it only takes place when the words signify a thing double either by nature, as the hands, the eyes, &c. or by art, as scissars, tongs, &c.

As to common and appellative names, they seem all naturally to require a *plural Number*; yet are there several which have none, as the names of gold, steel, &c.

The difference of *Numbers* in nouns is expressed by a difference of termination, or ending.

In English, the *singular* is usually converted into *plural*, by adding s; as tree, trees; hand, hands, &c. Where the pronunciation requires it, as when the *singular* ends in s, or x, fh, or ch, it is usually done by the addition of es instead of s.

The *plural* of adjectives, though varied from the *singular* in most other languages; yet in English are generally the same.

NUMBERS, in poetry, oratory, music, &c. are certain measures, proportions, or cadences, which render a verse, period, or song, agreeable to the ear.

Poetical and prosaic *Numbers* are somewhat different.

POETICAL NUMBERS consist in a certain harmony, in the order, quantities, &c. of the feet and syllables; which make the piece musical to the ear, and fit for singing; for which all the verses of the antients were intended. See **RHYTHM**.

It is of these *Numbers* Virgil speaks in his fourth eclogue:

—Numeros memini si verba tenerem.

And again, in the sixth eclogue:

Tum vero in Numerum faunsque ferasque videres

Ludere—

The *Numbers* are what constitute the air and character of a verse; and denominate it *smooth*, or *soft*, or *low*, or *rough*, or *sonorous*. The following lines of Milton furnish an instance of soft easy *Numbers*.

Then feed on thoughts, which voluntary move
Harmonious Numbers; as the tuneful bird
Sings darkling, and in shades covert bid,
Tunes her nocturnal note—

How different from the *Numbers* of these:

Arms meet with arms, fauchons with fauchons clash,
And sparks of fire, struck out from armour, flash.

Rhetorical, or prosaic NUMBERS, are a sort of simple unaffected harmony, less glaring than that of verse; yet such as is perceived, and affects the mind with pleasure.

The *Numbers* are that by which the style is said to be easy, free, round, flowing, &c. See **STYLE**.

A fine instance of *Numbers* we have in that passage of Tully for Marcellus: *Nulla est tanta vis, tantaque copia qua non ferro ac viribus debilitari frangique possit*. All the beauty of which would be intirely lost to any tolerable ear, if the *Numbers* were a little inverted, thus: *Nulla est vis tanta, & copia tanta qua non possit debilitari frangique viribus & ferro*.

Numbers are a thing absolutely necessary in all writing, and even in all speech. Hence Aristotle, Tully, Quintilian, &c. lay down abundance of rules as to the best manner of intermixing dactyls, spondees, anapests, iambus's, choriac and dichoriac molossus's, &c. in order to have the *Numbers* perfect.

The substance of what they have said, is reducible to what follows. 1. The style becomes numerous, by the alternate disposition and temperature of long and short syllables; so, as that the multitude of short ones neither render it too hasty, nor that of long ones too slow and languid.—Thus, Tully to Cæsar: *Domuisti gentes immanitate barbaras, multitudine innumerabiles, locis infinitas, omni copiarum genere abundantes*, &c.

Sometimes, indeed, long or short syllables are designedly thrown together, without any such mixture; to paint the celerity or slowness of a thing by that of the *Numbers*; as,

Quadrupedante putrem sonitu quatit ungula campum.

Æneid. l. 8.

Lucantes ventos, tempestatesque sonoras.

Id. l. 1.

2. The style becomes numerous by the intermixing words of one, two, and more syllables; e. gr. *Vivis*; & *vivis non ad deponendam sed ad confirmandam auidaciam*. Whereas the too frequent repetition of monosyllables renders the style pitiful, and grating: e. gr. *Hac in re nos hic non ferit*.

3. It contributes greatly to the numerousness of a period, to have it closed by magnificent and well-sounding words; as, *Qui locus quietis ac tranquillitatis plenissimus fore videbatur, in eo maxima molestiarum, & turbulentissima tempestates extiterunt*.

4. The *Numbers* depend not only on the nobleness of the words in the close, but of those in the whole tenor of the period: as in that fine oration of Cicero for Fonteius, a brother of one of the vestal maids: *Nolite pati, judices, aras deorum immortalium, vestraque matris, quotidianis virginum lamentationibus de vestro judicio commoveri*.

5. To have the period flow easily and equably, the harsh concurrence of letters and words is to be very studiously avoided, particularly the frequent meeting of rough consonants; as *ars studiorum, rex Xerxes*. The beginning the first syllable of a word with the last of the preceding; as, *Res mihi invisse sunt*. The frequent repetition of the same letter or syllable; as in that verse of Ennius, *Asiæ terribili tremuit horrida terra tumultu*: And the frequent use of like-ending words; as *amatrices, adjutrices, præsignatrices fuerunt*.

Lastly, The utmost care is to be taken, left in aiming at oratorical *Numbers*, you should fall into poetical ones; and instead of prose, write verse; which even Cicero himself is sometimes guilty of: witness *Cum loquitur, tanti fletus gemitusque fiebant*.

NUMERAL LETTERS, those letters of the alphabet which are generally used for figures; as I, V, X, L, C, D, M.

NUMERAL CHARACTERS. See the article **CHARACTER**.

NUMERALS, in grammar, are those words which express *Numbers*; as six, eight, ten, &c. See **ORDINALS**.

NUMERATION, in arithmetic, the art of estimating or pronouncing any *Number*, or series of *Numbers*.

The characters whereby numbers are ordinarily expressed, are the nine following ones, viz. 1, 2, 3, 4, 5, 6, 7, 8, 9. It being the law of the common *Numeration*, that when you are arrived at ten, you begin again, and repeat as before; only expressing the number of tens.

Weigelius, indeed, shews how to number without going beyond a quaternary, i. e. by beginning to repeat at each fourth, And Leibnitz, in what he calls his *binary arithmetic*, begins to repeat at every second; only using two characters, 1 and 0. But these are rather matters of curiosity than use. See **BINARY ARITHMETIC**.

That the nine numerical notes may express not only units, but also tens or decads, hundreds or centuries, thousands, &c. they have a local value given them; so, as that when either alone, or when placed in the right-hand place, they denote units; in the second place, tens; in the third, hundreds: in the fourth, thousands.

Now, To express any written number, or assign the proper value to each character; divide the proposed number by comma's into classes, allowing three characters in each class; beginning at the right-hand. Over the right-hand figure of the

the third class, add a small mark or transverse line; over the right-hand figure of the fifth class, add two marks or transverse lines; over that of the seventh, three, &c. The number to the left of the first comma, expresses by thousands; that which has over it the first transverse line, expresses by millions; that with two, by billions; that with three, by trillions, &c. Lastly, the left-hand character of each class, expresses by hundreds; the middle one by tens; and the right-hand one, by units. Thus will the *Numeration* be effected.

E. gr. The following numbers, 2⁰⁰, 125, 473⁰⁰, 613, 578⁰⁰, 432, 597, is thus expressed or read: Two trillions, one hundred twenty five millions of billions, four hundred seventy three billions, six hundred thirteen thousands of millions, and five hundred seventy eight millions, four hundred and thirty two thousand, five hundred and ninety seven.

NUMERATOR, in speaking of fractions, signifies the number which shews how many of those parts, which the integer is supposed to be divided into, are expressed by the fraction.

The *Numerator* is that part of a fraction which is placed over the little bar: by which it is separated from the under number, called the *Denominator*, and which shews into how many parts the integer is divided.

Thus, *v. gr.* $\frac{7}{10}$ expresses seven tenths; where 7 is the *Numerator*, and 10 the denominator. See **FRACTION**.

NUMERICAL, **NUMEROUS**, or *Numeral*, something that relates to number.

NUMERICAL Algebra is that which makes use of numbers, instead of letters of the alphabet.

NUMERICAL difference is the difference whereby one individual is distinguished from another.

Hence a thing is said to be *Numerically* the same, *idem numero*, or *numeric*, when it is the same in the strictest sense of the word. See **UNITY**, and **IDENTITY**.

NUMERO, in commerce, &c. a term prefixed to any number of things; marked or abbreviated thus, N^o. See **BOOK**.

De NUMERO, *i. e.* by tale, is used in ancient authors for the payment, *e. gr.* of a pound in a certain number of pieces, *viz.* 20 shillings.

In contradistinction to *Libra pensa*, or a pound weighed out.

NUMEROUS Arithmetic. See **ARITHMETIC**.

NUMEROUS Exegesis. See the article **EXEGESIS**.

NUMISMATOGRAPHIA, a Greek term used for the description and knowledge of ancient medals and coins, whether of gold, silver, or brass.

Fulvius Ursinus, Ant. Augustinus, bishop of Saragosa, Erizzo a noble Venetian, and Sambucus a Polish gentleman, have all succeeded in the *Numismatographia*.—Nor must the more modern authors on the same subject be omitted; *viz.* the two Mezzabarba's, Patin, Spanheim, Hardouin, Morel, Vaillant, Joubert, Baudelot, Beger, and among ourselves Evelyn.

NUMMUS, or **NUMUS**, among the Romans, a particular piece of money, otherwise called *Sestertius*. See **SESTERTIUS**.

This was sometimes called *Numus sestertius*.—*Decem millia nummum*, & *decem millia sestertium*, were Roman sums, which amounted to the same.

NUN*, **NONNA**, a word antiently used for a female religious; and still retained in that sense in our language; and in other languages, particularly the French, but by way of ridicule and buileique.

* The word comes from *nonna*, *nonnana*, or *nonnanis*, all Latin terms, first used for penitents, then for religious.—Borel derives it from *nonno*, or *nonna*, which in Italian signifies grandfather, or grandmother; and adds, that it was applied by way of honour to the woman, as that of father to the man, religious. See **FATHER**.

Hence also *nunnery*, a monastery of female religious.

NUNCIO, or **NUNTIO**, an ambassador from the pope to some catholic prince or state; or a person who attends, on the pope's behalf, at a congress, or an assembly of several embassadors.

The word *Nuncio* has the same import with embassador; but is restrained in its use to the embassadors of popes alone; as that of *internuncio* is to their envoys extraordinary. Branton informs us, that when he first came to court, the *Nuncio* had only the title of embassador.

The *Nuncio* has a jurisdiction, and may delegate judges, in all the states where he resides, except in France, where he has no authority but that of a simple embassador.

NUNCUPATIVE, in the schools, a term used to express something that is only nominal, or has no existence but in name.

Felix of Urgel maintained, that Jesus Christ, as man, was only God *Nuncupatively*, *i. e.* nominally. Alcuin, in his answer to Felix, maintains, that it is to fall into Nestorianism to distinguish two Sons of God in Jesus Christ, the

one natural, the other adoptive; and two Gods, the one real, the other *Nuncupative*.

NUNCUPATIVE Will denotes a last will or testament only made verbally, or *viva voce*, and not put in writing. See **WILL**, and **TESTAMENT**.

NUNDINAL, **NUNDINALIS**, a name which the Romans gave to the eight first letters of the alphabet, used in their calendar.

This series of eight letters, A, B, C, D, E, F, G, H, is placed and repeated successively from the first to the last day of the year; one of these always expressed the market-days, or the assemblies called *Nundinae*, *quasi novendinae*, because they returned every nine days.

The country people, after working eight days successively, came to town the ninth, to sell their several commodities, and to inform themselves of what related to religion and government.

Thus the *Nundinal* day being under the letter A, on the 1st, 9th, 17th, and 25th days of January, &c. the letter D will be the *Nundinal* letter of the year following.

These *Nundinals* bear a very great resemblance to the dominical letters; which return every eight days, as the *Nundinals* did every nine. See **DOMINICAL Letter**.

NUNTIO. See the article **NUNCIO**.

NUPER Obiit, in law, a writ which lies for a coheirefs being deformed by her coparcener of lands or tenements, whereof their common father or ancestor died seised in fee-simple.

If the ancestor died seised in fee tail, the co-heirefs deformed shall have a *formedon*.

NUPTIAL, something that relates to marriage. See **MARRIAGE**.

NURSERY, in gardening, denotes a seminary, or seed-plot for raising young trees, or plants.

Some authors make a difference between *Nursery* and *seminary*, holding the former not to be a place wherein plants are sown; but a place for the reception and rearing of young plants, which are removed, or transplanted hither from the seminary, &c.

Mr. Lawrence recommends the having several *Nurseries*, for the several kinds of trees: one for tall standards; *viz.* apples, ashes, elms, limes, oaks, pears, fycumores, &c. Another for dwarfs, *viz.* such as are intended for apricots, cherries, peaches, plums, &c. and a third for ever-greens.

The *Nursery* for standards should be in a rich, light soil, sown, with the proper seeds, in October, or November. For apples and pears, crab, and wild pear kernels are to be preferred for stocks: elms and lime are to be raised from planted suckers: and walnuts to be sown with the green shell upon them, to preserve them from mice. This *Nursery*, if it be well managed and weeded for two years, the crabs and pears will be fit for grafting and inoculating the third year.

Firs and pines are to be raised from those little seeds, taken out of their large apples.

The *Nursery* for dwarfs does best by itself, that it may not be over-topped by taller trees. Stones of apricots and peaches are not proper to raise those trees; but in lieu thereof, sow the stones of the pear-plum, musfel or bonum magnum plum; which prove better, and more lasting, than the former. For stocks for all sorts of cherries, black cherry-stones do best.

Mr. Mortimer directs all stone-fruit to be sown quickly after gathering; for that if they be kept, they will be two years ere they come up. Add, that, if they have not all the moisture of the winter to rot the shells, the kernel will scarce come up at all.

To furnish the *Nursery* of ever-greens, the several sorts of seeds or berries, as yew, holly, juniper, &c. are to be put in so many distinct pots or boxes, with some fine mould over them, and thus buried for a year; after which, they are to be taken out and sown.

If they were to be sown when gathered, like other seeds, they would not come up the first year, nor grow so kindly.

NUSANCE*, **NOCUMENTUM**, in law, is used not only for a thing done to the hurt, or annoyance of another, in his lands, or tenements; but also for the affize, or writ lying for the same.

* The word is derived from the French, *nuire*, to hurt.

Manwood makes three kinds of *Nusances* in the forest; the first, common *Nusance*; the second, special *Nusance*; the third, general *Nusance*.

The writ of *Nusance*, *de nocumento*, is either simply *de nocumento*, or *de parvo nocumento*.

Writs of *Nusances* are now properly termed *Trespas*, and actions upon the case.

NUT, **NUX**, a sort of fruit, inclosed in a hard cortex, or shell; which contains a softer edible nucleus, or kernel.

Of these we have divers kinds; small nuts, filberds, chefnuts, walnuts, &c.

NUTATION, in astronomy, a kind of trepidation, or tremulous motion of the axis of the earth; whereby, in each annual revolution, it is twice inclined to the ecliptic; and as often returns to its former position.

That the moon has the like motion, is shewn by Sir Isaac Newton, in the first book of his *Principia*; but he observes withal, that this motion must be very small, and scarce sensible.

NUTMEG, *Nux Moschata*, a delicate kind of aromatic fruit, or spice, brought from the East-Indies; whereof there are distinguished two kinds, the *male* and *female*.

The *female* is that chiefly used among us: its form is round, its smell agreeable, and its taste hot and pungent.

The *male* is a wild nut, of a longish form, and without either taste or smell; yet sometimes put off, while yet in the fruit, for the *female*.

Nutmegs are inclosed in four different covers: the first, a thick fleshy coat, something like that of our walnuts. Under this lies a thin reddish coat, of an agreeable smell, and aromatic taste, called *Mace*; by others, though improperly, *flower of Nutmeg*. This wraps up the shell, and opens in proportion as the fruit grows. The shell which makes the third cover, is hard, thin, and blackish. Under this is a greenish film of no use: and in this is found the *Nutmeg*, which is properly the kernel of the fruit.—Every *Nutmeg* has a little hole in it, which some ignorantly take for a defect.

The best *Nutmegs* are those gathered in April. They must be chosen heavy, of a whitish brown colour, well marbled without side, reddish within, having a fat unctuous moisture, and an agreeable smell.

As to the *mace*, it must be chosen in large blades of a high colour, and like the *Nutmeg* in taste and smell.

Nutmegs preserved green are excellent to fortify the stomach, and restore the natural heat. They are particularly esteemed carminative.—The powder called *Dukes powder*, esteemed a sovereign against rheums, is only *Nutmeg* pulverized with sugar, and a little cinnamon.—*Nutmegs*, by distillation, or expression, yield an oil of great fragrantcy, and use in medicine.

The whole commerce of *Nutmegs* is in the hands of the Dutch East-India company.—The *Nutmeg* tree is propagated after a particular manner: Tavernier tells us, that the birds devouring the *Nutmeg* when ripe, give it back whole by stool; and that thus falling down to the ground, besmeared with a viscous matter, it takes root, and produces a tree.

NUTRITION, in the animal oeconomy, the accession or apposition of new parts to the body, similar to those it already consisted of; either for its augmentation, or for the reparation of such as are worn off.

By the continual motion of the fluids in the minute vessels of the body, and the action of the muscles, &c. small parcels are of necessity worn off from the solids, become mixed with the fluids, move with them, and are at length eliminated and exhaled through the pores.

And at the same time the fluids, diminished as they are by a constant attrition, apply to the orifices of the perspiring vessels, and vanish out of the body.

Hence the animal body, by the very condition of its frame, becomes soon liable to destruction.

To preserve life, therefore, it is necessary, that a restitution be made to the juices and solids of the body, equal and similar to what is lost in those motions; which is what we call the *action of Nutrition*.

Now the lost juices are easily supplied by meat, drink, air, &c. taken into the stomach, digested, converted into chyle, then into blood, and thence secreted by the proper ducts, and carried by the action of the body, to the proper receptacles; after the manner laid down under the articles **DIGESTION**, **CHYLIFICATION**, **SANGUIFICATION**, and **SECRETION**.

But the *Nutrition* of the solid parts is much more obscure. This indeed has proved the subject of infinite doubts and differences among authors; nor had we any rational or satisfactory account of the same, till that of the accurate Boerhaave, whose doctrine is as follows.

Every solid part of the body consists of other lesser ones, in all respects like the larger; vessels, *v. gr.* of vesicles, and those of others still smaller; bones of ossicles, &c. Which structure goes beyond all limits of sense, however assisted by art; as appears by the experiments and observations of Malpighi, Ruych, Leewenhoeck, and Hook. Yet it is scarce possible this division and subdivision should be infinite, as that of fluids and juices is.

Again, it appears from microscopes, injections, small wounds, excisions, &c. that the solid parts of the body are very

small, compared with the fluids; and it is almost demonstrable from considering the rise and generation of the vessels, and the resolution of the greater vessels into their smaller constituent ones, that all the solid parts of the body is constructed of mere nerves, as its elements.

And, in effect, all this mass, an incredibly small particle only excepted, at first arose out of what was a very small coagulum, much like the nervous juice itself; as is abundantly shewn by the great Malpighi in his two treatises on incubated eggs. For neither does the white of the egg nourish, till, by means of the incubation, it have passed innumerable degrees of fluidity, from its first thickness to that exceeding subtilty wherein it terminates. But, even then, the liquor thus given to the embryo is exceedingly thick, in comparison with what it is to be, when converted into its vessels and viscera.

Now the first tender solids, arising from this subtle humour, do again pass infinite intermediate degrees, ere they arrive at their utmost state and consistence; as is shewn by Malpighi in eggs, and by Ruych in embryo's and foetus's. Hence, therefore, it follows, that the solids, in their first formation out of the liquids whence they arise, only differ from them in rest, cohesion, and figure. Therefore such a particle, now in its fluid state, will become a part of the solid to be formed out of it, as soon as there happens to be a power to effect its cohesion with the other solid parts; howsoever that cohesion be effected.

This cohesion is easily produced in a fibre already formed, if there happen to be a proper cavity in the solid, left open by some lost particle, and at the same time a particle in the fluid, answerable thereto in bulk, figure, and nature; and, lastly, if there be a power wherewithal to intrude it into that place, or accommodate it thereto. Thus will arise a real *Nutrition* of the solids in the minute vessels, by whose union the large ones are formed; that is, in the nerves, or in vessels similar thereto. Which being impracticable by any other liquid than that brought into these vessels, it appears very evident that the nervous juice, at least a juice perfectly like it, is the immediate matter of *Nutrition*: whence *Nutrition* appears one of the last and most perfect actions in the body; since to have this laudable, all the precedent actions must of necessity have been so.

The chyle therefore, which some make the immediate matter of *Nutrition*, is, indeed, fitted to fill the larger vessels, but it cannot nourish or restore them. This, when attenuated, changed, more intimately mixed in the lungs by means of respiration, and thus fitted for the passage of certain vessels, is, indeed, rendered fitter, yet far from being quite fit, to be the matter of *Nutrition*.

But, by the repeated action of the lungs, the viscera, vessels, &c. there is formed out of this humour, a soft, tenacious, plastic, insipid serum, which thickening by the fire, becomes perfectly like the white of an egg. This fluid therefore has in it all the conditions found in that from whence, by sure experience, we know all the solid parts of an animal arise, by mere incubation. It is therefore a step nearer, but is not yet quite disposed for nutriment. Much less is the cruor, or red globular part of the blood so. Neither are yet fitted to enter the vessels; yet both the one and the other are, by different authors, made the nutritive juice.

But as the heat of incubation, so the action of the viscera and vessels, on the serum, introduces various changes therein; till at length a part of it be rendered subtle enough for the purpose required. This, when exhausted, is instantly repaired: and thus we have the true immediate matter of *Nutrition*.

But this same humour, losing too many of its oily parts, by many repeated circulations, is rendered too sharp; and being likewise stripped of its most liquid parts, from the same cause, becomes too dense; and is thus rendered unfit for this secretion. Hence the necessity of new chyle, and new food, to keep up *Nutrition*.

The matter of *Nutrition* thus ascertained; the manner wherein, and the cause whereby it is effected, are as follow. A juice being driven directly through a full, conic or cylindrical, elastic or rigid canal; if its course be from a wider to a narrower part, or if it have any thing to oppose its motion, will endeavour to stretch the sides of its canal according to the axis of its length. This must be the case every-where in the body, except, perhaps, in the veins and receptacles. By this nius, or endeavour, how weak soever, continually repeated, the vessels will be insensibly lengthened out; and, in lengthening, they will be made more and more slender. Hence the last extremities of the vessels, which in man are extremely small, are continually stretched, and rendered less and less coherent, *i. e.* still nearer and nearer to a dissolution; and thus at length will they cohere so weakly, as scarce to differ from fluids.

While such motion goes on, therefore, and the propulsion is continued, there will, of necessity, happen these two things:

NUX

NYM

things; First, the outmost particles of the minutest tubes being torn off, will again be converted into a kind of humour, what part of the body sower they stick in. Secondly, the smallst particles, which by their union composed the slenderest fibrillae, will be so separated from each other, as to leave open interstices in those places, where, before, they cohered. Both these effects will be produced at all times, and in all parts of the body, so long as life continues; especially where nature is strong, and the actions of the body violent. But the same humour whereby these effects are produced, containing abundance of particles similar to those thus separated and loft, conveys and applies them to those interstices, by that very impetus whereby it endeavours to distend the canals; and thus intercepted, at length, it forms, adapts, and fastens them, so as to adhere in the same manner as the former.

The matter, preparation, application, energy of motion, still remaining the same; and what from time to time is lost, is thus presently restored; and the solids continue in the same state as before, i. e. they are perpetually nourished, and supplied, and preserved.

In this the Creator's wisdom is very conspicuous; in that the same power, which inevitably destroys, does not repair again at the same time, and by the same action; and that the greater the loss is, the more copious is the supply; and lastly, that those parts, first spent in the action of the body, are the first restored. Farther, it is evident, that the newer, the more tender, and the nearer to the moving cause these vessels are, the more easily will they be lengthened, distended, destroyed, and repaired: our bodies therefore, the nearer to their origin, the more do they grow. For, the action still continuing, the greater vessels become more extended by their fluid; and at the same time the smaller, whereof the membranes or coats of the larger sort are composed, are compressed, dried, and at last concreted, and grow up; whence arises a firmness, indeed, of the fibres, but a loss of the vessels.

Thus, what were formerly vessels, commence mere hard ligaments; and thus the fluids being once fixed, the several vessels coalesce: from the concurrence of these causes arise the strength, hardness, rigidity, and thickness of the solid parts.

Hence the number of vessels is greatest in embryos, and as age comes on, it sensibly diminishes; and hence it is that their weakness constantly declines, and their strength and firmness increases. In young people, therefore, the quantity of humours is redundant, and greatly exceeds the solids: in old men, the solids exceed the fluids. And hence we see the reason, manner, and appearance of growth, state, declension, and at length of death from pure old age.

A person who considers this account, and compares it with what is actually observable in the body, will find every circumstance to obtain: thus the whole cuticula is every where, and at all times, constantly desquamating, peeling off, and again renewing; and thus the hair, nails, teeth, continually rubbed, torn, and wore off, come again; parts taken off from the vessels, and the bones, soon grow again. And the fordes, or filth, rubbed off from the extremities of the vessels, when examined by a microscope, or diluted and viewed in water, appear plainly to consist both of solid and fluid parts; and those carried off by washing, shaving, &c. are the same.

Hence, too, we see that a general increase of the bulk of the body, with regard to habit, as in fat, fleshy, brawny persons, does not arise from any increase of the solids, but by their extension into larger cavities, crowded with stagnant humours. And hence fatness becomes hurtful, as it loads, weakens, and suffocates.

Whence arises a very considerable distinction between *nutrition* and *repletion*; to which a physician must have special regard: the one strengthening and condensing the vessels, the other weakening, loosening, and extending the same.

Hence, lastly, we see why the fabric of the solids is not destroyed by the contained fluids; how our machine comes to subsist so long; why, when a nerve is corrupted, the *nutrition* of that part it belongs to, ceases; and why the same obtains in an artery: why in an embryo there are no solids, in a foetus very few, in old men a great deal; and why even the nerves, tendons, arteries, and receptacles, become first cartilaginous, and then bony.

NUTRITION of Plants. See **VEGETATION**, **SAP**, **CIRCULATION**, &c.

NUTRITION, in pharmacy, a kind of preparation, consisting in the gradual mixture of liquors of different natures, by stirring them together till they have acquired a thick consistence, — as, in making butter of Saturn, or unguentum nutritum.

NUTRITIOUS Juice. See the article **NUTRITION**.

NUTRITIVE Faculty. See the article **FACULTY**.

NUTRITUM, in pharmacy, is a denomination given to a dative, cooling, unguent, prepared by the agitation and nutrition of litharge of gold with oil and vinegar, or the juice of solanum, in a mortar.

NUX Vomica, the fruit, or, as some will have it, the stone of the fruit of a vegetable, growing in several parts of Egypt, and in the islands Timor and Ceylon; of a strong narcotic quality, so as to be ranked in the number of poisons.

It is round and flat, of a grey mouse-colour without, and of various colours within; sometimes yellow, sometimes white, sometimes brown. The largest, whitest, newest, and cleanest, are the best.

This drug is said to be an assured poison for all animals except men.—On the contrary, Hermannus, botanic professor at Leyden, who has wrote expressly on it, says, that the *vomica nux* of Timor and Ceylon are, for the human species, excellent sudorifics, and are also to be ranked among diuretic medicines.

Nux Galla. See the article **GALLS**.

Nux Indica, the fruit of a tree called *cacao*. See **CACAO**, and **CHOCOLATE**.

NYCTAGES*, or **NYCTAZONTES**, a religious sect, distinguished by their inveighing against the practice of waking in the night to sing the praises of God; in regard, said they, the night was made for rest.

* The word comes from the Greek *νύξ*, night.

NYCTALOPIA*, or **NYCTALOPS**, a disease which prevents the seeing by day, not by night; or an indispotion wherein a person sees better by night than by day.

* The word comes from the Greek *νύξ*, night, and *αλωπῆ*, fox; this animal being said to see called by day, than night.

In which sense the word is used by Hippocrates.

The *nyctalopia* is supposed to be owing to the spirits being too much dissipated in the day, but collected by night. See **SIGHT**. Boerhaave says, the *nyctalopia* consists in this, that the uvula is immoveable, and at the same time very open.

NYCTALOPIA is also used by some for a disease of the eyes, which prevents their seeing, when the sun is set, and the light begins a little to diminish.

In which sense it amounts to the same with *nocturna cecitas*.

In the general, any disease which prevents the seeing at any particular time, when others see, is called *nyctalopia*.

In the *Philosophical Transactions*, we have an instance of a *nyctalopia*, or *nocturna cecitas*, in a youth of twenty years of age; who had been affected with it as long as he could remember.

—Dr. Parham assures us, he had a good sight all day, and distinguished objects at all distances as well as any body; but when twilight once came, he was quite blind, and saw nothing at all; nor could make scarce any use either of fire, candle, or glasses. Yet his eyes, upon examination, shewed nothing at all amiss; nor had he any vertigo, or other disease of the head. The cloudiness, as he himself told the doctor, used to come gradually on him like a mist, as day-light declined. He always saw alike in all aspects of the moon, felt no pain by fire or candle-light, and was the same in summer as winter.

Dr. Briggs accounts for the case thus: 'As vapours are raised in great quantities during the day time, which being condensed by the coldness of the evening, fall again, and render the air, near the earth, the thicker: so, perhaps, the humours in the eyes of this youth may be affected; and, in the evening, rendered grosser, and more turbid. As we see in urines, which frequently grow clear, or turbid, as heat or cold is applied to them. But such thickness or spissitude of the humours, the rays being either reflected, or too much refracted, do not reach the retina, or at least strike it too feebly.'

NYCTELIA* *Orgia*, or feasts in honour of Bacchus; so called, because held in the night-time.

* The word is formed from the Greek *νύξ*, night, and *τελεω*, perform, to accomplish, perform.

A great part of the ceremony consisted in running through the streets, with bottle and glass in hand, and drinking: but there was no impurity unpractised in them.

The Athenians celebrated the *nyctelia* every three years, at the beginning of the spring.

NYCTHEMERON, *Νυχθημερον*, the natural day. See **DAY**.

NYMPH*, *Νύμφη*, in mythology, a sort of heathen divinity, supposed to preside over waters, rivers, and fountains.

* The word comes from the Greek *νύμφη*, a bride, or woman newly married; and was applied to these deities, because represented under the figure of young maids. Though others derive *nymph* from *lympha*, water, in regard of their inhabiting near the waters.

Some extend the name *nymph* farther, and comprise under it the goddesses of the fountains, forests, and trees; called particularly *Oreades*, *Dryades*, and *Hamadryades*; as well as those of the sea, called *nerides*.

Meursius is of opinion, the Greeks borrowed their notion of the divinities from the Phenicians: for *nymphe* in their language signifying soul, the Greeks imagined, that the souls of the ancient inhabitants of Greece were become *nymphe*. Particularly, that the souls of those who had inhabited the woods, were called *dryades*; those who had inhabited the mountains, *oreades*; those who had dwelt on the sea-coasts, *nerides*; and lastly, those who had their place of abode near rivers, or fountains, *noiades*.

NYMPHA, among naturalists, is sometimes used for the little skin wherewith insects are inclosed; both while they are in the eggs, and after they have undergone the first apparent transformation.

NYMPHA, is used by others for the change itself of the crucea, or worm, into a flying animal; after having laid aside its former skin:

skin: which, as Swammerdam shews, is not effected by any proper transformation, but by simple accretion, or growth of the parts, whence the skin is by degrees stretched, and at last bursts: as is the case, likewise, in frogs.

NYMPHA is more frequently used by naturalists for the insects themselves, while they have yet only the form of worms, or maggots.

The word properly signifies bride, or a new-married woman; it being now, when it has laid aside its former skin, that it begins to shew all its parts distinctly.—In this change it loses its motion for awhile, as when in the egg: so that these insects are twice in their *nympha* state; first, in the maggot, which is their first *nympha*; and again in this change, which is their second.

The only difference between the two *nympha*-states consists in this, that in the latter the members appear more distinctly.—Swammerdam calls this latter *nympha aurea*, or *aurelia*, and *chrysalis*; and the former simply *nympha*.—The *nymphae* are otherwise distinguished into *vermiformes*, and *oviformes*.

The eggs of bees first change into *nymphae* or maggots; these maggots inclosed in their alveoli or cells, are transformed into *nymphae aureliae*; and twelve days afterwards come out bees. See *AURELIA* and *CHRYsalis*.

—Of the caterpillar's nymph, *aurelia*, or *chrysalis*, so called, because the creature here is veiled or covered up from sight, like a bride. See Supplement, article *NYMPH*.

NYMPHÆ, in anatomy, are two soft, spongy, red bodies, descending from the tip of the clitoris to the sides of the urinary passage; thus reaching to about the middle of the orifice of the vagina: where they grow less and less, till they disappear.—See *Tab. Anat. (Splanchn.) fig. 9. lit. n n. fig. 13. lit. e e.* Their breadth is uncertain, usually in maids half a finger: some-

times they are larger, and are capable of being distended to a great degree; so as to hang a good way out of the body: whence, in some, these, as well as the clitoris, have been forced to be cut.

The use of the *nymphae* is, by swelling in the act of coition, to embrace the penis, and by their sensibility to affect the woman, and mutually invite to procreation.

Their substance is very spongy, composed of membranes, and vessels loosely cohering, and therefore easily distensible.

NYMPHEUM *, *Νυμφαῖον*, among the antients, a public hall, or building, magnificently adorned and disposed for banqueting and entertainment; where those who wanted conveniences at home, held their marriage-feasts, &c.

• The word comes from the Greek: *νύμφη*, bride.

Some authors rather take the ancient *nymphæum* to have been a grotto, adorned with statues, jets, and other ornaments; and that it had its name by corruption, from *lymphæum* or *lympha*, water.

—In which sense it must have been a public bath.

NYMPHOMANIA, in medicine, the same with *furor uterinus*. See *UTERINUS*.

NYMPHOTOMIA, in surgery, the operation of cutting off part of the nymphæ, or of the clitoris: by some also called *nympha*, when they are so large and tumid, as to prevent the consummation of marriage, or render it very difficult.

The Egyptians, Galen observes, frequently practised the *nymphotomia*; but in our parts of the world, it is rarely found necessary.

When it happens to be so, the casuists give their judgment, that the woman is obliged to undergo it.

The *nymphotomia* is properly the circumcision of women. See *CIRCUMCISION*.



O.

O A T

O B E

O The fourteenth letter of the alphabet; and the fourth vowel.

The grammarians call it a close vowel; because pronounced with the mouth shut.

Among the Latins, the *O* bore so great an affinity with the *U*, that they frequently confounded them; writing *confol*, and pronouncing *conful*. See Gruter's *Inscript.*

Thus, also, they wrote *æquem* for *æquum*, *aurelius* for *aurelius*, *compactus*, *duomvir*, &c.

The Greeks had two *O*'s, viz. omicron, *ο*, and omega, *ω*; the first pronounced on the tip of the lips with a sharper sound; the second in the middle of the mouth, with a fuller sound, equal to *oo* in our language. — The long and short pronunciation of our *O* are an equivalent to the two Greek ones; the first, as in *suppée*; the second, as in *obey*.

O, among the antients, was a numerical letter, signifying eleven; as in the verse,

O numerum gestat qui nunc undecim extat.
When a dash was added at the top, as *Ö*, it signified eleven thousand.

Among the Irish, the letter *O* at the beginning of the name of a family, is a character of dignity, annexed to great houses. Thus in the history of Ireland, we frequently meet with the *O'Neals*, *O'Carrolls*, &c. considerable houses in that island.

Camden observes, that it is the custom of the lords of Ireland to prefix an *O* to their names, to distinguish them from the commonalty.

A majuscule *O*, in music, is a note of time, called by us *semi-breve*, by the Italians, *circolo*; making what they call *tempo perfetto*.

The antients used *O* as a mark of triple time; from a notion that the ternary, or number 3, was the most perfect of numbers, and therefore properly expressed by a circle, the most perfect of figures.

O *Ni*, in the exchequer. — As soon as the sheriff enters into, and makes up his accounts for issues, amerciaments, and mean profits; the practice is to mark on his head, *O Ni*, which signifies, *Oneratur nisi habeat sufficientem exonerationem*: and immediately he becomes the king's debtor, and a debt is set on his head. — Upon which the parties become debtors to the sheriff, and are discharged to the king.

OAK. See the article **TIMBER**.

Royal OAK. See the article **ROYAL**.

Scarlet OAK. See the article **KERMES**.

Mistle of the OAK. See the article **MISLETO**.

OAK-Balls, **OAK-Apples**, or **OAK-Cones**, in natural history, a kind of galls, or excrescences arising out of the oak. — For whose generation and use, see **GALLS**.

OAKHAM, **OCKHAM**, or **OAKUM**, in the sea language, denotes the matter of old ropes untwisted, and pulled out again into loose hemp, like huds of flax, to be used in the caulking of ships.

OAR, in navigation, an instrument whereby a boat, barge, galley, &c. is rowed, or advanced along the water.

In a vessel with *ars*, the water is to be considered as the point of support, or fulcrum; the *oar* as a lever; the boat as the burden to be moved, and the rower's hand as the moving power. See **LEVER**, and **MECHANIC Power**.

The burden is to be considered as applied to that point of the lever where the *oar* rests on the boat. — The greater therefore the distance of the hand from that point, and the less the distance of the water from that point, the greater effect will the *oar* have.

OAR, in natural history. See the article **ORE**.

ORISTUS, or **ORARISTYS**, a term in the Greek poetry, signifying a dialogue betwixt a husband and his wife; such as that in the sixth book of the *Iliad*, between Hector and Andromache.

Scaliger observes, that the *oristus* is not properly any particular little poem, or intire piece of poetry; but always a part of a great one. He adds, that the passage now cited in Homer, is the only proper *oristus* extant in the antient poets.

OASY. See the article **OAZY**.

OATH, *jururandum*, is usually defined a religious assertion, or affirmation; wherein a person invokes the Almighty, renounces all claim to his mercy, or even calls for the divine vengeance upon himself, if he speak falsely.

Some civilians look on this definition as too lax, since it may

agree to perjury; and would have this essential to an oath, that the thing affirmed be true. — But this is arbitrary.

An *oath* is esteemed a kind of civil medium, between the person that gives it, and him to whom it is given; whereby some controversy, or other matter, which could not otherwise be determined, is brought to an issue. — Its form, and the ceremonies it is attended withal, are arbitrary, and various, in different countries.

The *oaths* we make to God are called *vows*, and in some cases *sacraments*.

OATH, in a legal sense, is a solemn action, whereby God is called to witness the truth of an affirmation given before one or more persons, impowered to receive the same.

Legal oaths end with, *so help me God*; antiently with, *so help me God at his holy dome, i. e. judgment*. See **DOME**.

This, according to our law-books, is called a *corporal oath*; because the party, when he swears, touches the gospels with his right hand.

But, in some old customs of Anjou and Maine, it appears that *corporal oath* was antiently a simple affirmation, or vow of faith, and fidelity, made by a vassal who has no liege, by lifting up his hand; in contradistinction to that made by a liege vassal, which was made by laying his hand on the gospel.

An *oath* is called *canonica purgatio*, because allowed of by the canons; to distinguish it from *vulgares purgationes*, viz. by battle, fire, ordeal, &c. which the church always discouraged.

In small matters, which the plaintiff could not prove, or if he could, if his proof were set aside, the defendant might purge himself by his own *oath*: this was called, *jurare propria manu*.

But in matters of more weight, he was to bring other credible persons, usually of the same quality with the plaintiff, to swear that they believed the defendant had sworn the truth.

These were called *compurgators*, or *sacramentales*; and their number was greater or less, according to the quality of the defendant, and the nature of the thing in question. — Hence, *jurare duodecima manu*.

OATH is also used for a solemn promise faithfully to execute, or observe something.

Trials at common law depend on twelve, or twenty-four men, who take their *oaths* that they will declare the truth, as it shall appear to them. See **JURY** and **TRIAL**.

In this sense we say, *state oaths*; the *oath of supremacy*, *oath of allegiance*, *oath of abjuration*.

At the meeting of a new parliament, the commons, all, take the *oaths* of allegiance, supremacy, and abjuration.

Kings and princes swear to the performance of the treaties they make: though antiently, they did not swear of themselves; but others swore in their name.

Thus, in a treaty in 1177. between the emperor Frederic Barbarossa, Roger king of Sicily, pope Alexander III. and the cities of Lombardy; the count de Dieffe, by the emperor's order, swore, upon the soul of that monarch, that he would faithfully observe the peace; and, at the same time, Romuald archbishop of Salerno, and count Roger, swore, on the gospel, that when the emperor's messenger should arrive in Sicily, king Roger should procure some of his lords to swear for him.

Test OATH. See the article **TEST**.

OAZY, or **OASY Ground**, a name given by the seamen to soft, slimy, or muddy ground.

OBEDIENCE, **OBEDIENTIA**, is sometimes used in the canon law, for an office, or the administration of it.

In our antient customs, *obedientia* was used in the general, for every thing that was enjoined the monks, by the abbot.

OBEDIENTIA, in a more restrained sense, was applied to the farm belonging to the abbey, to which the monks were sent *vi ejusdem obedientie*, either to look after the farm, or collect the rents. — Hence, also, those rents themselves were called *obedientia*.

OBELISK*, **OBELISCUS**, a quadrangular pyramid, very slender, and high; raised as an ornament, in some public place, or to shew some stone of enormous size; and frequently charged with inscriptions, and hieroglyphics.

* Borel derives the word from the Greek *ὀβελός*, a spit, branch, spindle, or even a kind of long javelin. — Pliny says, the Egyptians

OBJ

Egyptians cut their *obelisks* in form of sun-beams; and that in the Phœnician language the word *obelisk* signifies ray.

The Egyptian priests called their *obelisks*, the sun's fingers, because serving as styles, or gnomons to mark the hours on the ground.—The Arabs still call them *Pharaoh's needles*: whence the Italians call them *aguglia*, and the English *Cleopatra's needles*.

The difference between *obelisks* and pyramids, according to some, consists in this, that the latter have large bases, and the former very small ones.

Though Cardan makes the difference to consist in this, that *obelisks* are to be all of a piece, or to consist of a single stone, and pyramids of several.

The proportions of the height and thickness are nearly the same in all *obelisks*; that is, their height is nine, or nine and an half, sometimes ten times their thickness; and their thickness or diameter a-top is never less than half, nor greater than three-fourths of that at bottom.

This kind of monument appears very antient; and we are told was first made use of to transmit to posterity the principal precepts of philosophy, which were engraven in hieroglyphical characters hereon.—In after-times they were used to immortalize the actions of heroes, and the memory of persons beloved.

The first *obelisk* we know of, was that raised by Ramefis, king of Egypt, in the time of the Trojan war. It was 40 cubits high, and, according to Herodotus, employed 20000 men in the building. Ptolemy Philadelphus another of 88 cubits, in memory of Arsinoe. See PORPHYRY.

Augustus erected an *obelisk* at Rome in the Campus Martius, which served to mark the hours on a horizontal dial drawn on the pavement.

F. Kircher reckons up 14 *obelisks*, celebrated above the rest, viz. that of Alexandria, that of the Barberins, those of Constantinople, of the Mons Esquilinus, of the Campus Flaminius of Florence, of Heliopolis, of Ludovico, of S. Mahut, of the Medici, of the Vatican, of M. Cælius, and that of Pamphylia.

OBELISK, in grammar, is a character, in form of a dagger (†), serving to refer the reader to some note, or other matter in the margin.

OBELUS, in antiquity, denotes a little line, or stroke, like a needle: whence its name, *obelos*, which signifies needle.

The word is chiefly used in speaking of Origen's *Hexapla*; wherein he distinguishes with an afterisk, or star, the supplements he makes to the text of the *Septuagint*, where it falls short of the Hebrew meaning; and with an *obelus*, or lineola (—) those places where the *Septuagint* had any thing not in the Hebrew.

St. Jerom says, the *obelus* was only used in those places where something was to be retrenched from the *Septuagint*, as superfluous; and the afterisk in those that were defective. These marks frequently occur in ancient manuscripts. Usually, the *obelus* is accompanied with two dots; the one above, the other underneath, as (—); and the afterisk is a St. Andrew's cross, cantoned with four points.

OBESITY, **OBESITAS**, in medicine, the state of a person too much loaded with fat, and flesh; otherwise called *corpulency*.

OBJECT *, in philosophy, something apprehended, or presented to the mind, by sensation, or by imagination.

* The word is derived from the Latin, *obicere*, to present to, to set before; which is composed of *ob* and *jaceo*, I lie against.

An *object* is something that affects us by its presence, that moves the eye, ear, or some of the other organs of sense; or, at least, is represented to us by the imagination.

The school-philosophers define *object* to be that about which a power, act, or habit, is employed. Thus, good is the *object* of the will; truth of the understanding; so colour is the *object* of sight; sound of hearing, &c.

Objects are usually divided into *next*, *proxima*, which are those the power, or habit is immediately employed on; in which sense colour is the next *object* of sight.—And *remote*, which are those only perceived by means of the former: in which sense, the wall is the remote *object* of sight, since we only see it by means of its colour, &c.

Ideas are the immediate *objects* of the mind in thinking: bodies, their relations, attributes, &c. are the mediate *objects*.

Hence it appears that there is a sort of subordination of *objects*. But, note, that a next *object*, with regard to a remote one, is properly a subject, not an *object*. See SUBJECT.

They also distinguish *objects per se*, which are what properly move, or affect our senses: such as are the sensible qualities.—And *objects per accidens*, which are substances, and only affect us by being invested with sensible qualities.

Again, they distinguish between common *objects*, which are such as affect divers senses; as are motion, figure, &c. and proper *objects*, which only affect one sense. See SENSE.

OBJ

There are several conditions requisite to an *object* of sense; as that it be material; that it be within a certain distance of a competent extent, its sensible qualities sufficiently intense, &c.

It is the *object* that reflects, or emits the rays of light which occasion vision.—*Objects* of themselves are invisible; we only seem to perceive them, because the different texture of their surface, disposing them to reflect differently coloured rays, occasion in us several sensations of colour, which we attribute to them.

The *objects* of the eye, or vision, are painted on the retina; though not there erect, but inverted, according to the laws of optics.—This is easily shewn from Cartes's experiment of laying bare the vitreous humour on the back-part of the eye; and clapping over it a bit of white paper, or the skin of an egg, and then placing the fore-part of the eye to the hole of a darkened room. By this means is had a pretty landscape of the *objects* abroad, painted invertedly on the back of the eye.

How in this case, the *objects* which are painted inverted should be seen erect, is matter of controversy. See SEEING.

OBJECT-GLASS of a telescope, or microscope, is the glass placed at that end of the tube which is next the *object*.

To prove the regularity and goodness of an *object-glass*,—strike two concentric lines on a paper, the one having its diameter the same with the breadth of the *object-glass*; the other half that diameter: divide the inner circumference into fix equal parts, and making fix fine small holes therein with a needle, cover one side of the glass with this paper; then exposing it to the sun, receive the rays that pass through these fix holes, on a plane, at a just distance from the glass; and by withdrawing or approaching this plane, from or to the glass, we shall find whether the rays that pass through these fix holes, unite exactly together at any distance from the glass; if they do, we may be assured of the regularity of the glass; that is, of its just form; and at the same time we obtain exactly the glass's focal length.

Indeed there is scarce any better way of proving the excellency of an *object-glass*, than by placing it in a tube, and trying it with small eye-glasses at several distant objects; for that *object-glass* which represents objects the brightest, and most distinct, which bears the greatest aperture, and most convex, and concave eye-glass, without colouring or haziness, is always the best.

To prove whether *object-glasses* be well centred,—hold the glass at a due distance from the eye; and observe the two reflected images of a candle; where those images unite or coalesce, there is the true centre.—If this be in the middle, or central point of the glass, then it is known to be truly centred.

OBJECT is also used for the matter of an art or science; or that about which it is employed.

In which sense the word coincides with *subject*.

The school-philosophers distinguish divers kinds of *objects* in the same science, viz.

MATERIAL OBJECT, which is the thing itself that is considered, or treated of.—And thus it is the human body which is the *object* of medicine.

FORMAL OBJECT is the manner of considering it.—And thus the same human body, considered with a view to the healing it, is the *formal object* of medicine.

OBJECTUM QUOD COMPLEXUM, of an art, is the aggregative whole; or a collection of all the objective conclusions, or consequences found in the science.

OBJECTUM QUOD INCOMPLEXUM is a collection of all the subjects of the objective conclusions.—Thus, therefore air is elastic, is the *complex object* of one branch of physics; and air itself, or the subject of the conclusion, the *incomplex object* of the same branch.

OBJECTUM QUO COMPLEXUM is a collection of all the objective antecedents of the science.

OBJECTUM QUO INCOMPLEXUM is a collection of all the mediums, or arguments contained in those antecedents, and whereby those conclusions are proved.

In these cases, the *object* is said to be *complex*, inasmuch as it includes both an affirmation and negation; and *incomplex*, as it includes neither: *quod*, as being that which (*quod*) is shewn in the science; and *quo*, as being that whereby (*quo*) the conclusions therein are proved.

Schoolmen also distinguish an *object per se*, and *per accidens*; *objectum adæquatum*, and *inadæquatum*; *attributiis*, and *attributum*, &c.

OBJECTION, in reasoning, something urged to overthrow a position; or, a difficulty raised against an allegation, or proposition of a person we are disputing withal.

The answering of *objections* comes under that branch of oratory, or that part of an oration, called *confirmation*, or *confutation*.

Over-ruling an OBJECTION. See OVER-RULING.

OBJECTIVE, **OBJECTIVUS**, is used in the schools in speaking of a thing which exists no otherwise than as an object known.

The effe, or exiftence, of fuch thing, is faid to be *objective*. Others call it *ratio objective*.

OBJECTIVE is alfo ufed for the power, or faculty, by which any thing becomes intelligible.—And, for the act itfelf, whereby any thing is prefented to the mind, and known.

Hence a thing is faid to *exift objectively, objective*, when it exifts no otherwife than in being known, or by being an object of the mind.

This fome will have to be real effe; others deny it. See **ESSE**.

OBJECTIVE evidence. See the article **EVIDENCE**.

OBJECTIVE line. See the article **LINE**.

OBJECTIVE notion. See the article **NOTION**.

OBJECTIVE plane. See the article **PLANE**.

OBITU *nuper*. See the article **NUPER**.

OBITU, OBITUUS, in our ancient cuftoms, was a funeral folemnnity, or office for the dead; commonly performed when the corpe lay uninterred in the church.

OBITU is alfo an anniversary office, or mafs, held yearly, in the Romifh church, on a certain day, in memory of fome perfon deceafed.

One of the moft ancient *obitu* in Europe is that of king Childbert, founded in the abbey of St. Germain Desprez, and faid on the eve of St. Thomas's day.

The tenure of *obitu*, or chantry-lands, held of the fubject by fuch fervice, is decreed to be extindt with us, by Stat. 1 Edward VI.

OBITUARY, OBITUARIUM, a funeral regifter, wherein are wrote the names of the dead, and the days of their burial; for whom obitu, or anniversaries, are to be performed.

Thefe, in fome places, are alfo called *mortuaries*; but more frequently *neologies*, or *calendars*.

OBITUARY is more particularly ufed for a book containing the foundation or infitution of the feveral obitu in a church, or monaftery. See **OBITU**.

This is more frequently called the *martyrology*. See **MARTYROLOGY**.

OBLATA, things given, or voluntarily offered, particularly to the king, by any of his fubjects.

They are thus called, by reafon the *oblata*, or offerings to our kings, were fo ftrictly looked to in the reigns of king John, and Henry III. that they were entered into the fine-roll under the term *oblata*; and, if not paid, were put in charge to the fheriff.

OBLATA, in the exchequer, fignifies old debts; brought, as it were, together, from preceding years, and put to the prefent fheriff's charge.

OBLATI, antiently, were feccular perfons, who beftowed themfelves, and their eftates, on fome monaftery, and were admitted as lay-brothers.

There were fome of thefe *oblati*, properly called *donati*, who gave their perfons, their families, and effects; and even entered into a kind of fervitude themfelves, and their defendants.

They were admitted by putting the bell-ropes of the church around their necks, and, as a mark of fervitude, a few pence on their heads.

The *donati* took religious habits, but different from thofe of the monks.

In the archives of the abbey of St. Paul de Verdun is a permiffion, given in 1360. to a man of that abby, to marry a wife; on condition, that, of the children arifing from the marriage, one half fhould belong to the abby, in quality of *oblatus*; the other half to the bifhop.—This kind of *oblatus* are faid to have taken their firft rife in the eleventh century.

In the earlier times, thofe only were called *oblatus* whom their parents engaged, from their infancy, to the monaftic life.—Thofe who embraced it themfelves, when at an age capable of choice, were called *converts*, *conversi*.

The *oblatus* made no profeffion; yet kept the celibate, lived in obedience to the fuperiors, and did the drudgery of the monaftery.—Yet they differed from the fervants of the houfe, who were allowed to marry.

The *oblatus* and *donati* were, properly, fervants by devotion, as the others were by condition.

Helyot fays, the *oblatus* differed from converts, inafmuch as the latter made the profeffion, and wore the habit, which the former did not.

OBLATI were alfo, in France, a kind of lay-monks, antiently placed by the king in all the abbeyes and priories in his nomination; to whom the religious were obliged to give a monk's allowance, on account of their ringing the bells, and fweeping the church, and the court.

Thefe offices were ufually filled with lame foldiers, and invalids, fome of whom had penfions on benefices, without any duty.—But thefe *oblatus*, with their penfions, have fince been all removed to the hôtel of the invalids at Paris.

OBLATIONS, OFFERINGS, properly denote things offered to God.

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In the canon law, *oblatus* are defined to be any things offered by godly chriftians to God, and the church, *i. e.* to the priefts, whether they be moveables; or immoveables.

Oblatus were antiently of various kinds; *viz.* *oblatus altaris*, which the prieft had for faying mafs.—*Oblatus defunctorum*, given by the laft wills of the faithful to the church.

—*Oblatus mortuorum*, thofe given by the relations of the dead, at their burials.—*Oblatus penitentium*, thofe given by penitents.—And *oblatus pentecoftales*, or Whitfun-offerings.

Till the fourth century the church had no fixed revenues, nor any other means of fubfiftence but alms, or voluntary *oblatus*.

OBLIGATION, an act whereby a perfon engages, or binds himfelf, or is bound by another, to do fomething; as to pay a fum of money, to be furety, or the like.

The acceptance of a bill of exchange, is a kind of obligation to pay it.

The exacting of intereft on a fum due by a fimple obligation, is accounted ufury.

All obligations arife from contracts, or quasi-contracts; from crimes, or quasi-crimes; and, in the Roman law, were either civil, or pretorian; *i. e.* either approved by the civil law, or introduced by the praetor.

There are three kinds of obligations; *natural, civil, and mixt*.

Natural OBLIGATIONS are founded on the mere bond of natural equity, without any civil neceffity; and without producing any action of constraint.—Such are the obligations a minor is under.

Civil OBLIGATION is that fupported on civil authority alone, and which induces a constraint without any principle or foundation in natural equity.—Such is the obligation on a man condemned unjuftly.

Mixt OBLIGATION, or an obligation both natural and civil, is that which, being founded in natural equity, is farther confirmed and enforced by civil authority.

There are alfo *personal obligations*; *hypothecary obligations*, obligations of goods, body, &c.

OBLIGATION, in a more ftrict fenfe, denotes a bond containing a penalty, with a condition annexed, for payment of money at a certain time; or for performance of covenant, or the like.

A bond, or obligation, is faid to differ from a bill, in that the latter is commonly without a penalty, and without condition.—Yet a bill may be *obligatory*. Coke on Littleton.

Till the conqueft, writings were rendered *obligatory* by certain marks of gold croffes, &c. The Normans firft introduced the cuftom of making bills and obligations with a print or feal in wax fet to every one's fignature, attested by three witneffes.

OBLIQUATION, in catoptrics.—*Cathetus* of **OBLIQUATION** is a right line drawn perpendicular to a mirror, in the point of incidence, or reflexion of a ray.

OBLIQUE, in geometry, fomething aflant, indirect, or that deviates from the perpendicular.

OBLIQUE angle, in geometry, is an angle that is either acute, or obtufe; *i. e.* any angle, except a right angle. See **ANGLE**.

OBLIQUE-angled triangle is that whole angles are *oblique*; *i. e.* either obtufe, or acute.

OBLIQUE line, a line which, falling on another, makes an *oblique* angle.

A line falling *obliquely* on another makes the angle on one fide obtufe, and that on the other acute.

OBLIQUE planes, in dialling, are fuch as recline from the zenith, or incline towards the horizon.

The obliquity, or quantity, of this inclination, or reclinacion, is eafily found by a quadrant; it being an arch of fome azimuth, or vertical circle, intercepted between the vertex of the place and of that plane.—This azimuth, or vertical circle, is always perpendicular to the plane.

OBLIQUE percuffion is that wherein the diretion of the ftriking body is not perpendicular to the body ftruck, or is not in a line with its centre of gravity. See **PERCUSSION**.

The ratio an *oblique* froke bears to a perpendicular one, is demonftrated to be, as the fine of the angle of incidence to the radius.

OBLIQUE powers, or forces. See **POWERS, MOTION, DIRECTION**, &c.

OBLIQUE projection, in mechanics, is that where a body is impelled in a line of diretion, which makes an *oblique* angle with the horizontal line.

OBLIQUE fphere, in geography, is that whole horizon cuts the equator *obliquely*; and one of whole poles is raifed above the horizon equal to the latitude of the place.

It is this obliquity that occasions the inequality of days and nights.

Those who live under an *oblique* sphere (as we, and all those in the temperate zone, do) never have their days and nights equal, except in the equinoxes.

OBLIQUE ascension, in astronomy, an arch of the equator intercepted between the first point of Aries and that point of the equator which rises together with a star, &c. in an *oblique* sphere. See **ASCENSION**.

OBLIQUE descension, an arch of the equator intercepted between the first point of Aries and that point of the equator which sets with a star, &c. in an *oblique* sphere; and reckoned from west to east. See **DESCENSION**.

To find the *oblique ascension* and *descension* by the globe. See **GLOBE**.

OBLIQUE sailing, in navigation, is when the ship, being in some intermediate rhumb between the four cardinal points, makes an *oblique* angle with the meridian, and continually changes both its latitude and longitude.

Oblique sailing is of three kinds; *viz.* plain sailing, Mercator's sailing, and great circle sailing. See **SAILING**.

The seamen also call the application of the method of calculating the parts of *oblique* plain triangles, in order to find the distance of a ship from any cape, head-land, &c. by the name of *oblique sailing*.

OBLIQUE distillation, in chymistry. See **DISTILLATION**.

OBLIQUE flank, in fortification. See **FLANK**.

OBLIQUE cases, in grammar, are all the cases of the declensions of nouns, besides the nominative. See **CASE**.

OBLIQUE, OBLIQUUS, in anatomy (see **MUSCLE**), is applied substantively to several muscles of the head and eye; particularly the

OBLIQUUS capitis major, or *par OBLIQUUM inferius*, the sixth muscle of the head; so called because lying to turn the head aside; though it has neither its origin nor insertion in the head.

This rises fleshy from the external parts of the spine of the second vertebra of the neck, and, swelling into a fleshy belly, runs *obliquely* to the transverse process of the first vertebra.—This some rank among the muscles of the neck.

OBLIQUUS capitis superior, or *minor*, or *par obliquum superior*, the seventh muscle of the head; which, springing fleshy from the transverse processes of the second vertebra of the neck, and ascending *obliquely*, is inserted laterally into the occiput.

Others will have its origin to be in the occiput, where the common opinion places its insertion; its insertion they make in the transverse processes of the first vertebra, near that of the same side.

The two *oblique* muscles, by pulling the transverse process, give the head a semicircular motion.

OBLIQUUS oculi superior, or *major*, the fifth muscle of the eye. See **EYE**.

It has its origin in the upper part of the orbit; whence, tending upwards towards the inward canthus of the eye, it passes through a cartilage on the bone of the forehead, called *trochlea*; whence, also, the muscle itself is called *trochlearis*: thence it is reflected to its termination in the *scleretica*, on the back part of the ball of the eye.

When this muscle acts, that part of the ball of the eye is drawn downwards towards the trochlea, whereby the pupil is directed downwards, towards the lesser canthus; and, at the same time, the whole ball of the eye somewhat outwards.

OBLIQUUS oculi inferior, or *minor*. It rises from the external margin of the lower part of the orbit, near the inner canthus; whence, rising towards the outward canthus, it terminates near the other.—It draws the ball of the eye outwards, and turns its pupil upward, contrary to the former. See **ROTATOR**.

OBLIQUUS descendens, or *declivis*, a very broad pair of muscles of the abdomen, each covering one half thereof, and part of the thorax; so called from the *oblique* course of its fibres.—It arises from the two last true ribs, and five spurious ones; and is indented with the serratus major anticus by five or six digitations, each whereof receives a nerve from the interstices of the rib: it springs, likewise, from the margin of the ilium, and ends in a broad tendon in the linea alba.—See *Tab. Anat. (Myol.) fig. 7. n. 19. fig. 1. n. 45. and fig. 6. n. 31.*

Besides the ordinary use ascribed to it by all anatomists, which is, to compress the intestines and bladder; Cowper and Glisson attribute to it another, which is, to turn the trunk of the body without moving the feet.

OBLIQUUS ascendens, or *acclivis**, lies under the lower part of the former; running with a course just contrary, from the

* *Acclivis* is compounded of *ad*, to; and *clivus*, a cliff, a scantling, or sloping.

lower part upwards: its fleshy fibres have their origin from the edge of the ilium, and end at the spurious ribs: it terminates with a large double tendon in the linea alba, the upper part whereof, creeping over the musculus rectus, and the other creeping under it, and joining together at the linea alba, do, as it were, sheath the rectus.—See *Tab. Anat. (Myol.) fig. 2. n. 30. fig. 1. n. 44.*

Its use is, to flut and compress the belly; as, also, the cavity of the thorax, in respiration; and it assists, with its antagonist, the *descendens*, in turning the body without moving the legs.

OBLIQUUS auris lies in the external part of the canal of the aqueduct; whence, passing upwards and backwards, it enters the tympanum, by a very *oblique* sinuosity, immediately above the bony circle to which the tympanum is fixed; and is inserted into the slender process of the malleus.

OBLIQUITY, that which denotes a thing *oblique*.

The *obliquity of the sphere* is the cause of the inequality of the seasons, of nights and days.

OBLIQUITY of the ecliptic, is the angle which the ecliptic makes with the equator.

Messieurs Cassini, and De la Hire, make the *obliquity of the ecliptic*, by their observations, 23°, 29'. M. le Chevalier De Louville, from later observations, makes it 23°. 28'. 41".

The same author, giving the history of the several determinations of this *obliquity*, by all astronomers, in all ages, observes, that they constantly diminish; and thence takes occasion to suspect, that the real *obliquity of the ecliptic* itself may have been diminished since the time of the ancient astronomers.

He goes so far, as even to fix the proportion of the diminution, which he makes to be at the rate of half a minute in fifty years. According to an ancient tradition among the Egyptians, mentioned by Herodotus, the ecliptic was formerly perpendicular to the equator.

The libration of the sphere makes some alterations in the *obliquity of the ecliptic*; so that Wolfius reckons a *great obliquity* of 23°. 53'. a *mean obliquity* of 23°. 41'. and a *small one* of 23°. 30'.

OBLONG, in geometry, a figure longer than it is broad.

Thus a rectangled parallelogram, whose sides are unequal, is an *oblong*: for an ellipsis is also an *oblong*.

OBLONGATA medulla. See **MEDULLA**, and **CRURA**.

OBLATA terra, in our ancient law-books, is a certain quantity of land, which some authors fix at half an acre; though others make it but half a perch.

According to Thomasius, the *obulus terræ* contains ten feet in length, and five in breadth.

OEBOLUS*, an ancient silver money of Athens, the sixth part of a drachma; worth somewhat more than a penny farthing sterling.

* The word comes from the Greek, οβολος, of οβελος, spit, or broach; either because it bore such an impression, or because, according to Eustathius, it was in form thereof: but those now in the cabinets of the antiquaries are round.

OEBOLUS was also used, among our ancestors, for half a noble, or florin; where the noble was esteemed as the penny, and its quarter part a farthing.

In effect, in the old histories and accounts of coins, we are to understand, by the word *denarius*, the whole coin, be it angel, rial, &c. by the *obolus*, its half; and by *quadrans*, its fourth part.

OEBOLUS, in medicine, is used for a weight of ten grains, or half a scruple.

Du Cange says, the *obolus* weighs three carats, or four grains of wheat: others divide it into six areolæ, and the areolæ into seven minutes; others into three filiquæ, each filiqua into four grains, and each grain into a lentil and an half.

Among the Scythians *obolus* also denoted the weight of a pound.

OBRÉPTICIOUS, OBRÉPTITIUS, a quality of letters patent, or any other instrument which confers a favour, title, or concession; denoting it obtained of a superior by surprize, or by concealing from him the truth, which was necessary to have been expressed, in order to render it valid.

In which sense the word stands opposed to *surreptitious*, where some falsehood has been expressed, in order to procure it the more easily.—*Obréption* annuls the grant, where-ever found.

By the canon law, a person demanding a benefice, without expressing those he is already possessed of, forfeits, &c. by *obréption*.

OBRINE, KNIGHTS of OBRINE, a military order instituted in the thirteenth century by Conrad, duke of Mazovia and Cujavia; whom some authors call also duke of Poland.

He first gave them the name of *knights of Jesus Christ*. Their first grand master was Bruno. Their chief end was to defend the country from the Prussians, who were yet idolaters, and committed great cruelties.

Duke Conrade putting them in possession of fort Obrine, they hence took a new name; and it was agreed between them, that whatever lands they conquered from the Prussians, should be equally divided with him.

But the Prussians blocking up the fort, so that none of the knights could get out; the order became useless, and was soon suppressed.—Upon this, Conrade called in the Teutonic knights.

OBSCURA Camera. See **CAMERA Obscura**.

OBSCURA Clara. See **CLAIR-OBSCURE**.

OBSCURE, something that is dark, or that only receives and returns a little light.

OBSCURE is also used in a figurative sense, for a thing that is not clear, express, and intelligible; that one does not fully apprehend; or that may be construed in divers senses.

OBSCURE notion, or idea. See **NOTION**, and **IDEA**.

CLAIR-OBSCURE. See the article **CLAIR-OBSCURE**.

OBSCURITY, that which denominates a thing obscure.

Obscurity is a fault that may either be in the perception, or the diction.

Obscurity in the perception arises chiefly hence, that we do not conceive things as they are, or as we find them; but as we judge them to be before we know them: so that our judgment precedes our knowledge, and is made the rule or standard of our conceptions.—Whereas nature and reason direct, that things should be judged of according as they are known; and that they are to be known, not as they are in themselves, but only in such manner as God was pleased to have them known.

Obscurity in the diction may arise, first, from the ambiguity of the sense of words; secondly, from the figures or ornaments of rhetoric; thirdly, from the novelty or obsolescence of the words.

OBSECRATION, OBSECRATIO, in rhetoric, a figure whereby the orator implores the assistance of God, or man.

This figure Cicero makes admirable use of, for K. Deiotarus, to Cæsar.—*Per dexteram te istam oro, quam regi Deiotaro hospiti hospitii porrexisti: istam, inquam, dexteram non tam in bellis & in preliis, quam in promissis & fide firmiore.*—Thus Virgil:

*Quod te per cæli jucundum lumen, & auras,
Per genitorem oro, per spem surgentis Iuli,
Eripe me his, invide, malis—*

OBSEQUIES*, funeral solemnities, or ceremonies performed at the burials of eminent personages.

* The word is derived from the Latin *obsequium*, obedience; these *obsequies* being the last devoirs we can render to the deceased.

OBSERVANCE literally denotes the act of observing, or complying, with a rule, law, or ceremony.

Hence *observance* is sometimes also used for a rule, statute, or ordinance to be observed. See **RULE**.

OBSERVANCE, OBSERVANTIA, is particularly understood, in a monastic sense, of a community of religious, who are tied to the perpetual observation of the same rule. In which sense the word coincides with *congregation*, or *order*.

The Cordeliers denominate themselves, *religious of the observance*; the great, and the lesser observance.

Among the Bernardines, there are monks of the *strict observance*, who eat nothing but fish.

OBSERVANTINES, religious Cordeliers of the observance.

In Spain there are bare-footed *observantines*.

OBSERVATION, in the sea-language, the taking the sun's, or any star's, meridian altitude, in order thereby to find the latitude.

For the method of making an *observation*, see **LATITUDE**.

The finding of a latitude from the meridian altitude observed, they call *working an observation*.

OBSERVATIONS, in astronomy. See **COELESTIAL observation**.

OBSERVATORY, OBSERVATORIUM, a place destined for observing the heavenly bodies; or, a building usually in form of a tower, raised on some eminence, and covered with a terrace, for making of astronomical observations.

The more celebrated *observatories* are,—10. The Greenwich *observatory*, built in 1676 by order of king Charles II. at the solicitation of Sir Jonas Moor, and Sir Christopher Wren; and furnished with the most accurate instruments by the same; particularly a noble sextant of seven feet radius, with telescope-sights.

The person to whom the province of observing was first committed, was Mr. J. Flamsteed; a man, who, as Dr.

Halley expresses it, seemed born for the employment. For the space of fourteen years, with unwearied pains, he watched the motions of the planets, chiefly those of the moon, as was given him in charge; that a new theory of that planet, exhibiting all her irregularities, being found, the longitude might thence be determined.

In the year 1690. having provided himself of a mural arch of 7 feet diameter, well fixed in the plane of the meridian, he began to verify his catalogue of the fixed stars, which hitherto had depended altogether on the distances measured with the sextant, after a new and very different manner; viz. by taking the meridian-altitudes, and the moments of culmination, or the right ascension and declination.

This instrument he was so pleased with, that he laid the use of the sextant almost wholly aside. Thus was the astronomer royal employed for thirty years; in the course of which time nothing had appeared in public, worthy so much expence and preparation: so that the observer seemed rather to have been employed for his own sake, and that of a few friends, than for the public; though it was notorious, the observations that had been made were very numerous, and the papers swelled to a great bulk.

This occasioned prince George of Denmark, in the year 1704. to appoint certain members of the Royal Society, viz. the honourable Fr. Roberts, Sir C. Wren, Sir I. Newton, Dr. Gregory, and Dr. Arbuthnot, to inspect Mr. Flamsteed's papers, and chuse out of them such as they should think fit for the press; purposing to print them at his own expence: but the patron of the work dying, ere the impression was half finished, it lay still for some time; till at length it was resumed by order of queen Anne; and the care of the press committed to Dr. Arbuthnot; and that of correcting, and supplying the copy, to Dr. Halley.

Such was the rise and progress of the *Historia Cælestis*; the principal part whereof is the catalogue of fixed stars, called also the *Greenwich catalogue*.

The *Greenwich observatory* is found, by very accurate observations, to lie in 51°, 28', 30", north latitude.

20. The *Paris observatory*, built by the late Louis XIV. in the Faubourg St. Jacques.—It is a very singular, but withal a very magnificent building; the design of M. Perrault. It is 80 feet high, and atop is a terrace.—It is here M. de la Hire has been employed.—The difference in longitude between this and the *Greenwich observatory*, is 20°, 20', West.

In the *Paris observatory* is a cave, or cellar, of 170 feet descent, for experiments that are to be made far from the sun, &c. particularly such as relate to congelations, refrigerations, indurations, conservations, &c.

30. Tycho Brahe's *observatory* was in the little island Wœen, or the Scarlet island, between the coasts of Schonen and Zealand, in the Baltic.—It was erected and furnished with instruments at his own expence; and was called by him Uraniburg. In this place he spent twenty years in observing the stars. The result is his catalogue.

Mr. Gordon, in *Phil. Trans.* observes, that this was none of the fittest places for some kind of observations, particularly the risings and settings; as lying too low, and being land-locked on all the points of the compass but three; and the land-horizon exceedingly rugged and uneven.

40. *Pekin observatory*. Father Le Compte describes a very magnificent *observatory*, erected and furnished by the late emperor of China, in his capital, at the intercession of some Jesuit missionaries, chiefly father Verbiest, whom he made his chief observer.

The instruments are exceedingly large; but the divisions are less accurate, and the contrivance, in some respects, less commodious, than those of the Europeans. The chief are an armillary zodiacal sphere of six Paris feet diameter, an equinoctial sphere 6 feet diameter, an azimuthal horizon 6 feet diameter, a large quadrant 6 feet radius, a sextant 8 feet radius, and a celestial globe 6 feet diameter.

OBSSESSION, the action, or rather passion, of being beset by an evil spirit; which, without entering the body, torments, and, as it were, besieges the person without.

In which sense, *obsession* differs from possession. The marks of *obsession*, according to some, are a being hoisted into the air, and thrown violently down without being hurt; speaking languages never learnt; having an aversion to all acts and offices of religion, &c.

Some physicians look on all cases of *obsession* as natural, and curable by natural medicines, particularly by an unguent called *unguentum carriobteri*, with purgatives, or vomitives.

Of this opinion is doctor Gabriel Clauderus, member of the Leopoldine academy, which he confirms with the testimony of Fromannus, in his treatise *De Fascinationibus*, and Ganius de Corallis; adding, that it has been confessed by many witches and forcerers, that the plant hyeciron, and other simples, &c. incommode them terribly, and prevent their operations.

He confirms this sentiment hence, that the devil, in those he thus besets, makes use of the melancholic humour, or the atra bilis, and the grosser impurities of the blood, without always acting immediately of himself. For which he refers to the books of Melchior Sebizio, and Jerom Jordan *de Divino in homine*; and gives the process of a cure of a manifest *obsession* of a child of a year old at Delitschebourg, three leagues from Leipzig. In truth, the devil has no share in the matter.

OBSDIONALIS*, an epithet which the Romans gave to a fort of crown wherewith they honoured such of their generals as had delivered a Roman army, or fortress, besieged by the enemy; and had raised the siege, or obliged them to decamp.

* The word comes from the Latin *obsidio*, siege.

It was also called *graminea*, because made of grass or herbs found on the spot or soil.

It was the soldiery who bestowed this crown; which, doubtless, was the reason of its not being of a more precious matter.

OBSTRUCTION, in medicine, a lett or stoppage of the natural passages or cavities of the body; occasioned either by the excessive quantity, or the vicious quality, of the humours; as lentor, thickness, or the like.

Obstructions are supposed usually to arise from the gross parts of the blood, detained in the extremities of the capillary vessels, and thus blocking them up.

Some physicians doubt whether there be any such thing as *obstructions* in the viscera; and rather attribute the inconveniences, usually ascribed to *obstructions*, to the acrimonies and crudities of the stomach.—But their reasons are not convincing. It is true, *obstructions* may not perhaps be so frequent as is usually supposed; and many of the symptoms ascribed to them, are, doubtless, owing to disorders of the stomach; but then there is no denying that there are any *obstructions* at all in the viscera, &c. scirrhus's, and other kinds of tumours, are incontestable proofs hereof.

Obstructions frequently prove the causes of dropsies. See **DROPSY**.

OBSTRUENTS. See the article **DEOBSTRUENT**.

OBSTRUXIT, *Quare OBSTRUXIT*. See **QUARE**.

OBTURATOR, in anatomy, a name given to two muscles of the thigh; by reason of their shutting, or covering up, the foramen, or aperture between the os pubis and the hip-bone.

The *obturator internus* and *marfupialis* are the two parts, or divisions, that make the gemini. See **GEMINI**.

The *obturator externus* arises fleshy from the exterior margin of the os pubis and ischium, and is inserted tendinous at the root of the great trochanter.—See *Tab. Anat. (Myol.) fig. 7. n. 25*.

OBTUSE literally imports blunt, dull, &c. in opposition to acute, sharp, brisk, &c.

OBTUSE angle, in geometry, an angle of more than 90 degrees, i. e. more than a quadrant of a circle; or an angle greater than a right angle. See **ANGLE**.

OBTUSE-ANGLED triangle, is a triangle, one of whose angles is obtuse.

OBTUSE appui. See the article **APPUI**.

OBVENTIONS, **OBVENTIONES**, in antient law-books, signify the produce of a benefice, or spiritual living; including oblations, tithes, rents, and other revenues. See **OB-LATION**, **TITHE**, and **BENEFICE**.

OCCASIO, in antient law-writers, denotes a tribute which the lord imposed on his vassals, or tenants, on occasion of war, and other exigencies.

OCCASIONAL cause, &c. See the article **CAUSE**, &c.

OCCIDENTAL, a term used chiefly in commerce, to distinguish commodities brought from the West-Indies, i. e. America, from those brought from the East-Indies, which are said to be oriental.

In this sense we say, *occidental bezoard*. See **BEZOARD**.

Occidental pearl. See **PEARL**.

OCCIDENTAL horizon. See **HORIZON**.

OCCIPITAL, in anatomy, a term applied to the parts of the occiput, or of the hinder part of the head. See **OCCIPUT**.

OCCIPITAL bone. See the article **OCCIPITIS os**.

OCCIPITALES, or **OCCIPITAL muscles** (see **MUSCLE**), are a pair of muscles of the head, whose origin is in the same place with that of the frontales, i. e. in the upper part of the head near the vertex; but which go a quite opposite course; viz. from before, hindwards; and are inserted into the lower part of the hairy scalp, or skin of the occiput, which they serve to draw upwards.—See *Tab. Anat. (Myol.) fig. 6. n. 1*.

Dr. Drake observes, that the *occipitalis* and *frontalis* are one continued digastric muscle on each side; that part called the *occipitalis*, after a small ascent, becomes a thin tendon, and marches over the whole bregma, where it divides; the one

part going on to the os jugale, and the other, growing fleshy, acquires the name *frontalis*.

OCCIPITIS os, or *os paræ*, in anatomy, the fourth bone of the cranium; so called from its situation in the occiput.—See *Tab. Anat. (Osteol.) fig. 2. lit. g. fig. 7. n. 2*. See also the article **OCCIPUT**.

It is the hardest and thickest of all the bones of the cranium. Its figure is triangular. In new-born children it is divided into four; but it grows up, and becomes one, in time.

It is joined to the bones of the finciput at the lambdoidal suture; as likewise to the petrosa, and os sphenoides, at the sphenoidal suture.

The parts of this bone are either solid, or hollow, i. e. empty: the solid are two processes, called *coronæ*; the hollow parts are either foramina, or sinu's.

The foramina are either common, or proper. The common are two, one on each side, common with the ossa petrosa, affording a passage to the nerves, par vagum, and to the internal jugular veins.

The proper foramina are five. The first is very large; and through this it is that the spinal marrow passes: two others give passage to the nerves of the tongue, and the two last an entrance to the cervical arteries.

It has two large sinu's withinside, for the reception of the two hemispheres of the cerebellum.

On each side the foramina which give passage to the spinal marrow, is usually a process lined with a cartilage, articulated with the first vertebra of the neck.

In lieu of this, is sometimes only a prominence of the bone, which, or the process where it is found, receives the insertions of the muscles of the head, whereof there are ten; viz. the par splenium, par complexum, par rectum majus externum, par rectum minus externum, par obliquum superius, obliquum inferius, par mastoideum, rectum internum majus, rectum internum minus, and rectum laterale; each of which see in its proper place.

OCCIPUT, the hinder part of the head, or skull; or the part wherein is the os occipitis.

Scultetus observes, that cauterizing the *occiput* is very frequent in many places.

OCCULT, something secret, hidden, or invisible.—The occult sciences are, magic, necromancy, cabbala, &c.

Agrippa has several books of *occult philosophy*, full of the vainest, wildest dreams, imaginable: and Fludd nine volumes of the *cabbala*, or *occult science*, wrapt up under figures, or Hebrew characters.

Weak philosophers, when unable to discover the cause of an effect, and unwilling to own their ignorance, say, it arises from an *occult virtue*, an *occult cause*, an *occult quality*.

OCCULT, in geometry, is used for a line that is scarce perceivable, drawn with the point of the compasses, or a black-lead pencil.

Occult, or dry lines, are used in several operations; as the raising of plans, designs of building, pieces of perspective, &c. They are to be effaced, when the work is finished.

OCCULT cancers. See the article **CANCER**.

OCCULTATION, in astronomy, the time a star, or planet, is hid from our sight, by the interposition of the body of the moon, or of some other planet. See **ECLIPSE**.

Circle of perpetual OCCULTATION is a parallel, in an oblique sphere, as far distant from the depressed pole, as the elevated pole is from the horizon.

Between this parallel and the pole, all the stars contained do never rise; but lie constantly hid under the horizon of the place.

OCCUPANT, in law, he that first seizes and takes possession of a thing.

If a tenant hold land, &c. for the term of another's life, and such tenant die first, without making any estate of it; he that first enters to hold that term out, is said to acquire a property; and is called an *occupant*, by reason his title comes by the first occupation.

So, if a tenant, for his own life, grant over his estate to another; if the grantee dies before him, there shall be an *occupant*.

OCCUPATION, or **OCCUPANCY**, in the civil law, denotes the possession of such things as at present properly belong to no private person, but are capable of being made so. As, by seizing or taking spoils in war; by catching things wild by nature; as birds, and beasts of game, &c. or by finding things before undiscovered, or lost by their proper owners.

OCCUPATION is also used, in common law, for the putting a man out of his freehold in time of war.

Occupation amounts to the same with *diffidm* in time of peace; only that the former is deemed not so great an offence. See **DISSEISIN**.

OCCUPATION is also used for holding, tenure, or possession. As, when we say, such land is in the tenure or occupation of such a man, that is, in his possession.

OCCUPATIONS, in the statute de Bigamis, denote usurpations upon the king, by using liberties or franchises a person is not intitled to.

As any unjust entry upon the king into lands and tenements is called an *intrusion*; so an unlawful using of franchises is called an *occupation*. See **INTRUSION**.

OCCUPAVIT, in law, a writ which lies for him who is ejected out of his land, or tenement, in time of war: as a novel disseisin lies for one ejected in time of peace.

OCEAN *, the grand sea, or the vast collection of salt and navigable water, which encompasses the whole globe of the earth.

* The word comes from the Latin *oceanus*, of the Greek *Ὠκεανός*, which Eustathius fetches from *ὠκεος* *razon*, to slide swiftly: Others say, the Greeks borrowed it from the Phœnicians, who called the circumference of the ocean, *eg*, from the Hebrew *מִגְדָּל* *hag*, circuit, ambit.

The *ocean* is that huge body of waters wherein the two grand continents known to us, the new and old, are inclosed like islands.

By computation it appears, that the *ocean* takes up considerably more of what we know of the terrestrial globe than the dry land.

Dr. Keil computes the surface of the whole *ocean* to be 85490506 square miles; so that, supposing the depth of the *ocean* at a medium to be $\frac{1}{2}$ of a mile, the quantity of water in the whole will be 21372626 $\frac{1}{2}$ cubic miles.

Yet Dr. Burnet computes, that all the waters in the *ocean* were not sufficient to drown or overflow the dry land so high as the Scriptures say it was at the deluge: seven or eight *oceans*, according to him, would scarce have sufficed.

The *ocean*, penetrating the land at several freights, quits its name of *ocean*, and assumes that of *sea*, or *gulf*; to which are usually added some epithets to distinguish it; as Mediterranean-sea, Persian-gulf, &c.—In very narrow places it is called *streights*, *sinus*.

The *ocean* takes different names according to the divers countries it borders on; as the *British ocean*, *German ocean*, &c. According to Maty, the *ocean* may be commodiously divided into *superior*, or *upper*; and *inferior*, or *lower*.

Upper OCEAN, which the ancients called the *exterior*, as encompassing all the known parts of the world, he subdivides, according to the four cardinal points, into the *northern*, *southern*, *eastern*, and *western*.

Northern OCEAN, called also the *glacial*, *frozen*, and *scythian*, is that part of the *upper ocean* next the north-pole, bounded on the south with the arctic-circle, and the northern coasts of Europe and Asia, and on the north with the unknown lands about the pole.

It is called the *icy* or *frozen ocean*, because those who have attempted a passage through it to China, &c. have always been stopped with the ice; and *scythian ocean*, because washing the coasts of Scythia.

Western, or Atlantic OCEAN, is that part of the grand *ocean* which washes the western coasts of Europe and Africa, extending from the arctic circle to the equinoctial.

Southern, or European OCEAN, is that part reaching from the equinoctial to the unknown antarctic lands.

Eastern, or Indian OCEAN, has its first name from its situation to the east; as its latter from India, the chief country it washes.—It reaches from the coast of Ajan to the ile aux Larons, i. e. of Thieves.

Inferior, or American OCEAN, is that vast part of the grand *ocean* which washes the coast of America; unknown, in great measure at least, to the ancients. It is divided into three parts, viz.

The *north sea*, which washes the eastern coasts of America, from the arctic-circle to the tropic of capricorn.

The *magellanic sea*, extending from the tropic of capricorn to the terra australis incognita.

The *south sea*, or *pacific*, which washes the western coasts of America to the east, as far as the ile of Thieves; and from south to north, from the tropic of capricorn to the land of Jesso.

For the saltiness of the *OCEAN*, see the article **SALTNESS**.

For the tides observed in the *OCEAN*, see the article **TIDES**.

Phil. Sachius, in 1664. printed a dissertation, intitled, *Oceanus microcosmicus*, dedicated to Bartholine; wherein he shews, that there is a circular motion in the waters, like that of the blood in the human body: that they all come from the *ocean*, and return thither again. The thought is Solomon's, Eccles. ch. 12. See **VAPOUR**, **SPRING**, &c.

OCHLOCRATIA *, a form of government, wherein the populace has the whole power and administration in its own hand.

* The word comes from the Greek *ὄχλος*, multitude, and *κράτος*, power, command.

VOL. II.

OCTABIS, in law. See the article **OCTAVE**.

OCTAETERIDES *, in chronology, &c. the space or duration of eight years.

* The word is formed from the Greek *ὀκταῖς*, composed of *ὀκτω*, eight, and *ἔτος*, year.

OCTAGON. See the article **OCTOGON**.

OCTAHEDRON, or **OCTAEDRON**, in geometry, one of the five regular bodies, consisting of eight equal and equilateral triangles.

The *octahedron* may be conceived as consisting of two quadrilateral pyramids put together at their bases.

Its solidity therefore is had by multiplying the quadrangular base of either, by one third of the perpendicular height of one of them; and then doubling the product.

The square of the side of an *octahedron* is in a subduple ratio of the square of the diameter of the circumscribing sphere.

OCTANT, or **OCTILE**, in astronomy, an aspect or position of two planets, &c. wherein their places are distant an eighth part of a circle, or 45 degrees from one another.

OCTAPLA *, a term in the sacred learning, used for a kind of ancient polyglot bible, consisting of eight columns.

* The word is formed from the Greek *ὀκτω*, eight; *q. d.* something with eight rows, or columns.

In the first column was the Hebrew text, in Hebrew characters; in the second, the same text in Greek characters; in the third, the Greek version of Aquila; in the fourth, that of Symmachus; in the fifth, the Septuagint; in the sixth, that of Theodotion; in the seventh, that called the *fifth*; the last was that called the *sixth*.

Origen was the author of the *octapla*, as well as of the *tetrapla*, and *hexapla*.

OCTATEUCH, in the sacred literature, is used for the eight first books of the Old Testament, viz. Genesis, Exodus, Leviticus, Numbers, Deuteronomy, Joshua, and Judges.—Procopius of Gaza has ten commentaries on the *octateuch*.

OCTAVE, in music, an harmonical interval, consisting of eight tones, or degrees of found.

The most simple perception the soul can have of true sounds, is that of union; in regard the vibrations there begin and end together.—The next to this is the *octave*; wherein the more acute sound makes precisely two vibrations, while the graver or deeper makes one; and wherein, by consequence, the vibrations of the two meet at every vibration of the more grave.

Hence union and *octave* pass almost for the same concord.

Hence also the proportion of the sounds that form the *octave* are in numbers, or in lines, as 2 to 1; so that two chords or strings of the same matter, thickness, and tension, one whereof is double the length of the other, produce the *octave*.

The *octave* is called, by the ancients, *diapason*, because containing all the simple tones and concords; all of which derive their sweetness from it, as they arise more or less directly out of it.

To be just, it must contain diatonically 7 degrees, or intervals; and consequently 8 terms, or sounds: whence its name, *octave*.

The *octave* containing in it all the other simple concords, and the degrees being the differences of these concords, it is evident the division of the *octave* comprehends the division of all the rest.

By joining, therefore, all the simple concords to a common fundamental, we have the following series:

$1 : \frac{9}{8} : \frac{5}{4} : \frac{4}{3} : \frac{3}{2} : \frac{2}{1} : \frac{7}{4} : \frac{5}{2}$

Fund. 3d.l, 3d.g, 4th, 5th, 6th.l, 6th.g, 8ve.

Again, the system of *octave* containing all the original concords; and the compound concords being the sum of *octaves*, and some lesser concord; in order to have a series to reach beyond an *octave*, we must continue them in the same order through a second *octave*, as in the first; and so on through a third and fourth *octave*. Such a series is called the *scale of music*.

Though the composition of *octaves* may be carried on infinitely, yet three or four *octaves* is the greatest length we go in ordinary practice. The old scales went no further than two, or at most three *octaves*, which is the full compass of an ordinary voice. And, notwithstanding the perfection of the *octave*, yet after the third, the agreement diminishes very fast; nor do they ever go so far at one movement, as from one extreme to the other of a double or triple *octave*; seldom beyond a single *octave*: nor is either voice or instrument well able to go beyond.—To form a fourth *octave*, if the acuter string be half a foot, which is but a small length to give a clear sound; the longer must be eight feet. If then we go beyond the fourth *octave*, either the acute term will be too short, or the grave one too long.

The *ollave* is not only the greatest interval of the seven original concords, but the first in degree of perfection. As it is the greatest interval, all the less are contained in it. Indeed, the manner wherein the less concords are found in the *ollave*, is somewhat extraordinary; viz. by taking both an harmonical and arithmetical mean between the extremes of the *ollave*, and then both an arithmetical and harmonical mean between each extreme, and the most distant of the two means last found; i. e. between the last extreme and the first arithmetical, and between the greater extreme and the first harmonical mean, we have all the lesser concords. Mr. Malcolm observes, that any wind-instrument being over-blown, the sound will rise to an *ollave*, and no other concord; which he ascribes to the perfection of the *ollave*, and its being next to unison.

From this simple and perfect form of the *ollave*, arises this peculiar property, that it may be doubled, tripled, &c. and still be concord, i. e. the sum of two or more *ollaves* are concord; though the more compound, gradually, the less agreeable. He adds, there is that agreement between its extremes, that whatever found is concord to one extreme of the *ollave*, is so to the other.

Des Cartes, from an observation of the like kind, viz. that the found of a whistle, or organ-pipe, will rise to an *ollave*, if forcibly blown, concludes, that no found is heard, but its acute *ollave* seems some way to echo or rebound in the ear.

OCTAVE, or **OCTAVIS**, in law, denotes the 8th day after any feast, inclusively; which space is also called *uitas*.

OCTAVE, among the Romanists, is used for the space or period of eight days allowed for the celebration of a feast, or service, in commemoration of some saint, or on other solemn occasions.

Easter, Whitfuntide, S. John Baptist, S. Laurence, Epiphany, the Dedication, &c. are celebrated with *ollaves*.—The office in the *ollave* is semi-double.

OCTILE, or **OCTANT**, in astrology, an aspect of two planets when distant from each other by an eighth of the zodiac, i. e. a sign and half, or 45°.

OCTO, *Ad Octo*. See the article *Ad octo*.

OCTOBER, the eighth month of the year, in Romulus's calendar; though the 10th in that of Numa, Julius Cæsar, &c. consisting of 31 days.

October has still retained its first name, in spite of all the different names the senate, and Roman emperors, would have given it.—The senate ordered it to be called *Fauſtinus*, in honour of *Fauſtina*, the wife of Antoninus the emperor: Commodus would have had it bear the name of *Inuictus*; and Domitian made it be called *Domitianus*, after his own name.

OCTOGON, or **OCTAGON**, in geometry, a figure of eight sides, and eight angles.

When all the sides and angles are equal, it is called a regular *octogon*, or an *octogon* that may be inscribed in a circle.

OCTOGON, in fortification, denotes a place that has eight bastions. See *BASTION*.

OCTOSTYLE, in the ancient architecture, the face of a building, or ordonnance, containing eight columns.

The eight columns of the *octostyle* may either be disposed in a right line, as in the Pseudodiptere temple of Vitruvius, and in the Pantheon; or in a circle, as in the round Monoptere temple of Apollo Pythius at Delphi, &c.

OCTO Tales. See the article *TALES*.

OCULARES Dentes, or *Cynodontes*, the eye-teeth. See *TOOTH*.

OCULUS, in anatomy. See the article *EYE*.

OCULI CANCROUM. See the article *CRABS-EYES*.

OCULI, *Eyes*, in botany, the gemmæ or buds of a plant just putting forth, or the knots out of which those buds arise.

Adductor OCULI. See the article *ADDUCTOR*.

Depressor OCULI. See the article *DEPRESSOR*.

Elevator OCULI. See the article *ELEVATOR*.

Obliquus OCULI. See the article *OBLIQUUS*.

ODA, in the Turkish seraglio, signifies a *class*, *chamber*, or *order*.

The grand signor's pages are divided into five classes, or chambers, called *Odas*. See *PAGE*.

The first, which is the lowest in dignity, is called the *great oda*, from the number of persons that compose it.

These are the juniors, who are taught to read, write, and speak the languages; which are the Turkish for this world; the Arabic for paradise; and the Persian for hell, by reason of the heresy of the people that speak it.

The second is called the *little oda*; where, from the age of 14 or 15 years, the youth are trained up to arms, and the study of such polite learning as the Turks are acquainted withal; viz. logic, arithmetic, geometry, and a little astrology.

In each of these chambers is a page of the privy chamber,

who superintends them, as the prefects in the colleges of the jesuits.

The third chamber, called *kilar-oda*, comprehends two hundred pages; which, beside their other exercises, are commanded by the *kilerdgi-bach*, for the service of the buttery and fruiter.

The fourth only consists of twenty-four: these, under the *khazineda-bachi*, take care of the treasure in the grand signor's apartment, where they never enter with any cloaths on that have pockets.

The fifth is called *has-oda*, i. e. privy-chamber, and consists of forty pages, which attend the emperor's bed-chamber. The first of this chamber is called *oda bachi*, the second *silik-tar*, &c.

Eight of these pages keep constant guard every night in the emperor's bed-chamber. They are posted in several places, some nearer him, others farther off, according to their degrees in the chamber. They are to take care the light, kept constantly in the chamber, do not glare in his eyes, and awake him; and if they find him disturbed with any troublesome dream, and to take care he be awaked by one of the aga's.

ODABACHI, or **ODDABASSI**, an officer in the Turkish soldiery, equivalent to a sergeant or corporal among us.

The common soldiers, and janizaries, called *oldachis*, after having served a certain term of years, are always preferred, and made *biquelairs*; and of *biquelairs* in time become *oda-bachi*'s, i. e. corporals of companies, or chiefs of certain divisions, whose number is not fixed, being sometimes ten, and sometimes twenty.

Their pay is six doubles per month, and they are distinguished by a large felt, a foot broad, and above a foot long, hanging on the back with two long ostrich feathers.

ODD. See the articles *EVENLY* and *FOOT*.

ODE *, *ODA*, in the ancient poetry, a song; or a composition proper to be sung, and composed for that purpose; the singing being usually accompanied with some musical instrument, chiefly the lyre.

* The word comes from the Greek *ὠδή*, *cantus*, song, or singing.

Odes, in the modern poetry, is a lyric poem, consisting of long and short verses, distinguished into stanza's, or strophes, wherein the same measure is preserved throughout.

The *Odes* of the antients, Vossius observes, had a regular return of the same kind of verse, and the same quantity of syllables, in the same place of every similar verse; "But there is nothing (says he) but confusion of quantities in the modern *odes*; so that, to follow the natural quantity of our syllables, every stanza will be a different song."

He should have observed, however, that all the antient *odes* were not of such kind. But he proceeds: "The moderns have no regard to the natural quantity of the syllables, and have introduced an unnatural and barbarous variety of long and short notes, which they apply without any regard to the natural quantity of syllables; so that it is no wonder our vocal music has no effect." *De poem. cantu*.

Among the antients, *ode* signified no more than a song; with us, they are different things.—The antient *odes* were generally in honour of their gods, as are many of those of Pindar and Horace: sometimes on other subjects, as those of Anacreon, Sappho, &c.—The English *odes* are generally composed in praise of heroes, and great exploits; as those of Dryden, Prior, &c.

The distinguishing character of the *ode* is *sweetness*: The poet is to soothe the minds of his readers by the variety of the verse, and the delicacy of words, the beauty of numbers, and the description of things most delightful in themselves. Variety of numbers is essential to the *ode*.

At first, indeed, the verse of the *ode* was but of one kind; but for the sake of pleasure, and the music to which they were sung, they by degrees so varied the numbers and feet, that their kinds are now almost innumerable. One of the most considerable is the *ionic*, distinguished by the boldness and rapidity of its flights.

The antient *ode* had originally but one stanza, or strophe; but was at last divided into three parts, *strophe*, *antistrophe*, and *epode*.—The priests going round the altar, singing the praise of the gods, called their first entrance *strophe*, i. e. turning to the left: the second, turning to the right, they called *antistrophe*, *q. d.* returning. Lastly, standing still before the altar, they sung the remainder; which they called *epode*.

Alcæic ODE. See the article *ALCÆIC*.

ODEUM, ὠδῆον, among the antients, was a place defined for the rehearsal of the music to be sung on the theatre.

ODEUM was sometimes also extended to buildings that had no relation to the theatre.—Pericles built an *odeum* at Athens, where musical prizes were contended for: Pausanias says, that Herod the Athenian built a magnificent *odeum* for the sepulchre of his wife.

Ecclesiastical writers also use *ODEUM* for the choir of a church.

ODIO *ſ* *Asia*, antiently called *breve de bono & malo*, is a writ directed to the sheriff, to inquire whether a man, being committed to prison on suspicion of murder, be committed on just suspicion, or only malice, and ill-will.

ODONTALGIA *, in medicine, the tooth-ach; one of the most common, yet most cruel pains the body is subject to.

* The word is Greek *οδονταλγία*, formed from *οδus*, tooth, and *αλγus*, pain.

Its cause is some sharp serosity, thrown on the membrane that lines the sockets, or alveoli of the teeth. The liquor is sometimes so very sharp and corrosive, that it eats away the teeth by little and little, and makes them fall piece-meal.—Its more remote causes are sugars, very hot things, and very cold acids, &c.

The disease is frequently attended with an inflammation, or oedematous tumour of the jaw.—It is sometimes also owing to a worm found in the root of the tooth.

The academists *Curiosi Naturæ*, deced II. mention an *odontalgia* cured by a box on the ear given the patient; and add an instance of blindness and *odontalgia* caused by shaving a man's beard. The very sight of a remedy frequently drives away the pain.

ODONTOIDES *, *Οδοντοειδης*, in anatomy, an apophysis in the middle of the second vertebra; so called from its resemblance to a tooth.

* The word is formed from the Greek *οδus*, tooth, and *ειδus*, form.

Its surface is somewhat unequal, that the ligament which comes out of it and binds it to the occiput, may take the better hold.

It is also encompassed with a solid ligament, contrived on purpose to prevent the spinal marrow from being compressed by this apophysis.

ODOR, or **ODOUR**. See the article **SMELL**.

ODORAMENTUM, in pharmacy, a medicine applied for the benefit of its smell, whether it be fetid, or agreeable.

Such are frequently used in hysterical and hypochondriac disorders; *e. gr.* assa fœtida, camphor, &c.

ODORIFEROUS Glands. See **GLAND**.

ODOROUS, or **ODORIFEROUS things**, are such as exhale a brisk, agreeable smell, sensible at a distance.

Such are the jessamin, rose, tuberose, &c.

ODYSSEE *, **ODYSSEA**, an epic poem of Homer, wherein he relates the adventures that befel Ulysses in his return to Ithaca from the siege of Troy. See **EPIC**.

* The word is formed from the Greek *οδυσσεια*, which signifies the fame, of *οδus*, Ulysses.

The design of the *iliad*, F. Bossu observes, is to instruct the states of Greece considered as united in one body, or as parts of the whole; and that of the *odyssee*, to instruct those same states, considered in their private capacities.

A state consists of two parts: the head, which commands, is the first; and the members, that obey, the second. Now, instructions are required both for the one and the other; but it is possible to have them both conveyed under the same person.

The fable, then, of the *odyssee* is as follows.—A prince had been obliged to quit his country, and lead an army of his subjects upon a foreign expedition: after having gloriously executed this, he was upon his return home; and in spite of all his endeavours, was detained for several years by tempests which threw him on several countries very different from one another as to manners, customs, polity, &c.

In the dangers he had to struggle withal, his companions, neglecting his advice, all perished, through their own default. In the mean time, the great men of his country, abusing his absence, commit strange disorders in his palace, squander his treasure, lay snares for his son, and will needs force his wife to chuse an husband among them; all this from an opinion that he was intirely lost. But at length he returns; and, having discovered himself to his son, and some others of his friends who had persisted in their allegiance, he becomes an eye-witness of the insolence of his courtiers; punishes them as they deserved; and restores that peace and tranquillity to his island, which had been banished during his absence.

The truth or model whereon this fable is founded, is, that a person's absence from home, so as that he cannot have an eye to his affairs, occasions great disorders. Accordingly, the hero's absence is the principal and most essential part of the action; and takes up the greatest part of the poem.

This poem, Bossu adds, is more calculated for the people, than the *iliad* is, where the subjects suffer rather from

the ill conduct of their princes, than by their own fault. The great names of heroes, Ulysses, &c. do not here represent the poorest peasants less than princes, Cæsars, Alexanders, &c. The meanest people are as liable to ruin their estates and families by negligence, &c. as the greatest; and accordingly have as much need of Homer's lectures, and are as capable of profiting by them, as kings themselves.

Gerard Croes, a Dutchman, in a book intitled *ΟΜΗΡΟΣ ΕΒΡΑΙΟΣ*, printed at Dort in 1704. endeavours to prove, that the subjects of Homer's two poems are taken from the Scriptures; that the action of the *odyssee*, in particular, is nothing else but the adventures of the Israelites till the death of Moses; and that the *odyssee* was composed before the *iliad*, the subject whereof is the taking of Jericho. What fancies!

OECONOMICS, **OECONOMICA**, that part of moral philosophy which teaches how to manage the affairs of a family, or household.

OECONOMUS, *Οικονομος*, a person appointed to direct and manage a vacant church revenue, or that of an hospital, or other community.

OECONOMUS was also antiently used for a protector, or advocate, who defended the rights and effects of churches, monasteries, &c.

OECONOMUS was also an appellation given to a church-officer, who took care of the buildings and repairs of the church, and received and distributed alms according to the directions of the bishop.

In this sense it is that the sixth council appoints, that every church have its *oeconomus*.

OECONOMY, *Οικονομία*, the prudent conduct, or discreet and frugal management, of a man's estate, or that of another.

To recommend *oeconomy*, a modern author observes, that land as good as most in England is let at 20 s. an acre *per annum*, and sold at 20 years purchase, or for 20 pounds the acre. Now, in an acre of land are 43560 square feet, and in 20 pounds are 4800 pence: by which dividing 43560, the quotient will be 9, and 360 remaining; which shews that one penny will purchase 9 square feet and almost 13 inches of land, *viz.* a piece 3 feet long, and 3 broad, and something more.

Whence it follows, that two shillings purchase a piece of ground of 216 feet; *viz.* 18 feet long, and 12 feet broad; enough to build a pretty house upon, and room for a little garden.

Animal OECONOMY, the first branch of the theory of medicine; or that which explains the parts of the human body, their structure and use; the nature and causes of life and health, and the effects or phenomena arising from them.

This is otherwise called *physiology*; and its objects just enumerated are called the *naturals*, or *res secundum naturam*.

Legal, or **Jewish OECONOMY** or **Dispensation**, is the manner wherein God thought good to guide and govern his people under the ministry of Moses. See **JUDAISM**.

This included not only the political and ceremonial laws, but also the moral law, inasmuch as it pronounced a curse on all those who did not fulfil it perfectly.

Evangelical, or **Christian OECONOMY** or **Dispensation**, is used in opposition to the *legal*; and comprehends all that relates to the covenant of grace, which God has made with men by Jesus Christ.

OECONOMY of the parts of plants. See **PLANT**.

OECEMENICAL * signifies as much as *general*, or *universal*.

* The word is formed of the Greek, *οικουμενικος*, of *οικουμενη*, the habitable earth; or, the whole earth.

In this sense we say, an *oecumenical* council, or synod; meaning one at which the whole Christian church assisted, or which they were invited to.

Du Cange observes, that many of the patriarchs of Constantinople, assumed to themselves the quality and denomination of *oecumenical* patriarchs; particularly John the Father in 590. and Cyril his successor.—Gregory the Great of Rome was exceedingly enraged at it; pretending it was a title of pride, and a character of antichrist; as supposing the title *oecumenical* to imply universal bishop, or bishop of all the world: whereas, in effect, it implied no more, than the quality of chief of the Eastern church; in like manner as the first doctor of the church of Constantinople was called *doctor oecumenicus*.

The title *oecumenical* bishop was first offered to Leo I. but he refused it; nor did his successors accept of it for a long time. The fifth council of Constantinople gave it to John, patriarch of that city; though some of the Romanists pretend, that the emperor Phocas gave it, by way of preference, to the bishop of Rome.

But those of Constantinople have preserved it; and so late as the council of Basil, that patriarch used the title. But

oecumenical

ecumenical here is only to be understood as of the extent of each patriarchate.

OEDEMA*, *Οἰδημα*, a tumour which appears whitish, soft, and lax, without any notable change of colour, heat, pain, or pulsation; and which yields to the pressure of the finger so as for some time to retain the dent or impression thereof.

* The word comes from the Greek *οἰδᾶν*, I swell; whence *οἰδημα*, a tumour. Accordingly, Hippocrates uses the word *oedema* for any tumour in general.

The general cause of *oedema* is vulgarly supposed to be a *pituita*, as it is called, or a phlegmy humour in the body. Contusions, fractures, luxations, &c. when of long standing, often give rise to *oedemas*, especially in dropical and aged persons: so also do irregular living, want of exercise, ruptures, disorders of the lymphatics, defluxions of humours, weakness of the joints, &c.

The chief seat of this tumor is the legs: in a leucophlegmatia, the whole body is *oedematous*. It frequently comes upon other diseases, especially clinics; and is familiar to women with child. It is dangerous when it tends to an abscess; when it hardens it becomes scirrhus.

There are also *spurious oedemas*; in which case the pituitous humour is mixed with other humours; whence the tumor becomes erysipelatous, scirrhus, and sometimes gypfous: and hence wens, &c.

OEDEMATOUS, in medicine, something that is of the nature of an *oedema*; or teised, or afflicted with an *oedema*.

Thus we say, an *oedematous arm*, *oedematous legs*, &c.—Physicians divide tumors into *inflammatory*, *oedematous*, *scirrhus*, *scrophulous*, *cancerous*, &c.

Oedematous tumors seldom, of themselves, prove dangerous, or mortal: but when they are of a long continuance, the effect of old age, or a dropical habit; when they grow hard, scirrhus, painful, or come to suppurate the cure is generally tedious and uncertain. Those which attend wounds, fractures, or the like, are less difficult to cure.

They are easily dissipated in their first formation by the external application of solutions of bay-salt, nitre, crude sal armoniac, &c. in Spanish wine, urine, lime-water, or other lixivious fluids; while the patient submits to a course of purgatives, to discharge the matter repelled by such applications.

Under the class of *oedematous tumors*, are ranked condylomata, crista, rhagades, thym, talpæ, or natæ, the ganglion and pydracium. See each under its proper article, *CONDYLOMA*, *CRISTA*, &c.

OENELÆUM*, in pharmacy, a mixture of wine and oil; usually of thick black wine, and oil of roses.

* The word is Greek, *Οινελαιον*, formed of *οινος*, wine, and *ελαιον*, oil.

In fractures with wounds, where the bone is not bare, Scultetus orders that the compresses, to make them stick, be drenched with *oenelæum*, to soothe the pain, and prevent an inflammation; and the bandages to be every day moistened with the same, till the inflammation be out of all danger.

OENISTERIA*, in antiquity, sacrifices, held by the youth of Athens, before the first time of cutting the hair, and shaving the beard.

* The etymology of the word, which comes from *οινος*, wine, shews that the matter here offered was wine.

These sacrifices were offered to Hercules; and the quantity of what was offered was regulated by law.

OENOPTÆ, a kind of officers or censors at Athens, who attended at their feasts, regulated the number of cups each was to drink, and took care that none drank too much or too little.

Those who would not be kept within the bounds of temperance, were presented by the *oenoptæ* to the Areopagus.—The *oenoptæ* were also called *eyes*, *oculi*.

OESOPHAGÆUS, in anatomy, one of the muscles of the pharynx, which it encompasses round like a ring. It is single, and serves to squeeze the aliment down, by closing the pharynx after the manner of a sphincter: whence some call it the *sphincter gulæ*; others *deglutitor*, or *swallower*.

Dr. Drake will have it no more than a production of the pterygopharyngeus, whose fibres surround the pharynx from a tendinous line on the back part of it: though Verheyen makes it a distinct pair.

OESOPHAGUS, *Οισοφαγος*, in anatomy, the gullet; a membranous pipe or passage, whereby our food and drink is conveyed from the mouth to the stomach.—See *Tab. Anat. (Splanchni)*, fig. 2. lit. a. See also *FOOD*, &c.

The *oesophagus* descends from the fauces to the stomach, between the aspera arteria and the vertebræ of the neck and

back, in a strait line, excepting for a little deflection about the fifth vertebra of the thorax, where it turns a little to the right to make way for the great artery, which runs along with it to the ninth; where turning again towards the left, it crosses the artery, and piercing the diaphragm, ends at the left orifice of the stomach. See *STOMACH*.

It consists of several coats or membranes, usually reckoned three; though some make them four, others five or six, all owing the crassa villosa to be one: which last division, Dr. Drake follows as most accurate.

The first coat is membranous, and only designed for a covering for the rest; and seems only a continuation of the outward membrane of the stomach, derived from the peritonæum; though some derive it from the pleura, and others from the diaphragm.

The second coat is muscular, consisting of strong, fleshy fibres, like other muscles; so that it seems to make the gullet an hollow fistulous muscle. According to Steno and Willis, it consists of two orders of fibres, going from top to bottom in spiral lines, contrary to and decussating each other. Which description is very exact of the gullet of ruminants, but not so of that of men. In men it consists of two fleshy lamellæ, like two distinct muscles: the outward composed of frail longitudinal fibres; the inner of annular fibres, without any observable angles. The use of this coat is to promote deglutition; the longitudinal fibres, when in contraction, shortening the *oesophagus*, and making its capacity larger to admit of the matter to be swallowed; and the annular, on the contrary, contracting the capacity, and closing behind the descending aliment, press it downward. So that the two orders of fibres seem to act as antagonist-muscles to each other.

The next coat, called the *vascular*, consists of a double membrane; the outer formed of irregular fibres and innumerable vessels interwoven; the inner of frail longitudinal fibres mixed with little glands; whence some call it the *glandulous*. This membrane adheres closely to another within, called the *nervous-coat*, which is exceedingly fine, and made up of excessively slender fibres, variously disposed. It is continued to that which covers the fauces, mouth, and lips; whence it happens, that tickling the bottom of the fauces by vellicating this membrane, provokes a retching to vomit.

This membrane has a quick sensation; and in this part, as some think, is the seat of thirst, or the organ whereby the appetite of drinking is excited. It is lined inwardly with a villous crust, which Dr. Drake takes to be the excretory ducts of the glands, and not unlike the cuticula of the cutis, to defend the subjacent membrane. In excoriations, this is sometimes cast out at the mouth.

The upper opening of the *oesophagus*, situate at the bottom of the fauces, is called the *pharynx*. See *PHARYNX*.

OESTRUM Veneris. See the article *VENERIS*.

OESYPE*, or *OESYPOS*, a kind of fatty mucilage, of the consistence of an unguent; of a greyish colour, and a sickish disagreeable smell, drawn from the greasy wool growing on the throats and between the buttocks of sheep.

* The word is formed from the Greek *οἶς*, sheep; and *οὔπη*, I purify, or corrupt: the *oesype* being a filthy, and, as it were, corrupted matter, drawn from sheep.

This wool they wash, boil it in water to scum, let the lotions or decoctions stand for some time, and from the top skim off a fatty substance, which being strained through a linen cloth, and set to cool, makes the *oesype*, much used externally to resolve, soften, and assuage pain.

OFFA Alba, a name which Van Helmont gives to the white coagulum arising from a mixture of rectified spirit of wine with spirit of urine.

Note, The spirit of urine must be distilled from well fermented wine; and the other must be well dephlegmated: else, no *offa* will arise.

OFFERING. See *OBLATION*, and *HEAVE-Offering*.

OFFERTORY, *OFFERTORIUM*, an anthem sung, or played on the organ, at the time the people are making an offering.

Antiently the *offertory* consisted of a psalm sung with its anthem; though it is somewhat dubious whether the psalm was sung intire; St. Gregory mentioning, that when it was time, the pope, looking at the choir who sung it, gave the sign when they should end.

OFFERTORY was also a name antiently given to the linen whereon the offerings were laid.—Dr. Harris says, it was properly a piece of silk, or fine linen, wherein the occasional oblations or offerings of each church were wrapped up.

OFFICE, *OFFICIUM*, in a moral sense, denotes a duty; or that which virtue, and right reason, direct a man to do.

Virtue, according to Chauvin, is the purpose of doing well: the thing which immediately follows, or arises from this purpose, is obedience; which same is also denominated *officium*: so that an *office* is the object of an obedience to virtue. See *VIRTUE*.

Cicero,

Cicero, in his discourse of *offices*, censures Panætius, who had written before him on the same, for omitting to define the thing or subject on which he wrote; yet does he himself fall under the same censure. He insists much on the division of *offices*; but forgets the definition.—In other of his places we find him defining *office* to be an action which reason requires to be done: *quod autem ratione actum sit, id officium appellamus.* De Finib.

The Greeks, he observes, made two species of *office*: *perfect*, called by them *κατεστην*; and *common*, or *indifferent*, called *κακορον*; which they define so, as that, what is absolutely right, makes a *perfect office*; and what we can only give a probable reason for, a *common or intermediate office*.

OFFICE, in a civil sense, denotes the mutual aid, and assistance, which men owe to one another.

Benevolence inspires a man with an endeavour to do good *offices* to all mankind.

OFFICE is also a particular charge, or trust, whereby a man is authorized to do something.

Loyseau defines *office* a dignity attended with a public function. The word is primarily used in speaking of the *offices* of judicature, and policy: as, the *office* of a secretary of state, that of a justice of peace, of a sheriff, &c.

Offices are either venal, or not venal.—*Venal offices* are those bought with money.

Venal offices are subdivided into two kinds; *viz.* *Dominal* and *casual*.—*Dominal*, or *offices in fee*, are those absolutely torn off, and separated from the king's prerogative, so as not to become vacant by death, but passing in the nature of a fee, or inheritance.

Of these we have but few instances among us, which go beyond a first reversion.—Among the French they are more frequent.

Casual offices are those given for life, by patent, commission, &c., and which become vacant, by the officer's death, to the king's benefit; unless the officer have before resigned, or disposed of it.

The venality of *offices* of judicature is one of the grievances in the French policy. See *VENAL*.

Alienation OFFICE. See the article *ALIENATION*.

Alternate OFFICE. See the article *ALTERNATE*.

Crown OFFICE. See the article *CROWN*.

Jewel OFFICE. See the article *JEWEL*.

Virtualing OFFICE. See the article *VIRTUALING*.

OFFICE is also used for a place, apartment, or board, appointed for the officers to attend in, for the discharge of their respective duties or employments.

Such are the *secretary's office*, the *six clerks office*, the *paper-office*, *signet-office*, the *prothonotary's office*, *pipe-office*, *king's silver-office*, *excise office*, *office of ordnance*, &c. See each in its place, *SECRETARY*, *SIX CLERK*, *PAPER*, *SIGNET*, *EXCISE*, *ORDNANCE*, &c.

Of such *offices*, some are distinguished by the name of *boards*, and others of *chambers*; as the board of green cloth, &c.

Where the inquisition obtains, the tribunal thereof is called the *holy office*.

OFFICE, in the canon law, is used for a benefice which has no jurisdiction annexed to it. See *BENEFICE*.

OFFICE is also used, in common law, for an inquisition made to the king's use of any thing found by virtue of his office who inquires or makes an inquisition *ex officio*.

Hence, to travel on *office*, is to travel an inquisition taken of *office* before an escheator.—To return an *office*, is to return that which is found by virtue of the *office*.

There are two sorts of *offices* issuing out of the exchequer by commission; *viz.* an *office* to intitle the king in the thing inquired into; and an *office* of instruction.

OFFICE is also used for divine service celebrated in public.

St. Jerom is the person, who, at the request of pope Damasus, is said to have first distributed the palms, epistles, and gospels in the order in which they are now found in the Romish *office*.

The popes Gregory and Gelasius added the prayers, responses, and verses; and St. Ambrose the gradualls, hallelujahs, &c.

OFFICE is more particularly used in the Romish church, for the manner of performing the service; which varies every day. Thus they say the *office* of Sunday; the *office* of such a saint, &c.

—The *office* is either *single* *half double*, or *double*.

OFFICE, again, is applied to a particular prayer preferred in honour of a saint.

When any person is canonized, a particular *office* is at the same time assigned him out of the common *office* of the confessions, the virgin, or the like. See *SAINT* and *CANONIZATION*.

We say, the *office* of the virgin; of the holy spirit; of the passion: the holy sacrament, &c. The *office* of the dead is rehearsed every day, excepting on feast-days, among the Carthusians. The *office* of the holy virgin is also added to the *office* of the day, in the order of Bernardins.

OFFICES, with regard to architecture, denote all the apartments that serve for the necessary occasions of a great house, or palace: as kitchens, pantries, liew-houses, collectionaries, fruiter-

ries, granaries, &c. as also wash-houses, wood-houses, stables, &c.

The *offices* are commonly in the basse-cour; sometimes they are sunk under-ground, and well vaulted.

OFFICER, a person possessed of a post or office.

Great OFFICERS of the crown, or state, are the lord high steward, the lord chancellor, the lord high treasurer, the lord president of the council, the lord privy-seal, the lord great chamberlain, the lord high constable, the earl marshal, and lord high admiral. See each under its proper article, *CHANCELLOR*, *TREASURER*, *MARSHAL*, &c.

OFFICERS of justice are those who are intrusted with the administration of equity, and justice in the courts thereof.

Royal OFFICERS are those who administer justice in the king's name,—as the judges, &c. See *JUDGE*.

Subaltern OFFICERS are those who administer justice in the name of subjects.—Such are they who act under the earl-marshal, admiral, &c.

OFFICERS of policy, are those in whom the government and direction of the affairs of a community are invested.—Such are mayors, sheriffs, &c.

OFFICERS of war, are those who have command in the forces.

These are either *general*, *field*, or *subaltern officers*.

General OFFICERS are such whose command is not limited to a single troop, company, or regiment; but extends to a body of forces composed of several regiments.

Such are the general, lieutenant-generals, major-generals, and brigadiers.

Field OFFICERS are such as have command over a whole regiment; such are the colonel, lieutenant-colonel, and major.

Subaltern OFFICERS are the lieutenants, cornets, ensigns, sergeants, and corporals.—See each *officer* under his proper article, *CAPTAIN*, *COLONEL*, &c.

Commission OFFICERS are such as are appointed by the king's commission.

Such are all from the general to the cornet inclusive.

They are thus called in contradistinction to *warrant*, or *staff officers*, who are appointed by the colonel's or captain's warrant: as quarter-masters, sergeants, corporals, and even surgeons and chaplains.

Sea OFFICERS, or *officers of the marine*, are those who have command in ships of war.

Flag OFFICERS are the admirals, vice-admirals, and rear-admirals.

OFFICERS of the household, are the lord steward, treasurer of the household, comptroller, cofferer, master, clerks of the green-cloth, &c. the lord chamberlain, vice-chamberlain, gentlemen of the privy and bed chamber, gentlemen-ushers, groomes, pages, master of the wardrobe, or the ceremonies, &c. the master of the horse, avenor, equerries, surveyors, &c. See *HOUSEHOLD*; see also each *officer* in his proper article.

Staff OFFICERS are such as in the king's presence bear a white staff; and at other times, going abroad, have a white staff borne before them by a footman bare-headed.

Such are the lord steward, lord chamberlain, lord treasurer, &c.

The white staff is taken for a commission; and at the death of the king, the *officers* break their staff over the hearth made for the king's body, and thereby discharge their inferior *officers*.

Municipal OFFICERS. See the article *MUNICIPAL*.

Reformed OFFICER. See the article *REFORMADO*.

OFFICERS of the mint. See the article *MINT*.

Signals for OFFICERS. See the article *SIGNAL*.

OFFICIAL, *OFFICIALIS*, in the canon-law, the bishop's deputy, or lieutenant; or an ecclesiastical judge appointed by a bishop, chapter, abbot, &c. with charge of the spiritual jurisdiction thereof.

Of these there are two kinds,—the one, as it were, vicar-general of the church; exercising jurisdiction throughout the whole diocese, called by the canonists *officialis principalis*, in our statute-law the bishop's chancellor. See *CHANCELLOR*.

There is no appeal from his court to the bishop; his being esteemed the bishop's court.

The other, called *officialis foraneus*, as having his jurisdiction *foris*, & *extra civitatem*, is appointed by the bishop when the diocese is very large; having a certain extent of territory assigned him, wherein he resides.

This *official* has but a limited jurisdiction, though he have *universitatem causarum*, and exercise it in the bishop's name.—Our statute laws call him, *commissary*.

The bishops, especially those of large sees, finding themselves oppressed with a multiplicity of business, at first, discharged a part of it upon their archdeacons and priests; to whom they gave commissions revocable at pleasure.—These are called *vicarii*, or *officials*.

As we do not meet with this term any-where before the constitutions of the *sacrosanctum*, it is pretty apparent the custom had not its rise till the end of the thirteenth century.

In process of time the function was divided into two; and the title *official* given to him with whom the bishop intrusted the exercise of litigious justice; and that of vicars-general, or grand vicars, to those who had the voluntary jurisdiction.

The number of *officials* was soon excessively multiplied; and not only bishops, but chapters and archdeacons would have their *officials*.

The *officials*, by degrees, had drawn to their cognizance and jurisdiction, most of the civil causes; till they were taken out of their hands by appeals, &c.

OFFICIAL is also used in our laws for a deputy appointed by an archdeacon, for the executing of his jurisdiction.

OFFICIALTY, the court, or jurisdiction, whereof an *official* is head.

The practice of *officialties* is now reduced into a little compass; and actions of promiss, and dissolutions of marriages, are the principal things transacted therein.

OFFICIAL *, in pharmacy, a term applied to such medicines, whether simple or compound, as are required to be constantly kept in readiness in the apothecaries shops, to be mixed up in extemporaneous prescription.

* The word is formed of the Latin *officina*, a shop.

The *officials* *simples* are appointed, among us, by the college of physicians; and the manner of making the compositions is directed in their dispensatory.

OFFICIO. *Suspension ab OFFICIO*. See **SUSPENSION**.

Ex OFFICIO. See the article *Ex officio*.

Quod clerici non elegantur in OFFICIO. See **QUOD**.

OFFING, or **OFFIN**, in the sea-language, that part of the sea a good distance from shore; where there is deep water, and no need of a pilot to conduct the ship into port.

If a ship from shore be seen failing out to seaward, they say she stands for the *offing*.—And if a ship having the shore near her, have another a good way without her, or towards the sea, they say, that ship is in the *offing*.

OFF-SETS, in gardening, &c. are those young shoots which spring, and grow from roots that are round, tuberous, or bulbous. See **ROOT**, **BULB**, &c.

The word is also applied by some to the loose, outer, brown skins of tulips, onions, &c.

OFF-SETS, in surveying, are perpendiculars let fall, and measured from the stationary-lines, to the hedge, fence, or extremity of the inclosure.

OGEE, or **OGE**, in architecture, a moulding, consisting of two members, the one concave, the other convex: the same with what is otherwise called *cymatium*. See *Tab. Archit. fig. 7. and 24. lit. f. x.*

Vitruvius makes each member of the *ogee* a quadrant of a circle; Scamozzi, and some others, make them somewhat flatter, and strike them from two equilateral triangles.

The figure of the *ogee* bears some resemblance to that of an S.

OGIVES, arches or branches of a Gothic vault, which, in lieu of being circular, pass diagonally from one angle to another, and form a cross with the other arches which make the side of the square, whereof the *ogives* are diagonals.

The middle, where the *ogives* cut or cross each other, is called the *key*, which is sometimes carved in form of a rose, or a cul de lampe.—The members or mouldings of the *ogives* are called *nerves*, *branches*, or *reins*; and the arches which separate the *ogives*, double arches. See **VAULT**.

OGLIO. See the article **OLIO**.

OGGRESSES, or **AGGRESSES**, in heraldry. See **PELLETS**.

OIL *, **OLEUM**, a fatty, unctuous, inflammable matter, drawn from several natural bodies.

* The word is formed from the Latin *oleum*; of *olea*, olive-tree, the fruit whereof abounds in such juice.

The word *oil* is sometimes applied to the juices which distill naturally from plants and trees; as balm, &c. but more strictly to those juices drawn by expression, &c. from plants, fruits, grains, or seeds; as *oil of olive*, *nut-oil*, &c. See **EXPRESSED** and **EXPRESSION**.

The kinds of *oil*, their properties, manners of expression, &c. are numerous: for the generality of them, the reader is referred to the proper articles.

Such as could not be more conveniently inserted, are as follows.

OIL of olives, is the most popular, and most universal of all others; being that chiefly used in medicine, in foods, sallets, and in the manufactures.

It is drawn from olives by presses or mills made for the purpose. The fruit is gathered when at its utmost maturity, in December and January, as it begins to redden; being

put under the mill, as soon as gathered, it yields that *oil* so very sweet, and of so charming an odour, called *virgin-oil*. But, as the olives newly gathered yield but little *oil*, those who rather regard quantity than goodness, leave them on the ground for some time, ere they press them.

Neither the smell nor taste of the second *oil* is very agreeable; though there is a third kind still worse, which is the common *oil* procured by throwing boiling water on the pressings, and repelling them more strongly.

The consumption of this *oil* is incredible; the south parts of France, Provence, Languedoc, &c. as also Candia, some parts of Italy, &c. yield vast quantities. Its use every body knows; it being reputed one of the most universally useful things in the whole world.

OIL of sweet almonds, cold drawn, or without fire, is prepared various ways. Some peel the almonds before they pound them; others pound them without peeling. Some warm them in luke-warm water; others in *balneo mariae*; some only bruise them; others beat them into a paste.—In effect there are almost as many different ways of preparing this *oil*, as there are persons who make it their business to prepare it.

In this diversity, Pomet gives us a method easier and less expensive than any of the rest; which, it should seem, we cannot do better than follow.

Method of procuring OIL of sweet almonds by expression without fire.—Take a pound and an half of sweet almonds, new and dry; after pounding them in a mortar, pass them through a coarse sieve, lay them in a hair-cloth, and put them under the press between two plates of copper, steel, or the like; press them gently; and when all the unctuous and fluid part is expressed, you will have a sweet *oil* without any sediment which is scarce avoidable in any of the other manners.

Palm OIL, or **OIL of Senegal**, a thick unctuous liquor, of a yellow colour, and a violet-smell; so called because drawn, by ebullition or by expression, from the fruit of a kind of palm-tree, growing in several places of Africa, especially in Senegal.

The Africans use this *oil* as we do butter; and burn it in their lamps when old. In Europe it is esteemed a sovereign remedy against cold humours; and is even said to give ease in the gout. It is sometimes counterfeited with wax, *oil* of olives, iris, and turmeric; but the trick is found out either by air or fire. The air alters the colour of the genuine, and leaves the counterfeit unchanged; and on the contrary, fire changes the counterfeit, but does not alter the genuine.

OIL of camomile, an oil made with the flowers of this plant steeped in oil of olives, and exposed to the sun in the heat of summer: some add fine turpentine.

It is the most esteemed when old. It is used for the cure of several kinds of wounds; and is reputed a kind of balm.

OIL of aspic, or *spike*, an inflammable oil drawn from the flowers or leaves of a plant frequent in the southern parts of France, resembling our lavender, and called by botanists *lavedula mas*.

It is of a white colour, and an aromatic smell; and is reputed the only oil that will dissolve sandarach; whence the genuine oil is easily distinguished from the counterfeit, which is oil of turpentine mixed with a little petrol.

It is used by painters and farriers; and is of some use in medicine, where it makes a part in several galenical compositions.

OIL of petrol. See **NAPHTHA**, and **PETROLEUM**.

OIL of amber. See **AMBER**.

OIL, or butter of antimony. See **ANTIMONY**.

OIL, or butter of arsenic. See **ARSENIC**.

OIL of balm. See **BALSAM**.

OIL of beam. See **BEEN**.

OIL of beech. See **BEECH**.

OIL of bricks. See **BRICK**.

OIL of camphor. See **CAMPHOR**.

OIL of cinnamon. See **CINNAMON**.

OIL of castor. See **CASTOREUM**.

OIL of wax. See **WAX**.

OIL of cammin. See **CUMMIN**.

OIL of nutmeg. See **NUTMEG**.

OIL of clover. See **CLOVES**.

OIL of nerali. See **ORANGE**.

OIL of black pitch. See **PITCH**.

OIL of rosemary. See **ROSEMARY**.

OIL of sage. See **SAGE**.

OIL of tartar. See **TARTAR**.

OIL of turpentine. See **TURPENTINE**.

Train OIL. See **Whale Fishery** and **TRAIN**.

Virgin OIL is understood of oil expressed from olives, nuts, &c. fresh gathered, without being heated, too much pressed, &c. See **OIL of olives**, and **VIRGIN**.

Granulated OIL is that fixed in little grains; this is the best, and most esteemed, especially of oils of olives.

Oil frequently takes new names from the drugs mixed with it;

as *oil of roses*, which is that mixed with roses; *oil of jessamy*, that perfumed with jessamin.

Plato observes, that *oil* is destructive to all plants; and he adds too, to the life of all animals, except that of man, to which it is agreeable, as also to the rest of his body. He adds farther, that it is very useful to the external parts of the body, but sometimes hurtful to the internal. Fernelius observes, that *oil* softens, moistens, and lubricates the body, and takes off the sense of weariness; for which reason the Greeks call it *acopum*; it also renders the body prompt and agile. Dioscorides says it cures leprosy, &c.

OIL, among the chymists, is the second of the elements, or hy-po-statical principles; otherwise called *sulphur*.

All natural bodies yield *oil*, either by distillation, putrefaction, or lixiviation, called *per deliquium*: and hence the chymists will have it a necessary ingredient in the composition of all bodies. They make it the principle of odours; and to the difficulties thereof ascribe all the differences of bodies in respect of smells.

All plants, unless distilled with water, yield a fetid *oil* at the end of distillation; but aromatic ones besides this yield another *oil*, which arises after the phlegm, and at the beginning of the distillation: this chymists call an *essential oil*, because it retains the natural smell of the plant; whereas the second *oil*, even that of aromatic plants, stinks intolerably.

M. Homberg, from an observation that plants which yield the most acid, yield likewise the most *oil*; took occasion to think that the acid might assist the *oil* to disengage itself from the body, and to rise in distillation; which he found to answer in the experiment. Mineral acids proved to have more force on the *oils* of plants, and put them in a condition of rising in distillation, and in greater quantity by the action of fire, than vegetable ones. Accordingly, whereas the perfumers find a deal of difficulty in raising *essential oil* of roses; and scarce get an ounce out of an hundred pounds of the flower: M. Homberg, on his principle, got at least one third more; viz. by laying the roses fifteen days in water impregnated with spirit of vitriol, before distillation.

The chymists doctrine of principles, Mr. Boyle shews to be very deficient in the article of *oils*: for the characteristic of a sulphur, or that which denominates a thing such, is its inflammability: now, there are at least three substances manifestly different in consistence, texture, or both; which, according to that notion, ought to be referred to sulphurs: for sometimes the inflammable substance obtained from a mixed body by means of fire, appears in form of an *oil* that will not mix with water; sometimes in form of an inflammable spirit, which will readily unite with that liquor; and sometimes also in form of a consistent body almost like common sulphur. *Productib. of Chym. Prin.*

Dr. Sæpe in *Philos. Transact.* gives us a scheme, or analysis of *oils*. He distinguishes *oils* into vegetable, animal, and mineral.

The vegetable he divides into *essential*, and *not essential*. The *essential* again are either perfect stillations made by the analysis of the chymist's fire; where the oleaginous particles are truly separated from all other; as those from the seeds of cummin, fennel, and dill: or light and ethereal, usually drawn from the tops of plants, and specifically lighter than water, and some of them than spirit of wine; as those from thyme, wormwood, hyssop, lavender, rosemary, penny-royal, rue, sage, fawn, &c. or ponderous, which commonly sink in water.

Those *not essential* are imperfect, made by expression; being decomposed of several parts of the plants; as of almonds, olives, walnuts, lime, rape, &c.

The *animal oils* are either those of the solid parts, as harts-horn, human skull, hoofs, &c. or those of the fluids, as of human blood.

Lastly, the *mineral oils* are those of amber, petroleum, Barbadoes tar, to which some add bees-wax.

Of these *oils* there are twelve; that, by a mixture of compound spirit of nitre, make an ebullition, explosion, and flame. Eighteen that make an ebullition and explosion without flame: and four that produce neither. See Supplement, article **OIL Essential**.

Ætherial OIL. See the article **ÆTHERIAL**.

Cantha OIL. See the article **ARSENIC**.

Medullary OIL. See the article **MEDULLARY**.

Anointing with OIL. See **UNCTION**.

Stillaceous OILS. See **STILLATIQUES**.

Gilding in OIL. See the article **GILDING**.

Painting in OIL. See the article **PAINTING**.

OIL-BAG, a vessel in birds, replete with an unctuous substance, secreted by one, sometimes two, glands for the purpose, disposed among the feathers; which being pressed by the bill or head, emits its *oily* matter, for the dressing and pruning the feathers.

OIL-Mill. See the article **MILL**.

Oily Waters. See the article **WATERS**.

ointment, in pharmacy and surgery, &c. See **unguent**.

OKER*, **OCHRA**, or **OCHER**, in natural history, a yellow, dry, fossil earth; harsh to the touch; often found in iron, copper, and lead mines, sometimes in those of silver, and very frequently in mines of its own.

* The word comes from the Greek *ωχρα*, yellow earth; formed of *ωχρος*, yellow.

Some authors seem more rightly to refer *oker* to the class of semi-metals, than that of earths. It consists, according to them, of earth and a metal, particularly iron, combined.

Mr. Boyle assures us he has seen a piece of *oker* richer in metal than most iron-ores; and which was even rendered magnetic by heating, and then cooling it in a perpendicular position.

Oker, in effect, is always impregnated with iron, and is what generally gives to the chalybeate springs their medicinal virtues; many of which we see, upon the water's standing, will deposit the *oker* at the bottom of the vessel.

Some authors esteem *oker* proper to promote the melting of metals, when they are too harsh and brittle; but its chief use is in painting.

Yellow *oker* is natural; the red is commonly prepared from the yellow by calcining it in the fire till it have acquired its redness, though there are some naturally red kinds.

The beds are often from one hundred and fifty to two hundred feet deep; and their thickness from four to eight inches; but this is all uncertain, some lying near the surface.

The best *oker* is that of Berry in France. There are several kinds dug up in England; some of them used in painting, and others in polishing looking-glasses. See Supplement, article **OCHRA**.

OLD Age. See the articles **AGE** and **LONGEVITY**.

OLD Astronomy. See the article **ASTRONOMY**.

OLD Style. See the article **STYLE**.

OLD Subsidy. See the article **SUBSIDY**.

OLD imposition of Tonnage. See the article **DUTY**.

OLEAGINOUS, something that partakes of the nature of oil; or out of which oil may be expressed.

Thus olives, nuts, almonds, &c. are *oleaginous* fruits, or fruits out of which oil is expressed.

Pines, Firs, &c. are *oleaginous* woods, yielding rosin, turpentine, &c. Of all woods, *oleaginous* ones burn the best. An *oleaginous* urine in malignant fevers is a sign of death.

OLECRANUM, *olecranon*, in anatomy, an eminence behind the bend of the elbow; being the part whereon the arm bears when we rest on the elbow. — See *Tab. Anat. fig. 7. n. 11*.

This eminence is nothing else but the posterior apophysis of the head of the ulna, which stays that bone, and prevents its slipping back; so as to form an acute angle when the arm is bent.

The *olecranon* is received into the hind sinus of the lower end of the humerus; and with the fore protuberance of the ulna, which is received into the fore sinus of the humerus, it forms a perfect ginglymus, whereby the two bones move as on a hinge.

OLEOSUM *Sal volatile*. See **SAL**.

OLERON-Laws, or the *Sea-Laws of OLERON*, are a set of ancient laws, relating to maritime affairs, made by king Richard I.

They are thus called, because composed in the *Oleron*, an island in the bay of Aquitaine, at the mouth of the river Charente.

OLFACTORY Nerves, in anatomy, the first pair of nerves springing out of the medulla oblongata; so called as being the immediate instruments of smelling. — See *Tab. Anat. (Osteol.) fig. 5. lit. b. b*.

The ancients called them *processus papillares*; which Dr. Drake thinks a more suitable name, till their arrival at the os cribriform; in regard they rather appear productions of the medulla oblongata, than distinct nerves; against which their manifest cavities, and their communication with the ventricles, argue.

The *olfactory* nerves have their rise just below the os frontis, and are distributed among the membranes of the nose.

OLIBANUM*, in pharmacy, a kind of gum, or resin, usually called *male frankincense*.

* It has its name *olibanum*, quasi *oleum libani*; because distilled in form of an oil, from a tree growing on mount Libanus.

Olibanum is brought to us in large white tears, bordering a little on the yellow; heavy, of a sharp bitter taste, and a brisk smell.

It is distinguished from the female, or common frankincense, by the largeness of the drops. — It is very glutinous, and consequently strengthening; and partakes enough of the turpentine to render it somewhat detergent. It is more used in compound strengthening plasters, than in inward compositions.

OLIGARCHY *, form of government, wherein the administration is in the hands of a few persons.

• The word is formed from the Greek, *ὀλιγος*, few; and *ἀρχή*, command, government.

The states of Venice, and Genoa, may be ranked among *oligarchies*.

Oligarchy amounts to much the same thing with aristocracy; unless perhaps the former import a kind of defect or corruption; as if the sovereign power were monopolized by a few persons, in prejudice of the rights of a great number.

OLIO, or **OGLIO**, a savoury dish, or food, composed of a great variety of ingredients: chiefly found at Spanish tables.

The forms of *olio's* are various. To give a notion of the strange assemblage, we shall here add one from an approved author.

Take rump of beef, neat's tongues boiled and dried, and Bononia sausages; boil them together, and after boiling two hours, add mutton, pork, venison, and bacon, cut in bits; as also turneps, carrots, onions, and cabbage, borage, endive, marigolds, sorrel, and spinach; then spices, as saffron, cloves, mace, nutmeg, &c. This done, in another pot put a turkey or goose, with capons, pheasants, widgeons, and ducks, partridges, teal, and stock-doves, snipes, quails, and larks, and boil them in water and salt. In a third vessel, prepare a sauce of white wine, strong broth, butter, bottoms of artichokes and chestnuts, with cauliflower, bread, marrow, yolks of eggs, mace and saffron. Lastly, dish the *olio*, by first laying out the beef and veal, then the venison, mutton, tongues, and sausages, and the roots over all; then the large fowls, then the smallest, and lastly pour on the sauce.

OLITORY, a kitchen-garden; or a garden of herbs, roots, &c. for food. See **GARDEN**, **SALLET**, &c.

OLIVARIA Corpora, in anatomy, are two protuberances in the under part of the brain, placed on each side the corpora pyramidalia, towards the lower end; having their name from their figure, which resembles that of an olive.

OLIVE, **OLIVA**, a stone-fruit, which yields plenty of oil; the produce of the *olea* or olive-tree.

There are three kinds of *olives* frequently sold; different in size and goodness; *viz.* those of Verona, which are the best; those of Spain; and those of Provence.

The *olives*, while on the tree, are intolerably bitter, without any thing of that delicious taste, which procures them admittance at the richest tables. To fit them for that, they must be prepared as follows:

Curing or pickling OLIVES.—In the months of June and July, long ere the *olives* are fit to yield their oil, they are gathered, and laid to steep some days in fresh water; when taken out, they are put in a lye made of water prepared with barilla, or kali, with ashes of *olive* stones calcined; or at least with lime.

They are next laid in a liquor of water and salt, with which they are put in those little barrels, wherein they are brought to us. To give them the flavour, they throw over them an essence usually composed of cloves, cinnamon, coriander, and fennel.

This essence is a kind of secret among those who deal herein; and, in effect, it is in this that all the difficulty of the preparation lies.

Drawing of oil of OLIVES.—The *olives* being gathered, are laid for some time on the ground to mellow, or to ripen farther; they are then ground into a paste with a mill-stone: the paste is put in large frails, and boiling water is poured over it. Lastly, the whole is pressed; by means whereof the oil is easily separated, and swims atop of the water.

OLIVE-COLOUR is a yellow mingled with black.

The term is chiefly used in speaking of the tincture of the complexion: the Spaniards and Indians are rarely white, generally *olive-complexioned*.

OLYMPIAD, *Ὀλυμπιας*, in chronology, a space, or period of four years; whereby the Greeks reckon'd their time. See **EPOCH**.

This method of computation had its rise from the *olympic games*, which were celebrated every fifth year, near the city *Olympia* in Peloponnesus.

The first *olympiad* commenced, according to some, in the year 3928 of the Julian period; the year from the creation 3174; the year before Christ 774; and 24 years before the foundation of Rome: or rather, as others will have it, in the year of the world 3211; the year of the Julian period, 3941; and 23 years before the building of Rome.

The Peloponnesian war began on the first year of the 87th *olympiad*. Alexander the Great died the first year of the 114th; and Jesus Christ was born the first year of the 195th *olympiad*.

The *olympiads* were also called *anni Iphiti*, from *Iphitus*, who instituted, or at least renewed the solemnity of the *olympic games*.

We do not find any computation by *olympiads* after the 264th, which ended with the year of Christ 440.—Except that in a charter of our king Ethelbert, the years of his reign are said to be reckoned by *olympiads*.

OLYMPICS, or **OLYMPIC Games**, were solemn games, famous among the ancient Greeks; instituted, according to some, by Hercules, in honour of Jupiter; and held at the beginning of every fifth year, that is, every 49th month, on the banks of the Alpheus, near Olympia, a city of Elis; to exercise their youth in five kinds of combats.

These games became so considerable, that the Greeks made them their epocha; distinguishing their years by the returns of the *olympics*.

Those who were conquerors in them, were so honoured by their countrymen, that at their return, a piece of the wall of the city was pulled down to give passage to their chariots.

The prize contended for, was a crown made of a peculiar sort of wild olive appropriated to this use.

OLYMPIC Fire, is sometimes used for the fire arising from the sun's rays collected in the focus of a burning-glass.

Gli OLYMPICI, the title of the academists of Vicenza in Italy. See **ACADEMY**.

OLYMPIONI ES, *Ὀλυμπιονίκης*, in antiquity, an appellation given to those who came off victorious in the *olympic games*.

The *olympionices* were infinitely honoured in their country, as being esteemed to have done it immortal honour. The Athenians particularly, were so lavish in their presents to the *olympionices*, their countrymen, that Solon found it necessary to restrain their liberality by a special law, which imported that the city should only give 500 drachma's to the *olympionices*; which amounted to about 58 ounces of silver, our weight. No very considerable sum!

OMBRE, a celebrated court-game at cards; played by two, by three, or by five persons; but generally by three.

The game of *ombre* is borrowed from the Spaniards; and requires all the plegm and gravity of that people in the playing. The name signifies as much as the *game of man*; *ombre*, or *hombre*, in Spanish, signifying *man*, in allusion to the thought and attention required herein.

In *ombre by three*, nine cards are dealt to each party; the whole *ombre* pack being only 40; by reason the eights, nines, and tens, are thrown aside: he that wins must take five tricks, or four when the other five are divided, so as one have two and the other three.

After the cards are dealt, if none of the parties think their hand strong enough to attempt for the stake or game, they all *pasi*; and, after something put down to the former stake, deal over again. If any will attempt for it, he henceforth is called the *ombre*; and the other two become leagued together, like two partners at whist, to defend it against him.

Note, each has the refusal of being *ombre*, according to his order of seniority.

There are two ways of undertaking for the game: In the first, which is the most usual, after chusing what he will have trumps, he *discards*, or lays aside what number of his cards he pleases, and in their lieu takes an equal number from the remainder of the pack; the like do the other two.—The other way is, when he dare trust to his own hand, and therefore declines to discard, or change any cards, but leaves that to the others; which is called playing *sans prendre*: if he gains the point in this latter case, he reaps somewhat extraordinary, more than in the first.

If he fail in either case, he is said to be *beasted*; and the failure is called a *remise*, or *repusse*; and if one of the defenders of the stake win more tricks than he, such person is said to win *edule*, and takes up the stake the *ombre* played for: and in both cases, the *ombre* is to forfeit the value of the stake played for to the board.

If the *ombre* win all the nine tricks, it is called winning the *vole*, and he reaps doubly; and if he attempt it, and miscarry, he suffers proportionably.

The overights and irregularities committed in the course of the game, are called *beafes*, and subject the persons chargeable therewith to forfeitures.

As to the order and value of the cards at *ombre*, it is to be observed, that the ace of spades, called *spadille*, is always the first or highest trump, in whatever suit the trump be; the duce of trumps, when trumps are of either of the black colours; or the seven, if of the red, is the second trump, and called *manille*; the ace of clubs, called *basto*, the third; and if either of the red suits be trump, the ace of that suit, called *punto*, the fourth. The rest in the black suits are valued according to the following order; *viz.* king, queen, knave, seven, six, five, four, and three. In the red suits they follow thus; king, queen, knave, duce, three, four, five, and six.

The three first, or principal trumps, are called *matadores*; which have this privilege, that they are not obliged to attend an inferior trump when it leads; but for want of another small trump,

trump, the person may renounce trumps, and play any other card.—Add, that if the three *matadores* be in the hands of the *ombre*, in case he be defeated, he is to forfeit for them; or, if he gain his point, he is to have a confideration for them; but for nothing less than three. And it must be further noted, that the trumps immediately succeeding these, *viz.* punto, king, queen, &c. if they be found in the same hand with the former, are also reputed as *matadores*, and to be allowed, or forfeited for, like the rest; and this as low as the sequence reaches, without interruption.

There are some varieties in the manner of playing the game of *ombre*.—Sometimes he who has *spadille* is obliged to play, let his game be ever so bad, which is called *force spadille*; sometimes, when all have passed, a person undertakes the game on condition of discarding, and making up his hand ere he names trump; which is called *gascarille*.

In *ombre by five*, which some even prefer to that by three, as not requiring so much attention; only eight cards apiece are dealt; and five tricks must be won, otherwise the *ombre* is *beasted*.

Here the person who undertakes the game, after naming the trump, calls a king to his assistance; upon which, the person in whose hand the king is, without discovering himself, is to assist him as a partner, and to share his fate. If between both they can make five tricks, the *ombre* wins; and then the auxiliary king shares the spoil; and *vice versa*.

If the *ombre* venture the game without calling in any king, this too is called playing *sous prendre*; in which case the other four are all against him, and he must win five tricks alone, or be *beasted*.—The rest is much the same as by three; *mutatis mutandis*.

OMBRE de Soleil, in heraldry, *shadow of the sun*, is when the sun is borne in armoury, so as that the eyes, nose, and mouth, which at other times are represented, do not appear; and the colouring is thin, so that the field may be seen through it.

OMELET *, or **AMLET**, a kind of pancake or fricassée of eggs, with other ingredients; very usual in Spain and France.

* *Menage* derives the word from the Italian *animella*, little soul; which, he says, that people use for the nice bits among the giblets of fowls, &c. used for fricassées, as livers, hearts, kidneys, gizzards, &c. From whence, by resemblance, is formed the French *omelette*, a fricassée of eggs. *Tripod* derives the word from *duas*, together, and *aver*, to dissolve, moisten, mix: and M. de la Mothe le Vayer, from the French *ouf*, egg, and *mélés*, mingled.

The loins of *omelets* are various. We meet with farced *omelets*, *omelets* with sugar, *omelets* of green peas, *omelets à la Turq.* &c.

A noted author in this way prescribes the following one: the eggs being beaten, are to be seasoned with salt and pepper, and then fried in butter made boiling hot: this done, gravy to be poured on, and the whole strewed with chives and parsley dried small. When one side is fried enough, it is to be turned on the other.

OMEN †, a sign or indication of something future, taken from the mouth of a person speaking.

† *Festus* derives the word *omen* from *oremen*, *quod fit ore*, as being a preface by the mouth. See **PRÆFAGE**.

OMEN PRÆROGATIVUM, among the Romans, was the vote of the first tribe, or century, in their comitia.

When a law, &c. was proposed, or an election to be made, an urn was brought in to the priests there present, into which were cast the names of the tribes, or centuries, or curiæ; as the comitia were either tributa, centuriata, or curiata. And the lots being drawn, that tribe, century, &c. whose name came up first, was called *tribus*, or *centuria prærogativa*, because their voices were asked first. And so much did the Romans depend on this prerogative century, that the rest generally followed them. Hence a person who had the voices of the prerogative, was said to have *omen prærogativum*.

OMENTUM †, in anatomy, a fat, thin membrane spread over the intestines, and following them in all their sinuities.—See *Tab. Anat. (Splanchn.) fig. 2. lit. g. g. fig. 3. lit. m. m.*

† The *omentum* is the same with what is otherwise called *epiploon*, *caul*, *rete*, *reticulum*, &c.

It reaches from the bottom of the stomach (to which it is connected) to the navel, at which it ordinarily terminates; tho' in some subjects it goes farther, so as upon a rupture of the peritonæum, to fall into the scrotum. Besides the stomach, it is fastened to the concave part of the liver, the backside of the duodenum, part of the colon, the back and the spleen; its other extremity to the small guts.

Its form resembles that of a pouch or sachel, which may be inflated with a blow-pipe to the capacity of a gallon.

Its substance is membranous, consisting of two leaves, or coats, between which, and on the surfaces of which, are innumerable veins, arteries, nerves, and vasa adiposa, or fat vessels, variously interwoven, and by their interfections dividing the part into a multitude of little areolæ, resembling the meshes of a fine net; whence its name, *rete*.

The fat, in its proper ducts, running along with the other

vessels, renders these areolæ very obscure; while the intermediate spaces are filled with a transparent membrane, full of small holes, so that the whole appears a beautiful kind of net. Its arteries come from the cœliac and mesenterics, and its veins run to the porta, and are called *epiploicæ*; its nerves are from the intercostals.

The fat here, as in the *membrana adiposa*, is either brought by the ducts into the adipose cells, or else delivered from the cells into the ducts; for the fineness of the vessels, &c. renders their course exceeding difficult to trace: it is even doubted whether or no they be hollow. Malpighi, and many others, incline to the former opinion; and take the *omentum* to be nothing else but a large pouch, full of innumerable little ones, filled with fat; they add, that the ductus adiposi are real vessels arising out of the *omentum*, and spreading themselves, by means of the *membrana adiposa*, throughout the whole body; distributing fat to every part, in the same manner as the arteries distribute blood. See **FAT**, and **DUCTUS ADIPOSI**.

The particular use of the *omentum* is to promote the peristaltic motion of the guts, by lubricating them with its oily substance, which transudes through its pores; and by following them in their doublings and windings, to serve them as a bolster to slide upon; and by filling up their hollows, preventing their being too much distended with flatulences, yet giving way to them when replete with aliment. See *Hist. Acad. R. Scienc. ann. 1725. p. 12, seqq.*

The *omentum* is single in all animals, excepting monkeys, in which it is triple, or quadruple.

OMITTAS. See the article **NON OMITTAS**.

OMNIUM florum aqua. See the article **AQUA**.

OMOPHAGI *, among the ancient geographers, a name given to certain nations who fed on raw flesh, as the Scythians, &c.

* The word is formed of *ομο*, crude, and *φαγε*, I eat.

OMOPHORUM *, a little cloak, antiently wore by the bishops over their shoulders; thereby to represent the good shepherd who brings home the strayed sheep on his shoulders.

* The word is pure Greek, formed from *ομο*, shoulder, and *φορεω*, I bear.

For this reason the *omophorium* was put off at the opening of the gospels, because then the true shepherd Jesus Christ was supposed present in person.

Some confound the *omophorium* with the *pallium* worn by the patriarchs: but there was this difference, that the *pallium* was a long cloak, of purple, and was peculiarly reserved for patriarchs; though since given to some bishops by way of distinction.

OMOPLATE *, *ὀμοπλάτη*, in anatomy, is used in the general for the shoulder; but more particularly for two bones situate on the hind part of the upper ribs, one on each side; called also *scapulae* and *shoulder-blades*. See **SCAPULA**, and **SHOULDER**.

* The word comes from the Greek *ομο*, shoulder, and *πλατή*, broad.

These bones are broad, and especially in the middle; thick in their apophyses; of a triangular form, concave within, and convex without; and are joined to the clavicles and arms.

OMPANORATE, an appellation given to the priests of the island of Madagascar.

These are the schoolmasters of the country, and teach Arabic and writing. They have several books, but none of them contain more than some chapter of the Alcoran, and a few physical recipe's.

They are divided into several orders, bearing some resemblance to our ecclesiastical dignities: as *ombiaffe*, secretary or physician; *tibon*, subdeacon; *mouladzi*, deacon; *fauquib*, priest; *catibon*, bishop; *lamlamaba*, archbishop; *ompisiquili*, prophets or diviners; *sababa*, calif, or chief of the religion.

The *Ompanorates* deal much in talismans, and other charms, which they call *bitidzi*, and which they sell to the grandes of the place. They also make little statues or images, called *auli*, which they consult as oracles; and to which they ascribe various powers; as the making rich, destroying enemies, &c. They have public schools, where they teach their superstitions and fortileges.

The *ompisiquili* practise geomancy, and are mostly consulted on diseases, and the success of affairs; resolving all questions by figures drawn on a little table covered with sand.

OMPHACION †, *ὀμφακίον*, in pharmacy, the juice of four or unripe grapes.

† The word is derived from the Greek *ὀμρα*, unripe grape.

Some have also given the name to a kind of oil, pretended to be drawn from olives while yet green and four.—But Pomet charges it as an imposture; adding, that olives yield no oil at all till perfectly ripe.

OMPHALOCÈLE †, in medicine, a kind of hernia or tumour in the navel; arising, like other ruptures, from a relaxation, or rupture of the peritonæum; by which either the *omentum*, or the guts, fall down.

† The word is Greek, *ὀμφαλόν*, formed of *ὀμφαλ*, navel, and *κῆλη*, tumour.—It is otherwise called *exomphalus*. See **EXOMPHALUS**.

Its remoter causes are violent strains, loud cries, abundance of ferous humour, difficult delivery, &c.

OMPHALO-MESENTERIC, in anatomy.—All fœtus's are wrapped in at least two coats, or membranes: most of them have a third, called *allantoides*, or urinary. Some, as the dog, cat, hare, &c. have a fourth, which has two blood-vessels; viz. a vein, and an artery, called *omphalo-mesenterica*; because passing along the string to the navel, and terminating in the mesentery.

OMPHALOPTER, or **OMPHALOPTIC**, in optics, a glass that is convex on both sides, popularly called a *convex lens*.

OMPHALUS. See **ENTEROMPHALUS**, **EXOMPHALUS**, and **HYDROMPHALUS**.

ONANIA, and **ONANISM**, terms which some late empirics have framed to denote the crime of self pollution; mentioned in Scripture to have been practised by Onan, and punished in him with death. Some take it for the same with what in other places of Scripture, particularly Levit. ch. xx. is called *giving of seed to Moloch*; for which the punishment allotted is stoning to death.

* This is but ill warranted: the ablest critics make them quite different things. Selden is positive the Jews, in imitation of their neighbours, actually sacrificed their children to Moloch. —Others fancy they only made them pass between two fires, in order to obtain the idol's favour and protection.

ONDEE, or **ONDE**, in heraldry. See the article **WAVY**.

ONE-subeeil plough. See the article **PLOUGH**.

ONEIROCRITICA*, *ὀνειροκριτική*, the art of interpreting dreams; or a method of foretelling future events by means of dreams.

* The word is formed from the Greek *ὄνειρος*, dream, and *κρισις*, of *κρισις*, judgment.—Some call it *oneirocritica*, and derive it from *ὄνειρος*, and *κρισις*, I possess, I command.

It appears, from several passages of Scripture, that there was, under the Jewish dispensation, such a thing as foretelling future events by dreams; but then there was a particular gift, or revelation, required for that purpose.

It should seem, hence, that dreams are really significant, and do forebode something to come; and all that is wanting among us is, the *oneirocritica*, or the art of knowing what: yet it is the opinion of many, that dreams are mere chimeras; bearing, indeed, some relation to what has passed, but none to what is to come.—As to the case of Joseph, it was possible for God, who knew all things, to discover to him what was in the womb of fate; and, to introduce that, he might take the occasion of a dream: not but that he might as well have foretold it from any other accident or circumstance whatever: unless God, to give the matter more weight, should purposely communicate such a dream to Pharaoh, in order to fall in with the popular notion of dreams and divination, which then prevailed among the Egyptians.

ONEIROCRITICS*, a title given to interpreters of dreams, or those who judge of events from the circumstances of dreams.

* The word is formed from the Greek *ὄνειρος*, dream, and *κρισις*, judgment.

There is no great regard to be had to those Greek books called *oneirocritics*; nor do we indeed know why the patriarch of Constantinople, and others, should amuse themselves with writing on so pitiful a subject.

Rigault has given us a collection of the Greek and Latin works of this kind; one attributed to Astramplicus; another to Nicophorus, patriarch of Constantinople: to which are added the treatises of Artemidorus and Achmet.—But the books themselves are little else but reveries; a kind of waking dreams, to explain and account for sleeping ones.

The secret of *oneirocriticism*, according to them all, consists in the relation supposed to be between the dream and the thing signified; but they are far from keeping to the relations of agreement and similitude, and frequently they have recourse to others of dissimilitude and contrariety.

ONERANDO *pro rata portione*, a writ which lies for a joint tenant, or tenant in common, when disfrained for more rent than the proportion of his land comes to.

ONGLEE, or **ONGLE**, is used by the French heralds to denote the talons or claws of beasts or birds, when of colours different from the body.

ONKOTOMY*, in chirurgery, the operation of opening a tumor, or abscess.

* The word is formed from the Greek *ὄγκος*, tumor, and *τομή*, I cut.

ONOMANCY*, or rather **ONOMAMANCY**, the art of divining the good or evil fortune which shall befall a man, from the letters of his name.

* The word is supposed to be formed from the Greek, *ὄνομα*, name, and *μαντεία*, divination.—Indeed there is something singular in the etymology: for, in strictness, *onomancy* should rather signify divination by asses; being formed from *ὄνος*, ass, and *μαντεία*, to signify divination by names, it should be *onomatomanancy*.

Onomania was a very popular and reputable practice among the antients. The Pythagoreans taught, that the minds, actions, and successes of men, were according to their fate, genius,

and name; and Plato himself seems somewhat inclinable to the same opinion. Aufonius expresses it to Probus, thus:

*Qualem creavit moribus,
Fussit evari nomine*

Mundi supremus arbiter.

Thus he plays with tipping Merce, as though her name told she would drink mere wine without water, or, as he calls it, *merum merum*. Thus Hippolytus was observed to be torn in pieces by his coach-horses, as his name imported; and thus Agamemnon signified he should linger long before Troy; Priam, that he should be redeemed out of bondage in his childhood. Hitherto may be also referred that of Claudius Rutilius:

*Nominibus certis credam decurrere mores?
Moribus aut patius nomina certa dari?*

It is a frequent observation in history, that the greatest empires and states have been founded and destroyed by men of the same name. Thus Cyrus, the son of Cambyzes, began the Persian monarchy; and Cyrus, the son of Darius, ruined it: Darius, son of Hytaspes, restored it; and, again, Darius, son of Artabanus, utterly overthrew it. Philip, son of Amyntas, exceedingly enlarged the kingdom of Macedonia; and Philip, son of Antigonus, wholly lost it. Augustus was the first emperor of Rome; Augustulus the last: Constantine first settled the empire of Constantinople, and Constantine lost it wholly to the Turks.

It is an observation of the like kind, that some names are constantly unfortunate to princes: as Caius, among the Romans; John, in France, England, and Scotland; and Henry, in France.

One of the great rules of *onomancy*, among the Pythagoreans, was, that an even number of vowels, in a name, signified an imperfection in the left side of the man; and an odd number, in the right.—Another rule, about as good as this, was, that those persons were the most happy, in whose names the numeral letters, added together, made the greatest sum: for which reason, say they, it was, that Achilles vanquished Hector; the numeral letters in the former name amounting, forsooth, to a greater number than in the latter.

And it was, doubtless, from a principle much of the same kind, that the young Romans boasted their mistresses at their meetings as often as there were letters in their names. Thus Martial,

Nævæ sex cyathis, septem Jussina bibatur.

Rhodiginus describes a singular kind of *onomantia*.—Theodotus, king of the Goths, being curious to know the success of his wars against the Romans; an *onomantical* Jew ordered him to shut up a number of swine in little flyes, and to give some of them Roman, to others Gothic, names, with different marks to distinguish them; and there to keep them till a certain day: which being come, upon inspecting the flyes, they found those dead to whom the Gothic, and those alive to whom the Roman names were given.—Upon which, the Jew foretold the defeat of the Goths.

ONOMATOPOEIA*, in grammar and rhetoric, a figure of speech, whereby names and words are formed to the resemblance of the found made by the things signified.

* The word is formed from the Greek, *ὀνομα*, name, and *ποίησις*, I make, I feign.

Thus is the word *trique-trac* formed, from the noise made by moving the men at this game: and from the same source arises the buzz of bees, the grunting of hogs, the cackling of hens, the snoring of people asleep, the clashing of arms, &c.

The surest etymologies are those deduced from the *onomatopœia*.

ONONYCHITES*, something that has hoofs, like the feet, of an ass.

* The word is formed from the Greek, *ὄνος*, ass; and *ὄνυξ*, hoof, nail.

ONONYCHITES was an appellation which the heathens, in the first century, gave the God of the Christians, because they owned and adored the same God with the Jews.—For it was a notion (howsoever it had its rise), as appears from Tacitus, *hist. lib. 5. c. 3.* that the Israelites, much afflicted with thirst, were led to a spring by an ass going to drink; and that, in gratitude for the benefit, they worshipped an ass; and that the Christians did so likewise. See Tertull. *Apol.*

ONTOLOGY, or **ONTOSOPHY**, the doctrine or science *de ente*, that is, of being, in the general, or abstract. See **ENS**. *Ontology* coincides with what in the schools is more usually called *metaphysica*.

ONYCOMANCY*, or, as some write it, **ONYMANCY**, a kind of divination by means of the nails of the fingers.

* The word is formed from the Greek, *ὄνυξ*, nail; and *μαντεία*, divination.

The antient practice was, to rub the nails of a youth with oil and foot, or wax; and to hold up the nails, thus smeared, against the sun.—Upon them were supposed to appear figures, or characters, which shewed the thing required. Hence, also, modern chiromancers call that branch of their art, which relates to the inspection of nails, *onycomancy*.

ONYX *, *ὄνυξ*, in natural history a kind of precious stone.

* The word in the Greek language signifies nail; the poets making this stone to have been formed by the Paræ, from a piece of Venus's nails, cut off by Cupid with one of his arrows.

It is usually of a dark horny colour, in which are veins of a bluish white, and sometimes of red; the several colours appearing as distinct as if laid on by art.

There are some, brought from Arabia, mixed with a brownish hue, which, after taking off one lay, or zone, shew another underneath of a different colour.—Whence they take the name Memphis, or Camehuia, *q. d.* another stone.

White zones or girdles are by some reckoned essential to an *onyx*.

Dioscorides and Galen rank alabaster among the number of *onyx*'s; though this is very remote from the sentiment of the moderns. See *Supplement*, article **ONYX**.

OPACITY, in philosophy, a quality of bodies which renders them opaque; that is, impervious to the rays of light.

The term *opacity* is used in opposition to *transparency*.

Opacity, according to the Cartesians, consists in this; that the pores of the body are not all strait, or directly before each other; or, rather, not pervious every way.

But this doctrine is deficient: for though it must be allowed, that, to have a body transparent, its pores must be strait, or, rather, open every way; yet how it should happen, that not only glass and diamonds, but even water, whose parts are so very moveable, should have all their pores open and pervious every way; and, at the same time, the finest paper, or the thinnest gold plate, should exclude the light, for want of such pores; is inconceivable. So that another cause of *opacity* must be found.

Now all bodies have vastly more pores, or vacuities, than are necessary for an infinite number of rays to find a free passage through them in right lines, without striking on any of the parts themselves: for since water is nineteen times lighter, *i. e.* so much rarer than gold; and yet gold itself is so very rare, that magnetic effluvia pass freely through it, without any opposition; and quicksilver is readily received within its pores, and even water itself, by compression; it must have much more pores than solid parts: consequently, water must have at least forty times as much vacuity as solidity. See **PORE**.

The cause, therefore, why some bodies are opaque, does not consist in the want of rectilinear pores, pervious every way; but either in the unequal density of the parts, or in the magnitude of the pores; and their being either empty, or filled with a different matter; by means whereof, the rays of light, in their passage, are arrested by innumerable refractions and reflexions; till, falling, at length, on some solid part, they become quite extinct, and are utterly absorbed.

Hence cork, paper, wood, &c. are opaque; while glass, diamonds, &c. are pellucid. For in the confines, or joining of parts alike in density, such as those of glass, water, diamonds, &c. among themselves, there arises no refraction or reflexion, by reason of the equal attraction every way; so that such of the rays of light as enter the first surface, pass strait through the body, excepting such as are lost and absorbed, by striking on solid parts: but in the bordering of parts unequal in density, such as those of wood and paper, both with regard to themselves, and with regard to the air or empty space in their larger pores; the attraction being unequal, the reflexions and refractions will be very great: thus the rays will be unable to pass through such bodies, being continually bandied about, till they become extinct.

That this interruption, or discontinuity of parts, is the chief cause of *opacity*, Sir Isaac Newton argues, does appear hence; that all opaque bodies immediately begin to be transparent, when their pores become filled with a substance of equal, or almost equal, density with their parts.—Thus paper dipped in water or oil, the stone called *oculus mundi* steeped in water, linen-cloth dipped in oil or vinegar, and other substances soaked in such fluids as will intimately pervade their little pores, become more transparent than before.

On the contrary, the most transparent substances, by emptying their pores, or separating their parts, may be rendered very opaque.—Thus salts, or wet paper, or *oculus mundi*, by drying; horn, by scraping; glass, by pulverizing, or flawing; and water itself, by being beat into bubbles or froth; are rendered opaque.

Indeed, to render bodies opaque, and coloured, their interstices must not be less than of some determinate size: for the most opaque bodies that are, if their parts be very minutely divided, as when metals are divided in acid menstrua, become perfectly transparent.

OPAL, *Opalus*, a precious stone, of various colours; changeable according to the different position of the stone to the light.

In it are seen the red of the ruby, the purple of the amethyst, the green of the emerald, besides yellow, blue, and sometimes black and white.

When the stone is broken, most of these colours disappear;

which shews that they arise by reflexion from one or two principal ones.

Its form is usually either round, or oval; its prevailing colour white. Its diversity of colours makes it almost of equal value with a sapphire or ruby.

Tavernier says, perhaps somewhat too positively, that there are mines of *opal* in Turkey; other authors, ancient and modern, say, Cyprus, Arabia, Egypt, Bohemia, and Hungary, produce it; whence it is distinguished into two kinds, *oriental* and *occidental*. Its figure and lustre are somewhat like those of a pearl. They polish it with tripoli.

Pliny among the antients, and Porta and Albertus Magnus among the moderns, are very copious on the virtues of the *opal*: forsooth, because it has the colours of all the other precious stones, it must have all their virtues too. The antients called it *paideros*, from its promoting love and good-will. Pliny and Solinus mention a species of *opal*, called *hexacanthus*, which had sixty colours. See *Supplement*, article **OPAL**.

Artificial OPAL.—In the *Philosoph. transact.* Mr. Colepreffe gives us an account of the manner of counterfeiting *opal*, as practised at Harlem. He says, the counterfeit is very lively; and thinks it only performed by the degrees of heat, which produce the colours. When the composition is melted, they take out some on the point of an iron rod, which, being cooled either in the air or water, is colourless, or pellucid; but, being put into the mouth of the furnace on the same rod, and there turned by the hand for a little space, hath its little particles so variously posited in various parts of the same piece, that the light falling on them, being variously modified thereby, represents the several colours seen in the natural *opal*. He adds, the colours may be destroyed and restored, according to the various motions of its particles by heat.

OPALIA, in antiquity, feasts celebrated at Rome in honour of the goddesses Ops.

Varro says, they were held three days after the expiration of the Saturnalia: according to Macrobius, they were held on the nineteenth of December, which was one of the days of the Saturnalia.—He adds, that those two feasts were celebrated in the same month, because Saturn and Ops were husband and wife; and that it is to them we owe the invention of corn and fruits: for which reason, the feast was not held till the harvest and fruit-time were intirely over.

The same author observes, that the vows offered to the goddesses were made sitting on the ground; to shew, that the was earth, the mother of all things.

OPEN flank, in fortification, is that part of the flank which is covered by the orillon.

OPEN fire. See **FIRE**, and **REVERBERATORY**.

OPEN fountain. See the article **FOUNTAIN**.

OPEN pound. See the article **POUND**.

OPENING a vein. See the article **PHLEBOTOMY**.

OPENING of trenches is the first breaking of ground by the besiegers, in order to carry on their approaches towards a place. See **TRENCH**.

OPENING of gates, in astrology, is when one planet separates from another, and presently applies to a third, bearing rule in a sign opposite to that ruled by the planet with which it was before joined.

OPENING the mouth. See the article **MOUTH**.

OPERA, a dramatic composition, set to music, and sung on the stage, accompanied with musical instruments; and enriched with magnificent dresses, machines, and other decorations.

Bruyere says, that it is essential to the *opera* to keep the mind, the eyes, and ears, in an enchantment. St. Evremond calls the *opera* a chimerical assemblage of poetry and music; where the poet and musician mutually cramp each other.

The *opera* we derive from the Venetians, among whom it is held one of the principal glories of their carnival.

While the English and French comic and tragic theatres were forming, the Venetians invented the *opera*: the abbot Perrin, introducer of ambassadors to Gaston duke of Orleans, was the first who formed the design of introducing it into Paris; and he obtained the king's privilege for the same in 1669. and it was not long ere it passed thence into England.—The author of the *Spectator* observes, that the French music agrees with their accent and pronunciation, much better than the English; and they are, at the same time, better calculated for the gay humour of that people.

At Rome they had a kind of *spiritual operas*, frequent in Lent; consisting of dialogues, duos, trios, ritornellas, choruses, &c. the subject whereof is taken out of Scripture, the life of some saint, or the like.—The Italians call them *oratorios*. The words are frequently Latin, and sometimes Italian.

OPERATION, in the general, the act of exerting, or exercising some power, or faculty, upon which an effect follows.

The noblest *operation* of man is that by the schoolmen called *vital*, or *immanent*; viz. the *operation* of the mind; which

with regard to the understanding, is threefold; apprehension or perception, discretion or judgment, and reasoning or discourse.

The directing of these makes the object of logic. See LOGIC.

With regard to the will, the immanent operations are willing and nilling; to which are referred loving and hating.

OPERATION, in medicine, denotes a methodical action of the hand, on the human body; in order to re-establish health.

Bleeding is a very common, but at the same time a dangerous operation.

Trepanning is one of the finest operations in surgery. The Cæsarean operation is the cutting open a woman with child, and drawing out the child through the aperture.

The other surgical operations, are Sutures, Tapping, Castrating, Cutting for the Fistula, Amputation, Extirpation, Cupping, &c. See each in its place, as SUTURE, &c.

High OPERATION. See the article HIGH.

Lateral OPERATION. See LITHOTOMY.

OPERATION is more particularly used in medicine, for the manner wherein any remedy produces its salutary effect; or that series of actions, mediate and immediate, whereby its remote end is attained.

See the operations of each kind of medicines under the proper heads, SPECIFICS, PURGATIVES, EMETICS, OPIATES, &c.

OPERATIONS, in chymistry, denote the processes, or experiments, by means whereof the proper changes are produced in bodies, and the effect of the art procured.

The changes chymistry produces in bodies are reducible to two kinds; viz. an union of parts, and a separation thereof: thus chymistry either separates spirits, salts, oils, &c. or compounds them together.

A chymical operation, then, consists in changing the situation of the parts; particularly, either in moving some parts, but not the whole, which is called separating; or in adding new parts, which is called uniting.

All chymical operations, therefore, are reducible to two general kinds; viz. such whereby the parts of bodies before joined or united, are separated, which the ancient chymists called solution; and such whereby the parts before disjoined are combined, or united, called coagulation.

Some, however, object digestion as a third species of operation, not reducible to either of them; but Boerhaave shews that it is a composition of both.

Most chymists, however, look on this division as scarce accurate and minute enough, and subdivide the art into a number of particular, or subordinate operations; as calcination, vitrification, distillation, sublimation, cobobation, amalgamation, fermentation, putrefaction, &c. See each in its place, CALCINATION, VITRIFICATION, SUBLIMATION, DISTILLATION, FERMENTATION, &c.

OPERATION, in theology, is used for the actions both of the word and the man, in Jesus Christ. See PERSON.

The orthodox teach, that there are two operations in Jesus Christ, the one divine, the other human; and not one theandric operation, as was the doctrine of the Monothelites and Monophysites.

OPERATOR, in medicine, &c. a person who operates, or works with the hand, on the human body, to preserve, or restore its health.

We say an operator for the stone, meaning a lithotomist, or a person who cuts.

OPERATOR for the eyes, denote a persons who cures cataracts, &c.

OPERATOR for the teeth, signifies a tooth-drawer, &c. See TOOTH.

OPHITES †, Ophites, in natural history, a sort of variegated marble of a dusky green ground, sprinkled with spots of a lighter green; otherwise called serpentine.

† It is thus called from the Greek *opsis*, serpent; by reason its spots resemble those of that animal. See Supplement, article OPHITES.

OPHITES is also the name of a sect of ancient heretics, who sprung out of the Gnostics; so called from their worshipping the serpent that seduced Eve.

This serpent, they taught, was instructed thoroughly in all knowledge; and they make it the father and author of all the sciences.

On which principle they built a thousand chimera's; part of which may be seen in St. Epiphanius. See Gnostic.

They said this serpent was the Christ; that he was very different from Jesus born of the virgin, into whom, said they, the Christ descended; and that it was this Jesus, not the Christ, that suffered.—Accordingly, they made all those of their sect renounce Jesus to follow Christ.

The Sethians, or Sethites, mentioned by Theodoret, were either the same with the ophites; or very little different from them.

OPHIUCUS, in astronomy, a constellation of the northern hemisphere; called also *serpentarius*. See SERPENTARIUS.

OPHTHALMIA *, *Οφθαλμία*, in medicine, a disease of the eyes; properly, an inflammation of the tunica adnata, or conjunctiva; accompanied with a redness, heat, and pain.

* The word is formed from the Greek *οφθαλμος*, eye.—Celsus calls the *ophthalmia lippitudo*, by reason of a gum sticking to the eye-lids in this disease, which the Latins call *lippa*.

The *ophthalmia* is either moist or dry: in the first, there is a shedding of tears; in the second, none at all. It sometimes happens in the *ophthalmia*, that the two eye-lids are so distorted, that the eye continues constantly open, without being able to shut; which is called *χρησμοις*; sometimes the eye-lids are so fastened together, that the eye cannot be opened, which is called *σπασμοις*, *q. d.* closure of things that should be open.

The immediate cause of the *ophthalmia* is the blood flowing in too great abundance in the little vessels of the adnata, so as to stagnate therein, and by that means distend them. The remote causes are the same with those of other inflammations.

—In summer it is frequent to have epidemic *ophthalmia*'s. Snow, applied to the afflicted eye, is reputed a good remedy for the *ophthalmia*: the ephemerides of the Leopoldine academy mention an *ophthalmia* cured by applying cows dung, while hot, between two linen cloths, to the eye. A fox's tongue, and the fat and the gall of a viper, are empirical preservatives against the *ophthalmia*.

The cure of *ophthalmia*'s, according to the modern practice, depends chiefly on the due repetition of purgatives. If these fail, recourse is had to vesicatories, issues, setons, &c. tho' Pitcairn prefers bleeding; it being his observation, that no disease requires copious bleeding so much as the *ophthalmia*. Pitcairn, and some others, distinguish an external and internal *ophthalmia*; the first in the adnata, which is that hitherto spoke of; the second in the retina.—The symptoms or indications of the latter, are *mulse volitantes*, dust seeming to fly in the air, &c.

This, when inveterate, degenerates into a gutta serena, or amaurosis. See GUTTA Serena.

OPHTHALMICs, medicines proper for diseases of the eyes.

Such are *ophthalmic waters*. See WATER. *Ophthalmic powders*, ointments, &c.—There is an excellent *ophthalmic* prepared of saccharum Saturni.

OPHTHALMIC nerves. The fifth pair of nerves of the brain, dividing into three branches; the first is called *ophthalmic*, because it goes to the eye.—This again subdivides into two branches, after sending out several twigs which encompass the optic nerves, and are distributed into the choroides.

OPHTHALMOGRAPHIA †, that branch of anatomy which considers the structure and composition of the eye, the use of its parts, and the principal effects of vision. See EYE.

† The word is formed from the Greek *οφθαλμος*, eye, and *γραφω*, description.

Our countryman, Dr. William Briggs, has published an excellent *ophthalmographia*, and Plempius another.

OPHTHALMOSCOPIA, that branch of physiognomy which considers a person's eyes and looks; to deduce thence the knowledge of his temper, humour, and manners.

OPIATE, OPIATUM, in medicine, is sometimes applied to any confection, or electuary.

In which sense it is defined an internal remedy, variously composed of powders, pulps, liquors, sugar, or honey, reduced into a soft consistence.

The opiate of Solomon is a composition of great fame, so called from one Solomon, a physician, its inventor; and first published by Laurence Joubert.

There are a particular kind of opiates, called *incarnatives*, for the teeth and gums, made of alum, fumach, lignum aloes, myrrh, mastic, &c. reduced into powder.

OPIATE is also used for any medicine given with an intention to procure sleep.

In which sense the word is of the same import with *narcotic*, *hypnotic*, *soporific*, or *pacific*.

OPIATE is more particularly used for a composition, wherein opium is an ingredient.

The operation of opiates, or the manner wherein they produce their effect in the body, Dr. Quincy thus lays down:—All pain is a stimulus on the part affected, and is attended with contractions of the pained membranes, which occasion a greater afflux than ordinary of the nervous juice that way: on the other hand, pleasure, or a delightful sensation in any part, is accompanied with a smooth undulation, and easy reflux of the nervous juice towards the brain. This is, as it were, the entertainment of the mind; with which being taken up, it doth not determine the spirits to the organs of motion; that is, there is such a relaxation of the muscular fibres, and such a disposition of the nervous fluid, as is necessary to sleep.

Now, it is shewn, that an agreeable sensation produced in the stomach, together with a distention of its membranes, is the im-

immediate cause of that sleepiness, to which we are inclinable after eating; the one engaging the mind, the other acting on the body. For pleasure amuses the soul, and the fulness of the vessels in the brain checks and hinders, in some measure, the derivation of the nervous juice into the organs.

Now, to apply this; a moderate dose of an *opiate* usually transports people with a pleasing sensation, to that degree, that, as they often express themselves, they are in heaven; and though they do not always sleep (which proceeds from the presentation of pleasing images to the mind so strongly, that, like dreams, they over-engage the fancy, and so interrupt the state of rest), yet they enjoy to perfect an indolence and quiet, that no happiness in the world can surpass the charms of so agreeable an ecstasy.

Thus we have from these medicines, but in a far more eminent degree, all those effects which are observed to follow upon that grateful sense in the stomach, which a moderate fulness produceth. For no bodies are so fit and able pleasingly to affect our sensible membranes, as those which consist of volatile parts, whose activity is tempered and allayed by the smoothness of some which is lubricating and oily; for they lightly rarefy the juices of the stomach, and cause a pleasant titillation of its nervous coat, whereby there is induced an agreeable plenitude, and the mind is entertained with ideas of satisfaction and delight.

And thus we easily see upon what mechanism the other virtues of *opiates* depend; for their easing pains, checking evacuations, &c. proceed not only from the mind's being taken up with a pleasing sense, whereby it is diverted from a disagreeable one; but all pain being attended with a contraction of the part, the relaxation of the fibres, which they cause, eludes and destroys the force of the stimulus.

Opiates are found to abate immoderate secretions and evacuations, which they do by removing that irritation of the organs, whereby they are occasioned. And herein lies the infracting quality of those medicines, in that the twitching sense upon the membranes of the lungs, bowels, &c. being lessened, the sharp humour is suffered to lodge there in a greater quantity, before it is so troublesome as to be thrown off and expelled; it being all one as if there were no irritation of the part, if the uneasy sense thereof be not regarded by the mind. And these effects will all be heightened by the mixture of the *opiate* particles with the blood; which is hereupon rarefied, and diffends its vessels, especially those of the brain; and this does still, to a greater degree, lessen the influx of the nervous fluid to the parts, by pressing upon the tubuli, or little canals, through which it is derived. Whence the reason of that difficulty of breathing, which *opiates* occasion; this symptom being inseparable from the rarefaction of the blood in the lungs.

OPINION, OPINIO, denotes a probable belief; or a doubtful and uncertain judgment of the mind.

Opinion is better defined the assent of the mind to propositions not evidently true at first sight; nor deduced, by necessary consequence, from others that are so; but such as carry the face of truth.

The schools define *opinion*, *assensus intellectus cum formidine de opposito*; an assent of the understanding, with some fear or distrust of the contrary being true.

According to logicians, demonstration begets science, or knowledge; and probable arguments beget *opinion*.

Where-ever the mind's acquiescence in a truth proposed to it is accompanied with any doubt, this is what we call an *opinion*.

Plato makes *opinion* a medium between knowledge and ignorance; clearer and more express than ignorance; yet more obscure and unsatisfying than knowledge. See **IGNORANCE**.

OPISTHOTONOS *, *Οπισθοτονος*, in medicine, a kind of convulsion, wherein the body is bent backwards, so as to form a kind of a bow.

* The word is compounded of the Greek, *οπισθεν*, backward, behind, and *τενειν*, tendere, to stretch or bend.

In which sense the word stands opposed to *emprosthotonos*, wherein the body is bent forwards.

The *opisthotonos* arises from a tonic motion of the muscles of the posterior parts of the body; especially those on the back of the head.

OPIUM *, in pharmacy, &c. a narcotic juice, drawn from the head of the white poppy, and afterwards inspissated.

* The word is formed from the Greek, *οπος*, succus, juice.

When the juice flows of itself, through incisions made in the poppy heads, it is properly called *opium*.—When drawn by expression, it ought rather to be called *meconium*.

The difference between the qualities and virtues of the two juices is very considerable. The former is preferable on all accounts; but it is exceeding rare; the Turks, among whom it is produced, and who make great use of it, never allowing it to be exported.—So that it is the latter that is ordinarily used among us, and sold for *opium*.

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It is mostly brought from the Levant, and Cairo; generally very impure; the Levantines, to shorten their labour, and to have the more juice, drawing it equally from the heads and the leaves of poppies, by expression, and then reducing it to the thickness of an extract by fire.—Though a late traveller into their countries assures us, it is drawn by decoction, and afterwards inspissated.—See *Mem. Acad. R. Scien. an. 1732. p. 427*.

It must be chosen dry, the smoothest and blackest possible of a disagreeable smell, and neither rugged, nor sticky, nor all in a mass.

It is a popular error, that there is any such thing as *white opium*; for though the juice, as it runs from the heads of the poppies, be of a milk-colour, it always becomes of a very deep brown as it thickens.—Where-ever it is found yellowish or soft, it is a sign the juice has not had fire enough.

Most of the *opium* sold at Constantinople is brought from Anatolia, from a place called, by the Turks, *Aphium Carabiat*, i. e. black caule of *opium*.—It is also produced in the territory of Thebes in Egypt; but this is held much inferior to the Anatolian *opium*.

Prepared OPIUM is called *laudanum*: of which there are two kinds: the one simple; extracted by means of rain-water, and spirit of wine.—The other compound, called *laudanum opiatum*; wherein there enter several other ingredients.

The uses of *opium* are to soothe pain, to excite sleep, and to stop vomiting and looseness.—Its dose is from half a grain to two grains. Some persons, who have much habituated themselves to it, can take 50 or 60 grains. Charas says, he has taken 12 grains himself; and adds, he knew one who made no scruple of 36. And in the *Philos. Transact.* we have an instance of one Mrs. Lovelock, who, in a fever, in three days time, took 102 grains.

Opium raises the spirits, occasions agreeable sensations, and has much the same effect with wine, or strong spirits.—The Turks ordinarily take to the quantity of a drachm when they go to battle, or undertake any affair that requires vigour and strength. *Opium* stops, for a time, all overflowings of humours, fluxes, hæmorrhages, &c. probably from the smoothness and roundness of its parts, which, by a kind of titillation, oblige the intestines, and other vessels, to contract themselves.

Willis, Sylvius, and Muller, look on *opium* as a coagulating poison, which fixes the spirits in the nerves.—Wesper and Pitcairn, on the contrary, maintain it to be a hot dissolving poison, which subtilizes the blood, exalts and reduces it into vapours, which bloat up the arteries; and the bloated arteries compressing the veins and nerves, shut up the passage of the spirits.

By analysis, *opium* is found to contain a great deal of volatile salt.

OPOBALSAMUM, in pharmacy, a whitish juice, gum, or resin, distilling from the branches of a tree called *balsamum*, or the *balsam tree*.

It is whitish, pretty thick, transparent, and of a smell approaching turpentine, but much more agreeable.

It is the same with the celebrated *balsamum verum*, or balm of the Levant.

It obtains a place among the alexipharmacs, and is a good ingredient in the theriaca Andromachi, and mithridate; very ill supplied with the expressed oil of mace for a succedaneum, which does not at all come up to the subtilty and activity of its parts, but is of a much heavier texture.

This, as all other balsams, is suppurative, deterfive, and incarnating, applied outwardly to tumours, ulcers, or green wounds.

OPOPANAX *, *Οπوپανας*, in pharmacy, a vegetable juice, or gum, yellow without-side, white within, fatty, and brittle, of an agreeable taste, and a very strong smell.

* The word is formed from the Greek, *οπος*, juice, and *παναξ*, the name of the plant which yields it.

The Latins call it *panax Herculeum*, from Hercules, who is supposed to have first discovered its specific virtues.—It is one of the three celebrated panaceas, or universal medicines, to which the ancients attributed such wonderful virtues. The two others are the *Aesclepium* and *Chironium*; the first found by *Aesculapius*, the second by Chiron. See **PANACEA**.

The gum *opepanax* flows by incision from a plant growing abundantly in Achaia, Boeotia, Phocis, and Macedonia: while it is liquid, it is white; but, as it dries and hardens, it assumes a beautiful golden yellow.

There are three kinds of it imported; that in tears; that in the mass; and that counterfeited, or flatted.—The first is the best, and the second is the better, as it has the more tears; the third is a rank sophistication, and good for little.

It is little used internally; though Etmuller ranks it among cathartics.—Its chief use is in the cure of wounds; whence it enters the composition of the unguentum divinum, with the galbanum, ammoniac, and bdellium.

OPPILATION, in medicine, the act of obstructing or stopping up the ducts, or passages of the body, by redundant or peccant humours.

The word is chiefly used for obstructions of the lower belly.

Viscid, heavy foods, difficult of digestion, are *opplative*; they do not pass off well, but stop in the mouths of the vessels.

OPPLATIVE. See the article **DIOPPLATIVE**.

OPPONENT, a person who withstands or opposes another.

The term is chiefly used in speaking of scholastic or academic disputes or exercises, where a person who opposes a thesis, or impugns it by his objections, is called *opponens*, opponent.

OPPOSER *Foreign.* See **FOREIGN Opposer**.

OPPOSITES, *OPPOSITA*, among logicians, are such things as differ among themselves; but so, as not to differ in like manner from some third.

By which circumstance, *opposites* differ from *disparates*.

The schoolmen reckon four kinds of *opposites*; viz. relatively, contrarily, privatively, and contradictorily *opposites*.

Either, say they, the opposition is between ens and non ens: if the former, it is either with a dependent ens, which makes a relative opposition, the lowest of all; or an independent one, which is a contrary *opposite*: if with a non ens, it is either with a non ens secundum quid, which is privative; or with a non ens simply, which is the highest opposition.

OPPOSITES, *Opposita*, complexly taken, are propositions that clash with each other.—As, man is an animal; and man is not an animal.

OPPOSITE Angles. See the article **ANGLE**.

If a line S T, (*Tab. GEOMETRY, fig. 46.*) meet two other lines, A P and B R, in different points A and B, but in the same direction; the angles u and y, as also z and y, hereby formed, are called *opposite angles*; particularly u, the *external opposite angle*, and z, the *internal opposite angle* of y.

OPPOSITE Cones denote two similar cones, vertically *opposite*, that is, having the same common vertex as well as the same axis. See **CONE**.

OPPOSITE Sections, are two hyperbola's made by cutting two *opposite cones* by the same plane. See **HYPERBOLA**.

If a cone be cut by a plane through its vertex, and afterwards by a second plane parallel to the former; this latter plane produced through the *opposite cone* will there make the *opposite sections*.

OPPOSITION, in geometry, the relation of two things, between which a line may be drawn perpendicular to both.

OPPOSITION, in logic, the quality of disagreement between propositions which have the same subject, and the same attribute.

Opposition is said, by logicians, to be either *complex* or *incomplex*.

Incomplex, or *simple opposition*, is the disagreement of two things, which will not suffer each other to be in the same subject.

Thus heat is opposed to cold; sight to blindness, &c.—Which *opposition* has already been observed to be of four kinds.

Complex opposition is defined, by Aristotle, to be the affirming and denying the same predicate of the same subject, not taken equivocally, but for the same, in the same manner, and at the same time.—As Socrates is learned; and Socrates is not learned. The later schoolmen, deviating from their master, define *opposition* an affection of enunciations, whereby two absolute propositions, the same extremes being supposed in the same order and number, and understood without any ambiguity, of the same thing, oppose each other, either in respect of quantity, or of quality; or of both.

According to the former definition, there are three species of *opposition*, *contrary*, *subcontrary*, and *contradictory*: according to the second, a fourth species is admitted, viz. *subaltern*.

To know how and wherein propositions are opposite, they must be compared, in quantity and quality, all the ways they can be compared in.—If they be opposite both in quality and quantity; i. e. if the one be affirmative, and the other negative; the one universal, the other particular; they are said to be contradictory:—v. gr. no pleasure is allowed; some pleasure is allowed.

If they be only opposite in quality, and not in quantity, they are called *contraries*, if universal; and *subcontraries*, if particular.—v. gr. All use of wine is evil; no use of wine is evil. Some means of preserving reputation are allowed; some means of preserving reputation are not allowed.

If the propositions be only opposite in quantity, they are called *subalterns*.—v. gr. Every man is liable to sin; some man is liable to sin. But this last is no proper *opposition*; inasmuch as the universal proposition always includes the particular one.

Single propositions, which can only be opposed in quality, are reducible to contrary ones.

The essential properties of propositions, considered with regard to their *opposition*; are, 1. That of two contradictory propositions, there is one always true, and another false. 2. Two contrary propositions can never be both true; but may be both false. 3. Sub-contrary propositions may be all true at the same time; as happens when the attribute is accidental to the subject; but when it is essential to it, the one is true, the

other false. 4. Subalterns may be either true or false at the same time; or the one may be true, the other false. If the attribute be essential to the subject, the subaltern affirmatives are true, and the negatives false; but if the negatives deny the subject an attribute incompatible with the subject, they will be both true. When the attribute is accidental to the subject, the universal subaltern is ordinarily false, and the particular one true.

OPPOSITION, in rhetoric, denotes a figure, whereby two things are joined together, which appeared incompatible; as when Horace says, a *wife fully*.

In Bouhours's notion, this figure, which seems to deny what it establishes, and contradicts itself in appearance, is very elegant.

OPPOSITION, in astronomy, is that aspect or situation of two stars or planets, wherein they are diametrically opposite to each other, or 180°, that is, a semicircle, apart.

When the moon is diametrically opposite to the sun, so that she shews her whole illumined face; she is said, with regard to the sun, to be in *opposition*; and she is then said to be *in her full*, and shines all night long. See **MOON** and **PHASES**.

Eclipses of the moon never happen but when she is in *opposition* with the sun, and when they both meet in the nodes of the ecliptic.

Mars in his *opposition* to the sun is nearer the earth than he is to the sun.

OPSONOMUS, in antiquity, a magistrate of Athens, whereof there were two or three; chosen out of the senate, or council. Their office was to inspect the fish-market, and to take care that every thing were done in order, and according to the laws.

OPTATIVE, in grammar, the third mood in the conjugations of verbs, serving to express an ardent desire or wish for any thing.

Instead of a particular mood, or a particular set of inflexions to express this desire, the English, Latins, &c. express it by an adverb of wishing prefixed to it. The Latins by *utinam*; the French by *plut a Dieu*; and the English by *would to God*, &c.

In these languages, setting aside the adverb, the *optative* is the same with the subjunctive; the inflections of the verb, which make what we call the moods, being the same in both.

Indeed, in the Greek, the wish is expressed by a particular inflexion, thence called *optative*; and in the French, Spanish, and Italian, there is something like it; their triple senses serving the same purpose. But the *optative* mood may be safely retrenched from the Latin and English.

OPTERIA *, among the antients, presents made to a child, the first time a person saw it.

* The word is formed from the Greek, *optomai*, I see.

OPTERIA was also used for the presents which the bridegroom made his bride when she was conducted to him; this being the first time he saw her. See Barthol. *de Puerp. vet.*

OPTIC or **OPTICAL**, something that relates to vision, or the sense of seeing. See the article **VISION**, &c.

OPTIC Angle. See the article **ANGLE**.

OPTIC Axis is a ray passing through the centre of the eye, and the middle of the optic pyramid, &c. See **AXIS**, &c.

OPTIC Chamber. See **CAMERA OBSCURA**.

OPTIC Glasses are glasses ground either concave or convex; so as either to collect or disperse the rays of light; by means whereof vision is improved, and the eye strengthened, preserved, &c.

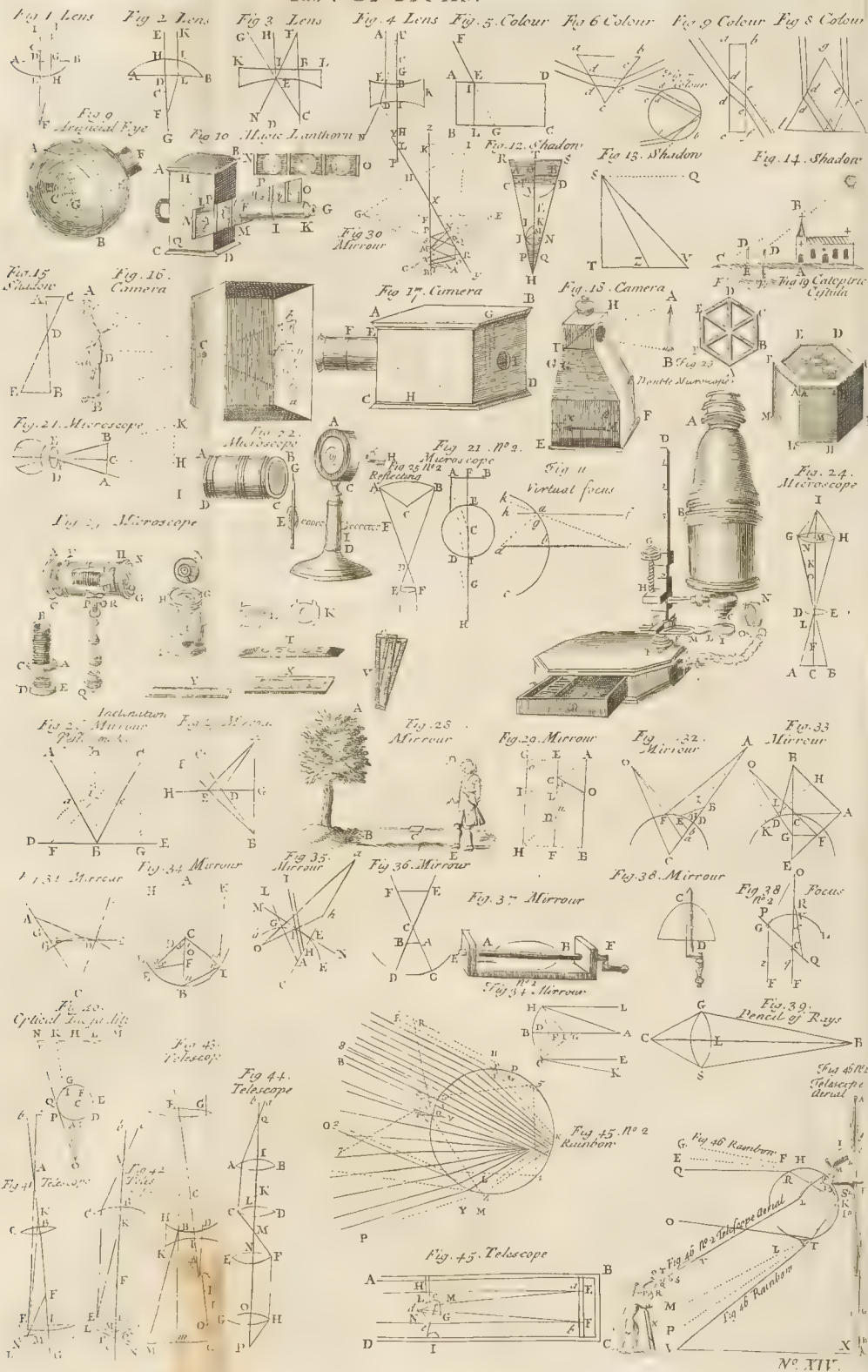
For the manner of grinding and polishing *optic glasses*, see **GRINDING**, **POLISHING**, **GLASS**, &c.—For their phenomena, see **LENS**, **MIRROR**, &c.

The principal among *optic glasses* are *telescopes*, *microscopes*, *spectacles*, *reading glasses*, *magic lanterns*, &c. See the construction and use of each under its proper article, **TELESCOPE**, **MICROSCOPE**, **SPECTACLE**, **MAGIC LANTERN**, &c.

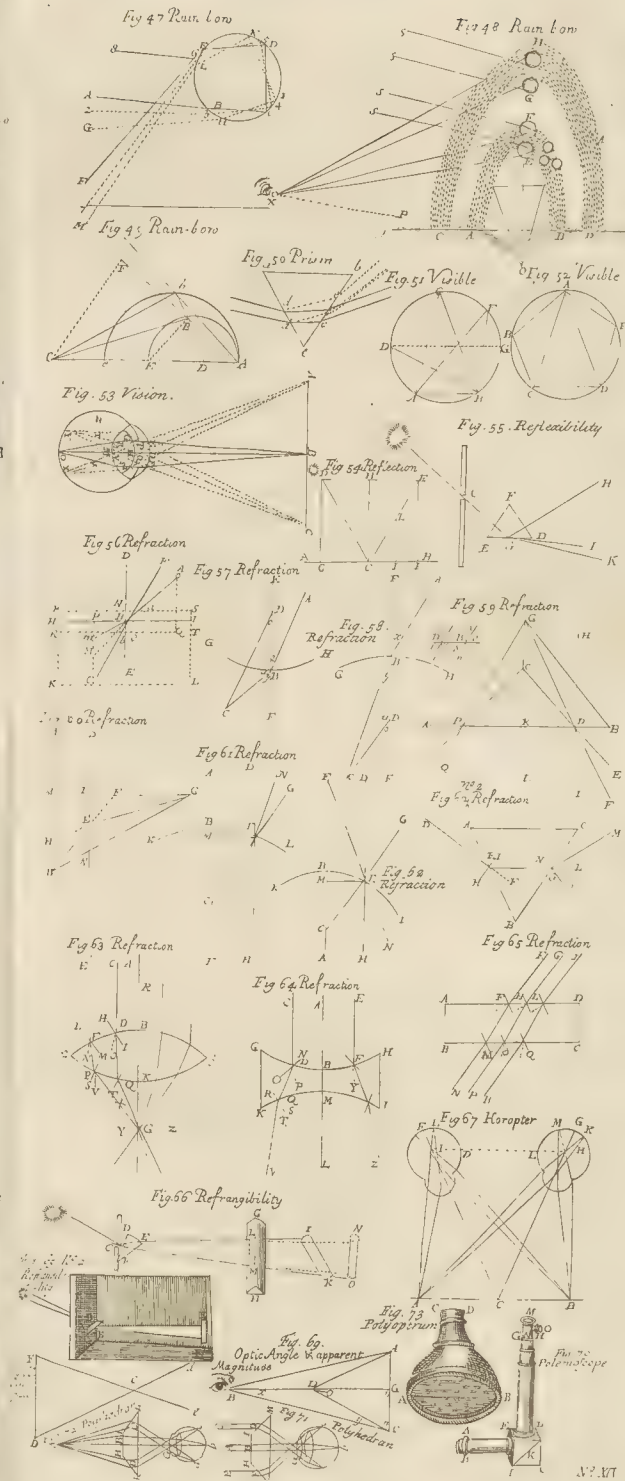
OPTIC Inequality, in astronomy, is an apparent irregularity in the motions of far distant bodies; so called, because not really in the moving bodies, but arising from the situation of the spectator's eye: so that were the eye in the centre, it would always see the motions uniform.

The *optical inequality* may be thus illustrated.—Suppose a body revolving in the periphery of a circle ABDEFQGP (*Tab. OPTICS, fig. 40.*) and moving through equal arches AB, BD, DE, EF, in equal times; and suppose the eye in the plane of the same circle, but at a distance from it viewing the motion of the body from O: when the body goes from A to B; its apparent motion is measured by the angle AOB, or the arch HL, which it will seem to describe. But in an equal time, while it moves through the arch BD, its apparent motion will be determined by the angle BOD, or the arch LM, which is less than the former arch HL. And when arrived at D, it will be seen a

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the point M of the line NLM. But it spends the same time in describing DE, as it does in AB or BD; and when arrived at E, is still seen at M; appearing stationary in all the space from D to E. When it arrives at F, the eye will see it in L; and at G, will appear at H; so that it will seem to have gone retrograde: and, lastly, from Q to P, it will again appear stationary.

OPTIC Nerves, the second pair of nerves, springing from the crura of the medulla oblongata, and passing thence to the eye.—See *Tab. Anat. (Osteol.) fig. 5. lit. ii.*

These nerves approach, by degrees, in their recess from their origin; and at length meet, in the basis of the brain, near the infundibulum. Thence they again separate, but without decussating; and proceed, one to each eye. See **EYE**.

They are covered with two coats, which they take from the dura and pia mater; and which, by their expansions, form the two membranes of the eye, called the *uvea* and *cornea*.

The *retina*, which is a third membrane, and the immediate organ of sight, is only an expansion of the fibrous, or inner, and medullary part of these nerves.

The construction of the *optic nerve* seems to be different from that of the other nerves, which all appear to consist of hard fibres: for this, ere it enters the orbit of the eye, is only a coat or cover formed by the pia mater, and including a production of the medulla of the brain, which is easily separated from it. At its entrance into the eye, it takes another coat from the dura mater; which two coats are bound together by exceedingly fine filaments: that from the pia mater is continued in the choroides, and that from the dura mater in the uvea.

From their entrance within the orbit, to the ball of the eye, the medulla, enclosed under the two coats, is separated into a number of little cells answering to each other. See **VISION**.

OPTIC Pencil, or *Pencil of Rays*, is that assemblage of rays by means whereof any point, or part of an object is seen.

Some *optic* writers laugh at the notion of *optic pencils*, and maintain them to be mere chimeras.

OPTIC Place of a star, &c. is that point of its orbit in which it appears to be, to our eye.

This is either *true*; as when the eye is supposed at the centre of the earth, or plant it inhabits; or *apparent*, as when at the circumference. The difference between the two, makes what we call the *parallax*. See **PARALLAX**.

OPTIC Pyramid, in perspective, is the pyramid ABCO (*Tab. Perspectivæ*, fig. 1.) whose base is the visible object ABC; and its vertex, in the eye O; formed by rays drawn from the several points of the perimeter to the eye.

Hence also may appear what is meant by *optic triangle*.

OPTIC Rays are particularly used for those wherewith an *optic pyramid*, or *optic triangle*, is terminated.—As OA, OC, OB, &c.

OPTICORUM nervorum thalami. See **THALAMI**.

OPTICS, **OPTICA**, is properly the science of direct vision. See **VISION**.

OPTICS is also used, in a larger sense, for the science of vision, or visibles in general.

In which sense, *optics* include catoptrics, and dioptrics; and even perspective.

OPTICS, in its more extensive acceptation, is a mixed mathematical science, which explains the manner wherein vision is performed in the eye; treats of sight in the general; gives the reasons of the several modifications or alterations, which the rays of light undergo in the eye; and shews why objects appear sometimes greater, sometimes smaller, sometimes more distinct, sometimes more confused, sometimes nearer, and sometimes more remote.

In this extensive signification, it is considered by Sir Isaac Newton in his admirable work called *optics*.

Optics makes a considerable branch of natural philosophy; both as it explains the laws of nature, according to which vision is performed; and as it accounts for abundance of physical phenomena, otherwise inexplicable. For what can be determined about light, colours, transparency, opacity, meteors, the rainbow, parhelia, &c. but on principles of *optics*? What about the nature of the stars? The structure of the mundane system? The motions of the planets? The eclipses of the luminaries? &c.—*Optics*, therefore, make a considerable part of astronomy.

Euclid has wrote on the ancient *optics* and catoptrics: dioptrics were unknown to them. F. Honorat. Fabri has an abridgment of *optics*, catoptrics, and dioptrics: Father Eschard has given a century of problems in *optics*: Vitellio, and Alhazen have performed well on the elements of *optics*. Father Kircher has a large volume on the secrets of *optics*, of light, and shadow, and their surprising effects, which pass on the people for magic. We have also *Optique & catoptrique* of F. Merienne, Paris 1651. *Dioptrique oculaire* of Father Cherubin, Paris 1671. fol. Christ. Sheineri *optica*, Lond.

1652. Jacobi Gregorii *optics*. Barrovi *Lectiones opticas* Lond. 1663. Joh. Bapt. Porta de *refractione optica*, Lond. 1669. *Principe generale de l'optique*, by Mr. Leisnitz, in the Leipzig acts, 1682. L'Oeuvre de l'Optique, or *Dioptrica Prædicta*, Carol. Ant. Mancini, Bologna, 1600. 29. *Physico-mathesis de lumine, coloribus, & uide*, per F. Mur. Grimaldi, Bononiæ, 1665. 4°. *Cogitationes Physico-mathematicæ de Natura Visionis*, per Joh. Ott. Scaphumam, Hendel. 1670. 4°.

and, which ought to be named first, the great Sir Isaac Newton's *Optics*, Latin and English, 4° and 8°.

From *optics* likewise arises *perspectivus*; all the rules whereof have their foundation in *optics*. Indeed Tacquet makes perspective a part of *optics*; though John, archbishop of Canterbury, in his *perspectiva communis*, calls *optics*, catoptrics, and dioptrics by the name *perspective*.

OPTIMATES, in antiquity, one of the divisions of the Roman people, opposed to *populares*.

According to Tully's description, the *optimates* were the best citizens, or those who desired their actions might be approved by the better sort: and the *populares* those, who out of a thirst of vain-glory, did not so much consider what was right, as what would please the populace, and get an interest in them.

Others rather make the *optimates* to be the vigorous asserters of the dignity of the chief magistrate, and the sticklers for the grandeur of the state; who cared not if the inferior members suffered, if it were for the advancement of the commanding powers: and the *populares* those who counted the favour of the populace, and encouraged them to demand larger privileges, to bring matters nearer to a level.

OPTION, the power, or faculty of wishing, or chusing; or the choice a person makes of any thing.

When a new suffragan bishop is consecrated, the archbishop of the province, by a customary prerogative, claims the collation of the first vacant benefice, or dignity, in that see, according as he shall chuse; which choice is called the archbishop's *option*.

OR, in heraldry, *yellow*, or the colour of gold.

Without this colour, or argent silver, there can be no good armory.

In the coats of nobles, it is called *topaz*; and in those of sovereign princes, *sol*. It is represented in engraving by small points, or dots, all over the field, or bearing; as in *Tab. Herald. fig. 72*.

It is accounted the symbol of wisdom, temperance, faith, force, constancy, &c.

Toujon d'Or. See the article **TOISON**.

ORACLE, an answer, usually couched in very dark and ambiguous terms, supposed to be given by demons of old, either by the mouths of their idols, or by those of their priests, to the people who consulted them on things to come.

The Pythian was always in a rage when he gave *oracles*: Ablancourt observes, that the study or research of the meaning of *oracles* was but a headless thing; and that they were never understood till after the accomplishment. Historians relate, that Croesus was tricked by the ambiguity and equivocation of the *oracle*:

Κροῖος ἄλλοις διαβας μεγάλῃν ἀρχὴν καταλύσει.

Thus rendered in Latin:

Croesus Halum superans magnam pervertet opum vim.

ORACLE is also used for the demon who gave the answer, and the place where it was given. See **DÆMON**.

The principal *oracles* of antiquity are that of Abæ, mentioned by Herodotus; that of Amphiarus; that of the Branchidæ at Didymus; that of the camps at Lacedæmon; that of Dodona; that of Jupiter Ammon; that of Nabarca, in the country of the Anariaci, near the Caspian sea; that of Trophonius, mentioned by Herodotus; that of Chrysolis; that of Claros in Ionia; that of Mallos; that of Patara; that of Pella in Macedonia; that of Phœclides in Cilicia; that of Sinope in Paphlagonia; that of Orpheus's head, mentioned by Philostratus in his life of Apollonius, &c.

But, of all others, the *oracle* of Apollo Pythius at Delphos was the most celebrated: this was consulted in the *dunier resort*, by most of the princes of those ages. See **PYTHIA**.

M. Bayle observes, that at first it gave its answers in verse; and that it fell at length to prose, upon the people's beginning to laugh at the poorness of its verification.

It is a pretty general opinion among the more learned, that *oracles* were all mere cheats, and impostures; either calculated to serve the avaricious ends of the heathen priests, or the political views of the princes.

M. Bayle says positively, they were mere human artifices, in which the devil had no hand. He is strongly backed by Van Dale, and M. Fontenelle, who have wrote expressly on the subject.

There are two points in dispute on the subject of *oracles*; viz. whether they were human, or diabolical machines? and whether

whether or no they ceased upon the publication or preaching of the gospel?

Plutarch has a treatise on the ceasing of some *oracles*: and Van Dale, a Dutch physician, has a volume to prove they did not cease since the coming of Christ; but that many of them ceased long before; and that others held till the fall of paganism, under the empire of Theodosius the Great; when paganism being dissipated, these institutions could no longer subsist.

Van Dale was answered by a German, one Mæbius, professor of theology at Leipzig, in 1685. M. Fontenelle espoused Van Dale's system, and improved upon it in his *History of Oracles*; and shewed the weakness of the argument used by many writers in behalf of Christianity, drawn from the ceasing of *oracles*.

F. Balthus, a learned Jesuit, has answered both Van Dale and Fontenelle. He labours to prove that there were real *oracles*, and such as can never be attributed to any artifices of the priests or priestesses; and that several of these became silent in the first ages of the church, either by the coming of Jesus Christ, or by the prayers of the faithful.

This doctrine is confirmed by a letter from Father Bouchet, missionary, to Father Balthus; wherein it is declared, that what Father Balthus says of the ancient *oracles*, is experimented every day in the Indies.

It seems, according to this missionary, that the devil still gives *oracles* in the Indies; and that, not by idols, which would be liable to imposture; but by the mouths of the priests, and sometimes of the by-standers: it is added, that these *oracles*, too, cease, and the devil becomes mute, in proportion as the gospel is preached among them.

It was Eusebius who first endeavoured to persuade the Christians, that the coming of Jesus Christ had struck the *oracles* dumb; though it appears from the laws of Theodosius, Gratian, and Valentinian, that the *oracles* were still consulted as low as the year 358. Cicero says, the *oracles* became dumb, in proportion as people, growing less credulous, began to suspect them for cheats.

Plutarch alleges two reasons for the ceasing of *oracles*: the one was Apollo's chagrin; who, it seems, took it in dudgeon to be interrogated about so many trifles. The other was, that in proportion as the genii, or daemons, who had the management of the *oracles*, died, and became extinct, the *oracles* must necessarily cease. He adds a third, and more natural, cause for the ceasing of *oracles*; viz. the forlorn state of Greece, ruined and desolated by wars. For, hence, the smallness of the gains let the priests sink into a poverty and contempt too bare to cover the fraud.

Most of the fathers of the church took it to be the devil that gave *oracles*; and looked on it as a pleasure he took to give dubious and equivocal answers; in order to have a handle to laugh at them.—Vossius allows, that it was the devil who spoke in *oracles*; but thinks that the obscurity of his answers was owing to his ignorance as to the precise circumstances of events. That artful and studied obscurity, wherein the answers were couched says he, shewed the embarrass the devil was under; as those double meanings they usually bore provided for their accomplishment. Where the thing foretold did not happen accordingly, the *oracle*, forsooth, was misunderstood.

Eusebius has preserved some fragments of a philosopher, called CEnomaus; who, out of resentment for his having been so often fooled by the *oracles*, wrote an ample confutation of all their impertinences: "When we come to consult thee, says he to Apollo, if thou feelest what is in futurity, why dost thou use expressions that will not be understood? dost thou not know that they will not be understood? if thou dost, thou takest pleasure in abusing us; if thou dost not, be informed of us, and learn to speak more clearly. I tell thee, that if thou intendest an equivocal, the Greek word whereby thou affirmed that Cæsus should overthrow a great empire, was ill chosen; and that it could signify nothing but Cæsus's conquering Cyrus. If things must necessarily come to pass, why dost thou amuse us with thy ambiguities? what dost thou, wretch as thou art, at Delphos; employed in muttering idle prophecies!" But CEnomaus is still more out of humour with the *oracles*, for the answer which Apollo gave the Athenians, when Xerxes was about to attack Greece with all the strength of Asia. The Pythian declared, that Minerva, the protectress of Athens, had endeavoured in vain to appease the wrath of Jupiter; yet that Jupiter, in compliance to his daughter, was willing the Athenians should save themselves within wooden walls; and that Salamis should behold the loss of a great many children, dear to their mothers, either when Ceres was spread abroad, or gathered together.

Here CEnomaus loses all patience with the god of Delphos: "This contest, says he, between father and daughter, is very becoming the deities! It is excellent, that there should be contrary inclinations and interests in heaven!—Poor wizzard, thou art ignorant whose the children are, that

"Salamis shall see perish; whether Greeks or Persians. 'Tis certain, they must be either one, or the other; but thou needest not have told so openly, that thou knewest not which. Thou concealest the time of the battle under those fine poetical expressions, either when Ceres is spread abroad, or gathered together: and wouldst thou cajole us with such pompous language? Who knows not, that if there be a sea-fight, it must either be in seed-time or harvest? It is certain it cannot be in winter. Let things go how they will, thou wilt secure thyself by this Jupiter, whom Minerva is endeavouring to appease. If the Greeks lose the battle, Jupiter proved inexorable to the last; if they gain it, why then Minerva at length prevailed."

ORACLES of the sibyls. See the article *SIBYL*.
ORAL, something delivered by the mouth, or voice. See the article *VERBAL*.

In this sense, we say, *oral law*, *oral tradition*, &c.
ORANGE *, a delicious fruit, of the apple-kind, too well known to need a particular description; yet yielding too many kinds of merchandize, to be passed over.

* The Latins call it *aurantium*, *aurantia malus*, or *malus aurea*, golden apple, from its colour.

Oranges are ordinarily brought from Nice, Ciouta, the isles of Hæres, Genoa, Provence, Portugal, the American islands, and even China and the coasts of India.

Those called *China oranges* were first brought into Europe from China, by the Portuguese; and it is said the very tree, whence all the European *orange*-trees of this sort were produced, is still preserved at Lisbon, in the house of the count S. Laurent.

Those most esteemed, and that are made presents of as rarities, in the Indies, are no bigger than a billiard-ball; when sweetened with a little sugar, they are esteemed excellent for disorders of the breast.—The juice is cooling and antiscorbutic.

Oranges are ordinarily preserved in halves and quarters. They are first peeled, then scooped, and dried in a stove.—Orangeat is the *orange*-peel cut in pieces, and candied. Italy furnishes a great deal of flower of *oranges*, either dry or liquid.

The water of flower of *oranges*, called *agua naphæ*, comes mostly from Provence. To be good, it must be very sweet-scented, and not above a year old.

There are various oils drawn from *oranges*: the oil of neroli is the produce of the flowers by distillation. That drawn from the skin by water and an alembic, is almost as good. There is also an oil drawn from little *oranges*, or *orangelettes*, by steeping them five or six days in common water, and distilling them with the same water in an alembic. These oils are all esteemed good for destroying worms in children; but are very apt to be sophisticated with oil of ben, or that of sweet almonds.

ORANGE colour, is an hue or dye, that partakes equally of red and yellow; or is a medium between the two.

In heraldry, the term *orange* or *orange* is given in blazon to all roundles that are tawny or tawney.

ORANGE-flower-water. See the article *WATER*.

ORANGEADE, a drink made of *orange*-juice, water, and sugar.

Lemery says it may be given to people in the height of a fever.

ORANGERY, a gallery in a garden, or parterre, exposed to the south, but well clothed with a glass window, to preserve oranges in, during the winter season.

The *orangery* of Versailles is the most magnificent that ever was built: it has wings, and is decorated with a Tuscan order.

ORANGERY is also used for the parterre, where the oranges are exposed in kindly weather.

ORATION, a speech, or harangue, framed according to the rules of oratory, and spoke in public.

All the kinds of orations may be reduced to three heads; viz. *demonstrative*, *deliberative*, and *judicial*.

To the demonstrative kind belong *panegyrics*, *genethliaca*, *epithalamia*, *epicedia*, *eucharistia*, *epinicia*, and *congratulations*.

To the deliberative kind belong, *persuasion*, *dissuasion*, *exhortation*, and *commendation*.

To the judicial kind belong *accusation*, *confirmation*, *confutation*, &c. See each under its proper article, *CONFIRMATION*, &c.

Funerel ORATION. See the article *FUNERAL*.

ORATORY, ORATORIA, the art of speaking well.

In which sense the word amounts to the same with *rhetoric*; the difference between the two only consisting in this, that the first is Latin, the other Greek.

ORATORY is also used among the Romanists, for a closet, or little private apartment, in a large house, near a bed-chamber, furnished with a little altar and a book-stand, for private devotion.

The ancient *oratories* were little chapels, adjoining to monasteries, wherein the monks said their prayers, ere they had any churches

churches. Several councils and synods have condemned the use of private oratories.

In the sixth and seventh centuries oratories were little churches, frequently built in burial-grounds, without either baptistery, cardinal priest, or any public office; the bishop sending a priest to officiate occasionally.

ORATORY is also used for a society or congregation of devout persons, who form a kind of monastery, and live in community; but without being obliged to make any vows. Hence, *Prælati of the ORATORY*, a community of secular priests, who live together in a monastic manner, but without vows; they were first established at Rome, about the year 1590, by S. Philip Neri, a Florentine, under the title of *oratory of Sancta Maria in the Valicella*.

On the model of this the cardinal Berulle established a congregation of the *oratory of Jesus* in 1612. In France, which has since increased: so that there are now 60 houses of *priests of the oratory* in that kingdom.

There is some difference, however, between the Italian and French institutions.—S. Philip Neri, to prevent the confusion which the great number of houses usually occasioned in congregations, would have his to be a single house: and though others were at liberty to form the like congregations, yet they were to have no dependence on one another.

For this reason, the houses of the *oratory* in Italy and Flanders are all independent; whereas those in France have a relation to each other, and all depend on the same chief, who has the quality of superior general; and, with three assistants, governs the whole congregation.

ORB, ORBIS, in astronomy, a spherical body, or space, contained under two superficies; the one concave, the other convex.

The ancient astronomers conceived the heavens as consisting of several vast azure transparent *orbs*, or spheres, inclosed in one another; or vast circles, which in their areas included the bodies of the planets; the radii whereof were comprized between the centre of the earth and the highest point to which the planets rise, supposing the earth to be in the centre.

There are *orbs concentrici*, i. e. having the same centre; and *orbs eccentrici*.

The *magnus ORBIS*, or *great ORB*, is that wherein the sun is supposed to revolve; or, rather, it is that wherein the earth makes its annual circuit.

ORB, in astrology. An *orb* of light is a certain sphere, or extent of light, which the astrologers allow a planet beyond its centre.

They say, that, provided the aspects do but fall within this *orb*, they have almost the same effect as if they pointed directly against the centre of the planet. See ASPECT.

The *orb* of Saturn's light they make to be 10 degrees; that of Jupiter 12 degrees; that of Mars 7 degrees, 30 minutes; that of the Sun 17 degrees; that of Venus 8 degrees; that of Mercury 7 degrees; that of the Moon 12 degrees, 30 minutes.

ORBICULARE *os*, ORBICULAR *bone*, in anatomy, the fourth of the little bones of the inward ear; tied by a slender ligament to the stapes; and named from its figure, which is round.

It was first discovered by Fran. Sylvius. Its use is in the extension and relaxation of the tympanum. See EAR.

ORBICULARIS, or *constrictor labiorum*, in anatomy, is one of the muscles of the lips.

The *orbicularis* is single; its fibres make a ring about the mouth, and serve to constrict and draw up the lips; and, by that means, to shut the mouth, &c. it also serves to advance, or stretch them outwards; and has the chief part in the action of kissing: whence it is also called *osculatorius*, or the kissing muscle.

Verheyen will not have it one muscle, but a pair, whose fibres meet, and join at both corners of the mouth; though other authors are unanimous in making it single, and call it a *fibula*.

ORBICULARIS, or *deprimens palpebrarum*, is a muscle springing from each corner of the eye, and answered by another of like figure and structure in the lower eye-lid; which are therefore often considered as one *orbicular* muscle.—See *Tab. Anat. (Mus.) fig. 1. n. 2.*

Its fibres surround the eye-lids, and are inserted into them, not unlike the sphincters of other parts: it is fastened to that part of the margin of the orbit, towards the nose, made by the fourth bone of the upper jaw.

ORBIT, ORBITA, in astronomy, the path of a planet, or comet; or the line described by its centre in its proper motion in the heavens.

The sun's, or rather earth's *orbit*, is the curve which it passes along in its annual revolution; called the *ecliptic*.

The *orbit* of the earth, and that of all the primary planets, is an ellipsis, in one of whose foci the sun is placed; in which ellipsis they move according to this law, that a radius drawn from the centre of the sun to the centre of

the planet, always describes areas proportional to the times.

The ancient astronomers made the planets describe circular *orbits*, with a uniform velocity: Copernicus himself could not believe they should do otherwise. *Fieri nequit*, says he, *ut cœlestis corpus simplex unq. orbe inæqualiter moveatur*. So that, to account for their inequalities, they were obliged to have recourse to eccentrics and epicycles; from the embarrass whereof Copernicus himself could not intirely disentangle himself.

But after him came astronomers who, with a little more physics, have made no difficulty of changing these circular *orbits* into elliptic ones; and of making them move with different velocities in different parts thereof.

Of these elliptic *orbits*, there have been two kinds assigned: the first that of Kepler, which is the common ellipsis; to which Seth Ward, though he himself keeps to it, thinks one might venture to substitute circular *orbits*, by using two points, taken at equal distances from the centre, on one of the diameters, as they do in the foci of the ellipsis. The second is that of M. Cassini, whose character is this; that the products of the right lines drawn from each point of its circumference are every-where equal; whereas, in the common ellipsis, it is the sum of those right lines that is always the same.

M. Varignon shews how inconsistent Copernicus's sentiment is with the mechanism of the heavens; since the forces which planets have, to retain them in their *orbits*, must almost always conspire to make them move with really different velocities; and that, among an infinity of cases, there is but one wherein they can move uniformly.

The semidiameter of the earth's *orbit* Dr. Gregory makes 94,696,969 miles English, and the semidiameter of Saturn's *orbit* about 10 times as great.

The *orbits* of the planets are not all in the same plane as the ecliptic, or the earth's *orbit* round the sun; but are variously inclined to it, and to one another: but still the plane of the ecliptic intersects the plane of the *orbit* of every planet in a right line which passes through the sun.

The quantities of the inclinations of the planes of the *orbits* of the primary planets to that of the ecliptic, are as follow: that of Saturn, is an angle of 2 degrees; that of Jupiter, an angle of 1 deg. 20 min. that of Mars is almost 2 deg. Venus is a little more than 3 deg. 20 min. and that of Mercury a little more than 7 deg.

The *orbits* of comets Cassini takes to be rectilinear; but Dr. Halley, from Sir Isaac Newton's theory, shews them to be parabolical, having the sun in one of their foci. See PLANET, and COMET.

ORBITS, in anatomy, the two large cavities, or sockets, wherein the eyes are placed.—See *Tab. Anat. (Osteol.) fig. 1. lit. b.*

Their figure is pyramidal: they are formed of the processes of the os frontis and the upper jaw-bone, joined together; and are perforated at bottom, to give passage to the optic nerves.

ORBITER, in anatomy, a name sometimes given to two holes, or cavities, either from their resemblance of, or nearness to, the orbits of the eyes.

The *orbiter externus* is an hole in the cheek-bone, below the orbit.

The *orbiter internus* is an hole in the coronal-bone of the skull, within the orbit.

ORCHARD, a seminary, or plantation of fruit-trees, chiefly of apples and pears.

It is a rule, among gardeners, that those *orchards*, *ceteris paribus*, thrive best, which lie open to the south, south-west, and south-east; and are screened from the north; and have the soil dry and deep.

Orchards are stocked by transplantation; seldom by semina-tion.

The season for transplanting apple-trees into *orchards*, is in the months of October and November: if the leaves be not all off at the time they are removed, they must be pulled off: and they are likewise to be pruned. Trees may be transplanted into *orchards* after three years grafting, and ought not to be set at a less distance than eight yards, nor at a greater than fourteen: and the richer the land, the greater the distance.

The trees are transplanted to best purpose when young; for trees ten or twelve years old, a narrow trench must be dug, the November before, deep enough to meet the spreading roots, at such a distance all around the tree, as the roots are to be cut off at. In making the trench, the roots are to be cut off clean, and without splitting or bruising the bark, and the trench filled up again: this will enable the tree, upon removal, to draw more nourishment than otherwise it would, and so thrive better in its new mansion.

The side-branches of all tall *orchard* fruit-trees are to be cut off, till the tree be arrived at the height desired: if the tree be to spread low, some are to be left on each side; so

as to form a kind of balance. For the first three years, at least, they must not grow thick, and bushy-headed: this must be prevented, by cutting off some of the inside shoots, and such as grow across each other, or pendent. See PRUNING.

The soil, if not rich enough, is to be amended in two or three years, by opening it around the tree, and on the outside of the ground first dug when the tree was set; and in a month's time filling it up again with a proper compost, or manure.

ORCHESTRA, in the drama, the lower part of the antient theatre; made in form of a semicircle, and surrounded by the seats.

It was so called, because, in the Grecian theatres, it was a place where they held their balls; from *ὀρχήστρις*, I dance.

The orchestra among the Greeks made a part of the scena; but, on the Roman theatres, none of the actors went down to the orchestra, which was taken up with seats for the senators, magistrates, vestals, and other persons of distinction; answering, nearly, to the pit in our theatre. With us the orchestra is the name of the place where the musicians sit.

ORDEAL*, ORDALIUM, a form of trial, that is, of discovering innocence, or guilt; practised in England, in the time of Edward the Confessor, and since, as low as king John, and king Henry III.

* The word, in the original Saxon, signifies a great judgment; formed of *or*, great, and *deal*, or *dele*, judgment.

It was called *purgatio vulgaris*, or *judicium*, in opposition to *bellum*, or *combat*, the other form of purgation.

The practice of ordeal did not only obtain in England, but also in France and Germany. It was condemned by pope Stephen II. and abolished by a declaration of Henry III.

The ordeal was of various kinds; viz. that of fire, that of red-hot iron, that of cold water, that of judicial pottage, that of hallowed cheese, that of boiling water, that of the green cross, and that of dice laid on relics, covered with a woolen cloth.—There were particular masses for each species of ordeal.

The more popular kinds of ordeal were those of red-hot iron, and water; the first for freemen, and people of fashion; the second for peasants.

It is a popular story in our histories, that Emma, mother of Edward the Confessor, being accused of too much familiarity with the bishop of Leicester, demanded the ordeal of red-hot iron; and passed bare-footed, and hood-winked, over nine red-hot plough-shares, without touching any of them.

ORDEFF, or OREDEF, a word frequently used, in charters of privileges, for a liberty whereby a man claims the ore found in his own ground.

It properly signifies ore lying under-ground; as a *delf* or *delf* of coal is coal lying in veins under-ground.

ORDER, in architecture, a system of the several members, ornaments, and proportions, of a column and pilaster.—Or, a regular arrangement of the projecting parts of a building, whereof the column is the chief, so as to form one beautiful whole.—See *Tab. Archit. fig. 25, 27, 29, 31, 33*.

Perrault defines order to be that which prescribes the proportions of intire columns, and determines the figures of certain parts suitable to the different characters their different uses and ends require.

M. Le Clerc defines an order to be a column charged with an entablature, and supported on a pedestal.

The definitions Vitruvius, Barbaro, Scamozzi, &c. give of order, are so obscure, that it were vain to repeat them: without dwelling, therefore, on the definition of a word, which custom has established, it is sufficient to observe, that there are five orders of columns; three whereof are Greek; viz. the Doric, Ionic, and Corinthian; and two Italic; viz. the Tuscan, and Composite.

The three Greek orders represent the three different manners of building; viz. the solid, delicate, and middling; the two Italic ones are imperfect productions thereof. The little regard the Romans had for these last, appears hence, that we do not meet with one instance, in the antique, where they are intermixed: that abuse the moderns have introduced, by the mixture of Greek and Latin orders, Daviler observes, arises from their want of reflection on the use made thereof by the antients.

The origin of orders is almost as antient as human society. The rigour of the seasons first led men to make little cabins, to retire into; at first half under-ground, and the half above covered with rubble: at length, growing more expert, they planted trunks of trees on-end, laying others across, to sustain the covering.

Hence they took the hint of a more regular architecture:

for the trunks of trees, upright, represent columns; the girts, or bands, which served to keep the trunks from burbling, exprest bafes and capitals; and the summers, laid across, gave the hint of entablatures; as the coverings, ending in points, did of pediments. This is Vitruvius's hypothesis; which we find very well illustrated by M. Blondel.

Others take it, that columns took their rise from pyramids, which the antients erected over their tombs; and that the urns, wherein they inclosed the ashes of the dead, represented the capitals, whose abacus was a brick, laid thereon to cover the urns; but Vitruvius's account appears the more natural.

At length the Greeks regulated the height of their columns on the foot of the proportions of the human body: the Doric represented a man of a strong, robust make; the Ionic that of a woman; and the Corinthian that of a girl: their bafes and capitals were their head-dress, their shoes, &c.

These orders took their names from the people among whom they were invented: Scamozzi uses significative terms to express their character, when he calls the Tuscan the Gigantic; the Doric the Herculean; the Ionic the Matronal; the Composite the Heroic; and the Corinthian the Virginal. See each order under its proper article; TUSCAN, DORIC, &c.

To give a general idea of the orders, it must be observed, that the whole of each order is composed of two parts, at the least; viz. the column and entablature; and of four parts at the most, when there is a pedestal under the column, and an acroter, or little pedestal, atop of the entablature: that the column has three parts; viz. the base, the shaft, and the capital; the entablature has three, likewise; viz. the architrave, the freeze, and cornice: which parts are all different in the several orders. See each part under its proper article; ENTABLATURE, CAPITAL, &c.

Tuscan ORDER is the first, most simple, and solid: its column is seven diameters high; and its capital, base, and entablature, have but few mouldings, or ornaments.

Doric ORDER is the second, and the most agreeable to nature: it has no ornament on its base, or on its capital. Its height is eight diameters. Its freeze is divided by triglyphs and metopes.

Ionic ORDER is the third, and a kind of mean proportional between the solid and delicate manner. Its capital is adorned with volutes, and its cornice with denticles.

Mich. Angelo, contrary to all other authors, gives the Ionic a single row of leaves at the bottom of the capital.

Corinthian ORDER, invented by Callimachus, is the fourth, the richest, and most delicate. Its capital is adorned with two rows of leaves, and eight volutes, which sustain the abacus. Its column is ten diameters high, and its cornice has modillions.

Composite ORDER, the fifth and last (though Scamozzi and Le Clerc make it the fourth), is so called because its capital is composed out of those of the other orders; having the two rows of leaves of the Corinthian, and the volutes of the Ionic. It is also called the Roman, because invented among that people. Its column is ten diameters high, and its cornice has denticles, or simple modillions.

Rustic ORDER is that adorned with rustic quoins, bossages, &c. See RUSTIC.

Attic ORDER is a little order of low pilasters, with an architrave cornice for its entablature; as that of the castle of Versailles over the Ionic on the side of the garden.

M. Blondel calls the little pilasters, of attics and mezzanines, false orders.

Persian ORDER is that which has figures of Persian slaves, instead of columns, to support the entablature.

Caryatic ORDER is that whose entablature is supported with figures of women, instead of columns. See CARYATIDES.

Gothic ORDER, that which deviates from the ornaments and proportions of the antique, and whose columns are either too massive, in manner of pillars; or too slender, like poles; its capitals out of all measure, and carved with leaves of wild acanthus, thistles, cabbage, or the like.

French ORDER is a new-contrived order, wherein the capital consists of attributes agreeing to that people; as cocks-heads, flowers-de-luces, &c.

Its proportions are Corinthian. Such is that of M. Le Brun, in the grand gallery of Versailles; and that of M. Le Clerc.

M. Le Clerc gives a second Tuscan order, and a Spanish order, besides his French order.—The Tuscan he ranks between the first Tuscan and Doric. Its height he makes 23 semidiameters, 22 minutes; the column to have 15, the pedestal 5, and the entablature 3, and

22 minutes: and he proposes its freeze to be adorn'd with turtles, which are the arms of Tuscany. The *Spanish order* he places between the *Corinthian* and *Composite*. The whole *order* he makes 30 semidiameters, 28 minutes; whereof the column has 9, and 25 min. the pedestal 16, and 18 min. and the entablature 4, and 15 min. The horns of the abacus he sustains with little volutes; the middle, in lieu of a rose, has a lion's snout: that animal being the symbol of Spain, and expressing the strength, gravity, and prudence of that nation.

Greek ORDERS. See the article GREEK.

ORDER is also used for a class or division of the members of the body of a state; with regard to assemblies, precedence, &c.

In this sense, *order* is a kind of dignity, which, under the same name, is common to several persons; and which, of itself, does not give them any particular public authority, but only rank, and a capacity of arriving at honours and employments.

To abridge this definition; *order* may be said to be a dignity attended with an aptitude for public employ. — By which it is distinguished from an *office*, which is the exercise of a public trust.

In this sense, nobility is an *order*, &c. The clericate is also an *order*, &c.

ORDER is also the title of certain ancient books, containing the divine office, with the *order* and manner of its performance.

Roman order is that wherein are laid down the ceremonies which obtain in the Roman church. See RITUAL.

ORDER, in astronomy, &c. — A planet is said to go according to the *order* of the signs, when it is direct; proceeding from aries to taurus, thence to gemini, &c. — It goes contrary to the *order* or succession of the signs, when it is retrograde, i. e. when it goes back from pisces to aquarius, &c.

ORDER, in war, denotes an arrangement of the parts of an army, either by land or sea; whether for marching, sailing, or engaging. See ARMY.

ORDER of battle, is the placing the battalions and squadrons in one, two, or three lines, according as the ground will allow, either in order to engage the enemy, or to be reviewed by the general. See LINE, &c.

An **ORDER of march** is disposed in two or three columns, according to the ground. — The *orders* and evolutions make the subject of the science of tactics.

ORDER is more particularly used for the equal distance of one rank, or file, from another.

The usual *order* in files is three feet; in ranks six feet. — The open or marching *order* is twice as much.

ORDERS, by way of eminency, or *holy ORDERS*, denote a character peculiar to ecclesiastics, whereby they are set apart for the ministry.

This the Romanists make their sixth sacrament.

In the reformed churches there are but three *orders*; viz. bishops, priests, and deacons. In the Romish church there are seven, exclusive of the episcopate: all which the council of Trent enjoins to be received, and believed, on pain of anathema.

They are distinguished into *petty*, or *secular orders*; and *major*, or *sacred orders*.

The *petty*, or *minor ORDERS*, are four; viz. those of door-keeper, exorcist, reader, and acolyth.

Those in *petty orders* may marry without any dispensation: in effect, the *petty orders* are looked on as little other than formalities, and as degrees necessary to arrive at the higher *orders*. — Yet the council of Trent is very serious about them: enjoins that none be admitted into them, without understanding Latin; and recommends it to the bishops, to observe the intervals of conferring them, that the persons may have a sufficient time to exercise the function of each *order*: but it leaves the bishops a power of dispensing with those rules; so that the four *orders* are usually conferred the same day, and only make the first part of the ceremony of ordination. The Greeks disavow these *petty orders*, and pass immediately to the subdiaconate; and the reformed to the diaconate.

Their first rite, Fleury dates in the time of the emperor Justinian. There is no call nor benefice required for the four *petty orders*; and a bastard may even enjoy them without any dispensation; nor does bigamy disqualify.

Sacred, or **major ORDERS**, we have already observed, are three; viz. those of deacon, priest, and bishop.

The council of Trent, retrieving the ancient discipline, forbids any person being admitted to the major *orders*, unless he be in peaceable possession of a benefice sufficient for a decent subsistence; allowing no ordinations on patrimonies or pensions; except where the bishop judges it for the service of the church.

A person is said to be promoted to *orders per saltum*, when he has not before passed the inferior *orders*. The council of Constantinople forbids any bishop being ordained without passing all the degrees; yet church-history furnishes us with instances of bishops consecrated, without having passed the *order* of priesthood; and Panormus still thinks such an ordination valid.

Military ORDERS, are companies of knights, instituted by kings and princes; either for defence of the faith, or to confer marks of honour, and make distinctions among their subjects.

There have been five *orders*, purely military, in England; viz. those of the knights of the garter, knights bannerets, knights of the bath, knights batchelors, and knights baronets.

See the institution of each under its proper article, GARTER, BATH, BARONET.

ORDER of the Thistle. See the article THISTLE.

The French have had five military *orders*; viz. that of the *genette*, instituted by Charles Martel; but which soon fell.

—The *order of the virgin Mary*, since called the *order of the star*, instituted by king John in 1352. — The *order of St. Michael*, instituted in 1469, by Lewis IX. — The *order of the Holy Ghost*, or the *blue ribbon*; the members of which are first to be knights of St. Michael. See HOLY GHOST. — And the *order of St. Louis*, instituted by Lewis XIV. in 1693.

The princes of the blood, marshals of France, admirals, and generals, become knights of St. Louis by their offices.

ORDER of Alcanatra,	} See	ALCANTARA.
ORDER of the Band,		BAND.
ORDER of Christ,		CHRIST.
ORDER of the Cross,		CROSS.
ORDER of the Elephant,		ELEPHANT.
ORDER of the Golden Fleece,		FLEECE.
ORDER of the Knot,		KNOT.
ORDER of the Rosary,		ROSARY.
ORDER of the Star,		STAR.
ORDER of the Stake, &c.		STOLE, &c.

Religious military ORDERS, are those instituted in defence of the faith, and privileged to say mass; and withal are prohibited marriage, &c.

Of this kind are the knights of Malta, or of St. John of Jerusalem. — Such also were the knights templars, the knights of Calatrava, knights of St. Lazarus, Teutonic knights, &c. See each under its proper article, MALTA, TEMPLAR, &c. Father Putignani accounts those *military orders* where marriage is not allowed, real *religious orders*. — F. Papebroch says, it is in vain to search for *military orders* before the XIIIth century.

Religious ORDERS, are congregations or societies of monastics, living under the same superior, in the same manner, and wearing the same habit.

Religious orders may be reduced to five kinds; viz. monks, canons, knights, mendicants, and regular clerics. See each under its proper article, MONK, CANON, &c.

Father Mabillon shews, that till the IXth century, almost all the monasteries in Europe followed the rule of St. Benedict; and that the distinction of *orders* did not commence till upon the re-union of several monasteries into one congregation: that St. Odo, abbot of Cluny, first began this re-union, bringing several houses under the dependence of Cluny: that, a little afterwards, in the XIth century, the Camaldulians arose; then, by degrees, the congregation of Vallombrosa; the Cisterians, Carthusians, Augustines; and at last, in the XIIIth Century, the Mendicants. He adds, that Lupus Servatus, abbot of Ferrieres, in the IXth century, is the first that seems to distinguish the *order* of St. Benedict from the rest, and to speak of it as a particular *order*.

White order denotes the order of regular canons of St. Augustine.

Black order denoted the order of Benedictines.

These names were first given these two *orders* from the colour of their habit; but are disused since the institution of several other *orders*, who wear the same colours.

Grey order was the ancient name of the Cisterians; but since the change of the habit, the name suits them no more.

ORDER of Charity. See the article CHARITY.

ORDER of St. Saviour. See the article SAVIOUR.

Third ORDER. See the article THIRD.

ORDER, in the geometry of curves. See GENDER, LINE, and CURVE.

Book of ORDERS. See the article BOOK.

ORDER Interlocutory, in law. See INTERLOCUTORY.

ORDINAL, **ORDINALE**, a book containing the order, or manner of performing divine service. See RITUAL.

ORDINAL,

ORDINAL, in grammar, an epithet given to such numbers as mark the order of things, or in what rank they are placed. Thus, first, second, tenth, hundredth, &c. are ordinal numbers. See **CARDINAL**.

ORDINANCE, or **ORDONNANCE**, a law, statute, or command of a sovereign, or superior.

Ordinance of parliament is ordinarily used in the same sense as statute, or act of parliament.

In the parliament-rolls, acts are often called *ordinances of parliament*.—Though in some cases we find a difference made between the two; *ordinances* being only temporary things, by way of prohibition; and capable of being altered by the commons alone: whereas an *act* is a perpetual law, and cannot be altered but by king, lords, and commons.

Sir Edward Coke asserts, that an *ordinance* of parliament differs from an *act*, as the latter can only be made by the king, and the threefold consent of the estates; whereas the former may be made by one or two of them.

Ordinance of the forest, is a statute made in the 34th year of Henry I. relating to forest-matters.

In the French jurisprudence, *ordonnances* are such laws as are established by the king's authority alone. All *ordonnances* begin with, *a tunc presens & a vobis salutem*.

ORDINANCE, or **ORDNANCE**, is also a general term for all sorts of great guns, or cannon, mortars, &c. used in war.

The parts of a piece of *ordnance* are the outside, round about the piece, which is called the *superficies of her metal*: the substance, or whole mass of metal, called her *body*: the part next us, when she stands ready to fire, the *breech*, or *cayle*: and the pommel, or round knob at the end of it, the *caswell*; by some the *caswell-deck*. The *trunnions* are the two knobs, or ears, which hold the piece in the carriage.

Munitions, or *dolphins*, in the German guns, are two handles placed on the back of the piece near the trunnions, and near the centre of gravity, to mount and dismount them more easily.

The rings about a piece of *ordnance* are five: the *base-ring*, that which is next below the touch-hole: the next above the touch-hole, is called the *reinforced ring*: the next to that forward, the *trunnion-ring*: the next to that, the *cerise-ring*: that at the mouth, the *muzzle-ring*, or the *freeze*.—All the rings near the mouth are sometimes called the *freezes*.

As to the internal parts; the whole cavity or bore of the piece is called her *chase*: that part of the cavity between the trunnions, and the muzzle or mouth, the *vacant cylinder*: that part from the trunnions to the end of the cavity, or so much of it as containeth (or is loaded with) the powder and shot, is called the *chamber*. The diameter of the mouth, the *caliber*: and the space between the shot, and the hollow superficies of the piece within, the *vent*; being the difference between the diameter of the shot, and the mouth of the piece.

Ordinance in England is distinguished into two kinds, *viz.* *Field pieces*, which are from the smallest to twelve pounders. —And *cannon of battery*, which are from a culverin to a whole cannon.

Each of these divisions is again subdivided; the first into base, rabinet, falconet, falcon, minion ordinary, minion largest, faker least, faker ordinary, demi-culverin least, and demi-culverin ordinary.—The second into culverin least, culverin ordinary, culverin largest, demi-cannon least, demi-cannon ordinary, demi-cannon large, and royal whole cannon.

The lengths and weights of each whereof, as also the weights of the bullets they carry, see expressed in a particular table under the article **CANNON**. See also each piece under its proper head, **CANNON**, **CULVERIN**, **SAKER**, &c.

The strength and serviceableness of a piece of *ordnance* depends much on the thickness of the metal, especially about its chamber and breech, which is called its *fortification*.

Of this there are three degrees, both for cannons and culverins.—Such are the ordinarily fortified, also called *legitimate pieces*. Those whose fortification is lessened, are called *halfard pieces*. Those doubly fortified, are called *extraordinary pieces*.

The fortification of a gun is reckoned from the thickness of the metal at the touch-hole, at the trunnions, and at the muzzle, in proportion to the diameter of the bore. The doubly fortified pieces are a full diameter of the bore in thickness at the touch-hole, $\frac{1}{2}$ of it at the trunnions, and $\frac{1}{3}$ of the diameter of their bore, in the thickness at the touch-hole, $\frac{1}{2}$ at the trunnions, and $\frac{1}{3}$ at the muzzle.

All the doubly fortified culverins, and all the lesser pieces of that kind, have a diameter and $\frac{1}{2}$ at the touch-hole, $\frac{1}{2}$ at the trunnions, and $\frac{1}{3}$ at the muzzle. And the ordinary for-

tified culverins are every way as the doubly fortified cannon; and the lessened culverins as the ordinary cannon, in all respects.—The ordinary fortified cannons have $\frac{1}{2}$ at the touch-hole, $\frac{1}{2}$ at the trunnions, and $\frac{1}{3}$ at the muzzle.

ORDNANCE, in painting. See the article **ORDONNANCE**.

ORDNANCE, or **ORDNANCE Office**, is the standing grand magazine of arms, habiliments, instruments, and utensils of war, as well by sea as land; not only of those lodged in the tower, but in all the garisons, castles, forts, &c. in Great Britain: from whence, as occasion requires, his majesty's armies, &c. are supplied.

The officers of the *ordnance* are, the *master-general*, from whom are derived all orders and dispatches relating to the same, as the service shall best require.—This post has often been annexed to the office of general and commander in chief.

Under him is a *lieutenant-general of the ordnance*, who receives orders from the master-general, and the rest of the prime officers at the board; sees them duly executed; orders the firing of guns on days of rejoicing, and sees the train of artillery fitted out when ordered to the field.

Next to him is the *surveyor-general*, who has the inspection of the *ordnance*, stores, and provisions of war, in the custody of the store-keepers; he allows all bills of debts, keeps a check on labourers, &c.

Under these is a *clerk of the ordnance*, who records all orders and instructions given for the government of the office; with all patents, grants, names of officers, &c. draws all estimates for provisions, and supplies all letters, instructions, commissions, deputations, contracts, &c. and serves as a check between the two accountants of the office, the one for money, the other for stores.

This office has also a store-keeper, who takes into his custody all *ordnance*, ammunition, stores, &c. thereto belonging; and indents, and gives in legal security for the safe keeping thereof; and renders an exact account from time to time.

Here is also a *clerk of the deliveries*, whose duty is to draw up all provisions, either at the tower, or any other of his majesty's magazines, to see them duly executed, &c.

And lastly, a *treasurer*, through whose hands passes the money of the whole office, as well for payment of salaries as disbursements.

Spiking up the ORDINANCE. See the article **SPIKING**.

ORDINARI, in antiquity, were a sort of gladiators; being those appointed to exhibit combats on certain stated days, &c.

ORDINARY, something that happens: or passes frequently, or usually.

Weekly, the *ordinary* course of things, whatever is done without miracles, is done by *ordinary* agents.

ORDINARY Ciceron. See the article **CULVERIN**.

ORDINARY Minion, &c. See the article **MINION**, &c.

Embassador, or *Envoy* in **ORDINARY**, he who is sent to reside steadily, and for a number of years, in the court of some prince or state, to keep up a good understanding, and watch the interests of his nation.

ORDINARY is also applied to several officers and servants belonging to the king's household, who attend on common occasions.—Thus we say, physician in *ordinary*, &c.

ORDINARY, **ORDINARIUS**, in the civil law, is any judge vested with authority to take cognizance of causes, in his own right, as he is a magistrate; and not by deputa-

tion.

ORDINARY, in common and canon law, denotes him who has *ordinary* or immediate jurisdiction in ecclesiastical causes in such a place.

In which sense archdeacons are *ordinaries*.—Though the appellation be most frequently given to the bishop of the diocese, who has the *ordinary* ecclesiastical jurisdiction, and the collation to benefices therein.

There are several chapels, chapters, abbeys, &c. exempted from the jurisdiction of the *ordinary*.

The archbishop is *ordinary* of the whole province, to visit, and receive appeals from, the inferior judicatures.

The Romish canonists call the pope *ordinary of ordinaries*, since by the Lateran council he has usurped the right of collating, by prevention, to all benefices; in exclusion of the *ordinary* collators.

ORDINARY of Affairs and Sessions was a deputy of the bishop of the diocese, antiently appointed to give malefactors their neck-veves, and judge whether they read or not; also to perform divine service for them, and assist in preparing them for death.

ORDINARY, or **Honourable ORDINARY**, in heraldry, a denomination given to certain charges properly belonging to that art.

The *honourable ordinaries* are ten in number, viz. the *chief*, *pale*, *band*, *fesse*, *bar*, *cross*, *saltier*, *chevron*, *bordure*, and *orle*. See each in its place, **CHIEF**, **PALE**, &c.

The heralds give several reasons for their being called *honourable*; viz. 1. Their great antiquity, as having been used ever since armour was fet on foot. And, 2. for that they denote the ornaments most necessary for noble and generous men: thus the chief represents the helmet, wreath, or crown, covering the head: the pale represents his lance or spear: the bend and bar, his belt: the fesse, his scarf: the cross and saltier, his sword: the chevron, his boots and spurs: and the bordure and orle, his coat of mail.

As to the allotting or distributing of these *ordinaries*, some authors write, that when a gentleman, having behaved himself gallantly in fight, was presented to the prince, or general, and a suitable coat-armour ordered him; if he were wounded in the head, they gave him a chief; if in the legs, he had a chevron; and if his sword and armour were discoloured with the blood of the enemies, a cross or bordure.

Some heralds have attempted to increase the number of *honourable ordinaries* to twenty; adding to those above-mentioned, the plain *quarter*, the *giron*, the *escutcheon*, *cappe* dexter and sinister, *enmanch* dexter and sinister, *chasse* dexter and sinister, and the *point*. But these are not yet authorized.

ORDINATE. See the article **Co-ORDINATE**.

ORDINATES, in geometry and conics, are lines drawn from any point of the circumference of an ellipse, or other conic section, perpendicularly across the axis, to the other side.

The Latins call them *ordinatim applicatæ*.—Such are the lines M M, M M, &c. (*Tab. Conicæ*, fig. 26.)

Half of each of these, as the lines E M, E M, &c. are properly only *semi-ordinates*, though popularly called *ordinates*.

In curves of the second order; if any two parallel right lines be drawn so as to meet the curve in three points: a right line which cuts these parallels *fo*, as that the sum of two parts terminating at the curve on one side the secant, is equal to the third part terminated at the curve on the other side: will cut all other right lines parallel to these, and that meet the curve in three points, after the same manner; i. e. so that the sum of the two parts on one side will always be equal to the third part on the other side:—and these three parts equal on either side, Sir Isaac Newton calls *ordinatim applicatæ*, or *ordinates of curves of the second order*. See **CURVE**.

ORDINATE in a parabola, } See { **PARABOLA**.
ORDINATE in an hyperbola, } { **HYPERBOLA**.
ORDINATE in an ellipse, } { **ELLIPSIS**.

ORDINATE Ratio is that wherein the antecedent of the first ratio is to its consequent, as the antecedent of the second is to its consequent.

ORDINATION, the act of conferring holy orders; or of initiating a candidate into the diaconate, or priesthood.

The *ordination* of bishops is more properly called *consecration*.

Ordination has always been esteemed the principal prerogative of bishops; and they still retain the function as a kind of mark of spiritual sovereignty in their dioceses.

In the ancient discipline there was no such thing as a vague, and absolute *ordination*; but every one was to have a church, whereof he was to be *ordained* clerk, or priest.—In the twelfth century they grew more remiss, and *ordained* without any title, or benefice.

The council of Trent restored the ancient discipline, and appointed, that none should be *ordained* but those who were provided of a benefice sufficient to subsist them.—The shadow of which practice still obtains among us.

The reformed hold the call of the people the only thing essential to the validity of the ministry; and teach, that *ordination* is only a ceremony which renders the call more august and authentic.

The council of Rome in 744. orders, that no *ordinations* shall be held except on the first, fourth, seventh, and tenth months.—With us, *ordination-days* are the four fundays immediately following the ember weeks: being the second funday in lent, trinity-fundays, and the fundays following the first wednesday after September the 14th, and December the 13th. Pope Alexander II. condemns *ordination per saltum*, as they call it; i. e. the leaping to a superior order without passing through the inferior.

ORDNANCE. See the article **ORDINANCE**.

ORDONNANCE, or **ORDINANCE**, in painting, denotes the disposition of the parts of a picture, either with regard to the whole piece, or to the several parts; as the groups, masses, contrails, aspects, &c.

In the *ordonnance* there are three things regarded, viz. the place, or scene, where; the distribution, how; and the contrast.

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In the first, regard is to be had to the *disposition* of things to serve as a ground-work; and to the *plan*, or position of bodies: under the former whereof come, 1. The *landscap*; whether an uninhabited place, where there is a full liberty of representing all the extravagancies of nature; or inhabited, where the marks of cultivation, &c. must be exhibited.

2. The *building*, whether rustic; wherein the painter's fancy is at liberty: or regular; wherein a nice attention is required to the orders.

3. The mixture of both; wherein 'tis a maxim to compose in great pieces, and make the ground-plot big enough; to neglect some little places, in order to bestow more on the whole mass, and to shew the more considerable places with the more advantage; and to mark some agitation in all the things that move.

As to plans of bodies, they are either solid; which again, are either so by nature, and which must be proportioned to their places; or artificial where regard is to be had to the rules of geometry, perspective, architecture, &c.—Or they move: which they do, either by a voluntary motion, wherein care must be had to proportion them to their situation, and to strengthen them by regarding the equilibrium; or by some extraordinary power, as machines, &c. where the causes of their motions must appear.—Or they are things at a distance. In all which an even plane must still be proposed to find their precise situation, and settle their place by sudden breaks and distances agreeable to perspective.

In placing the figures, regard must be had, 1. To the *group*, which connects the subject, and stays the fight. In this are to be considered the knot, or nodus, which binds the group; and the nearness of figures, which we may call the chain, as it holds them together; that the group be sustained by something loose and distinct from it; and by the same joined and continued to the other groups: and that the lights and shadows be so disposed, as that we may at once see the effect of all the parts of the composition.

2. To the *actions*, wherein forced attitudes are to be avoided, and simple nature shewn in her most advantageous postures. In weak and lean figures, the nudities are not to be shewn; but occasions of covering them are to be sought. In all human figures, special care to be taken, the head be well placed between the shoulders; the trunk on the haunches, and the whole on the feet.

3. To the *drapery*; which is to be adjusted, so as it may appear real garments, and not stuffs loosely thrown on. The folds to be so disposed as to leave the great parts, wherein the nudity may appear, free; ranging the little folds about the joints, and avoiding them on the relieve of the members. And, lastly, to dispose the draperies, by railing the stuff, and letting it fall easily and lightly, that the air sustaining the folds may let them fall soft.

Lastly, in the *contrast*, are to be considered the actions, which vary infinitely: the aspects, which, in actions of the same kind, may, by their difference, make a contrast: the situation, according as they meet above or under the fight, far or near. And, lastly, custom; which extends, indeed, to all parts of painting, but is particularly to be regarded in the *ordonnance*; to be managed discreetly, however, and stiffness and formality avoided.

ORDONNANCE, in architecture, is nearly the same as in painting; viz. the composition of a building, and the disposition of its parts, both with regard to the whole, and to one another.

Vitruvius defines *ordonnance* to be that which regulates the size or magnitude of all the parts of a building with respect to their use.

This definition is censured by M. Perrault, who takes the *ordonnance* to consist in the division of the plan or spot of ground whereon the building is to be raised; i. e. in the apportioning or laying it out, agreeably to the intended dimensions of the whole fabric; which Mr. Evelyn expresses in fewer words, by “determining the measure of what is assigned to compose the several apartments.”

On this foundation, *ordonnance* is the judicious contrivance of the plan or model; as when the court, hall, lodgings, &c. are neither too large, nor too little: but the court, *v. gr.* affords convenient light to the apartments about it, and is large enough for usual access. The hall of fit capacity to receive company; the bed-chambers accordingly, &c. When these divisions are either too great, or too small with respect to the place, as a large court to a little house, or a little chamber in a magnificent palace; the fault is in the *ordonnance*.

This the ancients called *taxis*; and distinguished it from *diathesis*, disposition; which is, where all the parts and members of a building are assigned their just place and situation with regard to their quality, office, rank, &c. without any regard to the dimensions, or quantity: as, that the vestibule or porch be before the hall, the hall before the parlour, and that before the

withdrawing-room, &c. The bed-chambers, again, to look to the fun-ling; and libraries, galleries of paintings, and cabinets of curiosities, &c. to the north.

ORF, in natural history, the mineral glebe, earth or stone, dug out of mines, to be purified, and to have the metalline parts procured, and separated from the same.

The ore is frequently called the *mineral*; and by some the *marcasite*; though, on other occasions, a difference is made in the signification of these two words; the denomination *ore* being only given where the mineral is rich enough of metal to be wrought.—When it is not, it is denominated *marcasite*. See Supplement, article **ORE**.

ORE, in navigation. See the article **OAR**.

ORGAL, or **ARGOLL**, the lees of wine dried, and used by dyers to prepare the cloth for the more readily taking their several colours.

ORGAN, *Organo*, is used in the general for any thing framed and defined for some certain action, use, or operation.

ORGAN, or **ORGANICAL Part**, in physiology, is such a part of the body as is capable of the performance of some perfect act, or operation.

In which sense, all the parts, even the most simple, may be denominated *organical*.

The organs are divided into *primary* and *secondary*.—The *primary* are those composed of similar parts, and appointed for some one single function.—Such as consist of several of these, though appropriated to one single action, are esteemed *secondary organs*.

Thus the veins, arteries, nerves, and muscles, are *primary organs*; and the hands, fingers, &c. are *secondary organs*.

ORGAN of sense is that part of an animal body, by means whereof it perceives external objects.

These, some divide into *internal*, which is the brain; and *external*, viz. the eye, ear, nose, &c.

ORGAN, in music, denotes the largest and most harmonious of all wind instruments; chiefly used for playing a thorough bass, with all its accompaniments. See **MUSIC**.

The invention of the organ is very antient, though it is agreed it was little used till the eighth century. It seems to have been borrowed from the Greeks. Vitruvius describes one in his tenth book. The emperor Julian has an epigram in its praise. St. Jerom mentions one with twelve pair of bellows, which might be heard a thousand paces, or a mile; and another at Jerusalem, which might be heard to the mount of Olives. The structure of the modern organ may be conceived as follows:

The organ is an assemblage of several rows of pipes. Its size is usually exprefsed by the length of its largest pipe: thus we say an organ of 32 feet, of 16 feet, of 8 feet, and of 2 feet.

Church organs consist of two parts, viz. the main body of the organ, called the *great organ*; and the *positive*, or *little organ*, which is a small buffet, usually placed before the great organ.

The organ has at least one set of keys, when it has only one body; and two or three, when it has a positive. The large organs have four, sometimes five sets. Besides the pedals or largest pipes have their key, the stops or touches whereof are played by the feet. The keys of an organ are usually divided into four octaves; viz. the second sub-octave, first sub-octave, middle octave, and first octave. Each octave is divided into twelve stops or frets; whereof the seven black mark the natural sounds, and the five white the artificial sounds; i. e. the flats and sharps. So that the keys usually contain 48 stops, or touches. Some organists add to this number one or more stops in the third sub-octave, as well as in the second. Note, in harpsichords and spinets, the natural stops or keys are usually marked white, the artificial ones black. The pedals extend to two or three octaves at the pleasure of the organist: so that the number of stops is indeterminate.

Each key or stop pressed down opens a valve or plug, which corresponds, lengthwise, to as many holes as there are rows of pipes on the sound-board. The holes of each row are opened and shut by a register or ruler pierced with 48 holes. By drawing the register, the holes of one row are opened, because the holes of the register correspond to those of the sound-board. So that, by opening a valve, the wind brought into the sound-board by a large pair of bellows finds a passage into the pipe, which corresponds to the open hole of the sound-board. But by pushing the register, the 48 holes of the register not answering to any of those of the sound-board, that row of pipes answering to the pushed register are shut. Whence it follows, that by drawing several registers, several rows of pipes are opened; and the same thing happens, if the same register correspond to several rows. Hence the rows of pipes become either simple or compound: simple, when only one row answers to one register; compound, where several. The organists

say, a row is *compound*, when several pipes play upon pressing one stop.

The pipes of the organ are of two kinds; the one with mouths like our flutes; the other with reeds. The first called *pipes of mutation*, consist,

1. Of a foot A A B B (Tab. Miscell. fig. 15.), which is a hollow cone, and which receives the wind that is to found the pipe. 2. To this foot is fastened the body of the pipe B B D D. Between the foot and the body of the pipe is a diaphragm, or partition, E E F, which has a little, long, narrow aperture to let out the wind. Over this aperture is the mouth B B C C; whole upper lip, C C, being level, cuts the wind as it comes out at the aperture.

The pipes are of pewter, of lead mixed with a twelfth part of tin, and of wood. Those of tin are always open at their extremities: their diameter is very small, and their found very clear and shrill. Those of lead mixed are larger; the shortest open, the longest are quite stopped; the mean ones partly stopped, and having besides a little ear on each side the mouth, to be drawn closer, or set further asunder, in order to raise or lower the found. The wooden pipes are made square, and their extremity stopped with a valve or tampon of leather. The found of the wooden and leaden pipes is very soft; the large ones stopped, are usually of wood; the small ones of lead. The longest pipes give the gravest found; and the shortest the most acute: their lengths and widths are made in the reciprocal ratio's of their founds; and the divisions regulated by their rule, which they call *diapason*. But the pipes that are shut are of the same length as the open ones, which yield the same found. Usually, the longest pipe is 16 feet: though in extraordinary organs it is 32. The pedal tubes are always open, though made of wood and of lead.

A reed pipe consists of, a foot A A B B, (Tab. Miscell. fig. 16.) which carries the wind into the shalot, or reed C D, which is a hollow demi-cylinder, fitted at its extremity D into a kind of mould I I, by a wooden tampon F G. The shalot is covered with a plate of copper E E F F, fitted at its extremity F F into the mould by the same wooden tampon: its other extremity E E is at liberty; so that the air entering the shalot, makes it tremble or shake against the reed; and the longer that part of the tongue which is at liberty F L, is made, the deeper is the found. The mould I I, which serves to fix the shalot or reed, the tongue, tampon, &c. serves also to stop the foot of the pipe, and to oblige the wind to go out wholly at the reed. Lastly, in the mould is soldered the part H H K K, called the *tube*, whose inward opening is a continuation of that of the reed. The form of this tube is different in the different ranks of pipes.

The degree of acuteness and gravity in the found of a reed-pipe, depends on the length of the tongue, and that of the pipe C K, taken from the extremity C of the shalot, to the extremity K of the tube.

The quality of the found depends on the width of the reed, the tongue, and the tube; as also on the thickness of the tongue, the figure of the tube, and the quantity of wind.

To diversify the founds of the pipes, they add a valve to the port-vent, which lets the wind go in fits or shakes.

Hydraulic ORGAN denotes a musical machine that plays by means of water instead of wind.

Of these there are several in Italy in the grotto's of vineyards. Ctesebes of Alexandria, who lived in the reign of Ptolemy Evergetes, is said to have first invented organs that played by compressing the air with water, as is still practised. Archimedes and Vitruvius have left us descriptions of the *hydraulic organ*. Felibien, *de la l'ie des Archet.*

In the cabinet of queen Christina is a beautiful and large medallion of Valentinian, on the reverse whereof is seen one of these *hydraulic organs*; with two men, one on the right, the other on the left, seeming to pump the water which plays it, and to listen to its found. It has only eight pipes, placed on a round pedestal.—The inscription is PLACEA SPETRI, if it be not wrong copied, which we suspect.

ORGANICAL, in the antient music, was that part performed with instruments.

The *organical* comprehended three kinds of instruments; viz. *Wind instruments*, as the trumpet, flute, &c. *Stringed instruments*, as the lute, lyre, &c. and *Pulsatile instruments*, or those played on by beating, as drums, &c. See each in its place, **TRUMPET**, &c.

ORGANICAL Part is that part of an animal or plant defined for the performance of some particular function.

ORGANICAL Disease, a disease in an *organical* part of the body, whereby its function is impeded, suspended, or destroyed.

ORGANICAL Description of curves is the method of describing them on a plane, by means of instruments: See **CURVE**.

ORGASM,

ORGASM *, **ORGASMUS**, an ecstasy, or impetuous desire of coition, occasioned by a turgescence of the seminal vessels, which are no longer able to restrain their contents.

* The word is Greek, *οργασμος*, denoting violence, or turgescence; formed from *οργαω*, *to surge*, I swell.

The antients also extend *orgasm* to the other humours, and even excrements, which, being accumulated, and coming to ferment, demand excretion.

Quincy uses *orgasm* for an impetuous, or too quick motion of the blood, or spirits; whereby the muscles are distended with an uncommon force.

ORGIA *, *Οργια*, in antiquity, feasts and sacrifices performed in honour of Bacchus, instituted by Orpheus, and chiefly celebrated on the mountains by wild, distracted women, called *Bacchæ*.

* Eusebius derives the word *απο της οργης*, fury, madness. Others from *ορος*, mountain; because Orpheus removed from Thrace to mount Citheron: others from *οργας*, a place consecrated to some divinity: others from *οργανον*, to remove, repulse; in regard the prophane were to be driven away.

The *orgia* were also called *orphica*, from their institutor. — They were held every third year. The chief solemnities were in the night-time; and were attended with all manner of imputities.

Servius says, that at first *orgia* was a common name for all kinds of sacrifices among the Greeks; of the same import with the word *ceremonia* among the Romans.

ORGUES, in the military art, thick long pieces of wood pointed and shod with iron, and hung each by a separate rope over the gateway of a city, ready on any surprize or attempt of the enemy to be let down to step up the gate.

ORGUES is also used for a machine composed of several harquebushes or musquet barrels, bound together; by means whereof several explosions are made at the same time; used to defend breaches, and other places attacked.

ORGYA, *Οργια*, an ancient Grecian measure, containing six feet.

Some represent the *orgya* as the Grecian pace.

Hefychius describes it as the space comprehended between the two hands, when the arms are extended: answering to the Roman *ulna*, and our fathom.

ORIENT, **ORIENS**, in geography and astronomy, the east, or east-point, of the horizon.

It is thus called from the Latin *orire*, to arise; because it is in this point the sun rises.

Equinoctial ORIENT is used for that point of the horizon wherein the sun rises when he is in the equator, or when he enters the signs Aries and Libra. See **SPRING**, and **AUTUMN**.

Æstival ORIENT is the point wherein the sun rises in the middle of summer, when the days are longest.

Hybernal ORIENT is the point where the sun rises in the middle of winter when the days are shortest.

ORIENTAL, something situated towards the east with regard to us: in opposition to *occidental*.

In this sense we say, *oriental pearls*, &c. *d. such* as are found in the East-Indies (See **PEARL**). — *Oriental languages*, meaning the Hebrew, Syriac, Chaldean, and Coptic. See **LANGUAGE**.

ORIENTAL Bezoard. See the article **BEZOARD**.

ORIENTAL Bible. See the article **BIBLE**.

ORIENTAL Emerald. See the article **EMERALD**.

In astronomy, a planet is said to be *oriental*, when it appears in the east before the sun. See **RISING**.

ORIENTING, the turning a thing towards the east, or disposing it so as it may look towards the east.

In most religions, particular care has been taken to have their temples *oriented*. — St. Gregory Thaumaturgus is said to have made a mountain give way, because it prevented the *orienting* of a church he was building.

ORIFICE, **ORIFICIUM**, the mouth, or aperture of a tube, pipe, or other cavity.

ORIFICE, in anatomy, is particularly applied to the mouths of the several ducts, vessels, and other cavities; as of the bladder, uterus, stomach, &c.

The upper *orifice* of the stomach is the part where hunger is felt; the lower *orifice* is called the *pylorus*.

There are some operations in chymistry, where the *orifices* of the vessel must be sealed hermetically.

ORIFICE is also used by extension for the aperture of a wound, or ulcer. See **WOUND**, and **ULCER**.

ORIGENIANS, **ORIGENIANI**, a sect of antient heretics, who even surpassed the abominations of the Gnostics.

St. Epiphanius speaks of them as subsisting in his time; but in very small number. He seems to fix their rise about the time of the great *Origen*; but does not say they took their name from him. On the contrary, he distinguishes them from the *Origenists*, whom he derives from *Origen Ada-*

mantius; adding, indeed that they first took their name from one *Origen*; by which he intimates, that it was not the Great *Origen*. And St. Augustine says expressly it was an error. As to their doctrine, all that modestly will allow to be said, is, that they rejected marriage; that they used several apocryphal books, as the acts of St. Andrew, &c. and that to excuse their open crimes, they accused the catholics of doing the same in private.

ORIGENISTS, in church-history, followers of the errors of *Origen*, who maintained that Christ is only the son of God by adoption; that the human soul had a pre-existent state, and had sinned in heaven before the body was created; that the torments of the damned shall not be eternal, but that the devils themselves shall be relieved at last.

St. Epiphanius insists very largely on the errors of this father; but as he declares himself too warmly against him, there may be somewhat of exaggeration in what he says. Nor do St. Jerome, or Theophilus of Alexandria, seem to have kept their zeal within the proper bounds in speaking of *Origen*. For which reason, no doubt, it was that St. Chrysostom himself was accused of being an *Origenist*, because not so vehemently bent against him. *Origenism* spread itself chiefly among the monks of Egypt.

ORIGINAL, a first draught, design, or autograph of any thing; serving as a model, or exemplar, to be imitated, or copied.

Scarce any of the antient titles, tenures, &c. are now found in the *originals*. They are only vidimus's, or copies collated with the *originals*.

ORIGINAL Sin, is that crime we become guilty of at our birth; by the imputation of Adam's disobedience.

Father Malebranche accounts for *original sin* from natural causes, thus: Men at this day retain, in the brain, all the traces and impressions of their first parents. For all animals produce their like, and with like traces in the brain; whence it is that animals of the same kind have the same sympathies and antipathies, and do the same things on the same occasions: and our first parents, after their transgression, received such deep traces in the brain, by the impression of sensible objects, that it was very possible they might communicate them to their children.

Now, as it is necessary, according to the order established by nature, that the thoughts of the soul be conformable to the traces in the brain; it may be said, that as soon as we are formed in the womb, we are infected with the corruption of our parents: for having traces in the brain like those of the persons who gave us being; it is necessary we have the same thoughts, and the same inclinations with regard to sensible objects. Thus, of course, we must be begun with concupiscence, and *original sin*. With concupiscence, if that be nothing but the natural effort the traces of the brain make on the mind to attach it to sensible things; and with *original sin*, if that be nothing but the prevalency of concupiscence; nothing in effect, but these effects considered as victorious, and as matters of the mind and heart of the child.

ORIGINAL Writs. See the article **WRIT**.

ORIGINALIA, in the exchequer, are records, or transcripts sent to the remembrancer's office, out of chancery.

They differ from *records*, which contain the judgments and pleadings in suits tried before the barons.

ORILLON, in fortification, a small rounding of earth, lined with a wall; raised on the shoulder of those bastions that have casemates; to cover the canon in the retired flank, and prevent their being dismounted by the enemy.

There are other sorts of *orillons*, properly called *épaulements*, almost of a square figure.

ORION *, in astronomy, one of the constellations of the southern hemisphere.

* The word is formed from the Greek *ωρεω*, to make water; the antients supposing that it raised tempests at its rising and setting.

The stars in the constellation *Orion*, in Ptolemy's catalogue are 37, in Tycho's 62, in the Britannic catalogue 80. — The names, situations, magnitudes, longitudes, and latitudes whereof, are as follow:

Names and situations of the stars.	St. Signs.	Longitude		Latitude		Magn.
		°	'	°	'	
Preced. and 6th in the lion's skin. II	7	32	39	15	25	30 4
5th in the lion's skin.	8	00	53	13	31	20 4
7th in the lion's skin.	7	46	00	16	48	55 4
1st and north. in the lion's skin.	9	09	15	8	16	07 4 5
3d in the lion's skin.	9	22	11	11	09	17 6
4th in the lion's skin.	9	14	57	12	24	01 4
8th in the lion's skin.	8	09	36	20	02	56 4
2d in the lion's skin.	10	07	34	9	06	31 4 5
Last and south. in the lion's skin.	9	11	42	20	53	51 4 5
Prec. of 2 infor. towards the horn of ♋	12	12	00	7	25	06 5

Names and situations of the stars.	Signs.	Longitude.	Latitude South.	Mag.
North. in the preced. arm.	II	12 20 45	14 22 37	6
South. and subseq. in the arm.		12 40 11	13 04 00	6
Subf. of the infor. tow. the horn of ♄		13 27 34	7 21 32	5
That against the preced. side.		13 13 48	20 07 24	4
That against the preced. arm.		14 36 24	11 45 55	6
15				
Bright one in preced. foot called <i>regel</i> .		12 30 00	31 10 11	1
More north. over the heel.		13 30 20	19 52 52	4
		14 46 42	20 30 01	6
North. in the prec. side under the girdle.		15 13 46	23 31 19	5
Preced. and north. in the side.		15 48 42	19 37 39	6
20				
In the preced. shoulder.		16 37 31	16 51 30	2
Preced. and south. in the back.		16 12 26	21 21 07	5
S. in the prec. side under the girdle.		15 55 45	24 05 24	6
In the hilt of the sword.		15 49 47	25 34 47	3
In the calf of the preced. leg.		15 13 47	30 57 44	5
25				
Preced. of 4 in the back (as it were in a right line)		16 50 50	20 08 18	5
That foll: the shoulder to the south.		17 23 22	24 21 29	6
2d of four in the back.		18 02 50	17 20 25	5
Preced. in the girdle.		18 01 10	20 00 09	6
		18 01 38	23 36 07	2
30				
Under the point of the sword		17 34 05	30 35 12	4
Preced. in the head.		19 15 51	13 51 19	5
In the back the 3d.		18 51 06	19 34 10	6
In the head the north. of three.		19 22 18	13 25 02	4
South. and subseq. of the head.		19 46 28	14 02 58	5
35				
Prec. of the contig. in the middle of the sword.		18 38 58	28 43 24	3
Preced. of the north. of the contig. in the mid. of the sword.		18 42 11	28 10 17	5
Subseq. in the middle of the sword.		18 39 17	29 14 37	4
South. in the sword.		18 40 46	28 11 45	5
Left of the north. in the sword.				
40				
Middle of three in the girdle.		19 07 44	24 33 23	2
Left of 4 in the line of the back.		20 09 50	19 16 03	5
That under the third of the girdle.		19 45 41	25 58 47	4
Subf. under the point of the sword.		19 35 25	30 34 50	5
Third and last in the girdle.		20 21 45	25 20 17	2
45				
Preced. in the hind-side.		20 57 34	21 56 08	5
In the hind-knee.		22 03 41	33 07 06	3
Preced. of two in the club.		24 22 23	3 11 44	5
Latter of two in the hind-side.		23 38 23	21 37 10	6
50				
Glittering star in the hind-shoulder.		24 29 13	3 44 01	6
		24 25 00	16 04 26	1
		25 14 10	21 38 50	6
That following the side out of form.		25 20 41	22 56 04	6
Preced. of those following the knee.		25 23 32	33 02 04	6
55				
In the lower part of the hind-arm.		26 29 13	3 47 31	5
Subseq. in the club.		26 16 05	13 50 01	4
		26 36 07	3 20 37	5
		26 21 38	18 01 50	6
Last of the two subseq. of the knee.		26 12 07	34 04 58	5
60				
Prec. of the south. in □ of hind-hand.		26 59 00	19 19 18	6
		27 31 17	8 42 16	4
		28 30 25	3 39 59	6
Preced. of the north. in the square.		28 34 14	7 19 30	6
Left of the south. in the same.		28 34 01	9 14 49	4
65				
Last of the north.		29 12 10	4 16 02	6
		29 24 09	7 17 31	6
		29 34 49	10 53 13	6
North. in the hind ulna.		29 45 12	11 10 30	6
		29 53 42	29 42 05	4
70				
South in the hind ulna.		30 00 00	13 28 25	6
		1 56 47	18 45 41	4
		3 33 12	28 03 05	5
		3 55 48	30 18 32	4
Informes following <i>orion</i> between <i>geminii</i> and <i>canis major</i> .		4 09 40	18 23 14	4
75				
		4 09 13	15 54 21	4
		6 02 11	13 13 14	4
		7 48 51	14 56 15	5
		8 27 11	22 32 58	4
		25 15 11	48 22 46	0

ORION'S *River*, in astronomy, a constellation called also *Eridanus*. See *ERIDANUS*.

ORIS *Columna*. See the article *COLUMNA*.

ORIS *Distartor*. See the article *DISTORTOR*.

ORIS *Speculum*. See the article *SPECULUM*.

ORLE *, ORLET, or ORLO, in architecture, a fillet under the ovolo, or quarter-round of a capital.—See *Tab. Archit. fig. 28*.

* The word is French, formed from the Latin, *orletum*, or *orlum*, of *ora*, a border or list.

When it is at the top or bottom of the shaft, it is called the *cincture*.

Palladio also uses *orlo* for the plinth of the bases of columns and pedestals.

ORLE, in heraldry, is an ordinary in form of a fillet, drawn round the shield, near the edge or extremity thereof, leaving the field vacant in the middle.

Its breadth is but half that of the tressure or bordure, which contains a sixth part of the shield; the *orle* only a twelfth: add, that the *orle* is its own breadth distant from the edge of the shield; whereas the bordure comes to the edge itself.

There is sometimes one *orle*, sometimes there are two, and sometimes three.—When there are three, or more, they take up the whole shield.—It is sometimes borne *fiory*, or counterfiory, like the tressure.

The form of the *orle* is the same with that of the shield; whence it resembles an incutcheon: as represented in *Tab. Herald. fig. 73*.

If a round of martlets, cinquefoils, &c. be placed about any ordinary, in manner of an *orle*, they are said to be *en-orle*, or *orle-wiſe*.

ORLOPE, or ORLOPP, in the sea language, the uppermost space or deck in a great ship, from the main-mast to the mizen.

In three decked ships, the second and lowest decks are sometimes also called *orlopes*.—See *Tab. Ship. fig. 2. lit. I. E. F.*

ORNAMENTS, in architecture, exerts all the sculpture, or carved work, wherewith a piece of architecture is enriched. See *SCULPTURE*, &c.

ORNAMENTS in *Relievo* are those carved on the contours of mouldings; as leaves, shells, scrolls, flowers, &c.

ORNAMENTS in *Creux* are those cut within the mouldings; as eggs, flutes, &c.

Vitruvius and Vignola also use the word *ornament* to signify the entablature.

Distribution of ORNAMENTS. See *DISTRIBUTION*.

ORNITHOLOGY *, that branch of natural history, which considers and describes birds, their natures, kinds, &c.

* The word is formed from the Greek *ornis*, bird, and *logos*, discourse.

We have an excellent *ornithology* of Fr. Willughby, Esq; and another of Mr. Ray, a posthumous work, which is chiefly an abridgment of the former, with the addition of his *Ichthyology*; and several kinds wanting in the other.

Willughby, herein, speaks with assurance of a swan that lived 300 years; and a goose that they were obliged to kill at 80, by reason of its mischiefousness.

ORNITHOMANCY, a kind of divination, or method of arriving at the knowledge of futurity, by means of birds.

ORNITHOMANCY, among the Greeks, was the same with *augury* among the Romans. See *AUGURY*.

ORPHAN, a child, or minor, destitute of father; or that has neither father, nor mother.

Hence the Taborites, or followers of Zisca, finding themselves, at his death, without chief or conductor, took the appellation of *orphans*.

ORPHANS *Money*, or *Tax*. See *DUTY*.

ORPIMENT, *Auripigmentum*, a bituminous mineral, usually found in copper mines; and supposed to contain particles of gold; which may be extracted by chymistry, but which were never found to countervail the expense.

Orpiment is found in lumps of several sizes, and figures: its colour is always yellow, intermixed with shades of other colours; as green, red, orange, &c.

Sometimes it is found almost quite red; which is the proper sandaracha of the antients.

But that usually called *red orpiment*, or *red arsenic*, is only the yellow *orpiment* heated to a great degree, in a crucible, with oil of hemp-seed, olives, or nuts.

Painters, farriers, &c. make a great consumption of this mineral; but as it is found a violent corrosive, and is even reputed a poison, it must be used with a great deal of precaution.

Orpiment must be chosen of a golden yellow hue, easy to scale, and the scales very thin, small, and shining like gold.

Some authors injudiciously distinguish *orpiment* into three kinds: *White*, which is the same with arsenic, and not properly any species of *orpiment*: *Yellow*, which is the proper

proper *oriment*; and *red*, which is *sandarach*, or *realgar*. See *REALGAR*.

The Indians use *oriment*, corrected with juice of lemons, with good success against fevers. See Supplement, article *ORPIMENT*.

ORTEIL, in fortification. See the article *BERME*.

ORTHODORON, ὀρθόδωρον, an ancient Greek long measure; being the space from the carpus or wrist to the tips of the fingers: rated at 11 inches.

ORTHODOXY*, a soundness of doctrine, or belief, with regard to all the points and articles of faith.

* The word is formed from the Greek ὀρθός, *right*, and δόξα, *opinion, judgment*.

Orthodoxy is used in opposition to *heterodoxy*, or *heresy*.

ORTHODOXY, or, *Feast of Orthodoxy*, denotes a solemn feast in the Greek church, instituted by the empress Theodora; still held on the first Sunday in Lent, in memory of the restoration of images in churches, which had been taken down by the Iconoclasts.

ORTHOGONIAL, **ORTHOGONIUS**, in geometry, denotes as much as rectangular, or right-angled.

When the term is referred to a plain figure, it supposes one leg or side to stand perpendicular to the other: when spoken of solids, it supposes their axis to be perpendicular to the plane of the horizon.

ORTHOGRAPHIC Projection of the Sphere, is a representation of the several points of the surface of the sphere on a plane which cuts it in the middle: the eye being placed at an infinite distance, vertical to one of the hemispheres.

It is thus called, because the perpendiculars from every point of the sphere, will all fall in the common intersection of the sphere with the plane of the projection.

ORTHOGRAPHY*, in grammar, the art of spelling, that is writing words justly, and with all the proper and necessary letters.

* The word is formed from the Greek ὀρθός, *right*, and γράφω, *scriptio, writing*.

Orthography makes one of the greatest divisions or branches of grammar.

That diversity found in most of the modern languages, especially the English and French, between the pronunciation and *orthography*, makes one of the principal difficulties in acquiring them; yet does it arise from the same source as the languages themselves.

The Gauls, *e. gr.* forming a new language from the ancient Latin, took the liberty to mould the words to their fancy: at first, indeed, 'tis probable they wrote as they pronounced; but, by degrees, finding that words pronounced with all their letters sounded harsh, they began to pronounce more smoothly.

Thus, in speaking, they thought fit to soften that harshness resulting from the concurrence and clashing of consonants: but as the *orthography*, or writing, did not offend the ear, it still continued on its former footing.

Attempts have been since made to reduce the writing to the pronunciation, or to make us write as we speak; which has occasioned great disputes. Pelletier of Mans was the first who pleaded for the change of the *orthography*; and after him Maigret, Peter Ramus, de Bois, Menage, and others; but in vain.

They have, however, occasioned a schism among writers, which has done more harm than the evil they intended to reform: the French writers being now divided into two parties; one of which retains to the *old*, the other to the *new orthography*.—The latter, F. Buffier observes, is the most considerable body, yet are these divided among themselves; some being for carrying the reformation much farther than others.

The chief matters urged in behalf of the ancient *orthography*, are, that by changing it, we should lose sight of the origin and etymology of words borrowed from the Greek and Latin, &c. That it does not matter what characters are used to express sounds in writing, provided one know the relation between those characters and the sounds they represent: that by a necessary consequence of such change, the language would in time be all altered, and we should lose the use of our old authors; as ours, in their turn, would likewise become unintelligible.

What is alleged for the new *orthography*, is, it being more commodious, natural, easy, short, &c.

Some authors take a middle course between the two extremes; retrenching the letters where they are absolutely useless, as the *y* in a multitude of words; and yet studiously retaining all the letters whereon the etymology has any dependence.

In the English the *orthography* is more vague, and uncertain, than in any other language we know of. Every author, and almost every printer, has his particular system. Nay, it is scarce so well with us as that: we not only differ from one another; but there is scarce any that confits with himself. The same word shall frequently appear with two or three

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different faces in the same page, not to say line. See *ENGLISH*.

The antients who have wrote treatises of *orthographie*, are Velius Longus, Marius Victorinus, Flavius Caper, Calpurnius, and Beda. Among the moderns, Torelli, Liplius, Dauquius, Scoppa, Valla, and Manutius the younger, have treated on the same subject.

ORTHOGRAPHY*, in geometry, is the art of drawing, or delineating the fore-right plan or side of any object; and of expressing the heights, or elevations of each part.

* It is called *orthography*, from the Greek ὀρθός, *right*, and γράφω, *description*, from its determining things by perpendicular right lines falling on the geometrical plan: or rather, by reason all the horizontal lines are here straight and parallel, and not oblique, as in representations of perspective.

ORTHOGRAPHY, in architecture, is the elevation of a building; shewing all the parts thereof in their true proportion.

The *orthography* is either *external* or *internal*.

External ORTHOGRAPHY, is a delineation of the outer face or front of a building; exhibiting the principal wall, with its apertures, roof, ornaments, and every thing visible to an eye placed before the building.

Internal ORTHOGRAPHY, called also *section*, is a delineation, or draught of a building, such as it would appear, were the external wall removed.

To draw the ORTHOGRAPHY of a building.—Draw a right line for a basis or ground line (*Tab. Perspective, fig. 13*) AB, and at one end erect a perpendicular AD. Upon AB set off the widths and distances of the gates, windows, &c. On the right line AD, set off the heights of the several parts visible in the face of the building, *v. gr.* of the doors, windows, the roof, chimneys, &c. and apply a ruler to each point of division.

The common intersections of the right lines drawn from three points, parallel to the lines AB and AD, determine the external *orthography* of the building: and after the same manner is the internal *orthography* laid down. See *PERSPECTIVE*.

ORTHOGRAPHY, in fortification, is the profile, or representation of a work; or a draught so conducted, as that the length, breadth, height, and thickness, of the several parts are expressed; such as they would appear, if it were perpendicularly cut from top to bottom.

ORTHOPNOEA*, ὀρθοπνοία, in medicine, a great difficulty of respiration, wherein the patient is obliged to sit, or stand upright, to be able to breathe.

* The word is compounded of ὀρθός, *right*, πνέω, and πνέω, *I respire or breathe*.

An *orthopnoea* is a species or degree of an asthma.

It may be caused from pus, thick or mucilaginous juices, or polypus in the bronchia; mercurial, and other fumes, hindering the playing of the lungs; stoppage of evacuations; cachexies, ill digestions, or whatever affords viscid chyle, or occasions the blood to run slower through the lungs, either by straitening the canals, or thickening the blood, or hindering the motion of the animal spirits, so that they cannot elevate the breast; or that causes the blood to be more rarefied, or more in quantity, so that there is not sufficient room to receive it into the vessels of the lungs.

ORTIVE, **ORTIVUS**, in astronomy. — *Ortive* or *eastern amplitude*, is an arch of the horizon intercepted between the point where a star rises, and the east point of the horizon, or point where the horizon and equator intersect.

ORVIETA, *Penitents of ORVIETA*. See *PENITENTS*.

ORVIETAN, a celebrated antidote, or counter-poison; so called, because invented and originally sold by an operator from Orvieto in Italy; who made experiments thereof in his own person, on the public stage, by taking several doses of poisons.

In Charas's *Pharmacopœia* is a method of making *orvietan*; where it appears that Venice-treacle is one of the principal ingredients of it.

OS, in anatomy. See *BONE* and *MOUTH*.

Os Pubis,	} See {	PUBIS.
Os Sacrum,		SACRUM.
Os Ischium,		ISCHIUM.
Os Hyoides,		HYOIDES.
Os Femoris, &c.		FEMUR, &c.

OSCHEOCELE*, ὀσχεοκήλη, in medicine, a kind of hernia, wherein the intestines or omentum descend into the scrotum.

* The word is formed from the Greek ὀσχεον, *scrotum*, and κήλη, *tumour*.

OSCHOPHORIA*, in antiquity, feasts instituted by Theseus, in acknowledgment for his having destroyed the Minotaur, and by that means freed his country Athens from the tribute of seven young men, which were to be sent every year into Crete, to be devoured by that monster.

* The word is formed from the Greek ὄσχη, *branch of a vine laden with grapes*, and φέρω, *I bear*. Plutarch says they were

were so named, because instituted by Theseus at his return to Athens, which happened to be at the time of vintage.

Some say the *Oschophoria* were instituted in honour of Minerva and Bacchus, who had assisted Theseus in his enterprise. Others, that they were in honour of Bacchus and Ariadne.

To celebrate the *Oschophoria*, the young people who had fathers and mothers alive, run to the temple of Bacchus, and that of Minerva, with grapes in their hands. He who arrived there first, was the conqueror; and was to perform the sacrifice, by pouring out of a phial a mixture of wine, honey, cheese, flower, and oil.

OSCILLATION, in mechanics, *vibration*; or the reciprocal ascent, and descent of a pendulum.

Axis of OSCILLATION, is a right line, parallel to the apparent horizontal one, and passing through the centre; about which the pendulum *oscillates*. See **AXIS**.

If a simple pendulum be suspended between two semicycloids, whose generating circles have their diameter equal to half the length of the thread; all the *oscillations*, howsoever unequal, will be isochronal, or equi-diurnal.

The time of the entire *oscillation* through any arch of a cycloid, is to the time of the perpendicular descent through the diameter of the generating circle, as the periphery of the circle to the diameter.

If two pendulums move in similar arches, the times of *oscillations* are in a subduplicate ratio of their lengths.

The numbers of isochronal *oscillations*, performed by two pendulums in the same time, are reciprocally as the times wherein the several *oscillations* are performed. See **CLOCK**.

M. Huygens's whole doctrine of *oscillation* is founded on this hypothesis; that the common centre of gravity of several bodies, connected together, must return precisely to the same height whence it fell; whether those weights return conjointly, or whether after their fall, they return separately; each with the velocity it had then acquired. See **CENTRE of Gravity**.

This supposition was opposed by several, and very much suspected by others. And some who inclined to believe it true, yet thought it too daring to be admitted into a science, which demonstrates every thing.

At length M. James Bernoulli demonstrated it by strict geometry; by referring the weights to a lever. After his death, a more easy and natural demonstration of the centre of *oscillation* was advanced by his brother. The substance whereof may be conceived as follows,

A simple pendulum of a determinate length and weight, raised to a determinate height, whence it is to fall till it recover its vertical line, employs in that fall, or demi-vibration, a determinate space of time, which can never possibly be either greater or less. Which time is necessarily such, because the agitative force, *i. e.* the force which produces the motion of the pendulum, is determined in every thing that concurs to the formation thereof: so that it can only cause one certain effect.

The agitative force of the pendulum arises from three things: 1^o. The power or moment of gravity. 2^o. The mass or body tied to the end of the inflexible rod. 3^o. The distance of that body from the point of suspension, or, which is the same, the length of the rod or the pendulum.

Now, 1^o. The power of gravity, be the cause what it will, is that power which makes a body fall, and that, *v. gr.* at the rate of fourteen feet, in the first second of time. It is visible, then, that this force is the effect of a quantity which determines those fourteen feet; and that an heavy body would pass more or less space in that same first second, if the force of gravity were greater or less.

2^o. As that force is inherent in each point, or infinitely small part of a body, the greater this body is, or the larger its mass, the greater quantity of motion or force it has.

3^o. The distance of the moving body from the point of suspension, or the length of the rod, is always the radius of a circle, whereof the moving body describes an arch: and of consequence the greater the radius is, *ceteris paribus*, the larger arch the body describes. And at the same time, the greater height it falls from, the greater velocity it acquires.

Now, the agitative force of the pendulum is only that of the body fastened to the end of the rod. So that it is the product of the force of the weight, of the mass of that body, and of its distance from the point of suspension. The force of gravity therefore being always the same; and a body or weight fastened to the end of the rod, always the same; it is impossible that two simple pendulums of a different length should be isochronal, or should make their vibrations in the same time; for by virtue of those different lengths, the velocities will be unequal, and of consequence, the times of their vibrations will be so.

But if it be supposed, that there are in nature different powers of gravity; it will then be possible that two simple pendulums of different lengths should be isochronal; the one ani-

mated by the natural weight; the other by the imaginary one.

If the imaginary gravity or weight be greater than the natural one, the pendulum imagined isochronal to the natural one, will necessarily describe a larger space or arch in the same time; and of consequence the weight will be fastened at a greater distance from the point of suspension. Though to have an isochronism, the two agitative forces of the two pendulums must be equal; yet of the three things which compose these forces, there are already two greater in the imaginary, than the real pendulum: the third, therefore, *i. e.* the mass or ball, must be diminished in the necessary proportion.

As the space or arch described by the imaginary pendulum is greater than that by the natural pendulum, in the same ratio as the imaginary gravity is greater than the natural one, and a radius of that arch, greater in the same ratio; are two things inseparable: the two gravities will be always to one another, as those two radii, or the two lengths of the two pendulums; which always gives the expression of the imaginary gravity, and by a necessary consequence, that of the diminished mass or ball of the imaginary pendulum. If the power of gravity be imagined less than that of the natural one, it is easy to observe how it is to be taken; but that were needless in our design.

If now there be a compound pendulum, charged with two weights or balls fastened to the same rod; M. Bernoulli conceives each of those weights removed to a greater distance from the point of suspension than it was before; but both to the same; and, diminished in mass, in a due proportion: so as that both together only make one simple pendulum, animated with one weight, the expression whereof is had, and isochronal to the natural compound pendulum.

Thus we shall have one simple natural pendulum isochronal to the compound natural one, by having a simple natural pendulum isochronal to the simple imaginary pendulum before found; which is very easy: since as the imaginary gravity is to the natural, so is the length of the simple imaginary pendulum to the length of the simple natural pendulum; and it is there is the centre of *oscillation* required.

Centre of OSCILLATION, in a suspended body, is a certain point therein, each vibration whereof is performed in the same manner, as if that point or part alone were suspended at that distance from the point of suspension.

Or, it is a point, wherein, if the whole length of a compound pendulum be collected; the several *oscillations* will be performed in the same time as before.

Its distance, therefore, from the point of suspension, is equal to the length of a single pendulum, whose *oscillations* are isochronal with those of the compound one.

OSCITATION, the act popularly called yawning. See **YAWNING**.

OSCUA, in anatomy, a term used for the orifices, or openings of the lesser vessels.

OSCULUM, in the new analysis.—A circle described on the point C, as a centre (*Tab. Analysis, fig. 12.*) with the radius of the evolute MC, is said to *osculate*, kiss, the curve described by evolution, in M; which point M is called by the inventor Huygens, the *osculum of the curve*.

The line BC is also called the *radius of the osculum*.

The evolute MCF is the place of the centres of all the circles that *osculate* the curve AM, described by evolution.

The doctrine of the *oscula of curves* is owing to M. Leibnitz, who first shewed the use of Huygens's evolute in measuring the curvature of curves.

OSCULUM PACIS.—Anciently it was a custom in the church, that in the celebration of mass, after the priest had consecrated the wafer, and spoke the words, *pax domini vobiscum*, the people kissed each other, which was called *osculum pacis*.

When this custom was abrogated, another arose; and while the priests spoke the words, a deacon, or sub-deacon, offered the people an image to kiss; which they called *pacem*.

OSIANDRIANS, a sect among the Lutherans, so called from Andrew Osiander, a celebrated German divine.

Their distinguishing doctrine was, that man is justified formally, not by the faith and apprehension of the justice of Jesus Christ, or the imputation of our Saviour's justice, according to the opinion of Luther and Calvin; but by the essential justice of God.

Semi OSIANDRIANS were such among the *Osiandrians*, as held the opinion of Luther and Calvin with regard to this life; and that of Osiander, with regard to the other: asserting, that man is justified here by imputation, and hereafter by the essential justice of God.

OSSA, in anatomy. See the article **BONE**.

OSSICLE, **OSSICULUM**. *little bone*; a diminutive of *os*, bone.

In which sense the term is frequently used among anatomists.

OST

Botanists also use *officulum* for the stone of a cherry, plum, apricot, or any other stone-fruit.

OSSIFICATION, in the animal economy, the formation of the bones; but more especially, the conversion of parts naturally soft to the hardness and consistency of bones.

Bones, Dr. Drake argues, are formed out of the most comminuted or broken part of the blood; since we see that the blood of old men, which by a long course of circulation, becomes in a manner unfit for the common office of nutrition, will however *effuse*, and convert into bones, many of the tendons and ligaments, and even the coats of the vessels themselves, whose substance being next to the bones the most compact, admits only of the smallest particles of the blood; which therefore soonest become *osseous*, as they are frequently found.

OSTENSIO, a tax antiently paid by merchants, &c. for leave to shew, or expose their goods to show and sale in markets.

OSTENSIVE Demonstrations, such as plainly and directly demonstrate the truth of any proposition.

In which they stand distinguished from *apagogical* ones, or reductions *ad absurdum*, or *ad impossibile*, which prove the truth propoed, by demonstrating the absurdity or impossibility of the contrary.

Offensive demonstrations are of two sorts:—some barely, but directly, prove the thing to be; which they call *direct*.—Others demonstrate the thing from its cause, nature, or essential properties; and these are called in the schools, *indirect*.

OSTEOCOLLA, *ὀστέοκολλα*, in natural history, a white, or ash-coloured sparry substance, shaped like a bone, and by some supposed to have the quality of uniting broken bones; on which account it is ordered in some plaisters. See Supplement, article **OSTEOCOLLA**.

OSTEOCOPOS*, or *ὀστέοκοπος*, is used by some for an acute pain, wherein the patient is affected as if his bones were breaking.

* The word is formed from the Greek *osteo*, bone, and *κοπεῖν*, to break, cut, or cleave.

It arises from a sharp humour vellicating the periosteum, or membrane wherewith the bones are invested.—It is particularly incident to scorbutic and pocky persons.

OSTEOLOGY*, *ὀστέολογία*, that part of anatomy which teaches the nature and fabric of the bones of the human body; their form, disposition, articulation, use, &c.—See *Tab. Anat. P. 1. Osteol.*

* The word is formed from the Greek *osteo*, bone, and *λογος*, discourse.

Dr. Clopton Havers has given us an *osteology* in good repute.

OSTIA, in anatomy, a term used indifferently with *oscula*, *orifices*, &c. for the mouths or apertures of the vessels of the body: as the *ostia vaginæ*, &c.

OSTRACISM*, *ὀστράκισμος*, a kind of popular judgment, or condemnation among the Athenians; being a sentence of banishment against persons whose too great power rendered them suspected to the people; or whose merit and credit gave umbrage, lest they should attempt something against the public liberty, and their power degenerate into tyranny.

* It had the denomination *ostracism*, in regard the people gave their votes, by writing the name of the person to be banished in a shell, by the Greeks called *ὀστράκα*, and casting the shells into an urn.

This kind of banishment had nothing infamous in it, as not being for any crime; but, on the contrary, was held very honourable, as it was a mark of popularity.

It lasted for ten years; but the banished person had the full enjoyment of his estate all the time.

Ostracism was null, unless there were 6000 citizens in the assembly of the people whereby it was enjoined.

OSTRACITIS, *ὀστράκίτις*, in natural history, a kind of crusty stone, hard, and in form of an oyster-shell, and, like that, separable into laminæ; found in several places in Germany; and held of good service in the gravel.

Dr. Home, in the *Philos. Transact.* says, it rather dissolves the little stones than forces them out, as not being remarkably diuretic.

He adds, that he prescribes it in powder, with a third part of flowers chamæmel.

The dose is from half a drachm to a whole one, in white wine. See Supplement, article **OSTRACITES**.

OSTRACITIS is also the name of a kind of cadmia, found at the bottom of furnaces where copper is purified.

It is very heavy, and in structure resembles an oyster-shell; whence its name.

It is esteemed astringent and deterfive; and is an ingredient in several unguents.

OVA

OTACOUS TIC*, a term applied to instruments, which aid or improve the sense of hearing.

* The word is formed from the Greek *ωτός*, ear, and *ακουω*, I hear. See **ACOUSTIC**.

OTALGIA*, *ὀταλγία*, in medicine, denotes a pain in the ear, especially that in the farther parts of the auditory passage.

* The word is formed from the Greek *ωτός*, ear, and *αλγία*, pain.

The *otalgia* usually arises from an inflammation; tho' sometimes from a sharp ferous humour, which vellicates the membrane wherewith the canal of the ear is lined. It is sometimes also occasioned by a wound or ulcer in that part, or by some pungent matter gathered within the ear.

The smoke of tobacco conveyed into the ear through a pipe, Etmuller recommends as good to alluage this pain; as also millepedes in a proper vehicle.

The *otalgia* is said sometimes also to arise from a worm in the ear; which is to be drawn out alive, or killed within.—Warm milk, they say, tempts the worm to come forth; wormwood juice destroys it within.

OTTIOSI, in the Hebrew customs. The learned are exceedingly divided about the *decem otiosi*, ten idle persons spoke of in the Jewish synagogues.

Some say, they were the three presidents, and the seven readers; others, that they were ten persons hired to attend constantly at the synagogue, because, without the number ten, it could be no regular synagogue, or legal assembly; so that the *decem otiosi* were ten idle folks kept in pay, to form, by their presence, a legal synagogue, or quorum.

Vitringa, in his *Archi-Synagoga*, refutes this opinion; and will have the *otiosi* to have been ten directors, or officers in the synagogue.

He shews, that each synagogue had its directors; that the number was greater or less according to the dignity of the synagogue; that the smallest had at least two; that, from the earliest times, each synagogue had its chief, called *archi-synagogus*, who had two colleagues, to be present at the ceremonies, and other acts of religion, and to take care every thing were done with decency; but that the *archi-synagogus* reserved to himself the power of teaching: that besides these three, the *archi-synagogus* named several readers who read in the synagogue every Saturday; and that these made the *decem otiosi* of the synagogue; so called, because being disengaged from all other employment, their whole attendance was on divine service.

OTTER-Hunting. See the article **HUNTING**.

OVA, Eggs, in natural history. See **EGG**.

OVA, in the human anatomy, are little spherical bodies, in form of bladders, or bubbles; consisting each of two concentric membranous, replete with a limpid humour like the white of an egg, found under the external membrane of the ovaries of women, and connected to the minute orifices of the vessels that compose the substance of the ovaries themselves, by a calix.

After the use of venery, the *ova* swell sensibly, become more and more pellucid, their membranes grow thicker, and at length, raise that of the ovary, in form of papillæ; till, at last, breaking the membrane of the ovary, they are detached from their calix, taken into the cavities of the fallopian tubes, and thence conveyed into the womb; where, being cherished and impregnated with the male feed, they commence embryo's; or, for want of that, are again ejected.

OVA, in architecture, are ornaments in form of eggs, carved on the contour of the ovolo, or quarter-round; and separated from each other by anchors, or arrows heads.

The English usually call these ornaments *eggs* and *anchors*.—Instead of eggs, the antients sometimes carved hearts; on which foundation it was, that they introduced arrows; to symbolize with love.

OVAL, *Ellipsis*; an oblong curvilinear figure, with two unequal diameters: or a figure inclosed with a single curve line, imperfectly round, its length being greater than its breadth; like an egg; whence its name.

The proper *oval*, or egg-shape, is an irregular figure, being narrower at one end than the other; in which it differs from an *ellipsis*, which is the mathematical *oval*, and is equally broad at each end.

The common people confound the two together; the geometricians also call the *oval*, a *false ellipsis*.

The method of describing an *oval* chiefly used among workmen, is, by a cord, or string, as E f M (*Tab. Geomet. fig. 48.*) whose length is equal to the greater diameter of the *oval*, and which is fastened by its extremes to two points or nails E, f, planted in its longer diameter; by which means the *oval* is made so much the longer, as the two points or nails are farther apart.

OVAL Column. See the article **COLUMN**.

OVAL Crown. See the article **CROWN**.

OVALE Foramen, in anatomy. See **FORAMEN ovale**.

OVARY, OVARIUM, in anatomy, that part of a female animal wherein the *ova*, or eggs are formed, and lodged. — See *Tab. Anat. (Splanchn.) fig. 11. lit. b. b.*

The ovaries in women are also called *testes muliebres*, female testicles; from their use, which the antients supposed analogous to that of the testicles in men.

They are two in number; lying near the ends of the fallopian tubes, two fingers distance from the uterus, to which they are connected by a strong ligament, called *vas deferens*, and in some measure by the fallopian tubes, and the broad ligament about the region of the ilium.

They are fastened to the peritonæum by the spermatic vessels, by which means they are kept suspended about the same height with the fundus uteri.

Their figure is semi-oval; their surface somewhat uneven; their size different in the different stages of life. At the time of puberty, when largest, they usually weigh about a drachm and half.

They are covered with a common membrane from the peritonæum; their substance is whitish, composed of a number of little thin membranous and slender fibres, interwoven with arteries, veins, and nerves.

Among these fibres and vessels are interspersed a number of little round bodies, like bladders; full of a limpid substance, and called *ova*, or eggs, of great use in generation.

OVATION, OVATIO, in the Roman history, a lesser triumph allowed to commanders, for victories won without the effusion of much blood; or for the defeating of rebels, slaves, pirates, or other unworthy enemies of the republic.

Their entry was on foot; sometimes on horseback; but never in a chariot: and they wore crowns of myrtle, called *ovales*; having all the senate attending in their retinue.

The denomination *ovatio*, according to Servius, is derived from *ovis*, sheep; because the conqueror sacrificed a sheep on this occasion to Jupiter; whereas in the greater triumph they sacrificed a bull.

Others derive it from the found or din of the acclamations and shouts of joy made by the people in honour of the solemnity; the people and soldiery, on this occasion, redoubling the letter O, as in the greater triumph they did the words *Io Triumpho*.

The *ovation* was first introduced in the year of Rome 250, or 251, in honour of the consul Posthumus Tubertus, after his defeating the Sabines.

OWELTY. See the article **OWELTY**.

OVER-FLOWING, or Inundation.

The *over-flowing of lands*, used by our husbandmen, is chiefly effected by diverting the streams of rivers, brooks, land-floods, or springs, or some part of them, out of their natural channel.

When the streams lie too low for this, they are made use of to turn such engines as may raise a sufficient quantity of water to do it.

The most usual engine, on this occasion, is the Persian wheel. See **PERSIAN Wheel**. See also Supplement, article **OVER-FLOWING**.

OVER-RAKE, in the sea-language.—When a ship riding at anchor, so over-beats herself into a head-sea, that she is washed by the waves breaking in upon her; they say, the waves *over-rake* her.

OVER-REACH, in the manage, is when a horse strikes his hind feet against his fore.

The word is also used for a strain, or painful swelling of the master-fine of an horse; occasioned by such *over-reach*.

OVER-RULING an Objection, in law, is the rejecting or setting it aside by the court.

OVER-RUNNING, among printers. See **PRINTING**, and **CORRECTING**.

OVERSAMESSA, an antient fine or penalty, imposed before the statute of hue and cry, on such persons, as hearing of a murder or robbery, did not pursue the malefactor.

OVERT Act*, a term in law, signifying an *open act*; or an act capable of being manifested, and proved.

* The word is formed from the French, *overt*, open.

In which sense it is distinguished from an *intentional act*.

OVERT Pound. See the article **POUND**.

OVERT Word, denotes a plain open word, not to be mistaken.

OUVERTURE, or OUVERTURE, opening, or prelude; a term used for the solemnities at the beginning of a public act, or ceremony; as of an opera, tragedy, concert of music, &c.

The *overture* of the theatre, or scene, is a piece of music, usually ending with a fugue.

The *overture* of the jubilee is a general procession, &c.

OVI Albumen. See the article **ALBUMEN**.

OVICULUM, in the antient architecture, a little *ovum*, or egg.

Some also use the word *oviculum* for *ovulo*.

Baldus will have this to be the Lesbian *aggragal* of Vitruvius.

OVILLA, or Septa, in antient Rome, a place in the Campus Martius, at first railed in, like a sheep's pen; whence its name.

Afterwards it was mounted with marble, and beautified with walks and galleries; as also with a tribunal, or seat of justice.

Within this precinct, or inclosure, the people were called to give their suffrages for the election of magistrates.

The ascent into the *ovilla* was not by stairs, but by pontes, a sort of bridges made for the time; every curia, tribe, and century, as the assembly was centuriate or tributed, &c. having its proper bridge.

Whence the proverb, *de ponte deiciendus*, where a person is to be barred from giving his vote.

OVI PAROUS, in natural history, a term applied to such animals as produce their young, *ab ovo*, from eggs; as birds, insects, &c.

The *oviparus* kind stand in opposition to those which bring forth their young alive, called *viviparus* animals; as, man, quadruped, &c.

Oviparus Animals, may be defined to be such as conceive eggs, which they afterwards bring forth; and from which, by the incubation of the parent, or some other principle of warmth and fermentation, at length arise animals; which, after they have spent the moisture or humour they were surrounded withal, and are grown to a sufficient bulk, firmness, and strength, break their shell, and come forth.

The *oviparus* kind, beside birds, include divers species of terrestrial animals; as, serpents, lizzards, tortoises, crabs, lobsters, frogs, &c.

OUNCE*, **UNCIA**, a little weight, the sixteenth part of a pound avoirdupois; and the twelfth of a pound troy.

* The word is derived from the Latin *uncia*, the twelfth part of any whole, called *as*; particularly in geometrical measures, an inch, or the twelfth part of a foot. See **ISCH**, and **AS**.

The *ounce avoirdupois* is divided into eighth drachms, and the drachm into three scruples.

The *ounce troy* into twenty penny weights, and the penny weight into twenty-four grains.

The *ounce, once*, makes the eight part of the French mark, and is divided into three gros, or drachms; the drachm into three penny weights, or scruples; and the scruple into twenty-four grains: each grain being computed to weigh a grain of wheat.

All precious merchandizes, as gold, silver, silk, &c. are sold by the *ounce*.

OUNCE Pearls are those too small to be sold by tale; usually called *seeds of pearl*, or *seed pearls*.

OUNCE Cottons, are certain cottons brought from Damascus, of a kind and quality superior to the rest. See **COTTON**.

OVOLO, OVUM, in architecture, a round moulding, whose profile, or sweep, in the Ionic and Composite capitals, is usually a quadrant of a circle; whence it is also popularly called the *quarter-round*.

It is usually enriched with sculptures among the antients, in form of chestnut-shells; whence Vitruvius, and others of the antients, call it *echinus*, *chestnut shell*. — See *Tab. Archit. fig. 5. fig. 24. lit. a. m. fig. 28. lit. p. fig. 32. lit. g. fig. 40. lit. c.*

Among us, it is usually cut with the representation of eggs, and anchors, or arrows-heads, placed alternately; whence its Italian name *ovolo*, Latin *ovum*, and French *œuf*, q. d. egg.

OUR Lady. See the article **NOTRE DAME**.

OUR Lady of the Thistle. See the article **THISTLE**.

OURAN, or URAN SOANGUS, the name of an imaginary sect of magicians, in the island Grumbeccanore, in the East-Indies.

The word implies *men-devils*; these people, it seems, having the art of rendering themselves invisible, and passing where they please, and by that means, doing infinite mischief: for which reason the people hate and fear them mortally, and always kill them on the spot, when they can take them.

In the Portuguese history, printed 1581, *folia*, there is mention of a present made by the king of the island, to a Portuguese officer, named Britto, consisting of twelve of these *ourans*; with whom it is pretended he made incursions on the people of Tidore, killed great numbers, &c.

To try whether, in effect, they had the faculty ascribed to them, one of them was tied by the neck with a rope, without any possibility of disengaging himself by natural means: yet, in the morning, it was found he had slipped his collar.

But, that the king of Tidore might not complain, that Britton made war on him with devils: it is said, he dismissed them, at length, into their own island.

OUTSTED *, in our ancient law-books, a being removed, or put out of possession.

* The word is formed from the French, *oster*, to remove, take or away.

OUTSTER *le main*, *amovere manum*, in law, denotes a livery of lands out of the king's hands; or a judgment given for him that traversed or sued a montrans le droit.

When it appeared, upon the matter discussed, that the king had no right or title to the land he had seized; judgment was given in chancery, that the king's hands be removed.—Hereupon, *ouster le main*, or *amoveas manum*, was awarded to the escheator to restore the land, &c.

But now all wardships, liveries, *ouster le mains*, &c. are taken away, and discharged, by statute 12 Car. II.

OUTSTER le mer *, in law, a cause of excuse, or effoign; where a man not appearing in court upon summons, it is alleged, that he is beyond the seas.

* The term is compounded of the old French, *oultre*, and *le mer*, *q. d.* beyond the sea.

OUTER rainbow. See the article RAINBOW.

OUTFANGTHEFE *, a privilege whereby a lord was enabled to call any man dwelling in his fee, but taken for felony in another place, to judgment in his own court.

* The word is formed from the Saxon, *ut*, extra, without; *fang*, *capto*, *vel captus*; and *theof*, thief; *q. d.* *Fur extracaptus*. Spelm.

OUT-LAW, *UTLAGATUS*, one deprived of the benefit of the law; or put out of the king's protection.

Bracton says, an *out-law* forfeits every thing he has; and that, from the time of his *outlawry*, he wears a wolf's head; and any-body may kill him *impune*; especially if he defend himself, or fly.—But, in the beginning of king Edward the Third's reign, it was resolved, by the judges, that it should not be lawful for any man, but the sheriff alone (having lawful warrant, therefore), to put to death a man *out-lawed*.

OUTLAWRY, or *UTLAWRY*, *UTLAGARIA*, the punishment of him who, being called into law, and lawfully fought, does (after an original writ, and three writs of *capias*, alias & pluries, returned by the sheriff with a *pon est inventus*, and an exigent with a proclamation awarded thereupon) contemptuously refuse to appear.

He must also be called at five county court-days, a month between each one; and, if he appear not in that time, *pro ex-lege tenebitur*, *cum principi non obediit, nec legi*, &c. *extunc exlegabitur*; i. e. he shall be pronounced to be out of the king's protection, and deprived of the benefit of the law. The effect of which is, if he be *out-lawed* at the suit of another, in a civil cause, he shall forfeit all his goods and chattels to the king; and if on felony, all his lands and tenements, which he has in fee, or for life; and all his goods and chattels.—And then, according to Bracton, he may perish without law, &c.

A minor, or a woman, cannot be *out-lawed*.—A woman is said to be waived, where a man is *out-lawed*. See WAIVE.

Clerk of the OUTLAWRIES. See the article CLERK.

OUT-PARTERS, in our ancient writers, were a sort of thieves, or highwaymen, on the frontiers of Scotland, who rode about to fetch in such things as they could lay hold on.

OUT-RIDERS are bailiffs errant, employed by sheriffs, or their deputies, to summon people in the remotest parts of their hundreds to the county or hundred-courts.

OUTWARD flanking angle. See ANGLE.

OUT-WORKS, in fortification, all those works made without the ditch of a fortified place, to cover and defend it.

Outworks, called also *advanced* and *detached works*, are those which not only serve to cover the body of the place, but also to keep the enemy at a distance, and prevent his taking advantage of the cavities and elevations usually found in the places about the counter-carp; which might serve them either as lodgments, or as *rideaux* to facilitate the carrying on their trenches, and planting their batteries against the place.—Such are ravelins, tenailles, horn-works, queue d'arondes, envelopes, crown-works. The most usual of these are ravelins, or half-moons, formed between the two bastions, on the flanking angle of the counter-carp, and before the curtain, to cover the gates and bridges.

VOL. II.

OUVERTURE. See the article OVERTURE.

OVUM *Philosophicum*, or *Chymicum*, is a glass body, of an oval form, resembling an egg; used for the sublimation of mercury.

OWELTY, or *OWELTY of services*, in our law-books, an equality of services; as when the tenant paravail owes as much to the mesn, as the mesn does to the lord paramount.

OWLER, a master of a ship, or other person, who conveys wool, or other prohibited goods, in the night, to the sea-side, in order to ship them off, contrary to law.

The name is derived hence, that, like *owls*, they only stir abroad in the night-time.

OWSE, among tanners, is oaken bark, beaten or ground small; to serve in the preparation of leather.

OXGANG *, or *OXGATE of Land*, is ordinarily taken, in our old law-books, for fifteen acres; being as much land as it is supposed one ox can plow in a year.

* *Bovata terra*, *q. d.* *quantum sufficit ad iter vel actum unius bovis*.

In Lincolnshire they still corruptly call it *oskin* of land.

OX-SPAVIN. See the article SPAVIN.

OXYCRATE *, *OXYCRATUM*, in pharmacy, &c. a mixture of water and vinegar.

* The word is Greek, *οξύκρατος*, formed of *οξύς*, sharp, four, and *κρατος*, I mix.

The usual proportion is one spoonful of vinegar to five or six of water.

Oxycrate is proper to assuage, cool, and refresh.—They make fomentations of *oxycrate*, clysters of *oxycrate*, &c.

OXYCROCEUM *, in pharmacy, a preparation much used in plaisters for fractures, and to form callus's; composed chiefly of saffron, with gums dissolved in vinegar.

* The word is formed from the Greek, *οξύς*, sharp, four, and *κροκε*, saffron.

OXYGALA *, *Οξύγαλα*, four milk.

* The word is formed from the Greek, *οξύς*, sharp, four, and *γαλα*, milk.

The Turks use this as a popular drink, and call it *igur*.—

Vigenere says, they drink four milk diluted with water; which is found to cool and nourish much better than the milk alone.

OXYGONIUS, *OXYGONOUS*, in geometry, *acute-angled*; a figure consisting wholly of acute angles, or angles less than 90 degrees.

The word is chiefly applied to triangles, where the three angles are all acute, or less than 90 degrees each.

OXYMEL *, *Οξύμηλι*, in pharmacy, a mixture of honey and vinegar, boiled to the consistence of a syrup.

* The word is formed from the Greek, *οξύς*, four, and *μηλι*, mel, honey.

There are two kinds of *oxymel*; the one *simple*, the other *compound*.

Simple OXYMEL is composed of two parts of good honey, and one of white-wine vinegar, boiled into the consistence of a syrup; it is proper to incise and scour any phlegm adhering to the throat and breast.

Compound OXYMEL only differs from the *simple*, in that to the honey and vinegar they add the decoction of the five greater opening roots, with the seeds of smallage, parslcy, and fennel. It is used to open obstructions of the liver and spleen.

OXYREGMIA *, *Οξύρεγμια*, in medicine, a fourness of the stomach-liquor, occasioning acid belches.

* The word is formed from *οξύς* and *ρεγυω*, *τιβο*. See RUC-TATION.

OXYRRHODON *, *OXYRRHODINUM*, a mixture of two parts of oil of roses, and one part of vinegar, stirred together for some time.

* The word is composed of the Greek *οξύς*, four, and *ροδον*, rose.

To these are sometimes added distilled waters.—It is used for inflammations, and to dry up tetter.

Scultetus prescribes it as follows: two whites of eggs beaten, one ounce and half of vinegar of roses, four ounces of rose-water, and two ounces of oil of roses.

OXYSACCHARUM *, *Οξύσακχαρον*, a liquid medicine composed of sugar and vinegar.

* The word is compounded of *οξύς*, four, and *σακχαρον*, sugar.

The name is more peculiarly given to a syrup prepared with vinegar, the juice of four pomegranates, and sugar; used to cool, refresh, and resist the malignity of peccant humours.

OYER, seems to have been antiently used for what we call *assises*. See ASSISE.

OYE

OYER and terminer *, a commission directed to the judges and other gentlemen of the county to which it is issued, by virtue whereof they are impowered to hear and determine treasons, and all manner of felonies and trespasses.

* The term is French, and literally denotes to hear and determine.—In our statutes it is sometimes wrote *oyer and terminer*.

It is the first and largest of the five commissions by which our judges of assize do sit, in their several circuits.

Antiently it was only in use upon some sudden outrage or infurrection, in any place.

OYER de record is a petition made in court, praying that the judges, for better proof-fake, will be pleased to hear, or look upon any record.

In the like sense a Person may demand *oyer* of a bond, deed, covenant, or the like.

O YES, a corruption of the French, *oyez*, hear ye; being

OZE

a term, or formula, whereby the criers in our courts injoin silence, or attention, ere they make proclamation of any thing.

OZENA *, in medicine, a putrid and stinking ulcer, in one or both nostrils; wherein the humour is very acrid, or corrosive, fanious, and sometimes mixed with a bloody mucus.

* The word is Greek, *ὄζις*, which signifies the same thing.

It sometimes proceeds from neglected or ill-managed wounds, contusions, &c. in the nostrils; especially in scorbutic, scrophulous, or venereal habits; and sometimes follows the small-pox.

It often spreads and eats through the alæ; and at other times preys into the septum nali, cartilage, and os palati; especially in venereal cases. Whence the great danger of the nose in that distemper.



P.

P A C

P, A consonant, and the fifteenth letter in the English Alphabet.

When the *P* is followed with an *H* in the same word, it has the sound of an *F*; thus *Philosophy* is pronounced *Filosophy*.

P and *B* are so like each other, that Quintilian declares, that in the word *obtinuit*, his reason required him to put a *b*, but that his ears could hear nothing but a *p*, *optinuit*: hence in ancient inscriptions and old glossaries, it appears, that these two letters have been often confounded.

Several nations still pronounce one for the other, the Germans particularly, who say *ponum vinum*, for *bonum vinum*.

Plutarch observes, it was usual for those of Delphos to say *Batani* for *patani*, *Batani* for *patani*; and among the Latins, as often as an *s* followed, the *b* was changed into a *p*, as *scribo*, *scripsi*.

P, in the Italian music, frequently represents *piano*; which is what in our music we call *soft*, i. e. the force of voice or instrument is to be diminished, so as to make a kind of echo.

P P signifies *piu piano*, i. e. more soft, or a second echo weaker or more remote than the former: and *P P P* signifies *piuissimo* softest of all, or a third echo, the voice being, as it were, lost in the air.

P M, among astronomers, is frequently used for *post meridiem*, or afternoon; and sometimes for *post mane*, after the morning, i. e. after midnight.

P was also used among the ancients as a numeral letter, signifying the same with the *G*, viz. an hundred; according to the verse of Ugutio.

P similem cum *G* numerum monstratur habere.

Though Baronius thinks it rather stood for seven—See what has been observed, with respect to these numeral letters in general, under the letter *A*.

When a dash was added a-top of *P*, it stood for four hundred thousand.

St. Jerome observes, on Daniel, that the Hebrews had no *P*; but that the *ph* served them instead thereof: adding, that there is but one word in the whole bible read with a *P*, viz. *apadna*.

P, in medicinal prescription, is used for *Pugil*, or the eighth part of a handful.

PÆ signifies *partes aequales*, equal parts of any ingredients: otherwise denoted by *a* or *ana*.

P P signify *pulvis patrum*, i. e. Jesuit's powder, or the cortex peruvianus in powder, which is so called, because first brought into Europe by those fathers.

PABULUM is sometime used among naturalists for fewel; or that part in combustible bodies, which the fire immediately feeds on or is supported by.

The oily or sulphurous part of fuels is the only proper *pabulum*. It is that alone wherein fire can inhere.

PACALIA, a feast held among the ancient Romans, in honour of the goddess *Pax*, peace.

Alnhelmus, *de Laud Virgin.* speaking of the impure festivals and ceremonies of the heathens, calls one of them *pacalia*; which passage Gronovius charges as faulty, alledging, that there was no feast of that name, but that it should have been *Pacalia*, or perhaps *Pahilia*.

The ancients, who personified, and even deified every thing, were not forgetful of peace: she had an altar at Rome, and a stately temple; and religious Rites were paid her with great solemnity.

PACE, *Passus*, *Step*; a measure taken from the space between the two feet of a man in walking.

The ordinary *Pace* of a man is two foot and a half; though many reckon it a yard: the *geometrical* or *German Pace*, called also the *greater Pace*, is five feet.

The ancient Roman and modern Italic mile consists of a thousand *Paces*, *mille passus*. The French league is 3000 *Paces*, and the German 4000.

PACE, in the manage, is a certain manner of motion, or progression of a horse.

The natural paces of a horse are three, viz. the walk, trot and gallop: to which may be added an amble; because some horses have it naturally. See under each its proper article, *TROT*, *GALLOP*, &c.

For the artificial paces, see the article *ARRS*.

Horses that mix their *Paces*, i. e. shuffle betwixt a walk and amble, &c. are seldom of any value. The defect proceeds from their restless, fiery temper: and sometimes from a weakness either in their reins or legs.

PACE is more particularly understood of that easy low motion wherein the horse raises the two feet of the same side at a time; called also *amble*. See *AMBLE*.

P A D

PACIFIC, peaceful, or free from troubles, tumults, &c.

Geographers call the South Sea, *mare pacificum*, the *pacifique ocean*; as being less infested with storms than the Atlantic. M. Frezier affirms, it does not deserve that appellation; and that he has seen as violent tempests therein as in any other sea: but Magellan happening to have a very favourable wind, and not meeting with any thing to ruffle him, when he first traversed this vast ocean in 1520, gave it the name which it has retained ever since. Maty, however, adds, that the wind is so regular there, that the vessels would frequently go from Acapulco to the Philippine Islands, without shifting a sail.

PACIFIC Letters, *Litteræ PACIFICÆ*, in the ancient church, was a denomination given to all sorts of letters testimonial, given by the bishop or chorepiscopus to their priests, when they had occasion to travel abroad; certifying that the bearer was a catholic, and in communion with the church.

The life of pope Sixtus I. taken from the pontifical of pope Damasus, mentions that pope as the first who introduced those letters called *Formatae*, *Canonicae*, *Commendatitiae*, *Communicatorie*, *Ecclesiasticae*, & *Pacificæ*.

PACIFICATION, the act of restoring or re-establishing the public peace, and tranquillity.

The word is particularly appropriated to the periods put to the religious broils raised in France, in the year 1562, by the edict of Nantz; and the civil commotions, between the English and Scots, ended in 1638.

PACIFICATOR is commonly understood in the same sense with *Mediator*, viz. one who endeavours to reconcile princes, or powers at variance.

Wicquefort makes a difference between *Mediator*, and *Pacificator*.—The peace being concluded between France and England, in 1621. the instruments on each side were put in the hands of certain ambassadors, who had been employed as *Pacificators*, not as *Mediators*; to be kept till such time as the ratifications had been exchanged.—So the archbishop of Pisa, the duke of Tuscany's ambassador at Madrid, was never esteemed a *Mediator*, though the French ambassadors allowed him to be present at the conferences held with the commissioners of Spain, to act as a *Pacificator* of the differences between them. The grand duke had not offered his mediation; nor would France have accepted it. Wicquefort, p. 2. §. 11.

PACK in commerce.—A **PACK** of wool is a horse's load; containing 17 stone and 2 pound; or 240 pound weight. See *WOOL*.

PACT*, **PACTUM**, or **PACTION** in law, a covenant or convention between two or more parties.

* Ulpian derives the word from the Latin verb *pacisci*, to bargain, agree, contract: Others with more probability, from *paco*, I appease or pacify; or from *pango*, I fix, establish.

The civil lawyers after Ulpian, define the word *Pacti* the consent of two or more parties to the same thing.—*Durum aut plurium in idem consensum*. L. III. §. 2. ff. de *pactis*.

There are two species of conventions, viz. the *Pacti* and *Contracti*. A *Pacti* against good manners, against public or natural equity is null.—'Tis a maxim in law, *ex nudo pacto non oritur lex*.

PACTA Conventa, in Poland are the articles agreed on between the king and the republic; and which they mutually oblige each other to observe.

PADDOCK, or **PADDOCK-Course**, a piece of ground, conveniently taken out of a park, ordinarily a mile long, and a quarter of a mile broad, encompassed with pales, or a wall, for the exhibiting of races with greyhounds for wagers, plates, or the like.

At one end of the *Paddock* is a little house, where the dogs are to be entered; and whence they are slipped; near which are pens to enclose two or three deer for the sport.

The deer, when turned loose, run all along by the pale; and the spectators are placed on the other side.

Along the course are several posts, viz. the law-post, 160 yards from the dog-house and pens; the quarter of a mile post, half mile post, and pinching-post; beside the ditch, a place made to receive the deer, and preserve them from further pursuit.

Near the ditch, are placed judges or triers. The keeper, to slip the dogs fairly, puts a falling collar upon each, to slip through a ring; and the deer being turned loose and put forward by a teaser, as soon as it is arrived at the law-post, the dog-house door is thrown open, and the dogs slipped.

If now the deer swerve so much, as that his head is judged nearer the dog-house than the ditch, before he arrive at the pinching-post; it is no match; but must be run over again three days after. If there be no such swerve, but the deer

runs strait as far as the pinching-post; then the dog nearest him, if he chance to swerve afterwards, or by any accident, be blanched; or if there be no such swerve, &c. the dog that leaps the ditch first, wins the match.

PADUAN, among medalists, a modern medal made in imitation of the antique; or a new medal struck with all the marks and characters of antiquity.

The name is taken from *Paduan*, *Paduanus*, a famous Italian painter, who succeeded so well in the imposture, it may be so called, that the best judges are at a loss to distinguish his medals from the genuine ones.

This *Paduan* was thus called from the place of his birth, Padua; his proper name was Giovanni Cavino; others say, Lewis Lee; he flourished in the XVIIth century.—Goethe Rink adds that he had an associate in this forgery, called Alexander Bassianus.—His son Octavian, though born at Rome, was also called the *Paduan*.

PADUAN is, properly, applicable to those medals only, which are struck on the matrices of the elder *Paduan*; which are still preserved.—Though it is frequently used in the general for all medals of this kind.

Joubert observes, that there have been a *Paduan* and *Parmesan* in Italy, and a *Cartoon* in Holland, who had the knack of imitating the antique in perfection. The *Parmesan* was Laurentius Parmesanus. We may also add another Italian who excelled in this way, viz. Valerius Bellus Vicentinus, but his medals are not so common as those of the rest.

PÆAN *, Παιων, in antiquity, a hymn in honour of Apollo, or some other of the gods; chiefly used on occasion of victory, and triumph.

* *Pæan* derives the word παῖς τινος, *ferire*, to smite, shoot: but Herichius rather takes Apollo to have been denominated *Pæan* from πᾶναι, διακρίνου, I heal, in allusion to his being the deity of Medicine.

The *Pæan* took its name from Apollo himself, who was denominated *Pæan*, because in his combat with the serpent Python, his mother Latona encouraged him to make use of his arrows, by crying frequently in *παι, in παι*, do boy, bravely boy.

PÆAN or **PÆON** is also the name of a foot in the ancient poetry; so called, as commonly supposed, because appropriated to the hymn *Pæan*; though Quintilian derives the name from its inventor *Pæon*, a physician.

The *Pæon* consists of four syllables, one of which is long, and the rest short.

PEDO-BAPTISM *, infant-baptism, or that conferred on children. See **BAPTISM**.

* The word is a compound of the Greek παις, παιδς, infant, and βαπτισμός, baptism.

PAGAN, **PAGANUS**, a heathen, gentile, or idolater; one who adores false gods.

Baronius derives the word *Paganus*, a *Pagis*, villages, because, when the Christians became masters of the cities, the heathens were obliged by the edicts of Constantine and his sons, to go and live in the country villages, &c.—Salmastius will have the word come from *Pagus*, considered as originally signifying *Gens* or nation: whence, he observes, we say indifferently *Pagans* or *Gentiles*.

The Abbot de Fleury gives another origin of *Pagan*: he observes that the emperor Constantine going from Antioch against Maxentius in 350, assembled all his troops, and advised such as had not received baptism to receive it immediately; declaring withal, that such as should be found unbaptized should quit the service, and go home.

Hence, perhaps, says the abbot, the name *Pagan* might be given to those who chose the latter: the Latin word, *Paganus*, properly signifying a person who does not bear arms: in opposition to *miles*, a soldier.

And hence it might, in time, extend to all heathens.—Or, continues he, the word might come from *Pagus*, village, in regard the peasants were those who stuck longest to the idolatry of the heathens.

PAGANALIA, an ancient rural feast, thus called, because celebrated in the villages, in *Pagis*.

In the *Paganalia*, the peasants went in solemn procession all around the village, making lustrations to purify it. They had also their sacrifices, wherein they offered cakes on the altars of the gods.

Halicarnæssus and St. Jerom refer the institution of the *Paganalia* to Servius Tullus. They were held in the month of February.

PAGANISM, the religious worship and discipline of *Pagans*; or the adoration of idols and false gods.

The gods of *Paganism* were either men, as Jupiter, Hercules, Bacchus, &c. or fictitious persons, as victory, fame, fever, &c. or beasts, as in Egypt, crocodiles, cats, &c. or finally inanimate things, as onions, fire, and water, &c.

PAGARCHUS *, Παρχης, among the ancients, a petty magistrate of a *Pagus*, or little district, in the country.

* The word is formed from *Pagus*, village, and αρχη, command.

PAGE *, a youth of state, retained in the family of a prince or great personage, as an honourable servant to attend in visits of ceremony, do messenges, bear up trains, robes, &c. and at

the same time to have a genteel education, and learn his exercises.

* The word seems formed from the Greek, παις, child, boy.

The *Pages* in the king's household are various, and have various provinces assigned them: as *Pages* of honour, *Pages* of the presence-chamber, *Pages* of the back-stairs, &c.

Pages were anciently distinguished from the other servants in livery, by their wearing drawers in lieu of breeches; and sleeves turned up with velvet.

Cujas and Gothofred observe, that pages in the emperor's families, were called *Pædagogiani Pueri*. Fauchet says, the word *Page*, was first given to the little boys who attend tilers to bring them their tiles, &c. That till the time of Charles VI. or VII. the name was common to the basest servants; and it is since then, that *Page* is become a term of honour; and the meaner servants are distinguished from them by the names of lacqueys, valets, &c.

PAGE is particularly used in the Turkish seraglio, for the children of tribute, or slaves who wait on the grand signor.

They are commanded by the first *Aga*; and constitute four classes, called *Od's*.

PAGE of a Book. See the article **PRINTING**.

PAGEANT, a triumphant car, chariot, arch, or other the like pompous decoration, variously adorned with colours, flags, &c. carried about in public shows, processions, &c.

PAGOD, a name which the Portuguese have given to all the temples of the Indians, and all the idolaters of the East.

The *Pagods* of the Chinese and Siamese are exceedingly magnificent. Among others, there is one at Golconda, whose nich, that they pray in, consists of a single stone, of such prodigious bulk, that they were five years in bringing it to the place: 600 men being constantly employed at it all that time; and the machine that brought it, drawn by 1400 oxen.

The revenues of the *Pagod* of Janigrade are so great, as to subsist, every day, from fifteen to twenty thousand pilgrims.

PAGON is also used for the idol adored in the temple.

Hence many give the name *Pagode* to those little porcelain images brought from China.

PAGON is also the name of a gold coin current in several parts of the Indies; on the footing of the piece of eight.

The English coin *Pagods* at fort St. George, and the Dutch at Palicate.

There are also silver *Pagods* struck at Narsingua, Bijnagar, &c. which usually bear the figure of some monstrous idol; whence their names. They are of various values.

PAIN, an uneasy sensation, arising from a sudden and violent solution of continuity or other accident in the nerves, membranes, vessels, muscles, &c. of the body.

Pain, according to some, consists in a motion of the organs of sense; and according to others, it is an emotion of the soul, occasioned by those organs.

If it be enquired what it is occasions the *Pain* of a puncture? one may answer, that the puncture cannot separate the fibres of the flesh, without shaking the nerves which proceed thence to the brain. If it be further asked, why we feel pain upon a shaking of that part of the brain? we are at a stand, there being no necessary connection between convulsions of the brain, and the sensation of pain wherewith the soul is affected.

To account, therefore, for *Pain*; F. Malebranche observes, we must have recourse to a superior being, who forms an arbitrary connection between the shakes of the brain, and the sensation of pain.

From the physical definition of *Pain*, it follows that whatever may distract or separate the parts of the nerves or membranes from one another may cause *Pain*; but there is nothing in the compass of nature which may not do that, with whatever figures and properties it be endued: for since somewhat may always be applied, or added to any other body, such body may at length encrease into a bulk too big to flow through a canal of a given diameter, and will therefore require more room: wherefore, while the sides of a canal are thrust outward beyond what they used to be, that is, while the parts composing those sides, before contiguous, become loosened and moved away from one another; if that body strike upon those sides with a brisk impetus, and that impetus be continually renewed, the solution will be considerable, or the nitis towards a solution violent; that is, there will be *Pain*.—Wherefore the constituent parts of fluids being sufficiently augmented in dimension, and propelled with a continually repeated impetus against any canal of our body, may occasion that solution, in which consists the essence of *Pain*.

For it comes to the same thing, whether some parts be added to a body; or the parts of that body be, by any cause whatsoever, separated to so great an interval near the sides of a canal, as to constitute a dimension equal to that which would arise from the addition of a new part; for the bulk may so far increase both ways, as that the natural capacity of the canal shall not be big enough to contain it, without some violent dilatation, and a distraction of the fibres it is composed of: and consequently *Pain* must ensue.

Farther,

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Farther, as there may be always somewhat added to another body; so from any body may somewhat be always taken away; a body so diminished in dimension, and impelled with a considerable impetus will break through the interstices of the fibres, where it is less than the capacity of such interstices, and is moved obliquely: and because the superficies of the fibres are not wont to be contained under geometrical right lines, but to have particles standing out and prominent, these it divides from one another. And thus any body, of whatsoever figure, may occasion in us *Pain*, so it be big enough to distend the vessels beyond their wonted Measure, or small enough to enter the pores in the sides of a canal, with an impetus in the manner intimated.

And what is thus advanced, with relation to things within the vessels, may be easily applied to others out of the vessels.

PAIN, in medicine, considered as a symptom of a disease, makes a considerable article in a palliative cure.

Pain is mitigated, or assuaged divers ways; as 1. by diluting and softening acrimonies, with warm water mixed with flower applied by way of drink, fomentation, clyster, or bath. 2. By resolving and washing away obstructions, by the same means and solvents. 3. By relaxing the nervous vessels, with drinks, fomentations, baths, relaxants, anodynes, and aperients. 4. By correcting the acrimony itself with proper remedies. 5. By freeing the obstructed, obstructed, and acrimonious parts from the too great pressure of the vital humour; and by softening, and suppurating, and depurating them. 6. By rebating or deadening the sense by narcotics, either internally or externally.

PAINE *fort, & dure*, in law, an especial punishment for one, who being arraigned of felony, refuses to put himself upon the ordinary trial of God and his country, and thereby stands mute by the interpretation of law.

This is vulgarly called *pressing to death*.—The process whereof is thus prescribed.

“He shall be sent back to the prison, whence he came, and be laid in some low dark room, where he shall lie naked on the earth, without any litter, rushes, or other clothing, and without any raiment about him, but only something to cover his privy-members; and he shall lie upon his back with his head covered, and his feet; and one arm shall be drawn to one quarter of the room, with a cord, and the other arm to another quarter, and his legs in the same manner; then let there be laid upon his body iron, or stone, as much as he may bear, or more; and the next day following, he shall have three morsels of barley-bread without drink; and the second day he shall have drink three times, as much as at each time as he can drink, of the water next unto the prison, except it be running water, without any bread: and this shall be his diet, till he dies.”

PAINIM the same with Pagans. See **PAGAN**.

PAINTING, *PICTURA*, the art of representing natural bodies, and even giving them an appearance of life by the duct or draught of lines, and the degrees of colours.

Painting is said to have had its rise among the Egyptians: and the Greeks, who learned it of them, carried it to its perfection; if we may believe the stories related of their Apelles, and Zeuxis.

The Romans were not without considerable masters in this art, in the latter times of the republic, and under the first emperors; but the Inundation of Barbarians who ruined Italy, proved fatal to *Painting*, and almost reduced it to its first elements. It was in Italy, however, that the art afterwards returned to its ancient honour, and in the beginning of the XVth century; when Cimabue, betaking himself to the pencil, translated the poor remains of the art from a Greek painter or two, into his own country.

He was seconded by some Florentines: the first who got any reputation was Ghirlandai, Michael Angelo's master; Pietro Perugino, Raphael Urbin's master; and Andrea Verocchio, Leonardo Da Vinci's master.

But these scholars vastly surpassed the masters; they not only effaced all that had been done before them, but carried *Painting* to a pitch from which it has ever since been declining.

It was not by their own noble works alone that they advanced *Painting*, but by the number of pupils they bred up, and the schools they formed.

Angelo, in particular, founded the school of Florence; Raphael, the school of Rome; and Leonardo, the school of Milan; to which must be added, the Lombard school, established about the same time, and which became very considerable under Giorgione and Titian.

Besides the Italian masters, there were other very great ones on this side the Alps, who had no communication with those of Italy, such were Albert Durer, in Germany; Holbeins, in Switzerland; Lucas in Holland; and others in France and Flanders; but Italy, and particularly Rome, was the place where the art was practised with the greatest success; and where from time to time, the greatest masters were produced.

To Raphael's school, succeeded that of the Caraccios, which has lasted, in its scholars, almost to the present time; wherein

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the French Painters, by the Munificence of the late Louis XIV. seem almost in a condition to vie with those of Greece or Italy. In Paris they have two considerable bodies of painters, the one, the *Royal Academy of Painting and Sculpture*; the other, the *Community of Masters in Painting, Sculpture, &c.*

The art of *Painting* is divided, by Freinoy, into three principal parts; invention, designing, and colouring; to which some add a fourth, *viz.* disposition.—Felibien divides *Painting* into composition, designing, and colouring.

M. Testlin, painter to the late king, divides it, somewhat more accurately, into the design or draught, the proportion, the expression, the clair-obscur, the ordonnance, and the colouring; to which his English translator adds the perspective. Under each of these heads, he gives us the rules and sentiments of the best masters; which see under their proper articles in this dictionary, **DESIGN**, **PROPORTION**, **EXPRESSION**, **CLAIR-OBSCUR**, **ORDONNANCE**, **COLOURING**, &c.

Painting is of various kinds, with regard to the materials used; the matter whereon they are applied; and the manner of applying them.—Hence we distinguish *Painting* in oil; *Painting* in water-colours, or Limning; *Painting* in fresco; *Painting* on glass; *Painting* in enamel; and *Painting* in miniature.

PAINTING in Oil. The art of *Painting* in oil was unknown to the ancients; and it was a Flemish Painter, one John van Eyck, or John de Bruges, who first discovered, and put it in practice in the beginning of the XIVth century; till him, all the painters wrought in fresco, or in water-colours.

This was an invention of the utmost advantage to the art; since, by means hereof, the colours of a painting are preserved much longer and better, and receive a lustre and sweetness which the ancients could never attain to, what varnish soever they made use of to cover their pieces.

The whole secret only consists in grinding the colours with nut-oil or linseed-oil; but it must be owned, the manner of working is very different from that in fresco, or in water; by reason the oil does not dry near so fast; which gives the painter an opportunity of touching and retouching all the parts of his figures, as often as he pleases: which, in the other kinds, is a thing impracticable.

The figures too are here capable of more force and boldness; inasmuch as the black becomes blacker, when ground with oil than with water; besides that, all the colours, mixing better together, make the colouring sweeter, and more delicate and agreeable, and give an union and tenderness to the whole work, inimitable in any of the other manners.

Painting in Oil is performed on walls, on wood, canvas, stones, and all sorts of metals.

To PAINT on a Wall.—When well dry, they give it two or three washes with boiling oil, till the plaster remain quite greasy, and will imbibe no more. Over this they apply delicate or drying colours, *viz.* white chalk, red oker, or other chalks beaten pretty stiff. This layer being well dry'd, they sketch out, and design their subject on it, and at last paint it over; mixing a little varnish with their colours, to save the varnishing afterwards.

Others, to fortify their wall better against moisture, cover it with a plaster of lime, marble-dust, or a cement made of beaten tiles soaked with linseed-oil; and at last prepare a composition of Greek pitch, mastic, and thick varnish boiled together, which they apply hot over the former plaster; and when dry, they lay on the colours as before.

Others, in fine, make their plaster with lime-mortar, tile-cement, and sand; and this being dry, they apply another of lime, cement, and iron scoriae; which being well beaten, and incorporated with whites of eggs and linseed oil, makes an excellent plaster. When this is dry, the colours are applied as before.

To PAINT on Wood.—They usually give their ground a layer of white tempered with size; or they apply the oil above-mentioned; the rest is done as in *Painting* on walls.

To PAINT on Cloth or Canvas.—The canvas being stretched on a frame, they give it a layer of size, or paste-water; and when dry, they go over it with a pumice-stone, to smooth off the knots. By means of the size the little threads and hairs are all laid close on the cloth, and the little holes stopped up, so that no colour can pass through.

When the cloth is dry, they lay on oker in oil, which is a natural earth, and bears a body; sometimes mixing with it a little white lead to make it dry the sooner. When dry, they go over it again with the pumice-stone, to make it smooth.

After this, they sometimes add a second layer composed of white lead and a little charcoal black, to render the ground of an ash-colour; observing in each manner to lay on as little colour as possible; that the cloth may not break, and that the colours when they come to be painted over, may preserve the better.

In some *Paintings* of Titian and Paolo Veronese, we find they made their ground with water, and painted over it with oil; which contributed much to the vivacity and freshness of their works: for the water ground, by imbibing the oil of the colours,

colours, leaves them the more beautiful; the oil it self taking away a deal of their vivacity.

As little oil therefore is to be used as possible, if it be desired to have the colours keep fresh: for this reason some mix them with oil of spike, which evaporates immediately, yet serves to make them manageable with the pencil.

To PAINT on Stones or Metals, it is not necessary to apply size, as on cloth; it suffices to add a slight layer of colours, before you draw your design; nor even is this done, on stones where it is desired the ground should appear, as on certain marbles and agates of extraordinary colours. All the colours used in fresco are good in oil, except white of lime and marble-dust.

Those chiefly used are white lead or cerufs, yellow and white masticot, orpiment, black lead, cinnabar or vermillion, lacca, blue and green ashes, indigo, lamp-black, burnt ivory, and verdigrease, &c. See the preparation, &c. of each under its proper article, CERUSS, ORPIMENT, VERMILLION, LACCA, INDIGO, &c.

As to oils, the best are those of walnuts, linseed, spike, and turpentine. The delicate or drying oils, are a nut oil boiled with litharge and sandarach, or otherwise with spirit of wine, mastic and gum-lacca.

To have a varnish that shall dry readily, they mix spirit of wine with turpentine. See VARNISH.

PAINTING in Water-Colours. See LIMNING.

PAINTING in Fresco. See FRESCO.

PAINTING in Miniature. See MINIATURE.

PAINTING on Glass. See GLASS.

PAINTING in Enamel. See ENAMEL.

PAINTING in Mosaic. See MOSAIC-WORK.

PAIR, PAR, a collective Term, used for two equal or similar things ordinarily joined together; though more frequently for artificial things, than for natural ones. As, a Pair of gloves, of stockings, of shoes, &c.

PAIR is also used in compound things, for two parts alike to each other, though they only make one whole.—As, a Pair of Scissars, &c.

PAIR is also used for a set, or system of several things joined to make another complete,—as a Pair of bagpipes, &c.

PAIR, again, is used by extension, for a thing that is single, as, a Pair of tables, &c.

PAIR, PAR, in anatomy, denotes an assemblage or conjugation of two nerves, which have their origin together in the brain or spinal marrow; and are thence distributed into the several parts of the body, one on the one side, and the other on the other.

Thus we say, the first Pair, second Pair, &c. the Par vagum, Par quintum, &c. sometimes the olfactory Pair, ophthalmic Pair, &c.

PALACE, PALATIUM, a name generally given to the dwelling-houses of kings and princes.

Procopius derives the word from a Grecian called Pallas, who gave his own name to a magnificent house he had built; adding, that Augustus after him, gave the Name Palatium to the house of the Roman emperors on the hill which for that reason was called the Palatine mount. — Others take it the contrary way; and say that Romulus's house, wherein Augustus lived, was properly called Palatium, because situate on the Palatine mount. Be this as it will, it is certain, Palatium, from a proper name, in time, became common to all houses of kings.

And as the kings usually heard and determined causes in their houses, in what part of the realm soever they were situate; hence also Palatium became a name for a court of justice, which usage is still retained, especially in France.

In course of time the name Palace has also been applied to the houses of other persons; taking different epithets, according to the quality of the inhabitants; as imperial Palace, royal Palace, pontifical, cardinal, episcopal, ducal Palace, &c.

PALÆSTRA, παλαίστρα, among the ancient Greeks, a public building, where the youth exercised themselves in wrestling, running, playing at quoits, &c.

Some say, the Palæstra consisted both of a college, and an academy; the one for exercises of the mind, the other for those of the body. But most authors rather take Palæstra to be a Xyftus, or mere academy for bodily exercises, according to the etymology of the word, which comes from παλᾶν, wrestling, one of the chief exercises among the ancients.

The length of the Palæstra was marked out by stadia, each equal to 125 geometrical paces; and hence the name Stadium was given to the Arena whereon they ran.

PALESTROPHYLAX * among the ancients, was the director of a Palæstra; and of the exercises performed therein. See PALÆSTRA.

* The word is formed from the Greek παλαίστρα and φύλαξ, guardian, keeper.

This Officer was also called Xystarcha and Gymnasiarcha.

PALANQUIN, a kind of chaise, or chair bore by men on their shoulders; much used by the people of China and the East, as a vehicle for their easy conveyance from place to place.

PALATE, PALATUM *, in anatomy, the flesh that composes

the roof, i. e. the upper and inner part of the mouth. See MOUTH.

* Du Laurence says it has its name from the Latin *pali*; because enclosed with two rows of teeth, resembling little flakes which the Latins call *pali*.

The Palate is a little vaulted or concave; it is lined with a glandulous coat, under which are great numbers of pretty conspicuous glands, scattered in the fore-part of it like grains of millet, with many interstices, whose excretory ducts piercing the membrane, open into the mouth; but towards the hinder part, they lie much thicker; and about the root of the uvula they are gathered to close together, that they appear to form one pretty large conglomerate gland, called by Verheyen, *glandula conglomerata palatina*.

Towards the bottom of the Palate, behind the uvula, is a pretty large perforation, which, a little from its orifice, divides into two, each whereof goes to one of the nostrils.

Many take the palate to be the organ of tasting.

PALATI Or, a small square bone, forming the hind-part of the Palate, and joined to that part of the os maxillare which forms the fore-part of the Palate.

PALATINATE, PALATINATUS, a province or signory, possessed by a Palatine, and from which he takes his title and dignity.

The Palatinates now subsisting, are either those of Germany, or Poland.—Those of Germany are the principalities of the upper, and lower Rhine, i. e. of Bavaria and the Rhine.

The Palatinates in Poland, are the provinces and districts of the Polish grandes or senators, who are the governors thereof.

PALATINE—Count PALATINE * Comes PALATINUS, in ancient customs was a title given to all persons who had any office, or employment in the prince's palace.

* The appellation is derived hence, that anciently the emperors sent the judges of their palace, whom they called *comites palatini*, or *pals-graves*, to correct the abuses of the other judges in the provinces of Saxony, Bavaria, Franconia, and the Rhine.

Matthaus says, that the Palatines were originally those who had the super-intendence of the palace; the same with what the Greeks call'd *Eurepalates*, and the French *Maitres du Palais*; though in time the name became more general.

The only Palatine of this kind, now subsisting, is the prince Palatine of the Rhine.

PALATINE was afterwards a title conferred on those delegated by princes to hold courts of justice in the provinces; and on such among the lords as had a palace, i. e. a court of justice, in their own houses.

The French writers make the Palatines of Champagne to be the first who bore that title; which they will have it, the Germans and other people borrowed from them; not they from the Germans.

At present, the word Palatine is restrained to a prince of Germany, or a lord of Poland possessed of a Palatinate.

In the code we find a title *De Palatinis sacrorum largitionum*.

These were a kind of treasures of the empire.

PALATINE Games, Ludi-PALATINI among the Romans, were games instituted in honour of Julius Cæsar, as some will have it, or as others say, of Augustus.

It is pretended that Dion calls them *Augustalia*; which should seem to confirm the second opinion. Indeed, it is certain that he says Livia instituted particular games on the Palatine mount, in honour of that prince; but he apparently distinguishes them from those called *Augustalia*.

The Romans had also their *Apollo Palatinus*, a surname of that deity, given him in respect of the temple erected to him by Augustus on the Palatine mount, in consequence of a report of the Aruspices, which required it to be done: Augustus enriched it also with a noble library; as is intimated by Horace, Lib. I. Epist. III. Ver. 17.

PALATINE Tribe, was one of the four tribes, into which Rome was anciently divided by Servius Tullius.

PALATINE. See ACOLYTHI.

PALATO-SALPINGÆUS, called also *Musculus tubæ novus Valsalvæ*, and *Pterygostaphylinus externus*, a muscle arising broad and tendinous from the edge of the lunated part of the os palati, several of its fibres being spread on the membrane that covers the foramen narium; whence growing into a small thin tendon, it is reflected about the hook-like process of the inner wing of the process pterygoidæus internus, and is inserted carnosus, into all the membranous, fleshy, and cartilaginous parts of the tube, which leads from the palate to the ear. It is used to dilate and keep open this tube.

PALATO-STAPHILINUS, in anatomy, a muscle called also *Pterygostaphylinus internus*. See PTERYGOSTAPHYLINUS.

PALE, PALUS, a little pointed stake, or piece of wood, used in making enclosures, separations, &c.

The pale was an instrument of punishment and execution among the ancient Romans; and still continues so among the Turks.—Hence *Empaling*; the passing a sharp pale through the fundament up the body. See EMPALING.

PALE,

PAL

PALE*, in heraldry, is one of the honourable ordinaries of an escutcheon; being the representation of a *Pale*, or stake, placed upright; and comprehending the whole height of the coat, from the top of the chief to the point. See **ORDINARY**. When the *Pale* is single, it is to contain one third of the breadth of the shield.

When there are several, more properly called *Pallets*, they are proportioned so, as that two take up two fifths of the shield; and three take up three sevenths: and in those cases, the number of pieces is specified as well as that of those they are charged withal, &c.

Pales are bore various ways, as *wavy*, *crenellé*, *faillie*, *indented*, *ingrailed*, &c. There are also the *cometé*, and *flaming Pales*, which are pointed, sometimes waved, &c.

PALED, **PALE** in heraldry—A coat is said to be *Paled*, when it is equally charged with pales of metal, and colour. It is *Counter-Paled* when it is cut, and the two *Demi-Pales* of the chief, though of colours the same with those of the point; yet differ in the place where they meet; so as if the first of the chief be metal, that corresponding to it, underneath, is of colour.

The coat is said to be *Palissé*, when the *Pales* are pointed like those used in the defence of places.

In **PALE**, is applied to things born one above another in manner of a *Pale*.

Party per PALE is where the shield is divided by a single line through the middle, from top to bottom. See **PARTY** and **PALY**.

PALED Flowers, in botany, are those which have thin leaves set about, or surrounding a head, or thrum: as in Marigolds, &c.

PALES, or **PILES**, in carpentry, denote rows of stakes drove deep into the ground, to make wooden bridges over rivers, and to erect other edifices on.

* Du Cange derives the word from the Latin name *Palla*, a hanging, or piece of tapestry: the ancients gave the name *Pales* to the hangings or linings of walls: thus a chamber was said to be *paled* with cloth of gold, with silk, &c. when covered with bands or stuffs of two colours.—Hence also the original of the word *Pale* a stake, &c. The arms of Arragon are *paled or and gules*.

Tertullian observes, that the Romans planted *Pales* to serve as boundaries of inheritances; and that they consecrated them to the god *Terminus*, under the name of *Pali Terminales*. Ovid tells us, they were crowned and adorned with flowers, festoons, &c. and that the god was worshipped before these *Pales*. See **TERMINALIA**.

Pales for building serve to support the beams which are laid across them, from one row to another; and are strongly bound together with cross-pieces.

PALLIA, a feast among the ancient Romans in honour of the goddesses *Pales*.

The *Pallia* by some called *Parika*, were celebrated by the shepherds on the first of May; to beseech that goddess to take care of their flocks, and preserve them from wolves, and diseases.

Part of the ceremony consisted in lighting heaps of straw, and jumping over them.

PALLICIUM, in astronomy, a fixed star of the first magnitude, in the Bull's-eye; called also *Aldebaran*. Its longitude in Mr. Flamsteed's catalogue is $5^{\circ} 27' 00''$. Its latitude $5^{\circ} 29' 49''$ South.

Pliny gives the name *Palladium* to the Hyades, of which the *Palladium* is properly only one.

PALINDROMUS*, a verse, or sentence, which runs the same, when read either backwards, or forwards.

* The word is Greek, *παλινδρομος*, *retro currans*, running backward, formed of *παλιν* again, and *δρομος* course.

Such is the verse
Roma tibi subito motibus ibit amor.

Some People of leisure have refined upon the *Palindromus*, and composed verses, each word whereof is the same backwards as forwards. As that instance in Cambden.

*Odo tenet mulum, madidam mappam tenet Anna.
Anna tenet mappam madidam, mulum tenet Odo.*

PAILING, or **PALEING** in agriculture, &c. a kind of fence-work for fruit-trees, &c. planted in fields, &c.

It consists of three small posts driven into the ground, at a foot and a half distance; with cross-bars nailed to each other, near the top.

In fixing the *Pales* in a form of a triangle, room is to be left for the tree to play and bow by the high winds without galling. The trees are to be bound to a stake for a year or two; after which fern or straw may be stuffed in betwixt the tree, and uppermost rails to keep it upright.

If the place be open to deer, rabbits, or the like, a post is to be nailed to the bar between every two *Pales*.

PALINGENESIA*, *Παλυνγινεσία*, a new birth, or regeneration. See **REGENERATION**.

* The word is Greek, formed of *παλιν* over-again, a-new, and *γενεσις*, generation.

PALINGENESIA, is also used by some for the migration or passage of the soul of a defunct into another body.

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PAL

The *Palingenesia* is almost the same thing with the *Metempsychosis* taught by Pythagoras, and still believed by the Brachmans, Banjans, and other philosophers of the east. See **METEMPSYCHOSIS**.

PALINODY, *Παλινωδία*, a discourse contrary to a preceding one.

Hence the phrase *Palinodium Canare*, to sing *Palinody*, *q. d.* to make a Recantation.

The word in the original Greek signifies *singing again*, or a-new. Hence it has passed as a general name for any poem; or the like, which contains a retractation in favour of a person whom the poet had before offended.

The poet *Stesichorus* is said to be the first author of the *Palinody*. The sixth ode of the first book of *Horace* beginning, *O Matre pulchra*, is a true *Palinody*.

PALINTOCIA*, *Παλιντοκία*, in antiquity, the birth or delivery of a child a second time.

* The word is formed from the Greek *παλιν* a-fresh, a-new, and *τοκος* of *ταλιν*, I bring forth.

Thus the second birth of *Bacchus*, proceeding out of *Jupiter's* thigh, was a *Palintocia*.

PALINTOCIA is also used for the restitution of tury, or the refunding of interests.

The *Megarians*, having expelled their tyrant, ordained the *Palintocia*; that is, they made a law, that all the creditors should return to their debtors the interests they had received for monies lent.

PALISADE or **PALISADO**, in fortification, an inclosure of stakes, or piles driven to the ground, each six or seven inches square, and eight foot long; three whereof are hid underground. See *Tab. Fortif. Fig. 18*.

Palisades are used to fortify the avenues of open forts, gorges, half-moons, the bottoms of ditches, the parapets of covert-ways; and in general all posts liable to surprize; and to which the access is easy.

Palisades are usually planted perpendicularly; though some make an angle inclining towards the ground next the enemy, that the ropes cast over them, to tear them up, may slip.

Turning PALISADES, are an invention of *M. Cohorn*, in order to preserve the *Palisades* of the parapet of the covert-way from the besiegers shot.

He orders them so, that as many of them, as stand in the length of a rod, or in about ten foot, turn up and down like traps; so as not to be in sight of the enemy till they just bring on their attack: and yet are always ready to do the proper service of *Palisades*.

PALISADE, in gardening, denotes a fort of ornament; being a row of trees which bear branches and leaves from the bottom, cut and spread in manner of a wall, along the side of an alley, or the like; so as to appear like a wall covered with leaves.

These *Palisades* are made of jessamin, phillyrea, &c.

PALISSE, in heraldry, a range of *Palisades* before a fortification represented on a fesse, rising up a considerable height; and pointed a top, with the field appearing through them—*V. Tab. Herald. Fig. 31*.

PALL, in heraldry, denotes a kind of cross; representing the *Pallium* or archiepiscopal ornament sent from Rome to the metropolitans.—See its figure in *Tab. Herald. Fig. 32*—Which is blazoned thus: He beareth Gules, a Cross Pall Argent.

PALLA, among the old Romans, a mantle which women wore over the gown called *Stola*.

It was born on the left Shoulder, whence passing to the other side, under the right arm, the two ends were bound under the left arm, leaving the breast and arm quite bare.

It made abundance of plaits or wrinkles; whence, according to *Varro*, it had its name, *viz.* from *παλλω*, *vibro*, I shake; or tremble.

Among the Gauls there was also a kind of *Palla* wore by the men, called *Gallica Palla*.

PALLADIUM, in antiquity, a statue of the goddesses *Pallas*, preserved in *Troy*; whereon the fate of that city is said to have depended.

The tradition is, that in building a citadel, in honour of *Pallas*, and a temple in the most elevated part thereof, the *Palladium* dropped from heaven, and marked out the place which the goddess was pleased to possess.—After this, *Apollo* gave an oracle, importing, that *Troy* should never be taken while the *Palladium* was found within its walls: which occasioned *Diomed* and *Ulysses*, in the Time of the *Trojan War*, to undertake the stealing thereof. 'Tis said, there was anciently a statue of *Pallas* preserved at *Rome*, in the temple of *Vesta*: which some pretended to be the true *Palladium* of *Troy*, brought into Italy by *Aeneas*: it was kept among the sacred things of the temple, and only known to the priests and vestals: This statue was esteemed the destiny of *Rome*; and there were several others made perfectly like it, to secure it from being stolen. See **ANCYLE**.

There was also a *Palladium* in the citadel of *Athens*, placed there by *Nicias*.

These *Palladiums*, in all probability, were no other than a kind of *Talismans*. See **TALISMAN**.

8 B

PALLET,

PALLET, among painters, a little oval table, or piece of wood, or two, very thin and smooth; on and round which the painter place the several colours they have occasion for, to be ready for the pencil.

The painter uses to mix the colours on, and to make the tints required in the work. It has no handle, but in head thereof, a hole at one end, to put the thumb through to hold it.

PALLET, among potters, crucible-makers, &c. is a wooden instrument, almost the only one they use, for forming, beating, and rounding their works.

They have several kinds; the largest are oval, with a handle; others are round, or hollowed triangularly; others, in fine, are in manner of large knives, serving to cut off what is superfluous on the moulds of their work.

PALLET, in gilding, is an instrument made of a squirrel's tail; used to take up the gold leaves from the pillow, to apply and extend them on the matter to be gilt. See **GILDING**.

PALLET, in heraldry, is the moiety, or half of the pale; or a small pale, half the breadth of the usual one.

The *Pallet* must never be charged with any thing either quick or dead; neither can it be divided into two equal parts: but it may be into four, for one fourth part of the *Pallet*, or $\frac{1}{4}$ parts of the pale, is called an endorse.

If the pale be upon any beast, they say, the beast is *debruisé* with the pale: but if the beast be upon the pale, they say he is *supporté* by it.

PALLET is also a part belonging to the balance of a watch or movement. See **WATCH**.

PALLIATION, the act of mitigating, soothing, or disguising a thing.

Hence, in medicine, *Palliatio* is used for the quieting and alluaging of pain, and providing against the severer symptoms of a disease, when nothing can be directly levelled against the cause.

PALLIATIVE Indication, is where the symptoms of a disease give too much trouble, and danger, to have their cure deferred till the disease whereon they depend, is removed. Here, the symptoms, themselves, are to be cured, or mitigated a part, and hence,

PALLIATIVE Cure, is the answering of a *Palliative* indication: or the removal, or mitigation of the symptoms of a disease; the cause of the disease still remaining.

Boerhaave observes, that every mitigation of a symptom takes away somewhat from the disease itself; so that to cure all the symptoms together, is almost to cure the whole disease.

The principal symptoms which call for such a sort of cure, are thirst, pain, too much waxing, and fainting. See each under its proper article.

PALLIER, or **PALLIER**, in building, a landing place in a stair-case; or a step, which, being broader than the rest, serves to rest upon. See **STAIR-CASE**.

The term is pure French, and is not much used in English. In persons, or large stair-cases, where the steps are sometimes several *Palliers* in the same range, or line, they ought to have each at least the width of two steps.

Those in the plans of stair-cases ought to be as broad as long. Vitruvius calls the *Palliers* or landing-places of the theatres, *Diapromata*.

PALLIFICATION, in architecture, denotes the piling of the ground-work; or the strengthening it with piles, or timber driven into the ground: which is practised, when people build upon a moist, or marshy soil.

PALLIO *lat. &c.* — It was an ancient custom, where children were born out of lawful wedlock, and their parents afterwards intermarried; that those children, together with the father and mother, should stand *Pallio cooperis*, under a cloth spread over them, while the marriage was a solemnizing; which was a kind of adoption, and had the effect of a legitimation.

Thus Robert Groshead, the famous bishop of Lincoln, in one of his letters says. — *In signum legitimatæ, nati ante matrimonium, conservant post sub pallio super facies eorum extantes, in matrimonii solemnizatione.*

Seiden, in his notes on Pleta, adds, that the children of John of Gaunt duke of Lancaster, by Catherine Swinford, though legitimated by act of parliament, yet were *circled with the Pall* at the time of the marriage of their parents.

PALLIUM or **PALL**, a pontifical ornament wore by popes, patriarchs, primates, and metropolitans of the Romish church over their other garments, as a sign of their jurisdiction. It is in form of a band, or fillet, three fingers broad, and encompasses the shoulder; whence by some authors it is called *Suspectandula*. It has pendants, or fringes, about a palm long, both before and behind; with little lunette of lead rounded at the extremes, and covered with black silk, with four red crosses.

The *Pallium* is made of white wool, shorn from off two lambs, which the nuns of St. Agnes offer every year, on the day of her feast, at the ringing of the bells, *Ann. Del.*

The lambs are received by the two canons of the church of St. John de Lateran; who deliver them into the hands of the apostolical sub-deacons, to whom belongs the feeding and shearing of them in season, and who alone have the right of making these *Palliums*; which, when made, they lay over the bodies of St. Peter and St. Paul in the grand altar of their church, making prayers over them all night, according to the form prescribed for that purpose in the Roman Ceremonial.

Some, with Eusebius, will have the *Pallium* to have been introduced by pope Linus; adding, that as the Ephod was the mark of the pontifical authority in the Jewish synagogue, so is the *Pallium* in the Romish church.

Others have observed, that there is no mention made hereof before the year 336.

Lastly, others will have it to have been first granted by Constantine the great, to pope Silverius; from whence it passed to the other patriarchs, and archbishops.

The pope pretends to the sole right of conferring the *Pallium*; though some patriarchs have granted it to their suffragans; having first received it themselves from the Roman see.

Anciently, the pope used to send the *Pallium*, to certain of his diocesan bishops, on whom he laid a good part of his authority, and who were a kind of collaterals to him, as the *Patricii* were to the emperors.

The first, who received it in France, was Vigilius, archbishop of Arles, this was done, in order, as Palquier observes, to give him the precedence over the other bishops.

Anciently they went to Rome to seek the *Pallium* in person; afterwards, it was sent by the pope's legates. At last the custom was introduced of sending persons express to demand it, with this form, *Inflammas, Inflammas.*

By the popish canon-laws, a metropolitan, till he have received the *Pallium*, cannot consecrate bishops, or churches, and he may not be called archbishop, &c. — Upon a translation he must have the *Pallium* affixed; and till then he cannot hold a synod, nor perform any of his archiepiscopal functions.

The *Pallium* was anciently interred with the person.

The use of the *Pallium* is restrained to certain seasons and occasions; none but the pope have the right of wearing it always, and in all places.

The pope sometimes sends it to bishops on his own accord; and has sometimes given the right hereof to particular churches. Among the Greeks all the bishops wear the *Pallium*.

In ancient records, we find mention made of another *Pallium*, which was a long garment spread over with crosses. Tertullian says it was a distinguishing garment of the christians; that of the heathens being called *Taga*.

PALM, **PALMUS**, an ancient long measure, taken from the extent of the hand.

The Roman *Palmus* was of two kinds: the *great Palm*, taken from the length of the hand, answered to our span, and contained 12 fingers, digits, or fingers breadths, or 9 Roman inches, equal to about 8 English inches $\frac{1}{2}$. See **DIGIT** and **SPAN**.

The *small Palm*, taken from the breadth of the hand, contained 4 digits or fingers, equal to about two English inches, 9 tenths.

The Greek *Palm* or *Doron*, was of two kinds. The small contained four fingers, equal to 2 inches $\frac{2}{3}$. The great contained 9 fingers. — The double Greek *Palm*, called *Dichas*, contained also in proportion.

The modern *Palm* is different in different places where it obtains. — At Rome it contains 7 inches $\frac{1}{2}$: At Naples, according to Riccioli, 8 inches: At Genoa, according to M. Petit, 8 inches $\frac{1}{2}$: At Morocco and Fez, 7 inches $\frac{1}{2}$: In Languedoc and some other parts of France, the *Palm* is 8 inches $\frac{1}{2}$. — The English *Palm* is 3 inches.

At Leghorn there are two kinds of *Palms*, the one for Soollens, the other for silks: the first one third shorter than the latter.

PALM, **PALMA**, in anatomy, denotes the inside of the hand; called also *Vola* and *Metacarpium*. See **HAND**.

PALMARIS, in anatomy, a muscle serving to contract the palm of the hand in grasping. See *Tab. Anat. (Miyol) Fig. 2. n. 25.*

It arises from the internal protuberance of the humerus, and by a long and slender tendon, passes above the annular ligament to the palm of the hand; where it expands itself into a large aponeurosis, which cleaves close to the skin above, and to the sides of the metacarpus below, and to the first phalanx of the fingers; by which means it makes four cables for the tendons of the fingers to pass through.

The muscle is sometimes wanting, but the aponeurosis is always there.

PALMARIS brevis or **quadratus**, a muscle that lies under the aponeurosis of the first. It arises from the bone of the metacarpus that sustains the little finger, and from that bone of the carpus which lies above the rest. It goes transversely, and is inserted into the eighth bone of the carpus.

It serves to draw the palm of the hand into a concave figure. PALMER, in our ancient writers, is used for a pilgrim, and sometimes for a croisé, on account of a staff made of the palm-tree, which they ever afterwards bore as a badge of their devotion. See PILGRIM and CROISÉ.

PALMISTRY, a kind of divination performed by inspecting the lines and marks of the hands and fingers: called also *chirromancy*.

PALMS, among botanists, white buds shooting out of willows, or fallows, before the leaf; of the expansions whereof, the flowers of that tree are formed.

PALM-SUNDAY, *Dominica PALMARUM*, the Sunday next before Easter-Sunday; or the last Sunday in Lent. See LENT.

It has been thus called from the primitive days, on account of a pious ceremony then in use, of bearing *Palms* in memory of the triumphant entry of Jesus Christ into Jerusalem, eight days before the feast of the passover, described by St. Matthew, Chap. XXI. St. Mark, Chap. XI. and St. Luke, Chap. XIX.

The ancients had other names for this day. For 1^o they called it *Dominica Competentium*, i. e. Sunday of the Competentes; because on that day the catechumens came to ask the bishop leave to be admitted to baptism, which was conferred the Sunday following.

They had also, then, given them the symbol or credo to get off by heart, to be repeated to the bishop in the ceremony of baptism.

2^o. They called it *Capitilucium*, the Sunday of washing the head; by reason those, who were to be baptized the following Sunday, were prepared by washing their heads on this day.

Some time afterwards they called it *Indulgentia Sunday*; by reason that the emperors and patriarchs used to distribute gifts on that day.

PALMULARII, more properly called PARMULARII, in antiquity, a sort of gladiators, who fought armed with a sort of little buckler called *parma*. See GLADIATOR.

PALPABLE, something that may be perceived by the senses, especially by the sense of feeling.

Hence, impalpable powder. See IMPALPABLE and POWDER.

PALPEBRE, in anatomy, the eye-lids, or those external moveable covers, which serve to screen and defend the eyes.

They consist of a thin muscular membrane, covered without side with a strong, yet flexible skin; and lined within-side with a production, as some think, of the pericranium. Their edges are fortified with a soft cartilage, by means whereof, they are enabled to close the better.

Out of these cartilages grow a palisade of stiff hairs called *Cilia*; of great use to warn the eye of the approach of danger, either in sleeping or waking; to keep off moths, flies, &c. in the air, and to break the too fierce impulsion of the rays of light.

These hairs, it is observed, only grow to a certain convenient length, and never need cutting, as most others do; add to this, that their points stand out of the way; those of the upper eye-lid being bent upwards, as those of the lower downwards, so nice is nature in such small matters.

At the commissure, or joining of the upper and under eye-lids, are formed two angles called *Canthi*.

In the inner of these is a gland called *Glandula lachrymalis*; from which proceed two or three ducts, which, opening on the inner surface of the eye-lid, serve to moisten the ball of the eye, and keep its membranes from growing harsh and dry.

Near the other angle, is a gland called *Innominata*; which helping also, by several branches, to irrigate the eye, the overplus is carried to the greater angle, and transmitted to the nose through the puncta lachrymalia.

By these glands it is, that the humour, called tears, is secreted.

The eye-lids are both moveable; especially the upper, which has two muscles to raise and depress it, called *Attollens*, and *Deprimens* or *Orbicularis*. See ATTOLLENS and ORBICULARIS.

In quadrupeds the lower *Palpebra* is moveable, and is the smaller; in birds, on the contrary, the lower is immovable, and the greater.

Animals that have hard eyes, as lobsters, and the generality of fishes, have no *Palpebre*, such eyes being sufficiently secured without.

In the generality of brutes there is a kind of a third eye-lid, which is drawn like a curtain, to wipe off the humidity which might incommode the eyes; it is called the *Nictitans Membrane*.

The monkey is almost the only one that wants it; as being furnished, like man, with hands to wipe the eye on occasion.

PALPITATION, PALPITATIO, in medicine, a preternatural beating, or pulsation of any of the solid parts of the body, especially the heart.

The *Palpitation* of the heart is an irregularity in the motions of that viscus, whereby it is driven with violence towards

the ribs, in its contraction, attended with a great feebleness of pulse.

There are several degrees of this *Palpitation*: sometimes it is great, sometimes moderate, sometimes small; it is sometimes so impetuous, as to be heard and even seen by the bystanders. The trepidation or trembling of the heart, differs from the *Palpitation*, or panting. In the former, the pulsations are faint, slow, and faltering, in the latter, the shakes are immoderate, violent, and convulsive.

The cause of the *Palpitation*, according to Boerhaave, is usually an inordinate and violent influx of the vital fluids into the vessels of the heart; as in violent passions, sudden fear, hysterical affections, and in violent and sudden motions. Sometimes it is owing to an irritation of the fibres of the heart, occasioned by some sharp stimulus; as an inflammation of the heart or pericardium, or some other disorder thereof from a stone, worms, hairs, an aneurysm, or the like.

Sometimes it arises from a thick, copious, polypous blood; and sometimes from the arteries being become cartilaginous or bony; or their extremities being obstructed therewith.

In the dictionary de Trevoux, an author, himself afflicted with this disease, makes a particular distinction into its nature and cause.

Anatomy, he observes, shews us a great number of occasional causes of this disease: but physicians are still at a loss to determine the efficient cause.

The moderns, with better reason than the ancients, seek for it in the blood of the pulmonary artery, which is supposed to rebound impetuously towards the right ventricle of the heart; by being prevented from pursuing its course towards the other vessels of the lungs, on their being stopped by some obstruction, or compressed from various causes.

In opening the carcasses of people dead of this disease, or subject to it while living, worms or polypus's have been often found in the pericardium.

In some the heart is extraordinarily big, and the pulmonary artery dilated to double, or quadruple its ordinary capacity, with obstructions of the pulmonary vein, consisting of cartilaginous matters which cram its cavity to close, that, as Blancard tells us, in his anatomy, it is sometimes difficult even to get a pin in. From these observations, some have concluded, that the capillary, and other vessels of the lungs, opposing an impassable dike to the course of the thickest part of the blood, driven thither by the contraction of the heart, so that only a small quantity can find a passage through them, the rest must make an effort against their sides, and oblige them to give way, and stretch them out in proportion to the quantity of blood impelled against them by the contraction of the heart.

But because the pulmonary artery cannot stretch wide enough to receive all the blood of the right ventricle driven thither at a contraction; and since the blood, by reason of obstructions, cannot continue its progressive motion, in proportion to the velocity wherewith it is impelled, by the contraction of the heart; the heart at each contraction fails to express into the pulmonary artery, all the blood it contained in its right ventricle. Thus that part of the blood which remains, receiving the whole shock impressed by the contraction, returns it again to the heart by reflection, striking impetuously against its sides, and making it bound and shoot toward the ribs.

The same consequences will arise from obstructions of the aorta, preventing the entire evacuation of the left ventricle; and generally, from all obstructions or compressions of the vessels, as polypus's, abscesses, and dropsies in the parts near the heart. As to worms, their biting and gnawing the fibrous parts of the heart, must occasion violent refluxes of spirits towards the brain, followed with a copious effluvia of other spirits into the nerves of the lungs, by the consent of parts. And by such means violent and convulsive contractions will be occasioned throughout the whole texture of the lungs, which opposing the free passage of the blood may also occasion a *Palpitation* of the heart.

The same disease may also arise from a compression of the lungs, occasioned by the extraordinary rarefaction of vicious and fermentative juices, sojourning in the stomach and intestines; which dilate those parts to that degree, that the diaphragm and lungs being extremely straightened, the blood cannot circulate without a great deal of difficulty; a *Palpitation* therefore must ensue; which will last as long as that rarefaction in the first passages.

Such, according to modern physicians, are the immediate causes of the *Palpitation* of the heart: the remote or occasional causes are whatever may occasion such obstruction of the pulmonary artery, &c.

In the same work, another physician lays down winds or flatul's, as the cause of the *Palpitation*; he adds, that the ancients, to a man, looked on that as the most ordinary occasion thereof: In effect, says he, from this source may be deduced a multitude of causes of sympathetic *Palpitation*, by means of the ventricle, the diaphragm, mediastinum, &c.

Others will have the sole cause of *Palpitation* to be a viscid blood;

blood; which, by its extraordinary rarefaction, dilating the pulmonary artery, and, by that means, opening the cavity of its capillary vessels towards their extremes; or, by this dilatation compressing the other little vessels of the lungs, prevents the blood from continuing its circulating motion with freedom; and thus occasions a *Palpitation* of the heart. All these authors hold the *Palpitation* a dangerous disease, and Galen observes, that those much troubled with it, when young, never live to be old.

According to M. Pison, a doctor of the faculty at Paris, the *Palpitation* of the heart may arise, either from a too abundant serosity swelling the proper membrane of the heart; as Galen found to be the case in opening a monkey; or from too great a quantity of water contained in the pericardium; by which means, the heart being frightened, and disabled from moving with its usual freedom, is obliged to make several jerks or half beats, instead of the regular motions it had before; or, again, it may arise from a serosity thrown into the ventricles of the heart, either from the grand vessels which furnish the blood, or from the lungs, or from the brain. Of these three causes, the most ordinary seems to be the too great extension of the pericardium, by water, as it is found to be in the bodies of most of those opened after this disease.

The different causes have their different symptoms. The boiling serosity thrown out of the blood-vessels into the heart, shews itself by sudden beatings of the temples, whizzings in the ear, dimness of the sight, and wandering pains in various parts of the body.

In that produced by the abundance of water in the pericardium, or from the humour swelling the proper membrane of the heart, the heart seems as if suffocated in water, the pulse is weak, and the *Palpitation* continual, or nearly so, together with a feverishness and a difficulty of breathing. To which may be added, that the disease comes by little and little. The *Palpitation* arising from the serosity is to be cured by bleeding, the other by purging. See *Supplement, Article PALPITATIO CORDIS*.

PALSGRAVE, a term used among the Germans, of the same import with *palatine*. See *PALATINE*.

It is compounded of the Latin, *palatium*, and the Dutch, *grave*, governor, *g. d.* governor, or superintendent of a prince's palace.

PALSY, *PARALYSIS*, in medicine, a disease, wherein the body, or some of its parts lose their motion, and sometimes their sensation, or feeling.

The causes of the *Palsy* are an impeded influx of the nervous spirits into the villi or the muscles: or of the arterious blood into their vessels; this may happen from some fault, either in the brain, the nerves, the muscles or their vessels.

The *Palsy* is said to be *perfect* or *complete*, when there is a privation of motion, and sensation at the same time. *Imperfect*, when one of the two is destroyed, the other remaining.

The *Palsy* again, is either *universal*, *lateral*, or *partial*.

Universal Palsy, called also *Paraplegia* or *Paraplexia*, is a general immobility of all the muscles that receive nerves from the cerebrum or cerebellum, except those of the head.—Its cause is usually supposed to reside in the ventricles of the brain, or in the root of the spinal marrow.

Etmuller makes this a different disease from the *paralysis*, which he supposes to consist in a relaxation of the ligaments and membranes serving for motion; but the *paraplegia* in a meer obstruction of the nerves.

The *paraplegia* is seldom a primary disease, usually a secondary one, attending or following an apoplexy, scorbutus, carus, or arthritis.

Lateral Palsy, called also *Hemiplegia*, is the same disease with the *paraplegia*; only that it affects but one side of the body.—Its cause is the same, only that it is restrained to one side of the brain, or spinal marrow.

Partial Palsy, is that where some particular part, or member alone is affected; *e. g.* where the motion of the arm or leg is destroyed.

Quincy observes, that a *Palsy* where motion is destroyed, sensation remaining, may be produced: first, by too much humidity stretching the muscular fibres in length. Secondly, from cold things, which thicken the juices. Thirdly, from external compression. And fourthly, from hot things, which straighten the supple membranes and vessels.—All these causes affect either the blood, or muscles; the former, by thickening that humour, so that it cannot suddenly rarify; and the latter, by relaxing the muscles into too great a length by too much moisture, or contracting them into too narrow dimensions by too much heat. But the sensation may yet be preserved, because, notwithstanding all these hindrances, the animal spirits and nerves may not be at all affected.

The causes of the *Palsy* where sensation is destroyed, motion remaining, he observes, may be all those things which so far thicken the animal spirits in the nerves, arising below the cerebellum, that though indeed they may flow into the muscles through the nerves, and there, by the occlusion of some

liquor secreted from the blood, may rarify; yet they cannot alone flow in such quantities into the nerves, as from a very slight cause to be made to undulate; whence sensation will cease without losing the motion of the part.

The causes of this kind of *Palsy* are also whatsoever render those nerves more lax and moist, and so less apt for lively vibrations; the animal spirits flowing in the mean time into the muscles, from whence motion is performed without sensation. The cure of the *Palsy*, according to Walldichmidt, does not differ much from that of the venereal disease. Internally, mercurials, sudorifics and decoctions of the woods are good: externally, unctions, particularly of fennel and penetrating things, not on the part affected, but on the spina dorsa. See *Supplement, Article PARALYSIS*.

PALUDAMENTUM, in antiquity, *Chlamis*: a garment wore by the Romans in time of war; being the coat of arms of their principal men, especially the generals; who, for that reason were distinguished by the appellation *paludati*. The soldiers only having short coats, were therefore named *legati*.

This garment was open on the sides, with short sleeves, by some resembled to angels wings, and came down no lower than the navel.

It was either white or red; Valerius Maximus remarks it was an ill omen to Clavius, that they gave him a black *Paludamentum*: *Pallum ei traditum est Paludamentum, cum in prælium euntibus album aut purpureum dari solet.*

Comutus says, the Romans wore the Toga in peace, and the *Paludamentum* in war.—And hence the phrase, *Togam Paludamento mutavit*.

PALY, or **PALE**, in heraldry.—When an escutcheon is divided into fix, eight, or ten divisions pale-wife, *i. e.* by perpendicular lines drawn from the top to the bottom: it is blazoned *Paly* of fix, eight, or ten, &c. pieces.

If the number be odd, then the field is first named, and the number of the pales specified. See **PALE**.

The like is to be understood also of barry and bendy. See **BARRY**, &c.

PALY-BENDY is, when a coat is divided, both pale and bend-wife: In *Paly-Bendy* the field is divided by perpendicular lines, which is called *Paly*, and then again by diagonals crossing the former, from the dexter side to the sinister, which is the *Bendy*. See *Tab. Herald. Fig. 30*. The field is *Paly-Bendy*, topaz and diamond.

PAMPINIFORME Corpus, in anatomy, a sort of plexus, or knot of blood-vessels, formed by the spermatick veins; which in their progress through the testis, constitute a body, called *Corpus Pampiniforme*, or *Pyramidale*. See **PYRAMIDALE Corpus**.

PANACEA *, **ΠΑΝΑΚΙΑ**, an universal medicine; or a remedy for all diseases.

* The word is formed from the Greek *πας*, all, *ιατρον*, I cure.

The accurate Boerhaave overturns the notion of *Panacea*, and shews, from the different causes, natures, effects, &c. of diseases, that several may indeed be cured by one medicine; but all, by none.

He observes, that the most universal remedies known, are water, fire, mercury and opium; and adds, that by these alone, cautiously digested, some have acquired the reputation of universal physicians.

PANACEA, **PANACES**, or **PANAX**, *All-heal*, is also applied to several plants, by reason of the extraordinary virtues ascribed to them.

There are three of these *Panacea*'s peculiarly famed among the ancients: the *heracleean*, *asclepiadian*, and *chironian*; these were so called from their inventors, Hercules, Asclepias, and Chiron.

The first is the *Panax Heraclea vera siculnea folio*, in English *true All-heal* of Hercules.—From the root and stem of this is drawn, by incision, the gum opopanax.

The *asclepiadian*, according to some botanists, is a kind of ferula, which Gaf. Bauhin. calls *Libanotis Ferula folio Es femine*.

The *chironian*, according to some, is a kind of helianthemum: according to Bradley, it is Doria's woundwort.

PANADA *, **PANATA**, or **PANATELLA**, a diet consisting of bread boiled in water, to the consistence of a pulp; given to sick Persons whose digestion is weak, or to whom stronger foods would be improper.

* The word is formed from the name of the principal ingredient, *panis*, bread.

It is sometimes made thin, to serve as a drink; and sometimes likewise is sweetened, &c. to render it more palatable.

PANAGE or **PANNAGE** in our ancient customs. See **PANNAGE**.

PANARIS *, **PANARITUM**, or **PARONYCHIA**, in medicine, is a painful tumour, or inflammation, arising on the extremities of the fingers or toes; popularly called among us a *Whitlow*.

* The word in Latin is *Panaritis*, which we find in Apuleius, formed apparently from the Greek *πανονχια*, *g. d.* an Abscess at the root of the nails; of *πανν* *juxta*, and *ονχ* *unguis*.

P A N

It is occasioned by a sharp or saline humour, lodged between the bone and periosteum, or among the nerves and tendons. An infallible remedy for it, is to open it either with the point of a lancet, or with some caustick, and then to dip the finger in a lixivium of vine aithes.

Beside the mild kind, called the *Whitlow*, there is also a malignant kind, called a *Fellon*.

The *Panaris* is exceeding painful. It sometimes tends to an imposthume, but more usually gangrenes.

For the *Panaris*, after bleeding, and the universal remedies, Dr. Burnet orders the patient to hold his finger a good while in a rotten egg, or in a putrified moulle. Helmont tells us, he has seen a finger as big as an arm by means of a *Panaris*, cured by rubbing it with blood, and then wrapping it up in mole-skins. Riverius adds, that to hold the finger affected in a cat's ear, cures a *Panaris* in two hours. Observat. 63. Cent. 4.

PANATA, or PANATELIA. See the article PANADA.

PANATHENÆA, Παναθηναία, in antiquity, a feast celebrated at Athens, in honour of Minerva, whom the Greeks called *Athena*.

Harpocration and Suidas, refer its institution to Erichonius IV. king of Athens, who lived before Theſeus. Theodoret, alone, says the feast was established by Orpheus.

Be this as it will, till Theſeus, this was a particular feast of the city of Athens, and was called simply *Athenæa*: but that prince uniting all the people of *Attica* into one republick, they afterwards all assisted at the feast; whence the name *Panathenæa*, i. e. the feast of all *Attica*.

In effect all *Attica* was present; and each people sent a bullock for the sacrifices, and for the entertainment of the vast multitude of people assembled.

If they eat a great deal, it appears they did not drink less; witness the vessels they drunk out of, which were called *Panathenæa*, each of which held two congius's and a half.

There were two kinds of *Panathenæa*; the *great* celebrated every five years; and the *little*, every year, or every three years; if we may credit the author of the argument of Demosthenes's oration against Midias.

In the *Panathenæa* was held one of the processions which the ancients called *Pompæ*, composed of the bravest old men, each whereof bore, in his hand, an olive branch; whence they were called *Thallopheori*.

This was to do honour to Minerva, in quality of inventress of the olive-tree; on which account they had likewise combats, wherein the victors were rewarded with vessels of oil, and crowned with olive crowns. It was a crime for any of the spectators to be clad in black.

The ceremonies were the same in the *great*, and the *little Panathenæa*; excepting for a banner wherein the actions of the goddess were represented in embroidery performed by maids, with the names of those who had distinguished themselves in the service of the republick; which was only bore at the *greater*.

PANCARPUS *, in antiquity, a sort of spectacle, or shew which the Roman emperors frequently exhibited to the people.

* The word is formed from the Greek, *παν*, all, and *καρπός*, fruit. — Whence the name was also given by the Athenians to a sacrifice, wherein all kinds of fruits were offered.

The *Pancarpus* of the Romans was a kind of chase, or hunt: for the performance hereof, a number of beasts, as hares, deer, bullocks, &c. were shut up in the circus or amphitheatre; into which trees were frequently transplanted, so as to form a kind of forest, wherein the beasts were let loose; whence the *Pancarpus* was also called *Sylva*.

The beasts were thus abandoned to the people: i. e. to all who were disposed to share in the pleasure of the chase; who purchased, shot, killed and cut in pieces all they could lay hold of. Helioabalus, the Gordians and Probus, gave this diversion very frequently.

Calaubon, Cujas, Pithou, &c. make the *Pancarpus* and *Sylva* the same thing; Salmassius will have them different. The *Sylva*, according to him, was such a diversion, as that above described; but the *Pancarpus* a combat, wherein robust people, hired for that purpose, fought with wild beasts; which opinion he confirms from Cassian, Justinian, Claudian, Firmicus, Marcellus, and Cassiodorus.

PANCHREAS. See the article PANCREAS.

PANCHREATIC. See PANCREATIC JUICE.

PANCHREST *, PANCHRESTOS, in medicine, a panacea, or remedy for all distempers. See PANACEA.

* The word is Greek Πανχρηστος, formed of *παν*, all, and *χρηστος*, useful.

PANCHYMAGOGUE *, PANCHYMAGOGUM, in pharmacy, a purging extract made from aloes, rhubarb, fenna, scammony, jalap, agaric, coloquintida, and black hellebore.

* The word is formed from the Greek *παν*, all, *χυμα*, juice, and *αγω*, to draw off.

Its name arises hence, that being a composition of all the kinds of purgatives, it was supposed to have the virtue of purging all the sorts of humours of the body at once.

P A N

PANCRATIUM *, Πανζατιον, among the ancients, a kind of intermixed exercise, confining of the lucta or wrestling, and the boxing or pugilate.

* The word is compounded of *παν*, all, and *κρατος*, I overcome.

The *Pancratium* was the third gymnastic exercise, and was not introduced till long after the others.

The people who were engaged in these exercises, were called *Pancratiſta*; which name was also given to such as did not confine themselves to one exercise, but succeeded in several different ones.

PANCREAS *, Πανκρεας, in anatomy, popularly called the *Sweet-bread*, a great conglomerate gland; or a body composed of an infinite number of little glands, tied up in the same common membrane; situate at the bottom and hind-part of the stomach, and reaching from the duodenum to the spleen. — See Tab. Anat. (Splanchn.) Fig. 1. lit. f.

* The word is formed of the Greek *παν*, all, and *κρεας*, caro, flesh.

The glands it consists of are bound together both by the vessel and by a membrane proper to each of them; and all together are loosely clothed with a thin membrane, from the peritonæum.

Its colour is a pale red; its form like that of a dog's tongue. It is 8 or 9 fingers long, 2½ broad, and one thick; its weight 4 or 5 ounces. — Its arteries come from the cœliac; its veins go to the porta; its nerves come from the hepatic plexus.

Each little gland has an excretory duct; which uniting form one common excretory duct, called *Ductus Pancreaticus Virens*; from Wirtungus, professor of anatomy at Padua, the discoverer thereof.

This duct, running along the middle of the *Pancreas*, opens into the cavity of the duodenum, generally by two mouths, the one four or five fingers below the pylorus, sometimes at the same orifice with the ductus choledochus; the other lower. It is of the bigness of a raven's quill, near the intestines, but less, further off. De Graaf observes, that it is frequently double.

The *Pancreas* serves to separate a peculiar humour from the blood, which is called the *Pancreatic Juice*. See PANCREATIC JUICE.

PANCREAS *Asilli*, in comparative anatomy, is a large gland in the middle of the mœntery of some brutes, especially dogs; to which most of the lacteals resort; and whence the chyle is conveyed, by large vessels, that have their rise immediately from the intestines, and are called *Lactea secundi generis*.

It has its name from the author who first took notice of it, Asellius. — M. Perrault observes, that the fish called *Place*, has 440 *Pancreas*'s; though it has but five ducts opening into the intestines, three of which correspond to 80 *Pancreas*'s, and 2 of them to 100 a-piece.

PANCREATIC JUICE, an insipid, limpid juice or humour separated from the blood, and prepared in the *Pancreas*.

This juice is not acid, as most authors have supposed; nor alkaline, as some others have thought; but a little saline, and much resembling the saliva in its origin, vessels, and properties.

It is carried by the *Pancreatic* duct into the duodenum, where it serves to dilute the chyle, to render it more fluid and fit to enter the mouths of the lacteals; and perhaps to temper and dilute the bile, to change its viscosity, bitterness, colour, &c. and make it mix with the chyle, in order to reduce the several tastes, odours, and properties of the several foods into one homogeneous one.

Janſon ab Almeloveen will have the *Pancreatic Juice* to have been known to Hippocrates and Galen. — De Graaf, a Dutch physician, has found means of collecting a quantity of it for experiments; and has published a treatise exprès, *de Succo Pancreatico*.

Brunner relates, that the *Pancreatic* duct; in several dogs having been tried, and cut, they still continued to eat, and drink, and perform all the other functions of life as usual. One of them seemed only to have the better stomach for it.

PANDECTS*, ΠΑΝΔΕΚΤÆ, in jurisprudence, the digest, or collection made by Justinian's order, of 534 decisions, or judgments of the ancient lawyers, on so many questions occurring in the civil law; to which that emperor gave the force, and authority of law by an epistle prefixed to them.

* The word is Greek Πανδεκτα, compounded of *παν*, all, and *δεκμα*, copia, I take; q. d. a compilation, or a Book containing all things. — Though others, as Baroll, will have it formed from *παν* and *δεκμα*; as if these books contained the whole doctrine of the law.

The *Pandects* consist of fifty books, and make the first part of the body of the civil law.

They were originally denoted by two *ππ*; but the copists taking those *ππ* for *ff*, the custom arose of quoting them by *ff*. The *Florentine Pandects*, are those printed from a famous ancient manuscript at Florence.

Papias extends the denomination of *Pandects*, to the old and new testament.

There are also *PANDECTA Medicinæ*, *Pandects of Medicine*; these are a kind of dictionary of things relating to medicine, compiled by Mat. Sylvaticus of Mantua, who lived about the year 1297. Leunclavius has published *Pandects of Turkey*; and bishop Beveridge *Pandects of the canons*, *Pandecta Canonum*.

PANDICULATION, *PANDICULATIO*, in a general sense, is a violent and tense motion of the solids which usually accompanies the act of yawning; and is otherwise called *Stretching*.

PANDICULATION, is also used in a peculiar sense for that restlessness, stretching, and uneasiness, which usually accompany the cold fit of an intermitting fever.

It is supposed to arise from a convulsive dilatation of the muscles, whereby nature endeavours to throw off something that disturbs her.

PANDURA, or **PANDORON***, a musical instrument, used among the ancients; much resembling the lute.

* The word, according to some, is formed from the Greek *παν* and, *δρον*, i. e. all-gift, all-forer of gifts. *Isidore* derives the name from its inventor *Pandorus*; others from *Pan*, to whom they attribute its invention, as well as that of the flute.

It has the same number of strings with the lutes; but they are of brass, and of consequence give a more agreeable sound than those of the lute. Its frets are of copper, like those of the cithre; its back is flat like those of the guitar; and the rims of its table, as well as its ribs, are cut in semi-circles.

Du Cange observes, that Varro, *Isidore*, and others of the ancients, mention it as having only three strings; whence it is sometimes also spoken of, under the denomination, *τρίχορδον*, *Tri chordum*.

PANEGRYIC*, **PANEGRYSIS**, or **PANEGRYICUS**, an oration in praise of some extraordinary thing, person, or virtue.

* The name is Greek *Πανηγυρις*, formed of *παν*, all, and *αγορη*, assembly, because anciently held in public and solemn assemblies of the Greeks, either at their games, their feasts, or their religious meetings.

The *Panegyric* is ranked among the demonstrative kind of orations.

To make their *Panegyrics* the more solemn, they used to begin with the praises of the deity, in whose honour the games, &c. were celebrated; then they descended to the praise of the people or country where they were celebrated; then to the princes or magistrates who presided at them; and at length to the champions, especially the conquerors who had gained the prizes in them.

F. de Colonia lays down two methods, or series's observed in *Panegyrics*.—The *Artificial*, where, without any regard to the order of time, every thing is reduced to certain heads. Thus, Tully refers the whole praise of Pompey to his skill in war, his virtue, authority, and felicity.

The other *Natural*, wherein the order and time of history are observed. This series he divides into three periods; the space before the person's birth, that wherein he lived, and if he be dead, that which followeth his death. This natural series requires much less art, genius, &c. than the other.

The place, or sources of *Panegyric* are chiefly the family, and country of the heroes, auguries at his birth, his virtues, the talents of his body and mind, honours, riches, manner of his death, and the consequences thereof.

PANEGRYIC, *Πανηγυρικόν*, is also the name of a church-book, in use among the Greeks; so called, as consisting of *Panegyrics*, or discourses in praise of Jesus Christ, and the saints. It is found in MS. in most churches; but is not the same in all; each church having its particular saints; and the compilers of these kind of books, usually suiting their collections to the taste of their own devotion.

They are disposed according to the order of months, and frequently consist of twelve Volumes, answering to the twelve months of the year.

PANEL, **PANELLA**, **PANELLUM**, in law, is derived by Spelman from *Pagella*, a schedule, or page: in which sense we say, a *Panel* of parchment, a *Counter-pane* of an indenture, &c.

PANEL or **PANNEL**, is more commonly used for a schedule or roll, containing the names of such jurors, as the sheriff returns to pass upon any trial.

Hence the empanelling of a jury, is the entering of their names, by the sheriff, into a *Panel*, or little schedule of parchment; called also the *Panel of assize*, *Panelum assise*. Coke on Littleton, will have *Panel* to be an English word, signifying a little part; as being a diminutive of the word *Pane*, part. But Spelman takes this for an over-sight.

PANEL, in joinery, &c. See **PANNEL**.

PANES, in the ancient theology. See **FAUNS**.

PANIC, or **PANIC-FEAR**, a term used for a needless, or ill-grounded fright.

Polyænus fetches the origin of the phrase from *Pan*, one of the captains of Bacchus, who, with a few men, put a nume-

rous enemy to rout, by a noise which his soldiers raised in a rocky valley, favoured with a great number of Echo's. This stratagem making their number appear much greater than it really was, the enemy quitted a very commodious encampment, and fled.—Hence all ill-grounded fears have been called *Pannics* or *Panic-fears*; and it was this that gave occasion to the fable of the nymph echo's being beloved by the god *Pan*.

Others derive the origin of the expression hence, that in the wars of the Titans against the gods, *Pan* was the first who struck terror into the hearts of the giants.—Theon on Aratus says, he did it by the means of a sea-shell which served him for a trumpet, whereof he was the inventor.

PANICULA, **PANICLE**, in Botany, a soft woolly beard, or string, whereon the seeds of some plants hang pendulous: as, in reeds, millet, &c.

Such are hence called *Paniculated Plants*.

PANIS & *Cerevisia Assisa*. See **ASSISA**.

PANIS & *Cerevisia Emendatio*. See **EMENDATIO**.

PANNAGE, **PANAGE** or **PAWNAGE**, are used in our law-books, &c. for the mast of woods; as of beech, acorns, &c. See **MAST**.

As also for the running, and feeding of swine, or other cattle in forests.

And for the monies taken by the agisters for the same.

PANNAGIUM liberum, or *free Pannage*, was a liberty of free running of swine in certain forests or woods, granted by privilege to certain private persons, and several religious houses.

Lindwood defines *Pannagium*, by *pastus pecorum in nemoribus, & in silvis, utpote de glandibus & aliis fructibus arborum sylvarum, quorum fructus aliter non solent colligi*.

It is also mentioned 20 Car. II. *Quisque villanus habens decem porcos, dat unum porcum de Pannagio*; by which it appears, that onehog in ten was given for the *Pannage*.

PANNEL, in law. See the article **PANEL**.

PANNEL, or **PANEL**, in joinery, &c. a tympan, or square piece of waincoat, sometimes carved; framed or grooved in a larger piece, between two mounters or upright pieces, and two traverses or cross-pieces.

Hence also *Panels*, or panes of glass, are compartments or pieces of glass of various forms, square, hexagonal, &c.

PANNEL in masonry, denotes one of the faces of a hewn stone. **PANNELS** * of a Saddle, are two cushions full of hair, or flocks, placed under the saddle, one on each side, next the horse's back, to prevent the bow from hurting the horse.

* The word is formed from the French *Pannau*, of *Pan*, flatside.

PANNICULUS*, in anatomy, a term frequently used for a membrane. See **MEMBRANE**.

* The word is Latin, and is formed by diminution, from *Pannus*, cloth, q. d. a little cloth or fine web.

Hence *Panniculus adiposus*, &c. is the same with *Membrana adiposa*, &c.

PANNICULUS Carnosus is a fleshy membrane, which the ancient anatomists supposed to be common to the whole body; and to be the fourth integument or covering thereof, after the epidermis, cutis, and the adiposus.

This *fleshy pannicle*, according to them, is a thick membrane, which covers the whole body; and even becomes muscular in some parts: but the latest anatomists deny any such membrane in the human body; maintaining, that what the ancients called the *fleshy Pannicle*, is only the fatty or adipose one.—Dr. DIANE makes it a double membrane, one half of which forms the *membrana adiposa*, the other half the *membrana communis* of the muscles.

The use the ancients ascribed to the *fleshy Pannicle*, was to wrinkle and contract the skin; but the truth is, where-ever the skin wrinkles, there are particular muscles for that purpose, called *cutaneous muscles*.

These muscles the ancients owned; but they said their office was confined to particular motions; adding, that there are places where no fat is found between the cutis and the *fleshy Pannicle*; which is false.

Further, even in animals which do move the skin, this *Pannicle*, is no more than a cutaneous muscle, as well as the dartos.

Some of the modern anatomists, however, admit the *fleshy Pannicle*, and deny the adipose one; supposing the latter, in reality, only a part of the former.

PANNIER, in architecture. See **CORNEL**.

PANNUS*, a Latin word, signifying cloth, rag, &c.

* The word is derived from *panis*, a web.

PANNUS, (in medicine) a disease of the eye, popularly called the *Web*.

The *Pannus* is an excrescence arising on the adnata or conjunctiva; is less hard and membranous than the unguis; and representing a web, or plexus of little veins swelled with blood. Its cause is an obstruction of the blood in the minute vessels of that tunic.

Its cure is much the same with that of the Ophthalmia.

A chief difference is, that in the *Unguis*, the membranous excrescence

excrecence only covers part of the eye, after the manner of a nail; whereas in the *Pannus* it covers the whole. See *UNGUIS*.
PANTALOON or **PANTALON**, the name of an ancient garment frequent among our forefathers, consisting of breeches and stockings all of a piece.

The denomination comes from the Venetians, who first introduced this habit, and who are called *Pantalonis*, from St. *Pantaleon*, who was formerly their patron.

PANTALOON, on the theatre, is a buffoon or mask, who performs high and grotesque dances, and shews violent and extravagant postures, and airs.

The word is also used for the habit or dress these buffoons usually wear; which is made precisely to the form of their body, and all of a piece from head to foot.

And hence those who wear a habit of this kind, for convenience, under their other cloaths, are called *Pantaloons* of Venice.

PANTHEON, *Naos*, among the ancients were single statues, composed of the figures, or symbols of several different divinities combined.

Father Joubert, who calls them *Panthea*, and who has observed them on several medals, says their heads are most commonly adorned with the symbols or attributes belonging to several gods.

An instance hereof we have in a medal of Antoninus Pius; which at the same time represents Serapis, by the bull's head; the Sun, by the crown of rays; Jupiter Ammon, by the ram's horns; Pluto, by the large beard; and *Æsculapius*, by the serpent twisted in his hand.

M. Baudelot, in a dissertation on the Lares, will have the *Panthea* to have had their rise from the superstition of those, who taking several gods for the protectors of their houses, united them all in the same statue, by adorning it with the several symbols, proper to each of these deities.

PANTHEON*, *Naos*, in architecture, a temple, or church, of a circular form; dedicated to all the gods, or to all the saints.

* It is thus named from the Greek *παν*, all, and *θεος*, God.

The *Pantheon* of ancient Rome, is of all others the most celebrated, and that whence all the rest take their name. It was built by Agrippa, son-in-law of Augustus, in his third consulate, 25 years before Christ. It was dedicated by him to Jupiter ultor, Jupiter the revenger; and had the name *Pantheon*, by reason of the great number of statues of the Gods ranged in niches all round it; and because built of a circular form, to represent heaven, the residence of the gods. It has but one door, and one window, receiving all its light from the top of its dome.

The pope obtaining this *Pantheon* of the emperor Phocas, converted it into a church, without any alteration in the building; and dedicated it to the virgin, and all the martyrs.—And it still subsists at Rome under the title of *Notre Dame della Rotonda*.

The *Pantheon* of *Nismes*, was a temple in that city, wherein were 12 niches, or statues, supposed to have been destined for the 12 great gods.

In the clerical, is a magnificent chapel, called *Pantheon*, 35 feet in diameter, and 38 high, from the pavement which is of marble and jasper inlaid. The whole inside of the chapel is of black marble, excepting the luthern and some ornaments of jasper and red marble.

In this chapel are deposited the bodies of the kings and queens: there are only places made for 26: eight of which are already filled. See *ESCRUAL*.

PAPA. See the article *POPE*.

PAPAL Crown, is a deep cap, or mitre of cloth of gold, encompassed with three coronets or circles of gold, adorned with flowers; and the whole enriched with precious stones; having a globe at top, finished with a cross. See *CROWN*.

PAPER*, a thin flexible leaf, usually white, artificially prepared of some vegetable substance, chiefly to write upon, with ink.

* The word is formed from the Greek *πᾶν*, *Papyrus*, the name of an Egyptian plant, called also *βύβλος*, *Biblus*, whereon the ancients used to write.

Various are the materials, on which mankind in different ages and countries have contrived to write their sentiments; as on stones, bricks, the leaves of herbs, and trees, and their rinds or barks; also on tables of wood, wax, and ivory; to which may be added plates of lead, linen rolls, &c. At length the Egyptian *Papyrus* was invented; then parchment, then cotton *Paper*, and lastly the common or linen *Paper*.*

* *Ud. Masbl. de Re diplomat.* l. 1. c. 8. *Fabric Bibl. Ant.* c. 21. *Leo Allat. Adv. Histr.* p. 127. *Hug. de Scrib. Origin.* Alex. ab Alexand. l. 2. c. 30. *Barthol. Diff.* 4. *de Libr. Legend.* p. 90. *seq.*

In some places and ages they have even written on the skins of fishes; in others, on the intestines of serpents; and in others, on the backs of tortoises.—Not to mention what Epiphanius relates, that Moses received the law written on tables of sapphire; nor what the Cabalists dream, that the same was written on a globe of fire; nor lastly, of those military testaments

spoken of by civilians, which were written in the dust or sand.*

* *Ud. Masbl. de Re diplomat.* l. 1. c. 8. *Fabric Bibl. Ant.* c. 21. *§. 9. p. 610. seq. Ramm. Idea Syllim. Antiq. Liter.* p. 359.

There are few sorts of plants but have at some time been used for *Paper*, and books: and hence the several terms, *biblos*, *codex*, *liber*, *folium*, *tabula*, *titular*, *philura*, *selecia*, &c. which express the several parts on which they were written: and though in Europe all these disappeared upon the introduction of the *Papyrus* and parchment, yet in some other countries the use of divers of them obtain to this day.—In Ceylon, for instance, they write on the leaves of the Talipot*. And the Biamin MSS. in the Tulinga language, sent to Oxford from Fort St. George, are written on leaves of the Ampana or Palma Malabarica*: Hermannus gives an account of a monstrous palm tree called, *Codia pana*, or *Palma Montana Malabarica*, which about the 35th year of its age, rises to be 60 or 70 foot high, with plicated leaves nearly round, 20 foot broad; wherewith they commonly cover their houses; and on which they also write; part of one leaf sufficing to make a moderate book. They write between the folds, making the characters through the outer cuticle*.

* *Knox. Hist. Ceyl.* l. 3. *Le Clerk. Bibl. Univ.* T. 23. p. 242. *Phil. Trans.* N° 246. p. 422. *seq.* *Vid. Hort. Ind. Malab.* p. 3. *Phil. Trans.* N° 145. p. 108.

In the Maldivce Islands, the natives are said to write on the leaves of a tree called *Macaraguean*, which are a fathom and a half long and about a foot broad. And in divers parts of the East Indies, the leaves of the Mufa Arbor or Plantain Tree dried in the sun, served for the same use, till of late that the French have taught them the use of European *Paper**.—Ray, in fine, enumerates divers kinds of Indian and American trees which bear *Paper*; particularly one called *Xagua*, which has something in it extraordinary; its leaves are so large, and of so close a texture, that they cover a man from top to toe, and shelter him from the rain, and other inclemencies of the weather like a cloak; and from the innermost substance of these leaves, a *Paper* is taken; being a white and fine membrane like the skin of an egg, as large as a skin of our vellum or parchment, and nothing inferior for beauty and goodness to the best of our *Papers**.

* *Vid. Savar. D. de Comm. T. 2. p. 967.* *Vid. Ray Hist. Plantar.* T. 2. l. 32. *Novo. Rep. Let. T. 12. p. 361.*

Paper is chiefly made among us of linen or hempen rags, beaten to a pulp in water, and moulded into square sheets, of the thickness required.—But it may also be made of nettles, hay, turnips, parsnips, colewort leaves, abesius, or any thing that is fibrous; nay, it may be made of white woollen rags; though this would not serve for writing, because of the hairiness*.—The Chinese *Paper* is so fine, that many of the Europeans have thought it was made of silk; not considering, says du Halde, that silk cannot be beat into such a paste, as is necessary to make *Paper**. But it is to be observed that the same author afterwards speaks of a *Paper* or parchment made of the balls of silk worms; and the like we are assured by others is done at Cathay*.

* *Hought. Collec. N° 360. T. 2. p. 418. seq.* *Descript. of Chin.* p. 360. *seq.* *Vid. Bulbeq. Legat. Turc. Epist.* 4. p. 320.

PAPER, with regard to the manner of making it, and the materials employed therein, is reducible to divers kinds: as the *Egyptian*, *European* and *Chinese Paper*: we also find mention of *cotton Paper*, *bark Paper*, and *asbestine* or *incombustible Paper*.

Egyptian PAPER, is that which was principally used among the ancients: it was made of a rush called *Papyrus*, or *Biblus*, growing chiefly in Egypt about the banks of the Nile: though it was also found in India; and Gualandinus assures us, he saw in Chaldaea at the confluence of the Tygris and Euphrates, large fens, wherein with his own hands he plucked a *Papyrus* differing in nothing from that of the Nile. Strabo likewise speaks of a sort of *Papyrus* growing in Italy; but we do not find that this was ever used for making *Paper*.

The description given by Pliny¹ of the *Papyrus*, or *Paper-reed*, is somewhat obscure. Its root, according to him, is of the thickness of a man's arm, and ten cubits long: from this arise a great number of triangular stalks 6 or 7 cubits high, each thick enough to be easily spanned. Its leaves are long like those of the bul-rush; its flowers flameous, ranged in clusters at the extremities of the stalks; its roots woody and knotty like those of rushes, and its taste and smell near akin to those of the *Cyperus**.

¹ *Vid. Plin. Hist. Nat.* l. 13. c. 11. ² *Vid. Theophr. Hist. Plant.* l. 4. c. 9. and Dalecamp. who gives us a figure of it, *Hist.* l. 18. p. 183.—See also Bauhin. l. 18. c. 186. who with Gesner makes it a species of *Cyperus*. *Grew. Mus. Reg. Societ.* p. 2. *sect. 2. p. 225. seq. Masbl. Jncor. Diplom. Bibl. Ital. T. 2. p. 246.*

Besides *Paper*, they made sails, ropes, and other naval rigging; as also mats, blankets, clothes, and even ships, of the stalk of the *Papyrus*. Moses, we are told, when a child, was exposed on the banks of the Nile, in *βύβλος*, *i. e.* in a basket of *Papyrus*. Add, that the Egyptian priests wore shoes of *Papyrus*. Gualandinus,

Guilandinus, a Prussian physician before mentioned, has a celebrated work expressly on the ancient *Papyrus*, by way of commentary on three chapters of Pliny*, wherein is amply, and with great learning, explained all that relates to this subject; yet Scaliger has written a severe critique on it**, in which some inaccuracies of Guilandinus are pointed out***, but this has not hindered Kirchmayer from adopting almost Guilandinus's whole book in his dissertation on the *Papyrus*****. Add, that the most ingenious and learned count Scipio Maffei has lately vindicated Guilandinus against the exceptions of Scaliger, as well as of Vossius and Hardouin.—*Vid. Ist. Diplomat. l. 2. Bibl. Ital. T. 2. p. 248.*

* *Melch. Guilandini Papyrus*, h. e. *Commentarius in tria C. Plinii Majoris de Papyri capita*, sc. lib. XIII. c. XI, XII, XIII, first published at Venice in 1572. and afterwards at Amberg in 1613, by Salmuth.—It seems Guilandinus intended a commentary on the whole of Pliny's *Natural History*; but this small part, not exceeding a moderate page, taking him up full six months, 'tis no wonder he was discouraged from proceeding with the rest. In these three chapters he has retorted above twenty passages in the text of Pliny, not merely from his own conjecture, or the help of MSS. but from the nature of the things described, and the testimonies of authors of the first rank: he shews that, he had been upon the spot, where formerly the *Papyrus* was manufactured, and had carefully examined all the ancient Greek and Latin authors who speak of it.

** *Jos. Just. Scaligeri Animadversiones in Melchioris Guilandini Commentarium in tria C. Plinii capita*, lib. XIII. *Historia Mundi sive Naturalis, quibus agit de Papyro*, first published in the *Lectiones bibliobucariæ memorabiles*, of Rudolphus Capellus, at Hamburg in 1682.—Where he follows Guilandinus step by step, finds as many faults in him as his father had done in Cardan, and uses him altogether as coarsely; every where pointing out his literary mistakes, and labouring to shew, that instead of restoring Pliny, he has often mistaken and corrupted him.

*** *M. Seb. Kirchmayeri Uffenbaimensis Franci Dissertatio Philologica de Papyro æterum*, Wittenbergæ 1666. 4to.—He had done better service, if besides Guilandinus he had consulted others, and particularly Scaliger. But as he chose to follow one rather than many, and that too as the blind follow their guides, his fate has been much the same.

The origin of the art of making *Paper* of the *Papyrus* is very obscure: no doubt it was first discovered in Egypt. Isidore fixes it more particularly to the city Memphis.—Orig. l. 6. c. 10. In which he seems to be countenanced by Lucan, where he says

Nondum flumina Memphis contexere Biblos
Neverat.—Pharal. l. 3. v. 222.

The Æra of this invention is warmly disputed: Varro, the most learned of the Romans, fixed it to the time of Alexander the Great, after the building of the city Alexandria by that conqueror; but several objections of no small weight are brought against this decision. Pliny recites a passage out of a very ancient annalist, one Cassius Hemina, wherein mention is made of *Paper* books found in Numa's tomb 535 years after his Death, which had been buried with him: Now Numa was prior to Alexander by above 300 years. Guilandinus in effect, maintains with great erudition, that the name and use of the *Papyrus* were known to the Greeks long before Alexander conquered Egypt; and that the words *βιβλος* and *βιβλίον* occur in their received signification in authors prior to, or at least older than Alexander, particularly Anacreon, Alcaeus, Plato the comedian, Aristomenes, Cratinus, Antiphanes, Plato the philosopher, Æschylus and Aristotle. And whereas some speak of I know not what, *pseudo biblus*, known before the discovery of the true sort, he argues on the contrary, that the *biblus* mentioned by those authors prior to the conquest of Alexander, appears from Herodotus, Theophrastus, and others, to be the very same plant with the *Biblus* or *Papyrus*, of which *Paper* was afterwards made. Even Homer and Hesiod, the most ancient Greek poets, and who, by Herodotus's testimony, lived about 400 years before himself, appear to have been no strangers to the *Papyrus*, since they both make express mention of it b.

* *Vid. Plin. l. 13. c. 13.* b *Guiland. Papyr. Memb. 2. Reimm. Ida Syst. Antiq. Liter. p. 285, seq. Kirchman. Diff. de Papyr. Art. 11. §. 2.*

To this it may be answered, that supposing the plant *Papyrus* known in Greece long before Alexander's conquest of Egypt, it no more follows, that they had then the use of *Paper*, than it follows that men had wine immediately on the discovery of the Vine: this last it is certain was known among them long before they made wine; and to this day, a part of the new world called *Florida* is said to abound with vines, though no use have been yet made of them either by the inhabitants or the Spaniards. As it was with the vine, which must have been known before wine could be made from it, so it is with *Papyrus*, which among the Greeks was long used for tying up things, before it came to be written on. In reality, Guilandinus produces testimonies from Anacreon and Alcaeus, in which the *Papyrus* is employed for binding and not for *Paper*: add, that he ill translates *ἡ ἑρμηνεία*, Ellychnium, since *ἡ ἑρμηνεία* here is the torch itself. Nor does the Poet say it was made of *Papyrus*, but tied up with it.—*Vid. Scalig. ib. cit. Reimm. ubi supra, p. 305, seq.*

Some have even doubted whether the art of manufacturing the *Papyrus* was so ancient as Alexander's time; chiefly on this ground, that for 200 years after Alexander, men wrote on skins, and on the barks of trees: But this is no-wise conclusive. The scarcity of the new manufacture may account for it: for some ages afterwards, even as low as Tiberius, we read of such a scarcity of *Paper*, that its use even in contracts was dispensed with by a decree of the senate, and the opinion of the judges. The same consideration may be carried further: *Paper* might have been known in Egypt, Judæa, Syria, and Asia on this side Taurus, long before the Birth of Alexander, though not in common use: but it might be later ere the Europeans received it; and probably it was by means of Alexander's conquest that it first became publicly known there.

When the manufacture of the Egyptian *Paper* ceased, is another question; for at present the *Papyrotechnia Egyptiaca* may be reckoned among those arts that are lost. Eulathius, the learned commentator on Homer, testifies, that even in his time, viz. in 1170. it was diffused; Mabillon indeed maintains that it continued till the eleventh century after Christ, and cites one Fridegod, a monkish poet of the 11th century, as speaking of it as subsisting in the age before his, that is in the IXth; and that it continued longer, the same Mabillon endeavours to evince from several papal bulls wrote on it as low as the XIth century d.

c *Vid. Eulath. ad Homer. Odys. p. Voss. de Art. Gramm. l. 1. c. 37.* d *Vid. Mabill. de Re diplomat. l. 1. c. 8. §. 6, seq. Reimm. Ida Syst. Antiq. Liter. p. 311.*

Maffei, on the other hand, maintains, with more probability, that the *Papyrus* was generally diffused before the Vth century; for that we find no authentic records written on it dated since that time; those bulls of popes, cited by Mabillon, appearing rather to be written on cotton *Paper* e. But this we may observe, relates only to the general and legal use of the *Papyrus*.—For that it should have continued to be made by particular persons several hundred years after it first began to give way, is not to be wondered at.

e *Vid. Maffei Ist. Diplomat. loc. cit. Bibl. Ital. T. 2. p. 251.*

In reality, a more commodious sort of *Paper*, made of cotton, having been invented some ages before in the East, and coming to be introduced into Europe, seems to have turned the *Papyrus* out of doors.—To which the continual wars with the Saracens, by which the traffick to Alexandria was rendered precarious, might possibly not a little contribute.

Yet several books written on leaves of the *Papyrus* have even continued to our days: Mabillon says, he had one of them, and adds, that there was another in the Petavian library, being a volume in small folio, containing several Sermons of St. Augustin; he also mentions a third, containing that father's epistles, formerly belonging to the church of Narbonne, and now in the custody of Madame de Phirmacon. Besides the Homilies of Avitus bishop of Vienne, and divers diploma's or charters all written on the *Papyrus*, which appear to be less than 1100 years old f. But the decisions of this learned father concerning MSS. notwithstanding all his diplomatic skill so highly boasted of, are not always infallible: witness his taking the MS. of St. Mark's Gospel at Venice to be written on the Egyptian *Papyrus*, and that of Josephus at Milan not to be so.—Maffei shews on the contrary, that the former is cotton *Paper*, and that the latter appears at first sight to be Egyptian: not but the Venetian MS. is very old; but it has been so much used, that its leaves are as it were transformed into the original paste from whence they were made g.

f *Vid. Mabill. Suppl. ad Libr. de Re diplomat. Journ. des Sav. T. 32. P. 2. p. 992.* g *Vid. Maffei lib. cit. Bibl. T. 2. p. 252.*

Manner of making the Egyptian *PAPER*.—They began with lopping off the two extremes of the *Papyrus*, viz. the head and root as of no use in this manufacture: the remaining stem they slit lengthwise into two equal parts, and from each of these they stripped the thin scaly coats or pellicles*, whereof it was composed, with the point of a penknife**. The innermost of those pellicles were looked on as the best; and those nearest the rind or bark the worst: they were kept apart accordingly, and constituted different sorts of *Paper*.

* These pellicles are called in Pliny by twelve different names, viz. *phylura*, *ramentum*, *fibula*, *cutis*, *plagula*, *corium*, *tavina*, *subtegmen*, *batumen*, *pargina*, *tabula*, and *papyrus*.

** The generality of critics, in lieu of a penknife employ a needle to separate the pellicles: in which they are warranted by the common text of Pliny: *Præparantur ex eo chartæ, diviso acu in præterius, sed quam latissimas phyluras*. But Guilandinus makes a correction here: he had found by experiment, that the pellicles of *Papyrus* cannot be separated by a needle; but that a very sharp knife is required: for which reason instead of *diviso acu*, he reads *diviso fagite* b. In which he is followed by Maffei; though Hardouin, Vossius, Pitiscus, and others, retain the ancient reading c.

a *Vid. Guiland. Papyr. Memb. 10. §. 3. & 5.* b *Maffei Ist. Diplomat. ep. Bibl. Ital. T. 2. p. 247, seq.* c *Voss. de Art. Grammat. l. 1. c. 37. Pitisc. L. Ant. T. 1. p. 413. voc. Charta. Hardou. ad Plin. l. 13. c. 12.*

As the pellicles were taken off, they extended them on a table: then two or more of them were laid over each other transversely, so as that their fibres made right angles; in this state they

they were glued together by the muddy waters of the Nilus*. These being afterwards pressed to get out the water, then dried, and lastly flattened, and smoothed by beating them with a mallet, constituted *Paper*: which they sometimes polished further by rubbing it with a hemisphere of glass, or the like. — *Vid.* Plin. Guiland. and Maffei *loc. cit.*

* In other countries, where the waters of the Nile were not to be had, the pellicles were fastened together with a paste made of the finest wheat-flower, mixed with hot-water, and a sprinkling of vinegar.

There were *Paper* manufactures in divers cities of Egypt; but the greatest and most celebrated was that at Alexandria, where, according to Varro's account, *Paper* was first made. It is certain at least it was from hence that Greece and Italy were furnished, on account of the convenient situation of that port: and it is more than probable it was this that gave the Romans occasion to conclude the art had been invented there. It was not, till late, when Egypt was reduced into a Roman province, that they had much intercourse or even knowledge of the inland cities of Egypt, where *Paper* was also made.—The trade and consumption of this commodity were in reality incredible. Vopiscus relates, that the tyrant Firmus, who rebelled in Egypt, publicly declared he would maintain an army only with *Paper* and glue, *Papyrus* & *glutine*. This, Cafaubon understands as spoken of the produce, and revenue of *Paper*; though Salmassius takes it to be meant of the *Papyrus* itself, which could supply most of the necessaries of life.—*Vid.* Montfauc. *Palæogr. Græc.* l. 1. c. 2. p. 14.

We find divers species of Egyptian *Paper* mentioned in ancient writers: some denominated from the places where they were manufactured; as 1^o the *Amphitheatrica*, supposed to have been made in some building belonging to an amphitheatre at Alexandria. Tho' Guilandinus, with more probability, reads it *Athribitica*, from *Athribis*, a city in the middle of the Delta, which was the place of its manufacture. What countenances this correction, is, that we find mention of this *Paper* before there was so much as an amphitheatre at Rome, much less at Alexandria.—2^o *Saitica*, made in the city Sai.—3^o *Tenistica*, or according to others *Taitica*, whose place authors are not agreed on. There were also other sorts denominated from the makers; as 1^o the *Panniana*, from the grammarian Rhem. Pannius Palæmon, who kept a *Paper* work. This kind was small, but finer than the amphitheatrical *Paper*; being first wrought at Alexandria, and afterwards finished at Rome.—2^o *Claudia*, first made by order of the emperor Claudius. This was reputed the best of all, in that besides the two pellicles, in common with the rest, it had a third.

Others were denominated upon the uses they were intended for, as 1^o *Hieratica*, the first or oldest sort, which was appropriated to religious uses; this was afterwards denominated *Augusta* and *Liviana*, in complement to the emperor of that name, and his wife; who, according to some, improved and made it whiter than before.—2^o *Emportica*, or *Emporica*, a small and coarse sort, serving for shop-keepers uses to tie up goods, &c. The qualities for which the ancient *Papers* were prized, were their thinness, closeness, whiteness and smoothness; tho' their breadth also considerably enhanced their value.—That sort called *Charta Claudia* was thirteen inches wide; the *Hieratica*, eleven; the *Panniana*, ten; and the *Amphitheatrica*, nine: for the *Saitica*, it exceeded not the diameter of the mallet it was beaten with.

a See further, concerning the ancient *Paper* in Nigrifoli *Dist. de Charta ejusque usu apud antiquos. Ext. in Galler. de Mineru.* T. 3. p. 249, seq. Other authors are enumerated in Fabric. *Bibl. Antig.* c. 21. §. 9. p. 609. Pitisc. *L. Ant. loc. cit.*

Bark PAPER, if it may be so called, was only the *Liber*, or inner withthin rind inclosed between the outer bark and the wood of divers trees, as the maple, plane, beech, and elm, but especially the *tilia*, *quercus*, or linden-tree, which was that mostly used for this purpose.—On this, stripped off, flattened, and dried, the ancients wrote books; several of which are said to be still entire.

b *Vid.* Plin. *Hist. Nat.* l. 13. c. 11. Hardou *Not. ad eund. Suid. Lex in Vex. phage.* *Ibid. Orig.* l. 6. c. 13. Alexand. ab Alexand. l. 2. c. 30. Salmuth. *ad Pancirol.* l. 2. tit. 13. p. 252, seq.

Mabillon and Montfaucon speak frequently of manuscripts and diploma's on *Bark*, and are very express in distinguishing between the *Papyrus* used by the Egyptians, and the *Liber* or *Bark* in use in other countries. The two are alleged to differ in this, that the *Bark Paper* was thicker and brittle than the *Papyrus*, as well as more apt to cleave or shiver, by which the writing was sometimes lost; as is the case in a *Bark* manuscript in the abbey of St. Germain, where the bottom of the *Paper* remains, but the outer surface, on which the letters had been drawn, is in many places peeled off.

c *Vid.* Montfauc. *Palæogr. Græc.* l. 1. c. 2. p. 15. Mabill. *de Re Diplom.* l. 1. c. 8. Reimm. *lita Syst. Antig. Liter.* p. 311.

But Maffei, it must not be forgot, combats the whole system of *Bark* manuscripts and charters as a popular error; and maintains that the ancients never wrote diploma's on *Bark*; that the distinction between the *Papers* made of the *Papyrus* and of *Cortex* is without foundation; that the only use of the *Tilia* or Linden, was for making thin boards or tablets for diptycha or pocket-books, wherein they wrote on both sides, as is done

among us: an advantage which they could not have in the Egyptian *Paper* by reason of its thinness.

A late French writer on the rules of criticism wanders still farther out of the way; when he speaks of a sort of *Paper* in Egypt made of the pith of the cyperus. he describes the manner of preparation, which was by reducing this pith to a pulp, and then spreading it out in leaves.—*Vid.* Hon. St. Marie *Reflex. sur les Regl. de la crit.* T. 2. Diff. 4. p. 77. This we suspect for a chimera hatched only in the critic's brain.

Not but there occur divers anomalous sorts of *Paper*, which antiquaries are not a little puzzled with, what species to refer them to: such is that of two bulls in the archives of the church of Gironne issued by the antipopes Romanus and Formosus, between the years 891 and 895. They are two ells long, and one broad, and consist of two leaves or pellicles glued together transversely, and are still legible in most places. The conjectures of the French *Literati* in regard to these are numerous: the abbot Hinaut de Belmont has a discourse expressive on the occasion. Some will have them made of the leaves of the *Alga*, or seaweed—others of the leaves of a rush called *li Daga*, growing in the marshes of Rouffillon—others of *Papyrus*—others of *Cotton*—and others of *Bark*. So little certainty does there really appear to be in these things, on which the critics nevertheless often lay a great stress.—*Vid.* *Mem. de Trev.* Sept. 1711. p. 1559, seq.

Cotton PAPER, *Charta Bambicina*, *Βαμβακίνη* (thus called from *Βαμβαξ*, a word which anciently signified silk, though in after times, *Βαμβαξ* and *Βαμβαξ* came to denote *Cotton*) is a sort of *Paper* which has been in use upwards of 600 years, as is shewn by Montfaucon from several authorities: What is more, *Cotton Paper* appears to have been very common at the beginning of that time, and consequently must have been invented long before. In the French king's library are MSS. on this *Paper*, which by the character, and other circumstances, appear to be of the 11th century. Be this as it will, from the 11th century, *Cotton* MSS. are more frequent than parchment ones.

d *Vid.* Montfauc. *Palæogr. Græc.* l. 1. c. 2. p. 17, seq. item l. 4. c. 6. p. 209. Maffei, *lib. cit. Bibl. Ital.* T. 2. p. 252.

Incombustible PAPER is made of the *lapis asbestis*, or *linum vitum*, which will bear burning without being injured. See *ASBESTOS*. Dr. Bruckmann, professor at Brunwick, has published a natural history of the *Asbestine* or *Incombustible Paper*; and what is most remarkable, has printed four copies of his book on this *Paper*: they are deposited in the library of Wolfenbützel. *Vid.* *Bibl. Germ.* T. 14. p. 197.

The manner of making this extraordinary *Paper* is described by Mr. Lloyd, from an essay made by himself.—He pounded a quantity of the asbestos in a stone mortar, till it became a downy substance; then sifted it in a fine sieve, and by this means purged it indifferent well from its terrene parts; for that what earth or stones he could not pick out of it before, or at the pounding, being reduced to a powder, came through the sieve, the linum remaining. This done, he brought it to the paper-mill; and putting it in water in a vessel just big enough to make a sheet with such a quantity, he stirred it pretty much, and desired the workmen to proceed with it in the usual method, with their writing-paper mould; only to stir it about always before they put their mould in; considering it as a far more ponderous substance than what they used, and that consequently, if not immediately taken up after it was agitated, it would subside.

The *Paper* made of it proved but coarse, and was very apt to tear: but this being the first trial, there is reason to believe it might be much improved; nor did the workmen doubt, but in case it were pounded in one of their mortars for 20 hours space, it would make good writing-paper.—*V. Ph. Trans.* N^o 166. p. 824.

Linen or European PAPER, is chiefly made of linen rags beaten to a pulp with great hammers, and the foil carried off by a continual supply of fresh water conveyed among the pulp in little troughs, till it be rendered perfectly white.

Besides the chief use of this *Paper*, which is for writing and printing on, there is a great consumption of it in packing up goods, and on other occasions.

The Turks, Busbequius tells us, have a veneration for *Paper* which approaches to superstition: they will not profane or prostitute the least bit of it to vile uses; but fold it very neatly, and lay it up safe, because the name of God, or some text, forsooth, of the alcoran may be written on it.—*Vid.* Busbeq. *Epist.* 1. *Legat. Turc.* p. 50.

Books in large *Papers*, are those which have wider margins than those on small *Paper*, though otherwise of the same impression.

The manufacture of *Paper* has got footing in most countries; though France, Holland, and Genoa, are the places where it succeeds best. In the general, it depends much on the quality of the linen worn in the country where it is made: where that is coarse, and brown, &c. the rags, and consequently the *Paper* made thereof, must be so too. Hence the whiteness of the Dutch and Flemish *Papers*, beyond the Italian and French, and much more the German *Papers*. The English manufacture was a great while in no great reputation; but it is every day improving; inasmuch that we now import little of the ordinary sorts, which were formerly all brought from abroad.

Yet paper-mills are of some standing among us. We find one erected at Dartford as early as the year 1588, which we believe was the first, and which is celebrated by a noted poet of that age, Tho. Churchyard, in a work in verse, intitled, *A description and discourse of paper, and the benefits it brings; with the setting forth of a paper-mill built near Dartford, by a High-German, called, Mr. Symon, Jeweller to the queen, Lond. 1588.* 4^{to}.

In reality, the deficiency of the English Paper-manufacture, did not seem owing to much to the quality of our rags, as to the want of skill and attention in the makers. The encouragement given it by the legislature, in the high duty laid on foreign Paper imported, we hope it will in time deserve. How considerable this is, will appear from the following state.—Genoa royal fine Paper pays per ream, 7 s. 7 d. $\frac{1}{2}$.—Genoa royal second, 6 s. 10 d. $\frac{1}{2}$.—Fine Holland royal, 7 s. 7 d. $\frac{1}{2}$.—Fine Holland second, 5 s. —Ordinary royal, 2 s. 6 d. —Genoa demy fine, 3 s. 10 d. $\frac{1}{2}$.—Genoa demy second, 3 s. 1 d. $\frac{1}{2}$.—Dutch printing demy, 3 s. 4 d. $\frac{1}{2}$.—Genoa crown fine, 3 s. 1 d. $\frac{1}{2}$.—Genoa crown second, 2 s. 4 d. $\frac{1}{2}$.—Dutch crown fine, 2 s. 4 d. $\frac{1}{2}$.—Dutch crown second, 2 s. —Genoa fools cap fine, 3 s. 1 d. $\frac{1}{2}$.—Genoa fools cap second, 2 s. 4 d. $\frac{1}{2}$.—Dutch printing fools cap, 2 s. —Atlas fine, 28 s. 10 d.

When and by whom *Linen Paper* was invented, is a secret, which Polydore Virgil owns he could never trace^a. Scaliger will have it to have been found out by the Germans^b: Maffei affirms it certain, that the invention is owing to the Italians^c. Others ascribe it to some refugee Greeks at Basil, who took the hint from the manner of making *Cotton-Paper* in their own country^d. Commingus takes the Arabs to have first brought it among us^e. Perhaps the Chinese have the best title to the invention; who for many ages have made Paper much after the same manner^f, and even in some provinces of the same materials, viz. hemp, &c. &c.

^a Vid. Polyd. Verg. de Inventor. Rer. l. 2. c. 8. — ^b Vid. Secund. Scaliger. p. 7. Fabric. Bibl. Antiq. c. 9. §. 21. — ^c Hist. Diplomat. l. 2. Bibl. Ital. T. 2. p. 253. — ^d Vid. Phil. Trans. N^o 288. p. 1515. — ^e Vid. Comming. Epist. ap. Ad. Brud. Lips. An. 1720. p. 94. — ^f Savar. D. Comm. T. 2. p. 963. — ^g Du Hald. Deskr. Chin. T. 1. p. 367.

Linen Paper appears to have been first introduced among us, towards the beginning of the XIVth century.—The learned Contingius denies that there are many manuscripts of this Paper above 400 years old^h; with whom agrees the count Maffei, who finds no marks of its use before the year 1300ⁱ.

^h Vid. Conting. Epist. ap. Ad. Brud. Lips. An. 1720. p. 94.

ⁱ Maffei Hist. Diplomat. l. 2. Bibl. Ital. T. 2. p. 253.

Some indeed go much further back; and take the *Libri lintei* mentioned by Livy, and other Roman writers, to have been written on *Linen Paper*^k. But Guilandinus, and after him Al-latus and others, have sufficiently refuted this notion; and shewn, that the *Libri lintei* were written on actual pieces of linen cloth, or canvas, prepared for this purpose, such as painters still use; and not on Paper made of linen rags^l.

^k Vid. Liv. Dec. 1. l. 4. Plin. Hist. Nat. l. 11. c. 11. Pitisc. L. Ant. T. 2. p. 85. — ^l Guiland. Papyr. Memb. 25. Sal-muth. ad Pancrat. l. 2. tit. 13. p. 253.

Others run into the contrary extreme, and make Paper the invention but of a very little while ago. The jesuit Inchofer dates its origin about 250 years ago^m: with whom agrees Milius in his *Hortus Philosphicus*, who maintains, that the art of making Paper was not invented till about the year 1470ⁿ. Of the same opinion seems Ray, who tells us the art of making this paper was not known in Guensey, till the year 1470, and when two persons, named Anthony and Michael, first brought it to Balle, out of Galicia in Spain^o. In effect, if the invention be owing to the refugee Greeks at Basil, who fled thither after the sacking of Constantinople, it must at least be posterior to the year 1452, when that city was taken^p. Some add a further argument for the novelty of Paper, drawn from the novelty of hempen cloth, which Rabalais, who died in 1553, mentions as first found out about an hundred years before him; and which was so scarce in the time of Charles VII. of France, who died in 1461, that the queen his wife, was the only woman in France that had a couple of shifts of it^q.

^m Vid. Mabill. de Re. Diplom. l. 1. c. 8. Reimm. Idea Syst. Antiq. Liter. p. 313, seq.

ⁿ Balbin. Miscell. Hist. Bohem. c. 22.

^o Act. Brud. Lips. 1682. p. 243. — ^p Ray Hist. Plant. l. 22.

^q Phil. Trans. N^o 288. p. 1515. — ^r Naud. de. p. 82. Nouv.

Rep. Let. T. 26. p. 571.

But these suggestions are refuted by Mabillon, from the testimonies of writers prior to the time here spoken of, and from many manuscripts of about 400 years old, which are written on *Linen Paper*^r. The jesuit Balbinus produces divers instances of Paper MSS. written before the year 1340^s. An ingenious writer of our own country assures us, he had a piece of Paper which agreed well with a charter dated in 1358, in the 32^d year of Edward III. He adds, that in the archives of the library belonging to the dean and chapter of Canterbury, is an inventory of the goods of Hen. 3, prior of Christ Church, who died in 1340, written on Paper; and that in the Cotton Library there are several writings on our Paper in the times of most of our Kings and queens as high as the 15th of Edw. III.

which coincides with the year 1335^t. And Dr. Prideaux affirms us he has seen a registration of some acts of John Crandun, prior of Ely, made on Paper, which bears date in the 14th year of king Edward II. that is, anno Dom. 1320.

^t Mabill. loc. cit. — ^u Balbin. lib. cit. — ^v Phil. Trans. N^o 288.

^w p. 1515. — ^x Prid. Connec. p. 1. l. 7. p. 710.

Add, that the invention of Paper may appear more modern than it is, by reason records were not used to be wrote on it, but it was a considerable time confined to letters, and other fugacious compositions; which is so true, that, to this day, few instruments of any consequence are written on it, though it have been so long in use.—It is even alledged, that Peter, the venerable abbot of Cluny, who died in 1157, has a passage in his book against the Jews, which plainly indicates Paper books to have been then known; on the authority whereof Valefius, in his notes on the panegyric of Berengarius Augustus, scruples not to make Paper upwards of 500 years old.—*Vid. Mabill. libi sup. Reimm. loc. cit.*

Father Hardouin assures us, he had seen records or diplomas on it prior to the XIIIth century.—But this will hardly be credited. Count Maffei assures us, that in all his researches he could never meet with one more ancient than the year 1367. It is highly probable the learned jesuit mistook a Cotton manuscript for a Linen one: a mistake easily made, as the chief difference between the two consists in the greater thinness of the Linen Paper. But it is known we have Linen Papers of very different degrees of thickness; and the like may be said of those of Cotton.—*Vid. Maffei Hist. Diplomat. l. 2. Bibl. Ital. T. 2. p. 253, seq.*

The invention, according to Prideaux, seems to have been brought from the East; for that most of the old MSS. in Arabic, and other Oriental languages, are written on this sort of Paper: some of which are certainly much older than any of the dates above-mentioned. This author thinks it most probable that the Saracens of Spain first brought it out of the East into that country; from whence it was propagated through the rest of Europe.—*Vide Prid. ubi supra.*

Method of making Linen Paper.—The process begins with preparing the rags.—These, when brought to the paper-mills, are first to be sorted into what they call the *grobins fine*, *grobins second*, and *grobins tres*: for among the rest there will be some linsey-woolsey, which the dirt makes indissoluble till they are once washed.—The way of washing, is by putting them in a punchon with many holes in the bottom, and grates on the side made of strong wires. Here are the rags to be often stirred, that the dirt may run from them.

When sufficiently washed, they are laid in square heaps, and covered close with pieces of clean facking, till they thoroughly sweat and rot, which is called *fermenting*, and is usually performed in four or five days; if they be not taken up from these heaps in the due time, they are apt to mildew, discolour and take fire. When duly fermented, they twist them in handfuls, then cut them with a sharp hook set fast in a frame, with the point upwards, and the edge from the workman; fill drawing them upwards, and cutting them piece by piece about half an inch long, or as short as the fingers will allow.

With the rags thus prepared, they prime or feed the mortars, which are made oval, and about half a yard deep, of heart of oak well seasoned. At the bottom of each is an iron plate an inch thick, eight inches broad, and thirty long; shaped inward like a mould for a salmon with head and tail rounded. In the middle is a washing block grooved with five holes in it, and a piece of hair sieve fastened on the inside. This keeps the hammers from touching it, and prevents any thing going out except the foul water.

The mortars are supplied with water night and day by little troughs, from a cistern fed by buckets fixed to the several floats of a wheel, so long as the wheel goes.

In these mortars the rags being beaten fit for a remove to the presses just by, they take them out with little iron hooked pails; this they can do out of any of the mortars, whose hammer they can stop whilst the others work. This makes what they call the *first stuff*.

From the mortars, this first stuff is lodged in boxes of five foot high, made like the corn-chandlers bins, with the bottom board a-flant, and a little separation on the front for the water to drain away.—The pulp of rags being in, they take away as many of the front boards as are needful, and press the mafs down hard with their hands: the next day they put on another board and add more pulp, till the box is full. And here it remains mellowing a week, more or less, according to the weather.

In the whole process, there must be no iron work where it may be liable to grow rusty, which would ironmould the stuff, and stain the Paper.

After this, the stuff is again put into clean mortars, and is beaten afresh, and removed into boxes as before; in which state it is called the *second stuff*.

The like we are to understand of the third deep, which fits it for the pit mortar, when it is again beaten, till some of it being mixed with fair water, and brewed to and fro, appears like flower and water without any lumps in it.

Thus prepared, it is fit for the pit mortar which has flat hammers without nails. Into this, by a trough, runs water continually

tinually whilst they work at the fat, and here the beating and water dissolves it perfectly: after which it is carried into the fat, and more is brought from the boxes.—And thus they do successively.

The fat is primed according to art, when the liquor has such a proportion of the pulp, as that a mould dipped in it, will take up as much as will make the sheet of *Paper* of the thickness desired. A mould is a square sieve about an inch deep, bottomed with brass-wire-cloth, supported with sticks to prevent the wire from bagging down, and to keep it perfectly horizontal: for that if it any way bags, one part of the sheet of *Paper* will be thicker than the other.

This mould the maker dips, with a dekle on, into the fat, and takes it out again shaking it, that the water may run clear from the pulp in the sieve, and thus he delivers it to the coucher, who couches it upon a felt laid on a plank, and lays another felt on it; and so successively, a sheet and a felt, a sheet and a felt, till a post, *i. e.* one preffing, containing six quires, be made.—Of post *Paper* they may make twenty posts or more per day.—The coucher having done his office, returns the mould to the maker, and the maker to the coucher successively. A post being made, either the maker, or coucher whistles; upon which four or five men advance, one whereof draws the post under the prefs with two little hooks; and the rest prefs it with great force till no water is left, which is quickly done with two or three pulls.

This being done, the post is pulled from the prefs, and set on the right side by the laying stool; then the layer takes off the first felt, returns it to the coucher, and lays the first sheet on the laying stool, over which he lays the second, then the third very regularly; and thus successively till the whole post be laid out.—Which done it is set by till toward the end of the day; and then the whole day's work is preffed again, and the sheets are set exactly one on another, so that the whole looks like one solid pasteboard.

This, after two or three pulls, as before, is taken out again by the dry workman, and carried up into the loft, and hung six or seven sheets together upon lines fastened to a thing called a *Tribble*, each tribble containing thirty lines ten or twelve foot long.

When thus dried it is taken down, laid on a three footed stool, and there rubbed smooth with the hands; and afterwards placed in heaps, seven or eight foot high, in a very dry place; where it stands till the fizing, which is the next operation.

Choosing a fine, dry, temperate day, they put into a copper two barrels of water; and into this, when just warm, they put sixty pounds weight of clean parchment or vellum shavings; which they boil till it be reduced to a perfect fize; they then strain it through a fine cloth, on which is strewed a due proportion of white vitriol and roch-allom finely powdered, into a tub a foot deep.

Near to this tub are brought four or five reams of the *Paper*; and a full gage, or so much as can be taken up with the hands at a time, is dipped into the fize, being as hot as the hands can well bear it; and by a certain gentle quick management, it is so ordered, that every sheet shall be preffed: after which it is put regularly into the prefs, and when preffed, moved thence into the drying loft, and hung usually sheet by sheet till dry. But care is taken, that the direct rays of the sun come not nigh it till it be dry, which would otherwise endanger the evaporation of the fize. When thoroughly dry it is taken down, smoothed with the hands as before, heaped, preffed hard, and so it stands all night. Next morning it is taken out, and carried into the storehouse, where it is sorted; what is fit for inside quires, are laid by themselves, and the outside by themselves; and then it is preffed again, and so commonly stands all night. In the morning it is carried into the storehouse again, where it is told into quires of 24 or 25 sheets each, folded, laid by in heaps; and when there is a prefs full, it is preffed again, double for a while, and then made into reams of twenty quires each, and bales of 10 reams to a bale^a.

^a Vid. Hought. Collect. T. 2. p. 412, seq.

^b Moor's Mathem.

The broken sheets are commonly put together, and two of the worst quires are placed on the out-sides of the ream, called the *Out-side* quires; thus being tied up in wrappers made of the setting of the fat, it is fit for sale.

With some of the aforesaid pulp, is also made pasteboard, after the same manner as *Paper*, only that it is thicker. See PASTEBOARD.

With a fine sort of this pasteboard, they also make playing cards. See CARDS.

Paper is sold by the ream, every where we think, except in the paper-works of Auvergne, where it is sold by weight, at the rate of 14 ounces to the pound; each ream, according to its kind, being to weigh a certain number of pounds, prescribed by authority.—Savar. *loc. cit.*

PAPERS are of various kinds.—With regard to colours, they may be divided into *white*, *brown*, *blue*, &c.—With regard to quality, into *fine*, *second*, *bylards*, *superfine*, &c.—With regard to use, into *writing*, *printing*, *preffing*, *cap*, *cartridge*, *cap*, *chanser*, *post*, &c.—With regard to dimensions, into *demis*, *medium*,

creux, *fol-roy*, *fol royal*, *super-royal*, *imperial*, *diaphan*, *atlas*, &c.—With regard to country, into *German*, *Luxemb.*, *Rabul*, *Genoa*, *Holland*, &c.

French *Papers* are divided into *large*, *middle* and *small*.—To the small belong these called, *petit Roman*, *petit Raisin*, or *Bidon royal*, *petit non de Jeau*, and *petit a la main*, all thus nominated from the marks impressed on them in making. Also the *Carter* for the backs of playing cards; *Pot* for the figure side; *Couronne*, which has commonly the arms of the comptroller general of the finances; *Tellier*, with the arms of the late chancellor *Tellier*, and a double T; and *Champy*; or a *Chaffis la Serpente*, so called from its mark, the serpent; which being extremely fine and thin; is used by fan-makers. To the middling sort belong the *grand Raisin simple*, *Carré simple*, *Cavalier*, and *Lombard*, the three last of which are for printing; *l'Ecu*, or *de compte simple*, *carré double*, *l'Ecu double*, *grand Raisin double*, and *Couronne double*, which three last are denominated *double* on account of their streight and thickness. Add to these the *Pantalon*, or *Paper* with the Dutch arms, and *grand Corinet*; so denominated from the impression on it.

To the large, belong the *grand Jesus*, *petite & grande fleur-de-lis*, *Chapelet*, *Colombier*, *grand Aigle*, *Dauphin*, *Soleil*, and *l'Etoile*, which are thus called from the figures they bear, being all proper for printing either at the letter-press, or rolling-press; also for merchants books, and for drawing on. The *grand Aigle* is the largest of all.—*Id. Savar. D. de Comm. T. 2. p. 965, seq.*

We have also *Painted PAPER*, to hang rooms withal.—*Stained Paper*, to write obligations, deeds and contracts upon.—*Red Paper* for books of accounts, &c.—To which may be added *Cut-Paper*, and *Gilt-Paper* for letters, &c.

Blue PAPER, is a sort used by tradesmen to wrap up goods; as sugar-loaves, pieces of linen, &c.

Blotting PAPER, is *Paper* not fixed, and in which therefore ink readily sinks or spreads. It is used in books of account, &c. in lieu of sand, to prevent blotting and disfiguring the opposite pages. The same kind is likewise used by apothecaries in filtrating juices and other matters, for which the *Manna Hippocratis* is not so proper.

Tint, or *Demi-tint PAPER*, for designing on, is either *brown*, *blue*, or *bistre*.

Bislerd PAPER, is white *Paper* washed over with a sponge dipped in foot-water. Its use, is to save the labour of the crayon in places which are to be shadowed the same depth with the tint of this *Paper*.—For light places, they are made thereon with white chalk.—*Vid. Corneil. Elem. de la Peint. Prat. c. 15. p. 34, seq.*

Marbled PAPER, is a sort of *Paper* variously stained, or painted as it were with divers colours; made by applying a sheet on the surface of a liquor wherein colours diluted with oil or ox's gall are suspended.

The manner of making it is thus.—A trough is provided of the shape and dimensions of a sheet of the *Paper* to be marbled, and about four fingers deep, this is made of lead or wood well joined, and pitched or primed to contain the liquor.—For the liquor, a quarter of a pound of gum tragacanth is macerated four or five days in fair water; this they stir from time to time, and add to it daily fresh water, till it be of a consistency somewhat thinner than oil; then they strain it into the trough.

The colours to be applied thereon, for blue, are indigo ground up with white lead.—For green, indigo and orpiment, the one ground, and the other tempered; mixed and boiled together with common water.—For yellow, orpiment bruised and tempered.—For red, the finest lake, ground with rappings of brazil wood which has been prepared by boiling half a day. Into all these colours they put a little ox or fish-gall, which is two or three days old; and if the colours dilate not of themselves sufficiently they add more gall.—On the contrary, if they spread too much, the gall is over-dosed, and must be corrected by adding more of the colour without gall.

For the operation of marbling: when the gum is well settled in the trough, they extend a sheet of *Paper*, and plunge it very shallow into the liquor, suddenly lifting it out again, in order to stir up, and raise the subsiding gum towards the surface, and for the more universal impregnating of the liquor.

This done, and all the colours ranged in gallipots on the table, where also the trough is placed, they begin by dipping a brush of hog's hair into any colour, commonly the blue first, and sprinkle it on the surface of the liquor: If the colour has been rightly prepared, it will dilate itself duly therein.

This done, the red is applied in the like manner, but with another pencil.—After this the yellow; lastly the green: for white, it is made by only sprinkling fair water, mixed with ox's gall, over the liquor.

When all the colours are thus floating on the liquor; to give them that agreeable cambletting which we admire in *Marble Paper*, they use a pointed stick, which being applied by drawing it from one side of the trough to the other with address, stirs up the liquor and fluctuating colours; then with a comb taken by the head with both hands, they comb the surface of the liquor

liquor in the trough from one extreme to another, permitting only the teeth to enter: this being performed with a gentle and uniform motion, makes those clouds and undulations whereon much of the beauty of the *Paper* depends.

If it be further desired to have the colours lie in any other fantastical posture, representing serpents or the like, it is effected with the pointed stick abovementioned, by drawing it over what has been already combed; but this must be done with a dexterous hand, and with a shallow dip into the liquor, circling as if you would draw some flourish, or figured letter.

Lastly, the colours being in this posture, the operator displays, and applies on them a sheet of white moistened *Paper*; to do which artist-like, requires a slight only to be obtained by practice; for that the surfaces of the liquor and the *Paper* are to meet equally in all parts: which done, before the colours have time to soak through, which, unless the paper be very thick, will be in the space of two or three pulses, he lifts up the *Paper* nimbly, and with an even hand; and then after spreading it a while on a board, hangs it on a line to dry; which when sufficiently done, they polish it with a marble stone, or ivory knob. It must be observed, that the sprinkling of the colours is to be renewed, and all the other ceremonies performed with the stick and comb at every application of a fresh *Paper*, by reason that every *Paper* takes off all the colour from the liquor.

* *Vid. Kirch. de Luce & Umbra*. l. 10. Par. 2. c. 4. *Merr. Observ. en Neri* d'art. *Vitr.* c. 42. p. 312. *Hought. Collect.* T. 2. p. 419, seq.

Some essays have been made to enrich the marbling by mixing gold and silver with the colours, which succeeded well in many attempts in the French king's library, though the expence has hindered the practice from obtaining.—*Savar. ubi supra.*

Chinese PAPER is of various sorts; some is made of the rinds, or barks of trees, especially those abounding in sap, as the mulberry-tree, and elm, but chiefly of the bambù and cotton-tree; but in reality, almost each province has its several *Paper*: that of Se-chwen is made of hemp: that of Fo-kyen, of soft bambù; that used in the northern provinces of the bark of the mulberry-tree: that of the province of Che-kyang, of wheat or rice-straw; that of the province of Kyang-nang, of the skin found in the silk-worms' balls. In fine, in the province of Hu-quang, the tree chu, or ko-chu furnishes the principal material for *Paper*.

For *PAPERS* made of the Barks of Trees; the manner of their preparation may be exemplified in the instance of that of the bambù, a tree of the cane, or reed-kind, being hollow, and divided into joints; but much larger, smoother, harder and stronger than any other sort of reed.

For this *Paper*, they ordinarily only use the second coat or skin of the bark, which is soft and white; this they beat in fair water to a pulp, which they take up in very large moulds or frames, so that they have sheets ten or twelve feet long, and sometimes more. They are completed by dipping them sheet by sheet in allom-water, which serves instead of the size used among us, and not only hinders the *Paper* from too freely imbibing the ink, but gives it that lustre which at first sight makes it look silvered, or at least varnished over. The *Paper* thus made, is white, soft and close, without the least roughness to stop the motion of the pen, or occasion the rising of any of its fibres. Though being made of the bark of a tree, it cracks more easily than the European *Paper*: add that it is more apt to take moisture, that the dust sticks to it, and that the worms soon get into it; to prevent which last inconvenience, they are obliged often to beat their books, and expose them to the sun. Add, that its thinness making it liable to be soon worn out, the Chinese are under a frequent necessity of renewing their books, by fresh impressions taken from their blocks.

† *Vid. le Compt. Nouv. Mem. sur Chin. Lett.* 7. *Kust. Bibl. nov. Libr. An.* 1697, p. 67, seq. *Lett. Edif. & Cur.* T. 19. p. 479.

But the *Paper* of the bambù, it is to be observed, is neither the best, nor that most used in China. In the former of these respects, it yields the priority to the paper made of the cotton shrub, which is the whitest and finest, and at the same time least subject to the inconveniences above-mentioned; for that it keeps as well, and is as durable as the European *Paper*.

Dr. Grew thinks we have many plants in England, which contain a down that in all probability would make as fine a *Paper* as that made by the Chinese from their cotton shrub.—By which it appears he mistakenly imagined that the Chinese *Paper* was made not from the rind of the cotton-shrub, but from the down or cotton itself.—*Vid. Grew Mus. Reg. Soc.* P. 2. §. 1. c. 5. p. 215.

But the *Paper* in most common use in China, is that made of the tree called *Chu-Ku*, or *Ku-Chu*, which du Halde compares, first to a mulberry-tree, then to a fig-tree, then to a sycamore-tree, and lastly, to increase the embarrass, to a strawberry-tree.—By all which, we know no more of it than if he had said nothing about it. But this is a way of describing very familiar to that author, who is often strangely jejune in the midst of the utmost prolixity, and is never more confused and incoherent, than when he aims most at order and Exactness. But to return to the *Ku-Chu*.

The method of preparing it for *Paper*, is by first scraping off lightly the thin outside of the tree, which is greenish: then they take off the inner rind in long thin slips, which they blanch in water and in the sun; and afterwards prepare them in the same manner as the bambù.

It must not be forgot, that in the other trees it is only the inward bark that serves for making *Paper*; but the bambù, as well as the cotton shrub, have this peculiarity, that not only their bark, but their whole substance may be employed, by means of the following preparation.

Out of a wood of the largest bambù's, they select shoots of a year's growth, which are about the thickness of the calf of a man's leg: these they strip of their first green rind, and split them into strait pieces of six or seven foot long: the pieces thus cleft, they steep in a pond of muddy water, till they rot and grow soft by the maceration. In a fortnight they take them out, wash them in clean water, spread them in a large dry ditch, and cover them with lime for a few days; then they take them out again, and having washed them a second time, they slip them into small filaments, which they expose in the sun to dry and whiten: then throw them into large copper, where they are thoroughly boiled: and lastly reduce them by the strokes of large hammers to a thin paste, or pulp.

After this they take some shoots of a plant called *Ko-teng*, they soak them four or five days in water, till there come out an unctuous fizzy sort of juice; this they mix with the pulp of which the *Paper* is to be made, somewhat in the same manner as painters temper their colours; care being taken not to put in too much, nor too little of it, on which the goodness of the *Paper* much depends.

When they have mixed the juice of *Ko-teng* with the cleft bambù, and beaten the whole till it resembles a thick clammy water, they pour it into a large deep reservoir, consisting of four walls raised breast high, and having the sides and bottom so cemented, that the liquor cannot run out nor soak in.

This being done, and the workmen placed at the sides of the reservoir, they dip in their moulds, and take up the surface of the liquor, which almost instantly becomes *Paper*; the mucilaginous and gummy juice of the *Ko-teng* binding the parts, and rendering the *Paper* compact, soft, and glossy, qualities which the European *Paper* never has when first made.

To harden the sheets, and make them bear ink, they dip them in allom-water: this operation is called *Faning*, from the Chinese word *Fan*, which signifies allom. The manner is this.—Six ounces of fish glue cut very small, are put in divers porringers of water, which they afterwards boil up, stirring it all the time to prevent lumps: when the whole is reduced to a liquid substance, they throw into it three quarters of a pound of calcined allom, which they melt and incorporate with it. This mixture is next poured into a wide basin, across which is laid a small round stick: then they shut the edge of each sheet in another stick cleft from end to end, and in this manner dip the sheet, gently drawing it out as soon as it is wetted, by sliding it over the round stick. When the whole sheet has been passed nimbly through this liquor, which makes it whiter and more compact, the long stick that holds the sheet by the edge, is stuck in a hole in the wall, and the sheet hung up to dry.—For the mould wherewith they take up the sheet, its frame is so contrived that it may be raised or lowered at pleasure; and its bottom is not made with wire, as ours, but with little slender slips of bambù drawn several times through holes made in a steel plate, whereby they are rendered as fine as wire: they are then boiled in oil till thoroughly soaked, that the mould may enter lightly into the water, and not sink deeper than is requisite to take up matter enough for a sheet.

To make sheets of any extraordinary size, care is taken to have a reservoir and mould large in proportion. This mould is sustained by strings which pass over the pulley; and the moment these pull up the frame, the workmen placed aside the reservoir, assist to take the sheet off; working together in a regular manner. For drying the sheets when taken off, they have a hollow wall, whose sides are well whitened: at one end hereof is an aperture, through which, by means of a pipe, they convey the heat of a neighbouring furnace: and at the opposite end is a small vent to let out the smoke. By help of this sort of stove, they dry the *Paper* almost as fast as it is made. Silvering of *Paper*, as it is called, is another secret among the Chinese, practised at a very small charge, and without using any silver.—In order to this, they take two scruples of glue made of neat's leather, one scruple of allom, and half a pint of clean water: these they simmer over a slow fire, till the water is consumed, that is, till no more steam arises; then on a smooth table they spread some sheets of *Paper*, and on this, with a pencil, they apply two or three layers of the glue: then they take a powder made of talc boiled, and mixed with the quantity of allom: the two are ground together, sifted, and the powder boiled again in water, then dried in the sun, and lastly pounded again.—This powder they sift through a fine sieve, spreading it uniformly on the sheets prepared as above: after which they hang them in the shade to dry; and this effected, they lay them again on the table, and rub them gently with clean cotton to take of the superfluous

fluor talc, which serves a second time for the same purpose. With this powder diluted in water mixed with glue and allom, they draw any figures at fancy on the *Paper*—*Vid. Du Hald, Descrip. Chin. T. 1. p. 368, seq.*

PAPER-CLOTHES became a mode a few years ago in France. M. Flachs has a dissertation exprets on the subject, wherein he tells us this fashion scarce outlived half a day; and undertakes to shew that it is no new thing, but had been practised among the ancients. But then it should be considered that the old Egyptian *Paper* was a very different thing from ours; as being likewise used for sails, ropes, &c.—*Bibl. Germ. T. 1. p. 260.*

PAPER-MILLS, (in the court of king's bench) is where the writings belonging to that court are repositied.

PAPER-OFFICE, (in the palace of Whitehall) is where all the publick writings, matters of state and council, proclamations, letters, intelligences, negotiations of the king's ministers abroad, and generally all the papers and dispatches that pass through the offices of the secretaries of state, are lodged, and disposed in the way of library.—It was chiefly from this noble repository that bishop Burnet had materials for his history of the reformation.—*Vid. Nichol. Eng. Hist. Libr. P. 3. c. 1. p. 180.*

PAPER-PORTRAITS, and Pictures.—One Elizabeth Pyberg, who lived at the Hague in 1699, cut in *Paper* not only towns, as Loo and Hounslersdyke, but even faces to an extreme likeness. Mr. Ellys assures us, she did king William and queen Mary better than any limner he had ever seen, and refused 1000 guilders for the pieces: which were so curious, that he could not believe the queen's drapery not to be point till he had most exquisitely inquired into it.—*Vid. Phil. Transf. N° 286. p. 1418.*

PAPERS is a Term also used for writings, especially those relating to a man's estate, property, dealings, or the like.

In which sense, *Papers* include books of accounts, invoices, and orders; also deeds, bonds, charters, and the like.

PAPERS is also sometimes used for manuscript-books. Such an author left his *Papers* to *** college. Several of Sir Isaac Newton's *Papers* have been published since his death.—Tournefort assures us, that the heirs of M. de Peirek warmed themselves a whole winter with the *Papers* he left in his cabinet. But it had been cheaper, adds M. Tournefort, if they had burnt cedar, or aloes wood.—*Vid. Journ. Liter. T. 12. p. 64.*

PAPERS is more particularly used of late days for gazettes, journals, and other public news-writings.

In this sense we say, to read the *Papers*: the *Papers* abound with falsehoods: the multitude of *Papers* is become a burthen on coffee-houses, but an advantage to the revenue.—We have daily *Papers*, weekly *Papers*, morning *Papers*, evening *Papers*, occasional *Papers*, political *Papers*, literary *Papers*, *Papers* of entertainment, &c.

PAPER, among bankers and other negociants, is also used for bills of exchange, bank, and promissory notes, &c.

I have no money to give you, but only *Paper*; *Paper* indeed as good as ready money. In the year 1720, multitudes were ruined by changing their money and lands for *Paper*. It is the use and effect of credit to represent money by *Paper*.

Substituting *Paper* for money, and giving the *Paper* an arbitrary value, was the way of paying debts introduced in France by Mr. Law.—A royal bank was established, to which people were to carry their money, and receive the value of it in bills, which were to pass current in trade as so much money.—*Vid. Cheygn, Scienc. des Pers. de la Cour. T. 2. p. 292, seq.*—It was made confiscation of goods, and the galleys, for any man to keep above 40 livres by him of any but *Paper* money. When the regent was told what a rage was spirited up against him about the arrears for making *Paper* current, and how openly the people threatened him, he answered coolly, the French were like watch dogs, they would bark but not bite, les Français ressemblent aux chiens à garde, ils aboient, mais ne mordent pas. *Mist. Misl. Lett. T. 4. p. 16.*

PAPER, among fan-painters. See the article **FAN**.

PAPILLA, in anatomy, a *nipple*; a prominence arising from the middle of the breast, or mamma.

The colour of the *Papilla* is various; in different states, and stages of life, it is redish, bluish, and blackish. It is encompassed with a pale brownish or redish circle, called *Arcola*.

The lacteal tubes, coming from the several parts of the breasts, terminate in the *Papilla*, with several nervous, or spongy emissaries which communicate with each other by anatomies, through which, in sucking, the milk is drawn.

PAPILLÆ Pyramidales, are little eminences arising from the subcutaneous nerves.

Under the cutis lies a thick congeries of nerves, wove into a kind of membrane; together with arteries, veins, and lymphatics: these nerves standing out about the level, form

little *Papillæ*, which laying aside the outer coat given them by the dura mater, form the corpus reticulare, first observed by Malpighi in the feet, hands, and tongue; and since shewn by Ruysch, throughout the whole body.—See *Tab. Anat. (Myol) Fig. 8. Lit. a a, &c. b b.*

These *Papillæ* are always the most numerous and conspicuous in the places of most acute sense, as the tongue, glans of the penis, vagina, labia, œsophagus, ventricle, small intestines, and tips of the fingers and toes, where the cutis they are covered withal is extremely thin.

In the other parts of the body the cutis is thicker, and the *Papillæ* are much fewer, smaller, &c.

These *Papillæ* are supposed to be the immediate organ of feeling.

PAPILLÆ of the tongue, are little eminences of the tongue; so called from their resemblance to the *Papillæ* of the breast. From the papillary tunic of the tongue arise numerous nervous *Papillæ*, which, penetrating the viscous substance over them, terminate under the surface of the tongue.

It is by means of these *Papillæ*, that the tongue is supposed to have its faculty of tasting.

PAPILLÆ, or uranula PAPILLARÆ, of the kidneys, are bundles of little urinary pipes, joined together in the inner substance of the kidneys.

They end in short tubulous bodies, or larger pipes, answering in number to the *Papillæ*, which are usually 12; and are called *Fistule Membranæ*; being only productions of the membranous cell called the *Pelvis*.

The *Papillæ* serve to distill the urine separated from the arteries, and brought them by the urinary pipes, into the pelvis: See **URINE**.

PAPILLARY, PAPILLARIS, in anatomy, an epithet given to a tunic or membrane of the tongue, called *Papillary Tunic, Papillary Membrane, or Papillary Body*.

The *papillary tunic*, or body, is the third tegument, placed beneath the exterior membrane which lines the tongue, and the viscous substance next under the same.

It is full of nerves derived from the fifth, and ninth pair. From this tunic arise little eminences, called *Papillæ* or *Papillary Eminences*.

The salts and juices of bodies, striking against these prominences, occasion undulations therein, which are immediately communicated to the spirits contained in the nerves, and these carry them to the brain, &c.

PAPILLARY Processes, is a name which the ancients gave to the olfactory nerves, from the place of their origin, to the os cribosum.

Dr. Drake thinks this name becomes them better in this place than that of nerves, in regard they rather appear as productions of the medulla oblongata, whence the olfactory nerves arise, than as distinct nerves; against which their manifest cavities, and their communication with the ventricles, argue.

PAPILIONACEOUS, in botany, an appellation given to the flowers of some plants, as representing something of the figure of a *papilio* or butterfly, with its wings displayed.

Papilionaceous Flowers have four petala, or leaves, joined together at the lower extremity: one in the middle of the flower is larger than the rest, and by some is called the *vestillum*, or the standard.

The plants, that have this flower, are of the leguminous kind, as peas, beans, vetches, &c.

PAPPUS, in botany, that soft light down, which grows out of the seeds of some plants, as thistles, dandelion, hawkweed, &c. and which buoys them up so in the air, that they may be blown any where about with the wind.

This distinguishes a class of plants, which are hence denominated *Pappusæ*, or *Pappiferæ*.

PAR, in commerce, an equality between different monies; or so much as a person must give of one kind of specie, to render it just equivalent to a certain quantity of another.

The *Par* differs from the course of exchange, in this, that the *Par* of exchange shews what other nations should allow in exchange; which is certain and fixed, by the intrinsic values of the several species to be exchanged; but the course shews what they will allow in exchange; which is uncertain and contingent, sometimes more, sometimes less. See **EXCHANGE**.

Some have charged our merchants with a great error in suffering our neighbours to settle the *Par* of our exchanges far below what it ought to have been settled at: by which means we have been imperceptibly robb'd of the greatest part of our silver, and no small part of our gold.

For instance, it hath been reckoned for upwards of 40 years last, that 37 Dutch schillings, and 4 ninths of their grofs Flemish are exactly equal to, or on a *Par* with our pound sterling or 20 shillings: whereas it appears demonstrable that we lose between 4 and 7 per cent. by every such exchange.—See Sir I. Newton's *Essays and Calculations* on foreign coins.

The French crown of 60 sols, before the late diminution, was equivalent to 54 pence (now to 31 d. 2) sterl. of England; to

100 deniers gros of Holland; and to 101 of those of Cologne. To 48 Lubec fols of Germany and Hambourg. To 88 c. euns of Aulbourg, and 90 of Franckfort, 87 of Belzam, and 84 of Swazeland. To 8 Julio's and an half of Rome, and as many of Ancona; to 3 Testoons of Florence, 58 Soldi of Leghorn, 83 of Geneva, 94 of Milan, 60 of Nova; to 5 liras or liras of Genoa, 4 liras and 10 soldi of Lucca, 8 liras of Beiguna, 3 liras and 15 soldi of Savoy; to 9 carlins of Naples, and as many of Sicily; 21 groats and three fifts of Venice, 24 of Naumbourg; to 372 maravedis of Spain, to 600 ices of Portugal, to 4 tarins and 15 grains of Malta, to 120 aspers of Constantinople, to a demi-honge of gold of Hungary, to two florins of Liege, 3 of Strasbourg, and 20 of Raconis, to 90 groats or groches of Poland, and 24 of Berlin, to 80 marks of copper of Sweden, to 50 grives or grifts of copper of Mucovy, and lastly, to 4 hois of Denmark.—Savar.

PAR, (in anatomy.) See PAIR.

PAR *Agim*, or the eighth Pair, is a very notable conjugation of nerves, of the medulla oblongata; thus called from their wide and vague distribution throughout the several parts of the body. —See their origin, course, distribution, &c. under NERVE.

PAR, (a term of nobility.) See PEER.

PARABLE*, ΠΑΡΑΒΟΛΗ, a fable, or allegorical instruction founded on something real, or apparent in nature, or history; from which a moral is drawn, by comparing it with some other thing, wherein the people are more immediately concerned.

* The word is formed from the Greek, παραβάλλω, to oppose, or compare.

Such are those *Parables* of the ten virgins, of Dives and Lazarus, of the prodigal son, &c. in the *New Testament*. St. Matthew says our Saviour never spoke to the people but by *Parables*. Aristotle defines *Parable*, a similitude drawn from form to form. Cicero calls it a collation, others a simile. F. de Colonia calls it a rational fable.

The Hebrew calls it, מִשְׁלָּה from a word which signifies either to predominate, or to assimilate; the proverbs of Solomon are by them also called מִשְׁלָּה *Parables*, or *Proverbs*. Gladius defines *Parable* a simile wherein a fictitious thing is related as real, and compared with some spiritual thing, or accommodated to signify it.

Some make *Parable* differ from fable; Grotius and others use the two terms promiscuously. Kircher derives the use of *Parables* from the Egyptians.

In the *New Testament*, the word *Parable* is used variously. In Luke IV. 23. for a proverb, or adage: In Matth. XV. 15. for a thing darkly and figuratively exprest: In Heb. IX. 9. &c. for a type: In Luke XIV. 7. &c. for a special instruction: Matth. XXIV. 32. for a similitude or comparison.

PARABOLA, in geometry, a figure arising from the section of a cone, when cut by a plane parallel to one of its sides. See SECTION.

From the same point of a cone, therefore, only one *Parabola* can be drawn; all the other sections within those parallels being ellipses; and all without them hyperbolas.

Wolffius defines the *Parabola* to be a curve wherein $ax = y^2$, that is, the square of the semi-ordinate is equal to the rectangle of the abscissa, and a given right line called the parameter of the axis, or *latus rectum*.

Hence, a *Parabola* is a curve of the first order; and as the abscissae increase, the semi-ordinates increase likewise; consequently the curve never returns into itself.

Hence also the abscissa is a third proportional to the parameter and semi-ordinate; and the parameter is a third proportional to the abscissa and semi-ordinate; and the semi-ordinate is a mean proportional between the parameter and the abscissa.

To describe a PARABOLA.—The parameter AB Tab. Conics Fig. 8. being given; continue it to C, and from B let fall a perpendicular to N. From centres taken at pleasure, with the compasses open to A, describe arches cutting the right line BV in I, II, III, IV, V, &c. And the right line BC in 1, 2, 3, 4, 5, &c. Then will B 1, B 2, B 3, B 4, B 5, &c. be abscissae; and B I, B II, B III, B IV, B V, &c. semi-ordinates. Wherefore if the lines B 1, B 2, B 3, &c. be transferred from the line BC to that BN, and in the points 1, 2, 3, 4, &c. perpendiculars be raised, 1 I = B I, 2 II = B II, 3 III = B III, &c. the curve passing through the points, I, II, III, &c. is a *Parabola*; and P N its axis.

Every point of the *Parabola* may also be determined geometrically; e. gr. If it be inquired, whether the point M be in the *Parabola* or not? from M to BN let fall a perpendicular describe a semicircle. For if that pass through M, the point M is in the *Parabola*.

In a *Parabola*, the distance of the focus from the vertex, is to the parameter, in a subquadruple ratio: and the square of the semi-ordinate is quadruple the rectangle of the distance of the focus from the vertex, into the abscissa. See FOCUS.

To describe a PARABOLA by a continual Motion.—Assuming a right line for an axis, let f A, Fig. 9. = AF = $\frac{1}{2}a$. In A fix a ruler D B cutting the axis f D at right angles. To the extremity of

another ruler E C, fasten a thread fixed at its other extreme in the focus E, which is to be = AD + AF. If then a style or point be fixed to the ruler E C, and the ruler be carried first to the right then to left, according to the direction of the other D B; the style will mark out a *Parabola*.—For, E M will be constantly = E M = P f = $x + \frac{1}{2}a$, and consequently the point M is in a *Parabola*.

Properties of the PARABOLA.—The squares of the semi-ordinates are to each other as the abscissae; and the semi-ordinates themselves, in a subduplicate ratio of the abscissae.

The rectangle of the sum of two semi-ordinates into their difference, is equal to the rectangle of the parameter into the difference of the abscissae: the parameter therefore is to the sum of the two semi-ordinates, as their difference to the difference of the abscissae.

In a *Parabola*, the rectangle of the semi-ordinate into the abscissa, is to the square of the abscissa, as the parameter to the semi-ordinate.

In a *Parabola*, the square of the parameter is to the square of one semi-ordinate, as the square of another semi-ordinate is to the rectangle of the abscissae.

In a *Parabola*, the subtangent is double the abscissa, and the subnormal subduple of the parameter.

Quadrature of the PARABOLA. See QUADRATURE.

Rectification of the PARABOLA. See RECTIFICATION.

Centre of gravity of a PARABOLA. See CENTRE OF GRAVITY.

Centre of oscillation of the PARABOLA. See OSCILLATION.

PARABOLA's of the higher kinds are algebraic curves, defined by $ax^m = y^n$. E. gr. by $ax = y^2$, $ax^2 = y^3$, $ax^3 = y^4$, $ax^4 = y^5$, &c. See CURVE.

Some call these *Parabolaids*: more particularly, if $ax = y^2$; they call it a *Cubical Parabola*.—If $ax^2 = y^3$, &c. they call it a *Biquadratical Parabola*, or a *Surdesoloidal Parabola*.

And in respect of these, the *Parabola* of the first kind, above explained, they call the *Apollonian*, or *Quadratic Parabola*.

Those curves are likewise to be referred to *Parabola's* wherein $ax^m = y^n$, as e. gr. $ax^2 = y^3$, $ax^3 = y^4$, which some call *Semi-parabola's*. They are all comprehended under the common equation, $ax^m = y^n$, which also extends to other curves, e. gr. to those wherein $ax^2 = y^2$, $ax^3 = y^3$, $ax^4 = y^4$.

Since in *Parabola's* of the higher kinds, $y^n = ax^m = x^{\frac{m}{n}}$; if any other semi-ordinate be called v , and the abscissa corresponding thereto z , we shall have $v^m = ax^{\frac{m}{n}} = z^{\frac{m}{n}}$, consequently $y^n : v^m :: a^{\frac{m}{n}} : z^{\frac{m}{n}}$. That is $x : z$. It is a common property, therefore, of these *Parabola's*, that the powers of the ordinates are in the ratio of the abscissae.

But in *Semi-parabola's*, $y^n : v^m :: a^{\frac{m}{n}} : z^{\frac{m}{n}}$: $zm = 1$: $xm = 1$: $zm = 1$. Or; the powers of the semi-ordinates are as the powers of the abscissae, one degree lower. E. gr. In *Cubical Semi-parabola's*, of the ordinates y^3 and v^3 are as the squares of the abscissae x^2 and z^2 .

Apollonian PARABOLA, is the common, or *Quadratic Parabola* of the first kind; so called by way of distinction from *Parabola's* of the higher kinds: which see.

Quadratic PARABOLA, is the same with the *Apollonian*. Which see.

Pelecoid PARABOLA. See the article PELECOID.

Resistance of a PARABOLA. See the article RESISTANCE.

PARABOLAN*, PARABOLANUS, among the ancients, was a sort of gladiator, called also the *Confector*. See CONFECTOR.

* The name was given them from the Greek, παραβάλλω, of *Parabola*, to throw, precipitate; in regard they threw themselves on danger and death.

PARABOLANI, or PARABOLARII, is also used in church-history, for a set of people, especially in Alexandria, who devoted themselves to the services of churches, and hospitals.

The *Parabolani* were not allowed to withdraw themselves from their function, which was the attendance on the sick.—They made a kind of fraternity, amounting sometime to 600 persons, dependant on the bishop.

The design of their institution was, that the diseased, especially those infected with the plague, might not be without attendance.

PARABOLIC Conoid, a solid figure generated by the rotation of a parabola about its axis.

The solidity of the *Parabolic Conoid*, is $\frac{1}{2}$ of that of its circumscribing cylinder.

The circles conceived to be the elements of this figure, are in an arithmetical proportion, decreasing towards the vertex.

A *Parabolic Conoid* is to a cylinder of the same base and height, as 1 to 2; and to a cone of the same base and height, as $1 \frac{1}{2}$ to 1.

PARABOLIC Cuneus, a solid figure formed by multiplying all the DB's Tab. Conics, Fig. 10. into the DS's: or which amounts to the same, on the base APB erect a prism, whose altitude is AS: this will be a *Parabolical Cuneus*, which of necessity will be equal to the *parabolical pyramidoid*; inasmuch as the component rectangles, in one, are severally equal to all the component squares, in the other.

PARABOLIC Pyramidoid, a solid figure, generated by supposing all

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all the squares of the ordinate applicates in the *Parabola*, so placed, as that the axis shall pass through all their centres at right angles; in which case the aggregate of the planes will form the *parabolic pyramid*.

The solidity hereof is had by multiplying the base, by half the altitude; the reason whereof is obvious: for the component planes being a series of arithmetical proportionals beginning from 0, their sum will be equal to the extremes multiply'd by half the number of terms, that is, in the present case, equal to the base multiplied by half the height.

PARABOLIC Space, the space or area contained between any entire ordinate, as *VV Tab. Centus, Fig. 8.* and the curve of the incumbent *Parabola*.

The *Parabolic Space* is to the rectangle of the semi-ordinate into the abscissa, as 2 to 3: to a triangle inscribed on the ordinate as a base, the *Parabolic Space* is as 4 to 3.

Every *Parabolic* and *Paraboloidal Space* is to the rectangle of the semi-ordinate into the abscissa, as xy to $(m+r)$ to x y , that is, as r to $m+r$.

Segment of a *PARABOLIC Space*, is that space included between two ordinates.

Quadrature of a Parabolical segment. See *QUADRATURE*.

PARABOLIC Speculum or Mirror. See *MIRROR*.

PARABOLIC Spindle. See *PYRAMOID*.

PARABOLOIDES, in geometry, *Parabola's* of the higher kinds. See *PARABOLA of the higher Kinds*.

Quadrature of a PARABOLOID. See *QUADRATURE*.

Rectification of a PARABOLOID. See *RECTIFICATION*.

Centre of Gravity of a PARABOLOID. See *CENTER*.

Quadratic PARABOLOID. *Cubical PARABOLOID.* *Surdifolial PARABOLOID.* See *PARABOLA of the higher Kinds*.

PARACENTESIS*, *ΠΑΡΑΚΕΝΤΗΣΙΣ*, an operation in chirurgery, commonly called *Tapping*.

* The word is formed from the Greek *παρα*, with, and *κεντεω*, punge, to prick.

It consists in opening a little hole in the lower venter or belly, to let out waters collected in the cavity thereof, or between the teguments, in an ascites or water dropsy.

The ancients cut the aperture with a lancet; but the moderns punch it with a kind of stilett or bodkin; clapping a cannula or tap into the hole when made, to carry off the water.

The operation is usually performed two or three fingers breadth on one side the navel, sometimes a little lower, but always so as to avoid the linea alba.

The water is usually drawn off at several times, as the patient's strength will allow; and a new puncture is made, every time the belly is thus to be emptied.

The *Paracentesis* does not often cure, though often repeated; because the root of the disease, notwithstanding the carrying off the water by this means, is still left behind.

PARACENTESIS, is also a name applied by some authors to all operations either with the lancet, the needle, or punch; not excepting the operation of couching for cataracts; this sense is founded on the etymology of the word.—Others restrain it to apertures made in the head, breast, belly, and scrotum; and others to the single operation of tapping in dropsies.

PARACENTRIC Motion, in astronomy, a term used for so much as a revolving planet approaches nearer to, or recedes farther from the sun, or centre of attraction. See *ATTRACTION*.

Thus if a planet in *A, Tab. Astronomy, Fig. 24.* move to *B*, then is *SB—SA=B*, is the *Paracentric* motion of that planet.

PARACENTRIC Solicitation of Gravity, amounts to the same with the *vis centripeta*, and, in astronomy, is expressed by the line *AL, Fig. 24.* drawn from the point *A* parallel to the ray *SB* (infinitely nearer *SA*) till it intersect the tangent *BL*.

PARACLET, a name which the church has given to the holy spirit; from the Greek *Παρακλητης*, *q. d.* comforter, or advocate.

PARACME, *Παραμυη*, a Greek word signifying declension, or a thing's being past its height.

PARACYNANCHE, in medicine. See *ANGINA*.

PARADE, the shew, or expofal of any thing to view, in all its advantages and ornaments.

Bed of Parade, is that wherein a person lies in state.

PARADE, in war, the place where troops assemble, or draw together, in order to go on any Service.

PARADE, is more properly the appearance of the officers and soldiery at a post assigned them, to put themselves under arms, in the best order they can; either to mount, or break up the guard, or to form a battalion, or on some other occasion.

PARADE, in fencing, is the action of parrying, or turning off any push, or stroke.

There are as many kinds of *Parades*, as of strokes, and attacks. As the *Parade* inward, outward, above, below, feigned, &c.

PARADIGM*, *ΠΑΡΑΔΙΓΜΑ*, an example, or instance of something said or done. See *EXAMPLE*.

* The word is formed of the Greek *παράδειγμα*, exemplar, of *παρά* and *δεικναι*, ostendo, *q. d.* juxta ostendo.

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PARADISE*, a term primarily used for the place wherein Adam was seated, during his innocence; and from which he was expelled for disobeying God: this is called in a stricter manner the *Terrestrial Paradise*.

* The word is formed of the Greek *παράδεισος*, orchard, a place stored with apples, and all kinds of fruit.—Moses calls it the *Garden of Eden*, *q. d.* garden of delight, from *עדן*, voluptas, pleasure.

The critics are in dispute about the precise place of *Paradise*. Some will have it in Judea, in the place where now is the lake Genesareth; others, in Syria, toward the springs of the Orontes, and Chrysorhoe: but in neither of those places do we discover any track of the rivers wherewith the *Paradise* in Moses's description was watered. Others place it in the greater Armenia near the mountain Ararat, where Noah's ark was left; and imagine they there discover the sources of the four rivers which watered the garden of Eden, *viz.* Euphrates; Hiddel-el, now the Tygris; Gihon, now Araxes; and Pison, now Phazzo. But Sir J. Chardin assures us in his travels, that the Phazzo springs out of the mountains of Caucasus, northward of the kingdom of Imereti, and far enough from mount Ararat: beside, that in Armenia, we have no signs of the countries of Havila and Ethiopia, which those rivers washed after their departing from Eden.

There are various other opinions, as to this point: Poffellus will have *Paradise* placed under the north-pole; grounding his notion upon an ancient tradition of the Egyptians and Babylonians, that the ecliptic or sun's way was at first at right angles to the equator; and so passed directly over the north-pole. Others are against limiting it to any one place, and contend, that it included the whole face of the earth, which was then, as it were, one continued scene of pleasures, till altered upon Adam's Transgression.

But the most common and probable opinion is that of Hopkinson, Huet, Bochart, &c. who place *Paradise* between the confluence of the Euphrates, and Tygris, and their separation. These rivers are two of those wherewith the garden of Eden was watered: Pison was a branch arising out of one of them after their separation; and Gihon another branch arising from the other, on the side of Armenia or the west: accordingly Ethiopia, one of the countries which these rivers washed, was incontestably Arabia Deserta, for Moses calls his wife, who was of this country, an Ethiopian; and Havilah, the other country, must have been the Chusistan in Persia; where there were anciently found gold, bdellium, the onyx, &c. mentioned in Moses's description.

PARADISUS, among ancient church-writers, denoted a square court, before cathedrals, surrounded by piazzas, or portico's for walking under, supported by pillars. Matthew Paris calls it *Parvifus*.

PARADOX*, *ΠΑΡΑΔΟΞΟΝ*, in philosophy, a proposition seemingly absurd, because contrary to the received opinions; but yet true in effect.

* The word is formed from the Greek *παρά*, contra, against, and *δοξα*, opinion.

The Copernican system is a *Paradox* to the common people; but the learned are all agreed of its truth.

There are even *Paradoxes* in geometry; a number whereof are collected by the Jesuit Marius Bettinus: among others is this, that the contained is greater than the containing.

PARADOXI, or **PARADOXOLOGI**, among the ancients, were a kind of mimes or buffoons, who diverted the people with their drolling.

They were also called *Ordinarij*, for this reason apparently, that, as they spoke without study or preparation, they were always ready.

They had another denomination, *viz.* *Nianicologi*, *q. d.* tellers of childrens tales: and, beside, were called *Aretologi*, of *aretis*, virtue, as talking much of their own rare talents, and qualifications.

PARÆNESIS*, *ΠΑΡΑΙΝΕΣΙΣ*, a Greek term, signifying adoration or exaltation.

* The word is formed of *παρά*, and *αἰνέω*, laudo, I praise.

PARAGE, **PARAGIUM**, in law, an equality of blood, or dignity; but more especially of land, in the partition of an inheritance between co-heirs.

PARAGE, **PARAGIUM**, is more properly used in ancient customs, for an equality of condition among nobles, or persons holding nobly.

Thus when a fief is divided among brothers; in this case, the younger hold their part of the elder by *Parage*, *i. e.* without any homage, or service.

This still obtains, in some measure, in Scotland, where the husbands of the younger sisters are not obliged to any faith or homage to the husband of the elder; nor their children, to the second degree.

This *Parage* being an equality of duty, or service among brothers and sisters, some have called it *Fratriage* and *Parentage*. The customary of Normandy defines tenure by *Parage* to be, when a noble fief being divided among daughters, the eldest does homage to the chief lord for all the rest, and the youngest hold

hold their parts of the eldest by *Parage*, i. e. without any homage or fealty.

Parage ceases at the sixth degree inclusively. It likewise ceases, when any of the sharers fell their part.

PARAGOVE, ΠΑΡΑΓΩΗ, in grammar, a figure whereby a word is lengthened out, by adding a syllable at the end thereof: as in *dicier* for *dicit*.

PARAGOGIC*, in grammar, denotes something added to a word without adding any thing to the sense thereof.

* The word is formed of the Greek παραγωγος, I prolong, compounded of παρα and αγω.

In the Hebrew, the פ is frequently *Paragogic*; as in, פורס, I will praise.

The use of *Paragogic* letters is only to give a more full and agreeable sound to words, either for the sake of the verse, or the smoothness of the period.

PARAGORICKS. See the article **PARAGORICKS**.

PARAGOUÉ. See the article **PARAGUAY**.

PARAGRAFE, ΠΑΡΑΓΡΑΦΗ, a term in jurisprudence, signifying a section, or division of the text of a law: otherwise called an *Article*.

Such a law is said to be divided into so many *Paragraphs*.

The character of a *Paragraph* in quotation, is §.

Among the Greek poets, *Paragraphs*, Παράγραφοι, were a species of critical notes, serving to mark the couplets, strophes, and other divisions of odes, and other poetical compositions.

— This *Paragraph*, as described by the scholiast of Aristophanes, was a short line with a dot at the extremity of it.

PARAGUAY, or **PARAGOUÉ**, in natural history, a celebrated plant of the shrub kind, growing in some provinces of South-America, especially in that of *Paraguay*, whence its name; though better known among us, under the denomination of *South-Sea Tea*.

This plant, which does not rise above a foot and half high, has very slender branches, and leaves somewhat like those of fenna; it may be looked on as a kind of occidental tea, which, like the oriental, is taken infused in hot water, to which it communicates a colour and smell nearly like those of the best tea seen in Europe.

There are two kinds of *Paraguay*, the one called simply *Paraguay*; the other *Camini*, by the Spaniards, *Yerva-camini*; which last is most esteemed, and sold for a third more than the other.

The first the Spaniards call *Yerva-con-palos*, i. e. herb with little sticks, because full of broken branches, this is chiefly used by domesticks and slaves: the latter is the drink of the rich. But both are of so much use, and esteemed of such absolute necessity, that no body in that part of *America* will live without them. The works of the mines of Potosi would stand still, but that the masters take care to supply the poor slaves that labour therein, with *Paraguay*, which is their constant remedy against those mineral steams wherewith they would otherwise be suffocated. Nor will a servant engage himself with any master, but upon this among other conditions, that he have nothing but *Paraguay* for drink.

The *Paraguay* makes one of the most considerable articles of the South American commerce. At Peru, Chily, and Buenos Ayres, there are above two millions worth sold *per Annum*; which passes almost altogether through the hands of the Jesuits.

The use of *Paraguay* began lately to obtain in England; where many people seemed to like it as well as tea. But foreigners say, that their approbation flowed as much from their interest as their taste; in regard they came to easily by it, by reason of their commerce with the Spaniards of South America, and Buenos Ayres, since the treaty of Utrecht in 1713.

The preparation of the plant, and the making it into drink, is much the same with that of tea, except that they infuse both the leaves and the wood, that they drink it immediately out of the vessel it is made in; without letting it have time to infuse, by reason of the black tincture it gives; and that, to prevent leaves and all from coming, they suck it through a silver or glass pipe, which goes round the company one after another. Frazier.

Beside all the virtues which the eastern people ascribe to their tea, as to be good in diseases of the head, breast and stomach, against phlegm, and to restore sleep; the Americans attribute to theirs this further, of purifying all kinds of water, how foul and corrupt soever, by only infusing it therein, either hot or cold. Thus, having always some of it with them, if they meet with none but the worst waters in the vast deserts to be crossed in going from Buenos Ayres to Peru and Chily, they are not afraid to drink them, after steeping some of the plant a little while therein. It is also held sovereign against the fever, and putrid fevers.

PARALEPSIS, ΠΑΡΑΛΕΨΙΣ, in rhetoric, a pretence of omitting, or passing over a thing, and yet expressing it by the way.

When the imagination is warmed, and reasons and arguments present themselves in abundance; the orator would willingly

lay them all down, in form; but for fear of wearying his audience, he only produces some of them *en passant*, and without dwelling on them: and this is called a *Paralepsis*, by the Latins *Præteritis*, by the Greeks *Ἀποσχοψή*.

For instance, I pass over in silence the many injuries I have received, &c. I wont insist on his last outrage.

PARALIPOMENA *, ΠΑΡΑΛΙΠΟΜΕΝΑ, a supplement of things omitted, or forgot in some preceding work, or treatise.

* The word is formed from the Greek παραλείπω, prætermitto, I pass by. — Some authors use the word *Subrepticum* instead of *Paralipomenon*.

In the canon of scripture, there are two books of *Paralipomena*, called in the English version, *Chronicles*; being a supplement to the four books of kings, the two first whereof are also called *Books of Samuel*.

Quintus Calabar has a work, entitled, the *Paralipomena of Homer*. **PARALLACTIC Angle**, called also simply, **PARALLAX**, is the angle made in the centre of a star by two right lines, drawn, the one from the centre of the earth, T B, (*Tab. Astron. Fig. 27.*) the other from its surface, E B.

Or, which amounts to the same, the *Parallactic* angle is the difference of the angles CEA, and BTA, under which the real and apparent distances from the zenith are seen.

The fines of the *Parallactic* angles ALT and AST, *Tab. Astron. Fig. 30.* at the same or equal distances from the zenith S Z, are in a reciprocal ratio of the distances of the stars from the centre of the earth T L and T S.

PARALLAX, ΠΑΡΑΛΛΑΞΙΣ, in astronomy, an arch of the heavens intercepted between the true place of a star, and its apparent place.

The true place of a star is that point of the heavens, B. *Tab. Astron. Fig. 27.* wherein it would be seen by an eye placed in the centre of the earth, as at T. — The apparent place is that point of the heavens C, wherein the star appears to an eye on the surface of the earth, as at E.

Now, as in effect, we view the celestial bodies not from the centre, but from the surface of our earth, which is a semi-diameter distant from the centre; we see it by a visual ray, which passing through the centre of the star, and proceeding thence to the surface of the mundane sphere, marks out another point C, which is its apparent place.

This difference of places, is what we call absolutely, the *Parallax*, παραλλαξις, or the *Parallax of Altitude*; by Copernicus it is called the *Commotation*; which, therefore, is an angle formed by two visual rays, drawn, the one from the centre, the other from the circumference of the earth, and traversing the body of the star; and is measured by an arch of a great circle intercepted between the two points of true and apparent place C and B.

PARALLAX of Declination, is an arch of a circle of declination SI, *Fig. 28.* whereby the *Parallax* of altitude increases or diminishes the declination of a star.

PARALLAX of right Ascension and Declension, is an arch of the equator D d, *Fig. 28.* whereby the *Parallax* of altitude increases the ascension, and diminishes the declension.

PARALLAX of Longitude, is an arch of the ecliptic T t, *Fig. 29.* whereby the *Parallax* of altitude increases or diminishes the longitude.

PARALLAX of Latitude, is an arch of a circle of latitude SI, whereby the *Parallax* of altitude increases or diminishes the latitude.

PARALLAX is also used for the angle made in the centre of the star, by two right lines, drawn, the one from the centre, the other from the surface of the earth.

This is also called *Parallactic Angle*. See **PARALLACTIC Angle**. Hence, the *Parallax* diminishes the altitude of a star, or increases its distance from the zenith, and has, therefore, a contrary effect to the refraction.

The *Parallax* of altitude CB, *Fig. 27.* is, strictly, the difference between the true distance from the zenith CA, and the apparent distance BA.

The *Parallax* is greatest in the horizon; in the zenith, or meridian, a star has no *Parallax* at all; the true and apparent places, then co-inciding.

The horizontal *Parallax* is the same, whether the star be in the true, or the apparent horizon.

The fixed stars have no sensible *Parallax*, by reason of their immense distance, to which the semi-diameter of the earth is but a meer point.

Hence also, the nearer a star is to the earth, the greater is its *Parallax*, at an equal elevation above the horizon; and Saturn is so high, that we have much ado to observe in him any *Parallax* at all.

The *Parallax* increases the right and oblique ascension, diminishes the declension; diminishes the northern declination, and latitude in the eastern part, increases them in the western; increases the southern in the eastern and western part; diminishes the longitude in the western part, increases it in the eastern. The *Parallax*, therefore, has just opposite effects to the refraction.

Hence the *Parallax* of the remoter star S, is less than the *Parallax*

rallax of the nearer L, at the same distance from the zenith; as before observed.

The lines of the *Parallactic* angles M and S, of stars equally distant from the centre of the earth T, are as the sines of the distances seen from the vertex Z M, and Z S.

Hence, as the distances from the vertex decrease, *i. e.* as the altitudes decrease, the *Parallax* encreases; and hence, also, the *Parallax* affects the altitude of the star, from the horizon to the zenith.

The doctrine of *Parallaxes* is of the utmost importance in astronomy; for determining the distances of the planets, comets, and other phenomena of the heavens; for the calculation of eclipses; and for finding the longitude.

Methods of finding the *Parallaxes* of the celestial phenomena are various: Some of the principal and easier follow.

To observe the PARALLAX of a celestial phenomenon.—Observe when the phenomenon is in the same vertical with a fixed star which is near it; and measure its apparent distance from the star. Observe again, when the phenomenon and fixed star are in equal altitudes from the horizon; and again measure their distance.—The difference of those distances will be, very nearly, the *Parallax* sought.

The *Parallax* of a phenomenon may be likewise found by observing its azimuth, and altitude; and by marking the time between the observation, and its arrival at the meridian.

All required to find the *Parallax* of the moon, is the *Parallax* of right ascension: to find the effect of the magnitude of the semi-diameter of the earth, with regard to the phenomena of its motion, it is sufficient to know how far the meridian, to which the eye refers it, deviates from the true meridian. This is what M. Cassini found and practised, with regard to mars; and what M. Maraldi has since practised, with regard to the moon.—The whole mystery here consists in having the moon's true motion, which refers to the centre of the earth; and its apparent motion, which refers to the place of observation. The difference of these, which is greatest in the horizon, or horary circle of 6 o'clock, gives the horizontal *Parallax*, for that latitude, whence the general *Parallax*, or that under the equator is easily found: the *Parallax* of any parallel being to that of the equator, as the semi-diameter of this parallel is to that of the equator. See the practice of this method exemplified in finding the *PARALLAX* of mars.

To observe the moon's PARALLAX.—Observe the moon's meridian altitude, with the greatest accuracy, (See ALTITUDE) and mark the moment of time: this time being equated; (See EQUATION) compute her true longitude and latitude; and from these find her declination; (See DECLINATION) and from her declination and the elevation of the equator find her true meridian altitude. If the observed altitude be not meridian, reduce it to the true altitude for the time of observation. Take the refraction from the observed altitude, and subtract the remainder from the true altitude: and the remainder is the moon's *Parallax*.

By this means Tycho in 1583. Oct. d. 12. hor. 5. 19'. from the moon's meridian altitude observed, 13°. 38'. found her *Parallax* to be 54 minutes.

To observe the moon's PARALLAX in an eclipse.—In an eclipse of the moon, observe when both horns are in the same vertical circle; in that moment take the altitudes of both horns; the difference of the two being halved and added to the least, or subtracted from the greatest, gives nearly the visible altitude of the moon's centre. But the true altitude is nearly equal to the altitude of the centre of the shadow at that time. Now we know the altitude of the centre of the shadow; because we know the sun's place in the ecliptic, and its depression under the horizon, which is equal to the altitude of the opposite point of the ecliptic in which the centre of the shadow is. Thus have we both the true and apparent altitude; the difference whereof is the *Parallax*.

From the moon's PARALLAX AST, Fig. 30. and altitude SR, to find her distance from the earth.—By her apparent altitude given, we have her apparent distance from the zenith, *i. e.* the angle ZAS; or by her true altitude the angle ATS. Wherefore, since, at the same time, we have the *Parallactic* angle S; and the semi-diameter of the earth AT is reputed as 1; by plain trigonometry we shall have the moon's distance in semi-diameters of the earth, thus: as the sine of the angle S is to the opposite side given, so is the sine the other angle T, to the side required TS.

Hence, according to Tycho's observation, the moon's distance at that time from the earth was 62 semi-diameters of the earth. Hence also, since, from the moon's theory, we have the ratio of her distances from the earth in the several degrees of her anomaly; those distances being found by the rule of three in semi-diameters of the earth, the *Parallax* is thence determined to the several degrees of the true anomaly.

De le Hire makes the greatest horizontal *Parallax* 1°. 1'. 25". the smallest 54'. 5". the moon's distance, therefore, when in her perigee is 55 $\frac{2}{3}$, that is almost 56 semi-diameters; in her apogee 63 $\frac{2}{3}$, that is, 63 $\frac{1}{2}$ semi-diameters of the earth.

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To observe the PARALLAX of mars.—1. Suppose mars in the meridian and equator, in H, *Tab. Astronomy, Fig. 31.*, and that the observer under the equator in A, observes him culminating with some fixed star. 2. If now the observer were in the centre of the earth, he would see mars constantly in the same point of the heaven with the star, and therefore, together with it in the plane of the horizon, or of the sixth horary. But since mars, here, has some sensible *Parallax*, and the fixed star has none, mars will be seen in the horizon, when in P, the plane of the sensible horizon: and the star, when in R, the plane of the true horizon: observe therefore the time between the transits of mars and of the star through the plane of the sixth hour. 3. Convert this time into minutes of the equator; by this means we shall have the arch PM, to which the angle PAM, and consequently the angle AMD is nearly equal, which is the horizontal *Parallax* of mars.

If the observer be not under the equator, but in a parallel, IQ, that difference will be a less arch, QM. Wherefore, since the little arches, QM and PM, are as their sines AD and ID; and since ADG is equal to the distance of the place from the equator, *i. e.* to the elevation of the pole; and therefore, AD to ID, as the whole sine to the co-sine of the elevation of the pole; say, as the co-sine of the elevation of the pole ID is to the whole sine AD; so is the *Parallax* observed in I, to the *Parallax* to be observed under the equator.

Since mars and the fixed star cannot be commodiously observed in the horizon; let them be observed in the circle of the third hour: and since the *Parallax* there observed, TO, is to the horizontal one, PM, as IS to ID; say, as the sine of the angle IDS, or 45° (since the plane DO is in the middle between the meridian DH and the true horizon DM) is to the whole sine, so is the *Parallax* TO to the horizontal *Parallax* PM.

If mars be likewise out of the plane of the equator; the *Parallax* found will be an arch of a parallel; which must, therefore, be reduced, as above, to an arch of the equator.

Lastly, if mars be not stationary, but rather direct, or retrograde by observations for several days, find out what his motion is every hour, that his true place from the centre may be assigned for any given time.

By this method Cassini, to whom we owe this noble invention, observed the greatest horizontal *Parallax* of mars to be 25 seconds, or a little less. But by the same method Mr. Flamsteed found it near 30 seconds.

By the same method the same author Cassini observed also the *Parallax* of venus.

It must be here noted, that the observation is to be made with a telescope, in whose focus are strained four threads cutting each other at right angles A, B, C, D, fig. 45. n° 2, and the telescope is to be turned about, till some star near mars be seen to pass over some of the threads, that the threads AB and CD may be parallel to the equator, and therefore, AC and BD may represent circles of declination. Thus, by means of the perpendicular threads, the situations of the star, and of mars in the meridian, and circle of three o'clock will be determined.

To find the sun's PARALLAX.—The great distance of the sun renders its *Parallax* too small to fall under even the nicest immediate observation: indeed, many attempts have been made both by the ancients and moderns, and many methods invented for that purpose. The first was that of Hipparchus, followed by Ptolemy, &c. This was founded on the observation of lunar eclipses; the second was that of Aristarchus, whereby the angle subtended by the semi-diameter of the moon's orbit seen from the sun, was sought from the lunar phases: but, these both proving deficient, astronomers are now forced to have recourse to the *Parallaxes* of the planets nearer us, as mars and venus; for from their *Parallaxes* known, that of the sun, which is inaccessible by any direct observation, is easily deduced.

For from the theory of the motions of the earth and planets, we know at any time the proportion of the distances of the sun and planets from us; and the horizontal *Parallaxes* are in a reciprocal proportion to those distances: knowing, therefore, the *Parallax* of a planet, that of the sun may be found from it. Thus, mars, when opposite to the sun, is twice as near as the sun is: his *Parallax*, therefore, will be twice as great as that of the sun: and venus, when in her inferior conjunction with the sun, is sometimes nearer us than he is; her *Parallax*, therefore, is greater in the same proportion.

Thus, from the *Parallaxes* of mars and venus, the same Cassini found the sun's *Parallax* to be ten seconds, which implies his distance to be 22000 semi-diameters of the earth.

In an observation of the transit of venus over the sun, which will be seen in May 1761. Dr. Halley has shewn a method of finding the sun's *Parallax*, and distance to a great nicety, *viz.* to a five hundredth part of the whole.

The PARALLAX of the Stars, with regard to the earth's natural orbit.—The stars have no *Parallax*, with regard to the earth's semi-diameter; yet, with regard to the earth's annual orbit, it is justly expected that some *Parallax* be found. See ORBIT.

The Axis of the earth in its annual motion describes a kind of cylinder, which being prolonged to the heaven of the fixed stars, there draws a circular circumference; each point whereof is the pole of the world for its respective day: so that the situation of the apparent pole, with regard to any of the fixed stars, changes very considerably in the course of a year.

Could this be found by observation, it would irrefragably evince the annual motion of the earth round the sun, and remove that only objection which lies against it, urged by Ricciolus, from no such *Parallax* being observed.

Accordingly, Dr. Hook attempted to find it by observing the various distances of a fixed star from the zenith, in different parts of the earth's orbit; and Mr. Flamsteed, from the access and recess of a fixed star from the equator at different times of the year; and with success, the result of his observations being, that a fixed star, near the pole, was found 40 or 45 seconds nearer it at the winter solstice than at the summer one, for seven years successively.

M. Cassini the younger allows the observations of Flamsteed to agree with those made at the royal observatory; but he denies the consequences: he says that the variations in the distance of the pole star are not such as they should be, supposing the motion of the earth. Fontenelle accounts for them from a supposition that the stars, like the sun, turn or revolve on their centres, and that some of them have their hemispheres unequally luminous: whence, when the more shining hemisphere is turned towards us, the stars appear bigger, consequently nearer the neighbouring stars than when the darker is towards us.

PARALLAX is also used in levelling, for the angle contained between the line of true level, and that of apparent level.

PARALLEL, in geometry, is applied to lines, figures and bodies, which are every where equidistant from each other; or which, though infinitely produced, would never either approach nearer, or recede farther from each other.

PARALLEL Right Lines, are those which, though infinitely produced, would never meet.

Thus, the line O P, *Tab. Geometry, Fig. 36*, is parallel to Q R. See **LINE**.

Parallel Lines stand opposed to lines converging, and diverging.

Some define an inclining or converging line, that which will meet another at a finite distance; and a *Parallel Line*, that which will only meet it at an infinite distance.

A perpendicular is by some said to be the shortest of all lines that can be drawn to another; and a *Parallel* the longest.

But for the orthodoxy of these notions of parallelism we do not undertake.

Geometricians demonstrate, that two lines, parallel to the same third line, are also parallel to one another; and that if two *Parallel* O P and Q R, be cut by a transverse line S T in A and B; 1. The alternate angles x and y are equal; 2. The external angle x is equal to the internal opposite one y ; and, thirdly, that the two internal opposite ones x and y are also equal to two right ones.

It is shewn on the principles of optics, that if the eye be placed between two *Parallel Lines*, they will appear to converge towards a point opposite to the eye. And if they run to such a length, as that the distance between them be but as a point thereto, they will there appear to coincide.

Parallel Lines are described by letting fall equal perpendiculars, and drawing lines through their extremes, by sliding the compasses open to the desired width along a line, &c.

PARALLEL Planes, are those planes which have all the perpendiculars drawn betwixt them equal to each other.

PARALLEL Rays, in optics, are those which keep at an equal distance in respect to each other, from the visible object to the eye, which is supposed to be infinitely remote from the object.

PARALLEL Ruler, called also *Parallelism*, an instrument consisting of two wooden, brass, or steel rulers, A B, and C D; *Fig. 37*, equally broad every where, and so joined together by the cross blades E F, and G H, as to open to different intervals, and accede and recede, yet still retain their *Parallelism*.

The use of this instrument is obvious; for one of the rulers being applied to R S, and the other withdrawn to a given point V; a right angle A B, drawn by its edge, through V, is a *Parallel* to R S.

PARALLELS, or **PARALLEL Circles**, in geography, called also *Parallels of Latitude*, and *Circles of Latitude*, are lesser circles of the sphere, conceived to be drawn from west to east through all the points of the meridian; commencing from the equator, to which they are *parallel*, and terminating with the poles.

They are called *Parallels of Latitude*, &c. because all places lying under the same *Parallel*, have the same latitude.

PARALLELS of Latitude, in astronomy, are lesser circles of the sphere *parallel* to the ecliptic, imagined to pass through every degree and minute of the colures.

They are represented on the globe by the divisions of the

quadrant of altitude, in its motion round the globe, when screwed over the poles of the ecliptic.

PARALLELS of Altitude, or *Altazimuths*, are circles *parallel* to the horizon, imagined to pass through every degree and minute of the meridian between the horizon and zenith; having their poles in the zenith.

On the globe, these are represented by the divisions on the quadrant and altitude, in its motion about the body of the globe, when screwed to the zenith. See **GLOBE**.

PARALLELS of Declination, in astronomy, are the same with *Parallels* of latitude in astronomy.

PARALLEL Sphere, that situation of the sphere, wherein the equator coincides with the horizon, and the poles with the zenith and nadir.

In this sphere all the *Parallels* of the equator become *Parallels* of the horizon, consequently no stars ever rise or set, but all turn round in circles *parallel* to the horizon; and the sun, when in the equinoctial, wheels round the horizon the whole day. After his rising to the elevated pole, he never sets for six months; and after his entering again on the other side of the line, he never rises for six months longer.

This position of the sphere is theirs who live under the poles; if any such there be. Their sun being never above $23^{\circ} 30'$ high.

PARALLEL Sailing, in navigation, is the sailing under a *parallel* of latitude.

Of this there are but three cases. 1^o Given, the departure, and distance; required the latitude.—The canon for which is, as the difference of longitude is to the radius, so is the distance to the co-sine of the latitude.

2^o Given the difference of longitude between two places under the same *Parallel*, required their distance.—The canon is, as radius to difference of longitude, so is co-sine of latitude to distance.

3^o Given the distance between two places in the same latitude; required their difference of longitude.—The canon is, as the co-sine of latitude to distance, so is radius to difference of longitude.

PARALLELEPIPED, in geometry, one of the regular bodies, or solids, comprehended under six parallelograms, the opposite ones whereof are similar, parallel and equal. As in *Tab. Geom. Fig. 38*.

A *Parallelepiped* is by some defined a prism, whose base is a parallelogram.

Properties of the PARALLELEPIPED.—All *Parallelepipeds*, prisms, and cylinders, &c. whose bases and heights are equal, are themselves equal.

A diagonal plane divides the *Parallelepiped* into two equal prisms: a triangular prism, therefore, is half a *Parallelepiped* upon the same base, and of the same altitude.

All *Parallelepipeds*, prisms, cylinders, &c. are in a ratio compounded of their bases, and altitudes: wherefore, if their bases be equal, they are in proportion to their altitudes; and conversely.

All *Parallelepipeds*, cylinders, cones, &c. are in a triplicate ratio of the homologous sides; and also of their altitudes.

Equal *Parallelepipeds*, prisms, cones, cylinders, &c. reciprocate their bases and altitudes.

To measure the surface and solidity of a *Parallelepiped*.—Find the areas of the parallelograms ILMK, LMON and OMKP (See **PARALLELOGRAM**.) Add these into one sum, and multiply that sum by 2: the factum will be the surface of the *Parallelepiped*.

If then the base ILMK be multiplied by the altitude M O, the product will be the solidity.

Suppose *v. g.* LM = 36 MK = 15 MO = 12. Then,

$$\begin{array}{l} \text{LM} = 36 \quad \text{LM} = 36 \quad \text{MK} = 15 \\ \text{MK} = 15 \quad \text{MO} = 12 \quad \text{MO} = 12 \end{array}$$

$$\begin{array}{r} 100 \quad 72 \quad 30 \\ 36 \quad 36 \quad 15 \\ \hline \text{ILMK } 540 \quad \text{LMON } 432 \quad \text{MOKP } 180 \\ \hline \text{LIK M } 540 \\ \text{MOKP } 180 \end{array}$$

$$\begin{array}{r} 1152 \\ \text{MO } 12 \quad 2 \\ \hline 580 \quad 2304 \text{ Superficies.} \\ 6480 \text{ Solidity.} \end{array}$$

PARALLELISM, the quality of a *parallel*, or that which denominates it such: or it is that whereby two things, *v. gr.* lines, rays, or the like, become equidistant from one another. See **PARALLEL** and **PARALLELOGRAM**.

Thus, we say, remote objects are scarce perceptible, by reason of the *Parallelism* of their rays.

PARALLELISM of the earth's axis, in astronomy, or, *motion of PARALLELISM*; is that situation or motion of the earth's axis, in its progress through its orbit, whereby it still looks to the same point of the heavens, *viz.* toward the pole star; so that if a line be drawn parallel to its axis, while in any one position, the axis, in all other positions or parts of

of the orbit, will always be parallel to the same line. This *Parallelism* is the necessary result of the earth's double motion; the one round the sun, the other round its own axis. Nor is there any necessity to imagine a third motion, as some have done, to account for this *Parallelism*.

It is to this *Parallelism* that we owe the vicissitude of seasons, and the inequality of day and night.

PARALLELISM of rows of trees.—The eye placed at the end of an alley bounded by two rows of trees, planted in parallel lines, never sees them parallel, but always inclining to each other, towards the further extreme.

Hence mathematicians have taken occasion to enquire, in what lines the trees must be disposed, to correct this effect of the perspective, and make the rows still appear parallel? to this purpose parallel they must not be, but diverging; but according to what law must they diverge? the two rows, in line, must be such, as that the unequal intervals of any two opposite or corresponding trees may be seen under equal visual angles.

On this principle, F. Fabry has asserted, without any demonstration, and F. Tacquet, after him, has demonstrated by a long and intricate synthesis, that the two rows of trees must be two opposite semi-hyperbolas.

M. Varignon has since, in the memoirs of the royal academy, an. 1717, found the same solution by an easy, and simple analysis. But he renders the problem much more general, and requires not only that the visual angles be equal, but to have them increase, or decrease in any given ratio: provided the greatest do not exceed a right angle. The eye, he requires to be placed in any point, either just at the beginning of the ranges, or beyond, or on this side.

All this laid down, he supposes the first row to be a right line, and seeks what line the other must be, which he calls the *curve of the range*. This he finds must be an hyperbola, to have the visual angles equal. The straight and hyperbolic rows will be seen parallel to infinity; and if the opposite semi-hyperbola be added, we shall have three rows of trees, (the straight one in the middle) and all three parallel.

Nor is it required this second hyperbola be the opposite of the first, i. e. of the same kind, or have the same transverse axis: It is enough if it have the same centre, its vertex in the same right-line, and the same conjugate axis. Thus the two hyperbolas may be of all the different kinds possible; yet all have the same effect.

Again, the straight row being laid down as before; if it be required to have the trees appear under decreasing angles. M. Varignon shews, that if the decrease be a certain ratio, which he determines; the other line must be a parallel straight line. But he goes yet farther; and supposing the first row any curve whatever, he seeks for another that shall make the rows have any effect desired, i. e. be seen under any angles equal, increasing or decreasing.

PARALLELOGRAM, in geometry, a quadrilateral right-lined figure, whose opposite sides are parallel, and equal to each other.

A *Parallelogram* is generated by the equable motion of a right line always parallel to itself.

When the *Parallelogram* has all its four angles right, and only its opposite sides equal, it is called a *rectangle*, or an *oblong*. When the angles are all right, and the sides all equal, it is called a *square*, which some make a species of *Parallelogram*, others not.

If all the sides be equal, and the angles unequal, it is called a *rhombus* or *lozenge*.

If both the sides and angles be unequal, it is called a *rhomboïdes*.

Properties of the PARALLELOGRAM.—In every *Parallelogram*, what kind soever it be of, e. gr. that ABCD, *Tab. Geometry, Fig. 41.* a diagonal DA divides it into two equal parts; the angles diagonally opposite B, C, and A, D, are equal; the opposite angles of the same side, C, D, and A, B, &c. are, together, equal to two right angles; and each two sides together are greater than the diagonal.

Two *Parallelograms* ABCD, and ECDF on the same or on an equal base CD, and of the same height A C, or between the same parallels A F, C D are equal.—And hence two triangles CDA, and CDF on the same base and on the same height, are also equal.

Hence, also, every triangle CFD is half a *Parallelogram* ACDB upon the same or an equal base CD, and of the same altitude, or between the same parallels. Hence also a triangle is equal to a *Parallelogram*, having the same base, and half the altitude or half the base, and the same altitude.

Parallelograms, therefore, are in a given ratio, compounded of their bases and altitudes. If then the altitudes be equal, they are as the bases, and conversely.

In similar *Parallelograms* and triangles, the altitudes are proportional to the homologous sides; and the bases are cut proportionably thereby. Hence, similar *Parallelograms* and triangles are in a duplicate ratio of their homologous sides, also of their

altitudes and the segments of their bases: they are, therefore, as the squares of the sides, altitudes, and homologous segments of the bases.

In every *Parallelogram*, the sum of the squares of the two diagonals, is equal to the sum of the squares of the four sides.

This proposition, M. de Lagny takes to be one of the most important in all geometry; he even ranks it with the celebrated 47th of Euclid, and with that of the similitude of triangles; and adds, that the whole first book of Euclid is only a particular case hereof. For if the *Parallelogram* be rectangular, it follows that the two diagonals are equal; and, of consequence, the square of a diagonal, or which comes to the same thing, the square of the hypotenuse of a right angle, is equal to the squares of the sides.

If the *Parallelogram* be not rectangular, and, of consequence, the two diagonals be not equal; which is the most general case, the proposition becomes of vast extent; it may serve, for instance, in the whole theory of compound motions, &c.

There are three manners of demonstrating this problem; the first by trigonometry, which requires 21 operations; the second geometrical and analytical, which requires 15. M. de Lagny gives a more concise one, in the *Mémoires de l'Acad.* which only requires 7.

To find the Area of the rectangle *Parallelogram*, ABCD.—Find the length of the sides AB, and AC; multiply AB into AC, the produce will be the area of the *Parallelogram*. Suppose e. gr. AB to be 345; AC 123; the area will be 11385.

Hence 1. Rectangles are in a ratio compounded of their sides AB and AC. 2. If, therefore, there be three lines continually proportional; the square of the middle one is equal to the rectangle of the two extremes: and if there be four proportional lines, the rectangle under the two extremes, is equal to that under the two middle terms.

Other *Parallelograms*, not rectangular, have their areas found by resolving them, by diagonals, into two triangles; and adding the areas of the separate triangles into one sum.

COMPLEMENT of a PARALLELOGRAM. See COMPLEMENT. **Centre of Gravity of a PARALLELOGRAM.** See CENTER of GRAVITY, and CENTROBARYC Method.

PARALLELOGRAM, or **PARALLELISM**, also denotes a machine used for the ready and exact reduction or copying of designs, schemes, prints, &c. in any proportion; which is done hereby without any knowledge or habit of designing. See DESIGNING.

The *Parallelogram* is also called *Pentagraph*. See its description and use under the article PENTAGRAPH.

PARALOGISM, ΠΑΡΑΛΟΓΙΣΜΟΣ, in logic, a false reasoning; or a fault committed in demonstration, when a consequence is drawn from principles that are false, or, though true, are not proved; or when a proposition is passed over, which should have been proved by the way.

A *Paralogism* differs from a *Sophism* in this, that the *Sophism* is committed out of design and subtlety; and the *Paralogism* out of mistake, and for want of sufficient light, and application.

Yet Messieurs du Port Royal do not seem to make any difference between them. There are none of the pretenders to the quadrature of the circle, but have made *Paralogisms*.

PARALYSIS*, ΠΑΡΑΛΥΣΙΣ, in medicine, a disease popularly called *Palsy*. See PALSY.

* The word is formed from the Greek παραλύω, I unbind; this disease being supposed to unbind the nerves and muscles.

The *Paralysis* only differs from the *paresis*, as the greater from the less. See PARESIS.

Authors distinguish the *Paralysis* into a paraplegia or paraplexia, and a hemiplegia, and partial *Paralysis*.

The first is a *Palsy* of the whole Body. See PARAPLEGIA.

The second, of one side of the body. See HEMIPLEGIA.

The third of some particular member; which is the proper *Palsy*. See PALSY.

PARALYTIC, a person afflicted with the *paralysis*, or *palsy*. See PALSY, &c.

PARAMESE*, ΠΑΡΑΜΕΣΗ, in the ancient music, the ninth chord, or found in the diagramma, or scale of music. See DIAGRAMMA.

* The word is Greek, and signifies *juxta median*, next to the middle; its situation in the first state of the scale, being next the mese, or middle chord.

PARAMETER, in geometry, a constant right line in each of the three conic sections; called also *latus rectum*. See LAT-
TUS RECTUM.

In a parabola VBV, *Tab. Conics, Fig. 8.* the rectangle of the *Parameter* AB, and an abscissa, e. gr. B 3, is equal to the square of the correspondent semi-ordinate 3 III. See PARABOLA.

In an ellipsis and hyperbola, the *Parameter* is a third proportional to the conjugate, and transverse axis. See ELLIPSIS, and HYPERBOLA.

P A R

PARAMOUNT, in our law, signifies the supreme lord of the fee.

There may be a tenant to a lord, who holdeth himself of another lord; in respect whereof, the former lord is called *lord Meise*; and the latter *lord Paramount*.

All honours which have manors under them, have the *lord Paramount*.

But even the term *lord Paramount*, is only comparative: for as one man may be great, compared to a leis, and little, being compared with a greater; so none truly seems to be *lord Paramount* but the king, who is patron *Paramount* to all the benefices in England.

PARANYMPH, **PARANYMPHUS**, among the ancients, the person who waited on the bridegroom, and directed the nuptial solemnities; called also *pronubus*, and *auspex*, because the ceremony begun with taking auspices.

In strictness, the *Paranymphe*, Παρυνμφη, only officiated on the part of the bridegroom; on the part of the bride, it was a woman officiated, who was called *Pronuba*.

The Jews had likewise a kind of *Paranymphe*, which the talmud and the rabbins call שושביני *Sushbeini*, q. d. companions of the spouse.

The IVth council of Carthage appoints, that, when the married couple come to ask the priest's blessing, they be presented, either by their fathers and mothers, or by their *Paranymphe*s.

PARAPET*, *Breastwork*, in fortification, a defence or screen, on the extreme of a rampart, or other work, serving to cover the soldiers, and the cannon from the enemy's fire.

* Borel gives us from Jos. Maria Subrelius, a curious collection of names, which the ancients and moderns have given to this kind of *Parapet*: the Latins call them *Suburrae*, and *Bastie*, whence the names *Bastion* and *Bastille*. They also called them *Pagineumata*, *Loica*, and *Antemuralia*. The Spaniards called them *Barbacanes*; the Italians, *Parapetti*, because of their defending the breast, *petto*; whence our *Parapet*.

Parapets are raised on all works, where it is necessary to cover the men from the enemies fire; both within and without the place, and even in the approaches.

The *Parapet Royal*, or that of the rampart, is to be of earth, cannon-proof, from 18 to 20 foot thick; six foot high towards the place, and four or five towards the rampart.—This difference of height makes a glacis or slope for the musketeers to fire down into the ditch, or at least the counterescarp.

Before the *Parapet* is a *banquette*, a little eminence, a foot and half high for the soldiers to stand on. See **BANQUETTE**. The *Parapet* of the wall is sometimes of stone.—The *Parapet* of the trenches is either made of the earth dug up; or of gabions, fascines, barrels, sacks of earth, or the like.

PARAPET, is also a little wall, breast-high, raised on the brinks of bridges, keys, or high buildings; to serve as a stay, and prevent people's falling over.

PARAPH, a particular character, knot, or flourish, which people habituate themselves to make always in the same manner at the end of their name, to prevent their signature from being counterfeited.

The *Paraph* of the Kings of France is a grate, which the secretaries always place before their own, in all letters, &c. *Message* derives the word from *Paragraphe*. See **PARAGRAPH**.

PARAPHERNALIA*, or **PARAPHERNA**, in the civil law, those goods which a wife brought her husband, besides her dower, and which were still to remain at her disposal, exclusive of her husband, unless there were some provision made to the contrary in the marriage contract.

* The word is formed from the Greek *παρε*, beyond, or over, and *φειν*, dot, dower.—*In his Rebus quas extra dotem mulier habet & quas Græci parapherna vocant, nullam uxore prohibente, vir habeat communem.* Cod. de pactis.

The grand customary of Normandy gives a different sense to the word; it calls *Paraphernalia* the moveables, linen, and other female necessaries, which are adjudged to a wife, in prejudice of the creditors, when she renounces the succession of her husband.

Some of our English lawyers give a still different sense to the word *Paraphernalia*, defining it to be such goods as a wife challengeth over and above her dower, or jointure after her husband's death; as, furniture for her chamber, wearing apparel, and jewels, which are not to be put into the inventory of her husband's goods.

PARAPHIMOSIS, Παρφημοσις, in medicine, a disorder of the penis, wherein the prepuce is shrunk, and withdrawn behind the glans, so as not to be capable of being brought to cover the same.

This happens ofteneft in venereal disorders, where the humours discharg'd frequently prove so sharp, as to cause this retraction. There sometimes arises a necessity in this case to snip, or cut the prepuce open, otherwise the humours will be pent up under it, and do a great deal of mischief.

PARAPHRASE, Παρρηρασις, an explanation of some text in clearer and more ample terms, whereby we supply what the author might have said or thought on the subject. See **TEXT**.

P A R

Colomesius looks on Erasmus's *Paraphrase* on the New Testament, as fo extraordinary a work, that he makes no scruple to declare, he thinks the author to have been divinely inspired, when he penned it.

Chaldee PARAPHRASE, is a phrase frequent among the critics and divines.—There are three *Chaldee Paraphrases* on the pentateuch: that of Onkelos, whom some take to be the same with Aquila, and whom others take to have been that Onkelos whom the talmudists in the treatise *Gittin*, make a nephew of the emperor Titus.

The second is the *Paraphrase* of Jonathan.—The third is called the *Targum* of Jerusalem.

The *Chaldee Paraphrase* on the prophets is of Jonathan son of Uziel, whom some confound with Theodotio.

The author of the *Chaldee Paraphrase* on the hagiographers is unknown. Some attribute it to one Joseph, furnished the quintessence; others to rabbi Akiba. Others say, there is so much difference in the style, that no one person can have been the author of the whole.

PARAPHRENESIS, or **PARAPHRENITIS**, Παρρηρηνησις, in medicine, a secondary kind of phrenzy, supposed by the ancients, to be owing not to any immediate disorder of the brain, or meninges, but to an inflammation of the ventricle and the liver, and especially of the diaphragm, whereby the brain and meninges come to be affected by content of parts. See **PHRENITIS**.

The ancients called it a *Pseudo-Phrenesis*, false phrenzy, to distinguish it from the true one, which they made to consist in an inflammation of the brain and its meninges.

The moderns do not make any such distinction in phrenzies: they determine that all come from the same cause; but that cause is neither an inflammation of the brain, nor of the diaphragm.

PARAPHRENITIS, among modern physicians, is sometimes used for an inflammation of the mediastinum, or pleura about the diaphragm, attended with a continual fever, and exquisite pain in the parts affected on contracting the abdominal muscles; as also a delirium and a rising of the hypochondria.

PARAPLEGIA*, or **PARAPLEXIA**, Παρρηπληγια, or Παρρηπλησια, in medicine, a species of paralysis, or palsy, usually succeeding an apoplexy.

* The word comes from the Greek *παρε*, much, and *πληρον*, or *πληρης*, I strike.

The *Paraplegia* is a general palsy, affecting the whole body, the head alone excepted.—Boerhaave defines it an immobility of all the muscles below the head, that have nerves from the cerebrum and cerebellum.

Sometimes, all sense as well as motion are destroyed hereby, sometimes only the one of them is lost.

Its original is usually supposed to be some disorder, or obstruction in the fourth ventricle of the brain, or in the beginning of the spinal marrow.

Etmuller distinguishes the *Paraplegia* from the *paralytic*. The paralysis, according to him, is a relaxation or resolution of the ligaments and members ministering to motion, not from any obstruction of the nerves, but from a resolution of the nervous parts.—Whereas the *Paraplegia* arises from some obstruction of the nerves.

The latter usually succeeds an apoplexy, epilepsy, convulsions, or vertigo's; the former, the scorbutus, hypochondriacal disease, colic, &c.

PARAPLEXIA, in medicine. See **PARAPLEGIA**.

PARASANG*, Παρρησαγγη, an ancient Persian measure different at different times, and in different places; being usually 30, sometimes 40, and sometimes 50 stadia, or furlongs.

* The word, according to Liddell, has its rise from *Parasch Agarius*, q. d. the space a post-man rides from one station, *Angaria*, to another.

PARASCENIUM, among the Romans, was a place behind the theatre, whither the actors withdrew to dreis, undreis, &c. more frequently called *Postscenium*.

PARASCEVE, Παρρησκεπη, the sixth day of the last week of lent, popularly called *Good-Friday*.

St. John says our Saviour was crucified on the *Parasceve* of the Passover, i. e. on the eve or day of preparation of the passover: For Ildore and Papias observe, that the word in the original Greek signifies *preparation*, and was applied among the Jews to Friday, because on that day they used to prepare what was necessary for the celebration of the Sabbath.

Hence what our Translation of the New Testament renders preparation of the Sabbath, M. Simon, and some others, call *Parasceve*.

PARASELENE*, in physiology, a *mock-moon*; a meteor, or phenomenon encompassing or adjacent to the moon, in form of a luminous ring; wherein are sometimes observed one, sometimes two apparent images of the moon.

* The word is formed from the Greek *παρε*, near, and *σεληνη*, moon.

The *Paraselenes* are formed after the same manner as the *parhelias*, or *mock-suns*. See **PARHELION**.

PARASITE, Παρρησιος, among the Greeks, was originally a very

very reputable title: the *parasites* being a kind of priests, or at least ministers of the gods; in the same manner, as at Rome were the *epulones*.

They took care of the sacred corn; or the corn destined for the service of the temples, and the gods, *viz.* sacrifices, feasts, &c. they had even the intendance over sacrifices, and took care that they were duly performed.

At Athens there was a kind of college of twelve *parasites*; each people of Attica furnishing one, who was always chosen out of one of the best families.

Polybius adds, that *parasite* was also an honourable name among the ancient Gauls; and was given to their poets; but of late it has been made a term of reproach, and us'd for a flatterer and mean dependant.

PARASITES, or PARASITICAL plants in botany, a kind of plants, growing on trees, and so called from their manner of living and feeding, which is altogether on others.

Such is moss, which was anciently supposed the effect of a discomposure of the texture of the bark: or a kind of rust, or at most, little filaments arising from the bark: but from many observations of the moderns, it appears, that mosses are real plants, whose seed is exceedingly fine, and inclosed in very little capulae; which bursting of themselves, the seed is driven by the wind, and at length detained in the inequalities of the barks of trees; where it takes root and is fed at the expense thereof.

Of these mosses M. Vaillant reckons no less than 137 species common in the neighbourhood of Paris: which with the lichens and other mosses discovered since his time, make the family of *parasite* plants very large.

The most pernicious of these *parasites*, to the trees that support them, are the lichens; which appear on the barks of trees in form of a crust, mixed with yellow and a dirty white.

M. de Reffions gives us a remedy for this disease, in the French Memoirs of the Acad. Roy. It consists in making an incision through the bark to the very wood, from the first branches to the earth; the bark closes again in a little time, and after this always preserves itself clean and free from mosses for the future.

This aperture renders the course of the sap more free, and prevents the forming of those inequalities so favourable to the production of mosses. The incision, he adds, is to be made from March to the end of April, and on that side turned most from the sun.

PARASOL, a little moveable, in manner of a canopy, bore in the hand to screen the head from the sun, rain, &c. more usually called *umbrella*.

It is made of leather, taffety, oil-cloth, &c. mounted on a stick, and opened or shut at pleasure, by means of pieces of whalebone that sustain it.—The East-Indians never stir without a *parasol*.

The word is French,—and that used against rains is sometimes called *parapluie*.

PARASTATA, in the ancient architecture, a kind of pier, or peditroit, serving as a defence or support to a column or arch. Mr. Evelyn makes the *parastata* the same with pilaster. Barbaro, and others, the same with anta: and Daviler, the same with peditroit. See **PILASTER**.

PARASTATÆ, in anatomy, *Epulomyia*, two tuberos, varicose bodies, lying upon, and adhering to, the upper part of the testicles; whereof they properly appear to be a part; though different from the rest in form and consistence.

The *parastatæ* consist, like the testicles, of a convolution of seminal tubuli, mixed with blood-vessels; the difference between them lying only in this, that in the *parastatæ*, the tubuli are united into one; the various convolutions of which, being more firmly bound together by a strong membrane, arising from the tunica albuginea, they feel more compact than the testicles. See **SEED, SPERMATIC, &c.**

The *parastatæ* and testicles, are said to be inclosed in three proper membranes; the first muculous, derived from the cremaster muscle; the second called the *vaginalia*; and the third the *albuginea*. See each under its proper head.

PARASYNANCHE *, in medicine, a kind of angina or squinancy, wherein the exterior muscles of the throat are inflamed.

* The word comes from *πασι, συ, αλγειν*, to suffocate.

PARATHEISIS, in the Greek church, the prayer which the bishop rehearses over the catechumens, stretching his hands over them to give them benediction; and which they receive, bowing their head under his hands.

PARATHESIS, (popularly called *Brackets* or *Crotchets*) is also the name of a kind of point or mark, as [] used in writing, chiefly to include synonyms, explicatives, and the like matters, not essential to the discourse. See **PARENTHESIS**.

PARATHESIS, in grammar, *apophision*; or a figure whereby two or more substantives are put in the same case.

PARATILMUS, in the ancient Greek jurisprudence, a name given to a sort of punishment imposed on adulterers who were poor and unable to stand the common penalty.

It consisted either in making them run a horse-radish up the anus, which they called *αποσπασμοειδης*; or in tearing up by the

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roots the hair about the pudenda, which they called *παρεσπασμος*; or *παρεσπασμος*, to tear, pluck up.

PARATITLES, PARATITLA, in jurisprudence, short notes; or summaries of the titles of the digest, and code; which have been made by several lawyers, in order to compare and examine the connection of the several parts with one another. We have *paratitles* of Cujas, of Maran, &c. Chaffaneus has a second comment on the *paratitles* of Cujas.

PARAVAIL, PARAVAILLE, in law, the lowest tenant of a fee; or he that is immediate tenant to the land. See **TENANT**.

He is called *tenant paravail*, because it is presumed he hath profit, and avails by the land.

PARAZONIUM, ΠΑΡΑΖΩΝΙΟΝ; or *Scissa*, among medals, a scepter, rounded at the two ends in manner of a truncheon, or commander's staff; or a kind of poniard, or short sword represented as wore at the girdle, on several ancient medals.

Antiquaries are much divided on the explication of the *parazonium*; as, indeed, the form and manner of bearing it are very different.—It is sometimes thrown across the shoulders in manner of a quiver.

PARBOILING, in pharmacy, &c. a term applied to fruits, herbs, &c. which are boiled a little while, to draw out the first juices; in order to be afterwards inspissated or thickened. See **BOILING**.

PARCÆ, goddesses who, according to the ancient Pagani theology, preside over the periods, or durations of human lives. These the ancients frequently confounded with the fates, or destinies; and, in effect, the *parcæ*, according to Plato, were the daughters of necessity, and destiny.

The *parcæ* were three, Clotho, Lachesis, and Atropos; Because, forsooth, all things have their beginning, progress, and end. Hence the poets tell us, the *parcæ* spun the thread of mens lives; that Clotho held the distaff, and drew the thread; Lachesis twirled the spindle, and spun it; and Atropos cut it, *Clotho colum retinet, Lachesis net, & Atropos occat*.

The ancients represent the *parcæ* divers ways: Lucian, in the shape of three poor old women, having large locks of wool, mixed with daffodils on their heads; one of which holds a distaff, the other a wheel, and the third a pair of scissars, wherewith to cut off the thread of life.—Others represent them otherwise; Clotho appearing in a long robe of divers colours, wearing a crown upon her head adorned with seven stars, and holding a distaff in her hand: Lachesis in a robe beset with stars, with several spindles in her hand; and Atropos; clad in black, cutting the thread with a large scissars.

The ancients imagined that the *parcæ* used white wool for a long and happy life; and black; for a short and unfortunate one.

PARCEL-Makers, two officers in the exchequer, who make *parcels* of the excheator's accounts, wherein they charge them with every thing that they have levied for the king's use, within the time of their office, and deliver the same to one of the auditors of the court to make their accompts thereof.

Bill of PARCELS. See the article **BILL**.

PARCENERS, quasi PARCELLERS. See **CO-PARCENERS**.

PARCHMENT *, in commerce, &c. sheep or goat's skin prepared after a peculiar manner, which renders it proper for several uses; particularly for writing on, and for the covering of books, &c.

* The word comes from the Latin *Pergamena*, the ancient name of this manufacture; which it is said to have took from the city Pergamos, to Eumenes, king whereof, its invention is usually ascribed. Though, in reality, that prince appears rather to have been the improver, than the inventor of *Parchment*. For the Persians of old, according to Diodorus, wrote all their records on skins; and the ancient Ionians, as we are told by Herodotus; made use of sheep-skins and goat-skins in writing, many ages before Eumenes's time. Nor need we doubt that such skins were prepared and dressed for that purpose, after a manner not unlike that of our *Parchment*; though probable not so artificially.—*Vide* Diod. Sicul. l. 2. p. 84. Herodot. l. 5. Frid. Connect. part. 1. l. 7. p. 708.

Parchment is begun by the skinner, and ended by the *parchment-maker*. It constitutes a very considerable article in the French commerce: it is made in most of their cities; and besides the consumption at home, they send vast quantities abroad, particularly to England, Flanders, Holland, Spain, and Portugal.

That called *virgin parchment*, and which superstitious people believe to be made of a kind of caul, wherein some children are inclosed in the womb, is nothing but a somewhat thinner and finer sort than the rest, and is most proper for certain purposes, as fans, &c. and made of the skin of an abortive lamb, or kid.

Manufacture of PARCHMENT.—The skin having been stripped of its wool, and having passed the lime-pit (after the manner described under the article **SHAMMY**) the skinner stretches it on a kind of frame, consisting of four pieces of wood, mortised into each other at the four angles, and perforated lengthways from distance to distance, with holes furnished with wooden pins that may be turned at pleasure, like those of a violin.

To stretch the skin on this frame, they make little holes all around it, and through every two holes draw a little skewer; to this skewer they tie a piece of small packthread, and tie that over the pins; so that coming to turn the pins equally, the skin is strained tight every way, like that of a drum. The skin being thus sufficiently stretched on the frame, the flesh is pared off with a sharp instrument for that purpose; this done, it is moistened with a rag; and a kind of white stone or chalk reduced to a fine dust, is strewn over it; then with a large pumice-stone, flat at bottom, much after the manner of a muller for grinding colours, they rub over the skin as if about to grind the chalk; and thus they scower off the remains of the flesh. Then they go over it again with the iron instrument; again moisten it as before, and again rub it with the pumice-stone without any chalk underneath; this smoothen and softens the flesh side very considerably. They then drain it again, by passing over it the iron instrument as before. The flesh side being thus drained, they pass the iron on the wool or hair-side; then, stretch it tight on the frame, by means of the pins, and go over the flesh side again with the iron: this finishes its draining; and the more the skin is drained, the whiter it always becomes.

They now throw on more chalk, sweeping it over with a piece of lamb-skin that has the wool on; this smoothen it still further, and gives it a white down or nap. It is now left to dry, and when dried, it is taken off the frame, by cutting it all round. The skin, thus far prepared by the skinner, is taken out of his hands by the parchment-maker; who first scrapes or pares it dry on the summer, with an iron instrument like that above-mentioned, only finer and sharper, with this, worked with the arm from top to bottom of the skin, he takes away about one half of its thickness. The skin thus equally pared on both sides, they pass the pumice-stone over both sides, to smoothen it. This last preparation is performed on a kind of form or bench covered with a sack stuffed with flocks, and it leaves the parchment in a condition for writing on.

The paring the skin dry on the summer, is the most difficult preparation in the whole process of parchment-making; for which reason the skinners seldom dare meddle with it; but usually leave it to those more experienced in it: the summer whereon it is performed, is a calf-skin well stretched on a frame, serving as a support to the skin which is fastened a top of it with a wooden instrument that has a notch cut in it. Lastly, that the iron knife may pass the easier between the summer and the skin to be pared, they put another skin which they call the counter-summer. The parings thus taken off the skin, are used in making glue, size, &c.

What we call *vellum* is only parchment made of the skins of abortive calves, or at least of sucking calves; 'tis finer, whiter, and smoother than the common parchment, but it is prepared in the same manner as that, abating that it is not passed through the lime-pit.

Roll of PARCHMENT. See the article ROLL.

PARCO *fractus*, in law, a writ which lies against him who violently breaks open a pound, and takes out beasts thence, which, for some trespass done, were lawfully impounded. See POUND.

PARDON, in law, a remission, or forgiveness of a felonious, or other offence, against the king, or the laws.

This our lawyers make twofold; the one, *ex gratia regis*, the other, *per cours de ley*.—The first is that which the king out of some special regard to the person, or some other circumstance, grants by his absolute prerogative, or power, either before conviction of the offender, or after.

PARDON *by cours de law*, is that which the king grants as the law and equity persuades, for a slight offence; as homicide, casual, &c.

Charter of PARDON. See the article CHARTER.

PARDON, in the canon law, is an indulgence which the pope grants to supposed penitents, for remission of the pains of purgatory, which they have merited for the punishment of their sins.

The grand time for the dispensation of pardons is the Jubilee. In this sense, pardon is properly the angelic salutation said to the virgin at the sound of three little strokes of a bell rung in the morning, at noon, and night, in order for the person to be entitled to indulgences.

PARDONERS, in our ancient customs, were persons who carried about the pope's indulgences, and sold them to the best bidders.

PARAGORICKS*, in medicine, remedies which assuage pain.—The same with what we otherwise call *anodynes* and *opiates*.

* The word is Greek, *παραγορικα*, formed of *παρηγορεω*, *lenio*, I appease, or mitigate.

PARAIRA BRAVA, the root of a plant growing in the West-Indies, chiefly in Mexico and Brazil; esteemed a specific for the cure of the stone and gravel.

The name, which in the original Portuguese, signifies wild-vine, or bastard-vine, bears a good deal of analogy to the plant, which bears branches laden with leaves perfectly like those of

the vine; and which, like them, creep along walls and trees. The Portuguese value this root on an equal footing with the ipecacuanha. Some druggists call it, by corruption, *para-irada brava*.

M. Geoffroy attributes the efficacy of this root, in nephritic cases, to its dissolving the viscid matters, whereby the particles of the sand, &c. were cemented together; and hence, he gives it with the same intention in jaundices, asthma's, &c. It is administered in decoction.

The Portuguese hold it also a remedy for dysenteries, quin-zies, bites of venomous beasts, &c. See Supplement, article PARAIRA BRAVA.

PARALCON, in grammar, a figure, whereby a word or syllable is added to the end of another.

PARALLA, or rather *parabola*, in physiology. See PARABOLUM.

PARENCHYMA*, in anatomy, a peculiar kind of substance different from flesh, whereof several parts of the body, as the heart, lungs, liver, spleen, kidneys, &c. were anciently supposed to be formed.

* It is thus called from the Greek *παρεγχυμα*, effusion, *q. d.* generated by a collection, and condensation of juice.

Erasistratus first used the word; as imagining the substance of these parts not to be vascular like the rest, but to consist of a mass or coagulum of blood, stagnated in the vessels of the parts.—But the moderns universally reject this opinion: the observations made by microscopes, injections, &c. clearly shewing, that the heart is a true muscle, the lungs and spleen, clusters of membranous vessels, and vessels, and the liver and kidneys, compositions of glands, through which the bile and urine are filtrated.

PARENCHYMA of plants.—Dr. Grew gives the name *parenchyma*, to the pith or pulp, or that inner part of a fruit or plant, through which the juice is supposed to be distributed.

This, when viewed with a microscope, appears to resemble marrow; or rather a sponge; being a porous flexible dilatable substance.

Its pores are innumerable, and exceedingly small; receiving as much humour as is requisite to fill and extend them; which disposition of pores it is, that is supposed to fit the plant for vegetation and growth.

The *parenchyma* of roots is white at first, but it changes its colour, in proportion as the root grows thicker. Thus it becomes yellow in the root of the bastard rhubarb, and red in that of the bistort.

PARENT, PARENS, a term of relation, applicable to those from whom we immediately receive our being. See FATHER and MOTHER.

PARENTALIA, in antiquity, funeral obsequies; or the last duties paid by children to their deceased parents.

PARENTALIA, is also used for a sacrifice or solemn service offered annually to the manes of the dead.

PARENTELA.—*De parentela se tollere*, in ancient customs, signified a renunciation of one's kindred and family.

This was done in open court, before the judge, and in the presence of twelve men, who made oath, they believed it was done for a just cause.

We read of it in the laws of Henry I. after such abjuration, the person was incapable of inheriting any thing from any of his relations, &c.

PARENTHESIS*, in grammar, certain intercalary words inserted in a discourse, which interrupt the sense or thread, but which seem necessary for the fuller understanding of the subject.

* The word is Greek, *Παραθεσις*, formed of *παρε*, *inter*, between, and *θεσις*, position, *q. d.* putting between.

The politest of our modern writers avoid all *parentheses*; as keeping the mind in suspense, embarrassing it, and rendering the discourse less clear, uniform, and agreeable: long and frequent *parentheses* are intolerable, especially in verse, which they ever render dull, and languid, and like to prose.

The proper characteristic of a *parenthesis* is, that it may be either taken in or left out, the sense and grammar remaining entire.

In speaking, *parentheses* are to be pronounced in a different tone; and in writing, they are inclosed between (); to distinguish them from the rest of the discourse.

The character itself whereby they are distinguished, is also called a *parenthesis*.

PARERE, in commerce, an Italian term which begins to be naturalized. It signifies the advice, or counsel of a merchant, or negotiator; for that such a person, being consulted on any point, introduces his answer, in Italian, with *mi pare*, i. e. I think, it seems to me.

The method of negotiating, especially that of bills of exchange, being borrowed from the Italians, most trading cities, especially Lyons, retain the use of *pareres*; which are the advices or opinions of merchants and negotiators, and which serve as aids before notaries, when given by authority of a judge-conservator, or at a particular consultation, for maintaining the right of the consuler.

P A R

M. Savary has an excellent treatise, entitled, *parere, ou avis & conseils sur les plus importantes matieres du commerce*; containing the resolution of the most difficult questions relating to bankrupts and failures, bills of exchange, orders without date or expression of value, bank-signings, renewing of bills of exchange, those drawn or accepted by women in behalf of their husbands, or during the minority of the drawer, &c.

PARERGA, ΠΑΡΕΡΓΑ, a term sometimes used in architecture, for additions, or appendages, made, by way of ornament to a principal work.

It is sometimes also used in painting for little pieces, or compartments on the sides, or in the corners of the principal piece.

PAREISIS, ΠΑΡΕΙΣΙΣ, in medicine, a disease called also *paralysis* and *palsy*.

PARGETING, in building, is used for the plastering of walls; sometimes for plaster itself.

PARGETING is of various kinds; as, 1. White lime and hair mortar laid on bare walls. 2. On bare laths, as in partitioning and plain ceiling. 3. Rendering the insides of walls, or doubling partition-walls. 4. Rough-casting on heart-laths. 5. Plastering on brick-work, with finishing mortar in imitation of stone-work; and the like upon heart-laths.

PARHELILUM*, or **PARHELION**, in physiology, a mock-sun, or meteor, in form a very bright light, appearing aside of the sun; and formed by the reflexion of his beams in a cloud properly posited.

* The word is formed from the Greek, *παρά, juxta, near, and ἥλιος, sol, sun.*

The *parhelia* usually accompany the coronæ, or luminous circles, and are placed in the same circumference, and at the same height. Their colours resemble those of the rainbow, the red and yellow are on the side towards the sun, and the blue and violet on the other.

Though, there are coronæ sometimes seen entire, without any *parhelia*; and sometimes *parhelia* without coronæ.

PARHELLA are sometimes double, triple, &c.

In the year 1629, was seen at Rome a *parhelion* of five suns; and in 1666, another at Ayles of six.

M. Mariotte accounts for the appearance of *parhelia*, from an infinity of little parcels of ice floating in the air, which multiply the image of the sun, either by refracting or breaking his rays, and thus making him appear where he is not; or by reflecting them, and serving as mirrors.

The known laws of reflection and refraction have given a handle for geometrizing on these phenomena; and M. Mariotte has determined the precise figure of the little icicles, and their situation in the air, the size of the coronæ or circles which accompany the *parhelia*, and the colours wherewith they are painted, by a geometrical calculus.

M. Huygens accounts for the formation of a *parhelion*, in the same manner as for that of the halo, viz. by supposing a number of small icy cylinders with opaque kernels, carried in the air, neither in a perpendicular nor parallel direction, but inclined to the horizon in a certain angle, which must be nearly half a right one.

To make the effect of these cylinders manifest, M. Huygens produced to the academy of Paris, a glass cylinder a foot long, with an opaque cylinder of wood in the middle, and the ambient space filled with water, and transparent ice; which cylinder being exposed to the sun, and the eye put in the requisite situation, there were successively seen all the refractions and reflections necessary for the phenomena of the *parhelia*.

PARIAN Marble. See the article **MARBLE**.

PARIETALIA Ossæ, in anatomy, the third, and fourth bones of the cranium; so called, because they form the *parietes*, or sides of the head.

They are also denominated *ossa bregmatica*, and *ossa sincipitis*.

Their substance is finer and thinner than that of the coronal and occipital bones. Their figure is square; their size surpasses that of the other bones of the head; and their situation is in the lateral parts, which they possess entirely.

The sagittal suture connects them at the upper part; the coronal joins their fore-part to the os frontis; the lambdoidal joins them by the hind-part to the occipital bone; and, lastly, the squamous suture joins them by the lower-part of the ossa petrosa.

The outer surface of these bones is very smooth and polite; the inner, rough and uneven, being full of impressions which the arteries of the dura mater have made by their continual pulsation before the bones were ossified.

PARIETES, in anatomy, a term used for the inclosures, or membranes that stop up or close the hollow parts of the body; especially those of the heart, the thorax, &c.

The *parietes* of the two ventricles of the heart are of unequal strength and thickness, the left exceeding the right, because of its office, which is to force the blood through all parts of the body; whereas the right only drives it through the lungs.

P A R

PARISH*, the precinct, or territory of a parochial church; or the circuit of ground within which the people belonging to any church do inhabit.

* The word comes from the Latin *parochia*, of the Greek *παροικία*, habitation; compounded of *παρά, near, and οἶκος, house*.

—Accordingly, Du Cange observes, that the name *παροικία* was anciently given to the whole territory of a bishop, and derives it from *neighbourhood*; because the primitive christians, not daring to assemble openly in cities, were forced to meet secretly in neighbour houses.

In the ancient church, there was one large edifice in each city, for the people to meet in; and this they called *parochia, parish*. But the signification of the word was afterwards enlarged, and by *parish* was meant a diocese, or the extent of the jurisdiction of a bishop, consisting of several churches; unless we will suppose, as some do, that those bishops were only pastors of single churches.

Du Pin observes, that country *parishes* had not their origin before the IVth century; but that those of cities are more ancient. The city of Alexandria is said to have been the first that was divided into *parishes*. Baronius says, that in the time of pope Cornelius, there were 46 *parishes* in Rome.

The division of England into *parishes*, is attributed to Honorius archbishop of Canterbury, in 636. Camden reckons 9284 *parishes* in England. And Chamberlayn makes, at present, 9913.

PARISH-PRIEST, the parson or minister, who holds a *parish* as a benefice.

If the predial tythes be appropriated, the parson is called *rector*. See **RECTOR**. If they be impropriated, he is called *vicar*. See **VICAR**.

PARISIS, a French money of account, formerly a real coin struck at Paris, at the same time with the tournois struck at Tours.

The *parisis* exceeded the tournois by one fourth; so that the livre or pound *parisis* was 25 sols; and the livre tournois 20. The sols and deniers *parisis*, &c. were in proportion.

PARK*, **PARCUS**, a large inclosure, privileged for wild beasts of chase, either by the king's grant, or by prescription.

* The word is originally *Celtic*, where it signifies an inclosure, or place shut up with walls.

Manwood defines a *park* a place of privilege for beasts of venery or hunt, and other wild beasts of the forest, and of chase, *tam sylvæstris quam campæstris*.—A *park* differs from a forest, in that Crompton observes, a subject may hold a *park* by prescription, or the king's grant, which he cannot do by a forest.

A *park* differs from a chase also; for that a *park* must be enclosed; if it lie open, it is a good cause of seizing it into the king's hand; as a free chase may be, if it be enclosed. Nor can the owner have any action against such as hunt in his *park*, if it lye open. See **CHASE**.

Du Cange refers the invention of *parks* to king Henry I. of England; but Spelman shews, it is much more ancient; and was in use among the Anglo-Saxons. Zosimus assures us also, that the ancient kings of Persia had *parks*.

PARK is also used for a moveable palliade set up in the fields to inclose sheep in to feed, and rest in during the night.

The shepherds shift their *park*, from time to time, to dung the ground, one part after another.

PARK is also used for a very large net, disposed on the brink of the sea, with only one hole which looks towards the shore; and which becomes dry, after the flood is gone off; so that the fish once got in, have no way left to escape.

PARK, in war. **PARK of artillery**, a post in a camp out of cannot shot of the enemy, and fortified to secure the magazines, and ammunition.

Here are the artillery, artificial fireworks, powder, and other warlike provisions kept, and guarded by pikemen only, to avoid all casualties that might happen by fire.

Every attack, at a siege, has its *park* of artillery.

PARK of provisions, is a place in a camp, on the rear of every regiment, which is taken up by the sutlers, who follow the army with all sort of provisions, and sell them to the soldiers.

PARLEY*, a conference with an enemy, &c.

* The word is formed of the French, *parler, to speak, talk*.

Hence to beat or found a *parley*, is to give a signal for the holding such a conference by beat of drum, or sound of trumpet. See **CHAMADE**.

PARLIAMENT, **PARLIAMENTUM**, in England, a grand assembly, or convention of the three estates of the kingdom, viz. lords spiritual, lords temporal, and commons, summoned to meet the king, to consult of matters relating to the common-weal; and particularly to enact, and repeal laws.

The two houses of *Parliament* are the king's grand council. Till the conquest, the great council, consisting only of the great men of the kingdom, was called *magnatum conventus*, and *prælatorum procerumque concilium*. The Saxons, in their own tongue, called it *Wittenagemote*, i. e. assembly of the wise.

After the conquest, about the beginning of the reign of king Edward I. some say, in the time of Henry I. it was first called *parlementum*, q. d. *speechment*, from the French, *parler*, to speak; though it still only consisted of the barons, or great men of the nation; till in the reign of Henry III. according to some, the commons were also called to sit in *parliament*, the first writs sent out to summon them bearing date 49 Henry III. anno 1217: But Sir Walter Raleigh in his prerogative of *parliaments*, thinks the commons were first called in the 17th of Henry I. and Dr. Heylin fixes the time of their first admission to the reign of Henry II. Indeed, Sir Edward Coke, Dodderidge, Prynne, and others, have shewn that the commons of England had always a share in the legislature, and a place in the great assemblies; though not on the present footing, as making a distinct house, and as composed of knights, citizens, and burgesses. *Parliaments* are to be summoned, prorogued, and dissolved by the king alone: nor can a *parliament* begin without the king's presence, or that of his commissioners.

At first, new *parliaments* were called every year: by degrees their term grew longer. In the time of king Charles II. they were held a long time with great interruptions between. Both which methods were found of so ill consequences, that in the beginning of the reign of king William, an act was passed whereby the term of all *parliaments* was restrained to three sessions, or three years; this was hence called the *triennial act*. Since that, from other views, the period of *parliaments* is again lengthened to seven years.

A *parliament* is called by the king's writ, or letter, directed to each lord, commanding him to appear; and by other writs directed to the sheriffs of each county, to summon the people to elect two knights for each county, and one or two burgesses for each borough, &c.

Anciently, all the people had votes in the elections; till it was enacted by Henry VI. that none but freeholders, residing in the county, and who had a yearly revenue of 40 s. should be admitted to vote; nor were any to be elected, that were under 21 years of age.

That the members might attend in *parliament* with more freedom, they, and all their menial servants, were privileged from all arrests, attachments, imprisonments, &c. for debts, trespasses, &c. *enando, morando vel ad propria redeundo*; but not from arrests for treason, felony, and breach of peace.

The place where the *parliament* meets, is wherever the king pleases; of late, it has been in the palace of Westminster; the lords and commons each in a distinct apartment. In the lords house, the princes of the blood are placed in distinct seats; the great officers of state, dukes, marquises, and bishops on benches; and the viscounts and barons on others across the house; all according to their order of creation, place, &c.

The commons sit promiscuously; only the speaker has a chair at the upper end; and the clerk and his assistant at a table near him. Before any business is done, all the members of the house of commons take the oaths, and subscribe their opinions against transubstantiation, &c. which test, the lords too, though they do not take the oaths, are obliged to take.

The house of lords is the sovereign court of justice of the realm, and the dernier resort: the house of commons is the grand inquest, but is no court of justice.

As to the manner of debating and passing bills in PARLIAMENT.

Any member may move to have a bill brought in for any thing, which, upon a question put, being agreed to by the majority, this person with others, are ordered to prepare and bring in that same. When ready, a time is appointed for reading: after reading it by the clerk, the speaker reads the abstract thereof, and puts the question, whether or no it shall have a second reading? after a second reading, the question is, whether or no it shall be committed? which is either to a committee of the whole house, if it be of importance; or to a private committee, any member naming the persons. The committee being appointed, and a chairman chosen, the chairman reads the bill, paragraph by paragraph, puts every clause to the question, and fills up blanks, and makes amendments, according to the opinion of the majority. The bill thus gone through, the chairman makes his report at the side-bar of the house, reads all the additions and amendments, &c. and moves for leave to bring up the report to the table; which granted, he delivers it to the clerk, who reads the amendments, &c.

The speaker then puts the question, whether they shall be read a second time; and, if agreed to, he reads them himself. To so many as the house acquiesces in, the question is now put, whether the bill, thus amended, shall be engrossed and writ fair in parchment, and read a third time? the bill engrossed, the speaker holds it in his hand, and asks if it shall pass? if the majority be for it, the clerk writes on it, *fait baille aux seigneurs*. Or, in the house of lords, *fait baille aux communes*.—If a bill be rejected, it cannot be any more proposed during that session.

Forty members constitute a house of commons, and eight a committee. A member of the commons, to speak, stands up, uncovers, and directs his speech to the speaker only. If what he says be answered by another, he is not allowed to reply the same day, unless personally reflected on. Nor may any person speak more than once to the same bill in the same day. In the lords house they vote, beginning at the puiſne or lowest baron, and go up orderly to the highest, every one answering apart, content, or not content. In the house of commons, they vote by yeas and nays; and if it be dubious, which is the greater number, the house divides. If the question be about bringing any thing into the house, the ay's go out; if it be about any thing the house already has, the no's go out. In all divisions, the speaker appoints four tellers, two of each opinion. In a committee of the whole house, they divide by changing sides, the ay's taking the right, the no's the left of the chair, and then there are but two tellers. If a bill pass one house, and the other demur to it, a conference is demanded in the painted chamber, where certain members are deputed from each house; and here the lords sitting covered, the commons stand bare, and the case is debated. If they disagree, the affair is null; if they agree, this, with the other bills that have passed both houses, is brought down to the king, in the house of lords, who comes thither clothed in the royal robes, and with the crown on, before whom the clerk of the *parliament* reads the title of each bill, and as he reads, the clerk of the crown pronounces the royal assent or dissent.

If it be a public bill, the royal assent is given by these words, *le roy le veut*. If a private one, by *soit fait comme il est desire*. If the king refuse the bill, the answer is, *le roy s'avisera*. If it be a money bill, the answer is, *le roy remercie ses loyaux sujets, accepte leur benivolence & aussi le veut*.

The bill for the king's general pardon has but one reading. The number of members in the house of lords is uncertain, as increasing at the king's pleasure. The members of the house of commons, when full, are 553; viz. 92 knights of shires; 52 deputies for the 25 cities, London having 4; 16 for the 8 cinque ports; 2 for each university; and, finally, 332 for 180 boroughs, besides 12 boroughs for Wales, and 45 members for Scotland.

Porter of PARLIAMENT house. See the article PORTER.

Rolls of PARLIAMENT. See the article ROLLS.

Session of PARLIAMENT. See the article SESSION.

PARLIAMENT is sometimes also used for other assemblies beside those of the states of the realm.—Thus we read that the abbot of Croyland was used to call *parliaments* of his monks, to consult of the affairs of the monastery.—And, at this day, an assembly, of the two temples, called to consult of their common affairs, is called a *parliament*.

PARLIAMENTS of France, are courts or assemblies established by the kings to judge of the differences between particular persons, and to pronounce on appeals from sentences given by inferior judges.

There are ten of these *parliaments* in France. That of Thoulouse, established in 1303: that of Dijon, in 1476: that of Grenoble, in 1453: that of Rouen, in 1499: that of Rennes in Bretagne, in 1553: that of Bourdeaux, in 1502: that of Aix, in 1501: that of Metz, in 1633: that of Pau in Bearn, in 1519; and that of Paris.

The *parliament* of Paris is the principal, and that whose jurisdiction is of the greatest extent. This is the chief court of justice throughout the realm. It consists of six chambers: the grand chamber, where causes of audience are pleaded; and five chambers of inquests, where processes are adjudged in writing.

Under their second race of kings, this *parliament*, like that of England, was the king's council, it gave audience to ambassadors, and consulted of the affairs of war and government.

The kings, like ours, at that time presided in them, without being, at all, masters of their resolution. But, in after times, their authority has been abridged, the kings having reserved the decision of the grand affairs of the public to their own councils; leaving none but private ones to the *parliaments*.

PARLIAMENTUM *Indictorum*, a denomination given to a *parliament* held at Coventry, 6 Henry VI. whereunto, by special precept to the sheriffs of the several counties, no lawyer, or person skilled in the law, was to be called.

PARLIAMENTUM *Insanum*, was a *parliament* held at Oxford, anno 41 Henry III. thus called, say our chronicles, because the lords came with great retinues of armed men to it; and many things were violently transacted therein, against the king's prerogative.

PARLIAMENTUM *Diabolicum*, was a *parliament* held at Coventry, 38 Henry VI. wherein Edward earl of March, afterwards king, and several others, were attained.—The acts passed herein, were annulled by the succeeding *parliament*.

PARLIAMENTUM *de la bende*, was a *parliament* in Edward II's time, whereto the barons came armed against the two Spencers, with coloured bands on their sleeves for distinction.

PARLOUR.

PARLOUR*, **PARLOIR**, in nunneries, a little room, or closet, where people talk to the nuns, through a kind of grated window.

* The word is formed from the French *parler*, to talk.

Anciently there were also *parlours* in the convents of monks, where the novices used to converse together at the hours of recreation; but there were listening places over, from whence the superiors could hear every thing they said.—Such a one there still subsists in the abbey St. Germain de Piez. In the order of Feuillans, the *Parlar* is a little room open on all sides, placed at each end of the dormitory, where the monks talk together, it not being allowed them to speak in the dormitory.

PARMA, among antiquaries, a kind of ancient buckler.

Polybius describes the *Parma* as very strong, round, three foot in diameter, and big enough to cover the whole body; yet Servius on the *Æneid*, and even Virgil himself mention it as a light piece of armour, in comparison of the clypeus, though bigger than the pelta.

PARMASITY, the popular name for *Sperma Ceti*.

PARMESAN. See the article **PADUAN**.

PAROCHIAL, something belonging to a parish. See **PARISH**, and **EXTRAPAROCHIAL**.

Every church is either cathedral, collegiate, or *parochial*.

Cathedral, is where there is a bishop's see, or seat called *cathedra*. Collegiate consists either of regular clerks, professing some religious order; or of a dean and chapter.

Parochial church is that instituted for the performing of divine service to the people who dwell within a certain compass of ground. See **PARISH**.

PARODICAL degree, in an equation, the several regular terms in a quadratic, cubic, biquadratic or other equation, the indices of whose powers ascend or descend orderly in an arithmetical progression. See **TERM**, and **EQUATION**.

Thus, $Z + Z \cdot M + Z \cdot r = S$ is a cubical equation where no term is wanting, but having all its *parodic* degrees; the indices of the terms regularly descending thus 3, 2, 1, 0. Harris.

PARODY*, **PARODIA**, a popular maxim, adage, or proverb. See **PROVERB**, and **ADAGE**.

* The word is formed from the Greek *παρά* and *ὁδός*, *via*, way; as being true, or passing among the people.

PARODY, *Παρόδια*, is also a poetical pleasantry, consisting in applying the verses written on one subject, by way of ridicule, to another; or in turning a serious work into burlesque, by affecting to observe, as nearly as possible, the same rhymes, words, and cadences.

The *parody* was first set on foot by the Greeks; from whom we borrow the name. It comes near to what some of our late writers call *travestry*.

PARCEMIA*, *ΠΑΡΟΜΙΑ*, a proverb. See **PROVERB**.

* The word is formed from the Greek *παρά*, and *οἶμος*, way; *quasi* *παρά οἶμον*, *juxta cium*, i. e. *tristom*.

PAROL, *ΠΑΡΟΛΕ*, in law, is sometimes used in ancient writers for a plea in court.

Leafs-PAROL, or *per PAROL*, is a leaf by word of mouth; thus called to distinguish it from one in writing.

PAROLE, in war, &c. when a prisoner of war is allowed to go into his own country, or to his own party, upon his word and promise to return at a time appointed, if not exchanged, he is said to be out upon *parole*, i. e. upon his word.

Pass-PAROLE. See the article **PASS-PAROLE**.

PAROLL, in gaming, the double of what was laid at stake, before.—Hence, to offer the *paroli*, &c.

PARONOMASIA*, *ΠΑΡΟΝΟΜΑΣΙΑ*, in rhetoric, a Pun, or a figure whereby words nearly alike in sound, but of very different senses, are affectedly or designedly used.

* The word is formed from the Greek *παρά*, near, and *ὄνομα*, name, *q. d.* proximity or resemblance of two names.

As, not friends but fiends were here: so Tully to Anthony, *cupi in gremio minorum mentem & mentum deponeres*: and to Atticus, *consul ipse parvo animo & pravo, facie magis quam facitibus ridiculus*. And that of P. Chrylogorus, *monachorum cellulae jam non eremiticae sed aromaticae*. And in another place, *boi egant in cellis quod angeli in cœlis*.

Among the Greeks the *paronomasia* was very familiar. Thus Herodotus, *παρρησια, μαχηματα, quæ nocent, docent*. And thus that inscription of Apollodorus a celebrated painter, on one of his pieces.

Μυησονται τις μάλλον, η̄ μιμησεται.

It will be easier to deride, than to imitate.

PARONYCHIA*, *παρωνυχία*, in medicine, a painful kind of tumor, or abscess, arising at the ends of the fingers, and the roots of the nails; otherwise called *Panaritium* and *Panaris*. See **PANARITIUM**.

* The word is derived from the Greek *παρά*, near, and *ὄνυξ*, *unguis*, nail.

The humour, or matter of the *paronychia*, is sometimes so sharp as to corrode the tendons, nerves, the periosteum, and even the bone itself.

It is either lodged between the integuments, or between the periosteum and bone. The deeper it lies, the more dangerous it is.

VOL. II.

PAROTIDES*, *ΠΑΡΟΤΙΔΕΣ*, in anatomy, two large glands situate behind the two ears; and filling all the space between the posterior angle of the under jaw, and the malarial apophysis.

* The word is formed from the Greek *παρά*, near, and *ὤτις*, ear.

They are of the conglomerate kind, and by divers excretory ducts, which, at last, coalesce into one trunk, they discharge a humour separated in them from the arterious blood, called *saliva*, into the mouth, by two vessels formed of several branches uniting at the issue of these glands, and which run along the cheek to the third grinder.

PAROTIDES, in medicine, tumors, or inflammations arising behind the ears, on the *parotid* glands.

Parotides are very frequent after malignant and pestilential fevers: children also are particularly liable to them. They are to be treated like bubo's. See **BUBO**.

PAROXYSM*, *ΠΑΡΟΞΥΣΜΟΣ*, in medicine, the severe fit of a disease under which it grows higher, or exasperates; as of the gout, &c.

* The word is formed from the Greek *παρά*, much, and *ὄξυς*, acute.

PAROXYSM is sometimes also used for the access, or return of a disease that intermits; as an ague.

PARRICIDE, *PARRICIDA*, or *PATRICIDA*, in strictness, denotes the murder, or murderer of a father: as matricide does of a mother.

Though the word *parricide* is also ordinarily extended to both. The Romans, for a long time, had no law against *parricide*, from an opinion that nobody could be so wicked as to kill his parents. L. Ostius was the first who killed his father, 500 years after Numa's death; and then the Pompeian law was made, which ordained, that the person convicted of this crime, after he had been first whipped till the blood came, should be tied up in a leathern sack, together with a dog, an ape, a cock, and a viper, and so thrown into the sea, or the next river.

PARRICIDE is also extended to the murder of any near relation, as a husband, wife, brother, sister, child, grandchild, uncle, &c. and even to that of great or sacred persons, though no way allied in blood, as a king, &c.

PARRYING, in fencing, the action of defending a man's self, or of staying off the thrusts, strokes, &c. offered him by another. See **FENCING**.

Good fencers push and *parry* at the same time.

The Spaniards *parry* with the poniard. The ancients *parried* with their bucklers.

PARSON, *PERSONA*, the rector or incumbent of a parish church.

He is said, by some, to be thus called by way of eminence; the revenues of a church being destined to maintain *magnam personam*; or, as some will have it, because he is bound by virtue of his office, in *propria persona servire deo*, whence *impersonare*, in old charters, is to put in possession of a parsonage, &c.—Or, according to others, because the original *parsons*, *personae*, were, in reality, only dignitaries, and possessed benefices, which gave them some personal pre-eminences in the church or chapter, but no power.—Or, lastly, according to others, because the *parson*, for his time, represents his church, and sustains the person thereof, as well in suing, as being sued in any action touching the same.

Some distinguish between a *rector* and *parson*; the rector, say, they, is where the vicarage is endowed; and the *parson*, *persona*, where the parsonage is without a vicarage: the distinction seems new and subtle: Bracton apparently uses *rector*, and *parson*, as synonymous terms.

Formerly he who had a church by institution and induction only for his own life, was called *parson mortal*: but any collegiate, or conventual body, to whom the church was for ever appropriated, was called *parson immortal*.

Some again make a distinction between *parson* simply, and *parson impersonae*, or *impersonated*.

Parson impersonae is the rector or incumbent in possession of a parish church, whether presentative or inappropriate, and with whom the church is full.

Parson simply, they contend, is properly the patron, or he that has the right of presentation; called *parson*, by reason, before the Lateran council, he had a right to the tythes, in respect of his liberality in erecting or endowing the church, *quasi sustineret personam ecclesiae*.

It is certain, in the register of writs, *persona impersonata* is used for the rector of a benefice presentative: and in Dyer, a dean and chapter are said to be *parson impersonae* of a benefice appropriated to them.—So that *personae* seems only changed into *impersonata*, in respect of the possession of the benefice. See *Coke on Litt. fol. 300*.

PARSONAGE, a rectory; or a parish church endowed ordinarily with house, glebe and tithes, for the maintenance of a minister with cure of souls within such parish.

There may also be a rectory or *parsonage* without any glebe land, except the church and church-yard; and without any tithes, or other fixed income, except an annual payment, or pound rate.

PARSONAGE in its original, and, at this day, in other countries, is a benediction which gives some prerogative, or pre-eminence in a church or chapter, but without any jurisdiction.

The ancient *Parsonages* gave a little honour, and dignity as to the person, but they gave no power: whence, apparently, the name; intimating the effect of the dignity to be restrained to the person, *persona, parson*.

Such are still the chantries in several churches, and the sub-chantries in others.

Some as Oldrade, &c. extend the word *parsonage* to dignitary, and comprehend under it the archdeacons, deans, &c. in cathedrals; but this seems to be straining the sense of the word.

In effect, the canonists use the term very differently; some applying it to all who have any prerogative in the choir, or the chapter, over the other canons, either in options, suffrages, elections, or barely in place and procession; thus confounding it with dignity; while others apply it to simple rectors, &c.

PART, PARS, a portion of some whole, considered as divided, or as divisible.

Quantity is divisible into an infinite number of *Parts*: not equal *Parts*, but proportional ones. Philosophy is divided into four *Parts*, *viz.* logicks, ethicks, physicks and metaphysics.

The schoolmen usually distinguish *Parts* into *logical* and *physical*.

Logical PART, is that referring to some universal as its whole—in which sense the species are *Parts* of a genus; and individuals, or singulars, are *Parts* of the species.

Physical PART, is that which, though it enter the composition of a whole, may yet be considered a-part, and under its own distinct idea—in which sense, a continuum is said to consist of *Parts*.

It is controverted in the schools, whether the *Parts* of a continuum or physical whole, *e.g.* water, do exist actually before the division be made, or only potentially?

Physical Parts, again, are of two kinds; *homogeneous* and *heterogeneous*—the first are those of the same denomination with some other; the second of a different one. See **HOMOGENEOUS**, &c.

Parts, again, are distinguished into *subjective*, *essential*, and *integral*.

Subjective or potential PART, is the same with *logical Part*, *viz.* that contained in some universal whole, not in act, but only in power.—As, man and horse are in animal: Peter and Paul in man.

Essential PART is that, whereby, with the concurrence of some other, an essential whole is constituted.—Thus the body and soul are essential *Parts* of man.

Integral or Integral PART, is that which is necessary to the integrity of the whole.—As a head is of a man, &c.

Anatomists divide the *Parts* of the human body into contained; and contained; similar and dissimilar; and the similar, again, into spermatic and sanguineous, &c.

Noble or essential PARTS, are those absolutely necessary to life: as the heart, lungs, liver, brain, &c.

Natural or genital PARTS, popularly called *privy Parts*, are those ministering to generation.

The finest writings of physicians are those which treat of the use of the *Parts*: Galen's works, *de usu partium*, affords infinite arguments of the being and wisdom of a God.

Nature, we say, always discharges itself on the weak *Part*, the diseased *Part*, the *Part* affected, &c.

Consent of PARTS. See the article **CONSENT**.

In chymistry, bodies are said to be resolved into their minute *Parts*, their component *Parts*, &c.

That art is said to separate the homogeneous *Parts* from the heterogeneous; and the volatile, subtil, sulphureous, mercurial, &c. *Parts*, from the fixed, crass, earthy, viscid, &c. *Parts*.

PART, in geometry and astronomy, is applied to the divisions of lines and circles.

The semi-diameter of the circle, called also the radius, and whole sine, is divided into an hundred thousand *Parts*; and the circumference of the circle into 360 *Parts* or degrees; in which two divisions all the celestial computations are made.

Aliquot PART, is a quantity which, being repeated any number of times, becomes equal to an integer. Thus 6 is an *aliquot Part* of 24; and 5 an *aliquot Part* of 30, &c.

Aliquant PART, is a quantity which, being repeated any number of times, becomes always either greater or less, than the whole. Thus 5 is an *aliquant Part* of 17; and 9 an *aliquant Part* of 10, &c.

The *aliquant Part* is resolvable into aliquot *Parts*. Thus 15, an *aliquant Part* of 20, is resolvable into 10 a half, and 5 a fourth *Part* of the same.

Proportional PART, is a *Part* or number agreeable and analogous to some other *Part* or number; or a medium to find some

number or *Part* unknown by proportion and equality of reason.

Similar PARTS are those which are to one another as their wholes are to one another.

Organical PART. See the article **ORGANICAL**.

PART, in music, denotes a piece of the score or partition, wrote by itself, for the convenience of the musician; or it is one or more of the successions of sounds which make the harmony, wrote a-part.

Or, the *Parts* are the sounds made by several persons singing, or playing in concert.

Music in *Parts* was unknown to the ancients; they had but one *Part*; all their harmony consisted in the succession of notes, none in the consonance.

There are four principal *Parts*; the treble, bass, tenor, and counter-tenor.

Some compare the four *Parts* in music, to the four elements: the bass, they say, represents the earth; the tenor, water; counter-tenor, air; and the treble, fire.

PART, in trigonometry. In a rectangular spherical triangle ABC, *Tab. Trigon. Fig. 22*, that *Part* lying between two others, considered as extremes, is called by some authors, the *middle Part*.—Thus, if AB and BC be the extreme *Parts*, the angle B will be the *middle Part*.

If the *Parts*, considered as extremes, be contiguous to the middle *Part*, and one of the extremes; those are called *conjunct Parts*.—Thus, if B be in the middle *Part*, AB and BC will be the *conjunct Parts*.

If between the extremes, and the middle *Part*, there lie another, beside a right angle; then the *Parts* are said to be disjunct, or separate;—*e.g.* If B be the middle term, A C and C will be disjunct *Parts*; because, between the middle *Part* B, and the extreme C, there lies the hypothenuse BC; and between the middle *Part* B, and the other extreme A C, besides the right angle, there lies the leg A B.

Those *Parts*, either joined to the middle *Part*, or separated from it, are called *lateral Parts*.

Parts of speech, in grammar, are all the sorts of words which enter the composition of discourse.

The grammarians usually admit of eight *Parts* of speech, *viz.* noun, pronoun, verb, participle, adverb, conjunction, preposition, and interjection. See each in its proper place, **NOUN**, **PRONOUN**, &c.

Part of fortune, in judiciary astrology, is the lunar horoscope; or the point wherein the moon is, at the time when the sun is in the ascending point of the east.

The sun in the ascendant is supposed, according to this science, to give life; and the moon dispenses the radical moisture, and is one of the causes of fortune.—In horoscopes, the *Part of fortune* is represented by a circle divided by a cross.

Art and PART, in law. See the article **ART**.

EX PARTE. See the article **EX**.

PARTERRE, in gardening, that open part of a garden into which we enter, coming out of the house; usually set with flowers, or divided into beds, encompassed with platbands, &c.

The *Parterre* is a level division of ground, which, for the most part, faces the south and best front of a house, and is generally well furnished with greens, flowers, &c.

There are divers kinds of *Parterres*, as bowling-green or plain *Parterres*; *Parterres* of embroidery; and *Parterres* cut in shell-work, in scrollwork, &c. with sand-alikes between.

An oblong, or long square is accounted the most proper figure for a *Parterre*; the sides whereof, should be as two, or two and a half to one. See **Supplement, Article PARTERRE**.

PARTI, PARTY or PARTED, in heraldry, is applied to a shield, or escutcheon, denoting it divided, or marked out into partitions. See **SHIELD**, and **ESCUTCHEON**.

The French heralds, from whom we borrow the word, have but one kind of *parti*, the same with our *Parti per pale*, which they call simply *Parti*: but, with us, the word is applied to all the sorts of partitioning; and is never used without some addition to specify the particular kind intended.

Thus we have *parti or parted per cross*, *per chief*, *per pale*, *per fess*, *per bend dexter*, *per bend sinister*, *per chevron*, &c. See **QUARTERING**.

The humour of our ancestors, Colombiere observes, turning much upon exploits of arms and chivalry; they used to preserve their battered and hacked armour as honourable symbols of their hardy deeds; and those who had been in the hottest service, were distinguished by the most cuts and bruises that appeared on their shields. To perpetuate the memory hereof, says the same author, they caused them to be painted on their shields, and thus handed down to posterity.—And when heraldry grew into an art, and officers were appointed to direct the manner of bearing, and blazoning; they gave names to those cuts, answerable to the nature thereof; appointing four, from which all the others proceed: these are *Parti*, (called by our Herald, *Parti per pale coupe*, (*parti per fesse*) *tranche*, (*parti per bend dexter*) and *taille* (*parti per bend sinister*).) See **COUPED**, **TRANCHE**, &c.

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PARTI per pale, is when the shield is divided perpendicularly into two halves, by a cut in the middle from top to bottom.

PARTI per fesse, is when the cut is a-crofs the middle, from side to side.

PARTI per bend dexter, is when the cut comes from the upper corner of the shield on the right hand, and descends athwart to the opposite lower corner.

PARTI per bend sinister, is when the cut coming from the upper left corner, descends a-crofs to the opposite lower one.

From these four partitions have proceeded an infinite number of others of various and extravagant forms.

Spelman, in his *Aspilogia* observes, that the present divisions of escutcheons were unknown in the reign of the emperor Theodosius; and were brought up in the time of Charlemain, or later; they were little used among the English in the days of king Henry II. but more frequently under Edward III.

The erect or upright section, he observes, is called in Latin, *palaris*, from its resemblance to a *palus*, or stake; and two coats are often entire on the sides, the husbands on the right, and the wives on the left.—The direct section a-crofs, being in the place of a belt, is called *bellica*, &c.

When the shield is *parti*, and *couped*, it is said to be *ecartelé*. It is said to be *parti one from the other*, when the whole shield is charged with some honourable bearing divided by the same line that parts the shield.—Here it is a rule, that one side be of metal, and the other of colour. Thus he bears fable *parti d'argent*, a spread eagle *parti* from one to the other.

PARTIAL Cause. See the article CAUSE.

PARTIAL Eclipse. See the article ECLIPSE.

PARTICIPATION, **PARTICIPATIO**, that which gives us a part or share in any thing, either by right or grace.

In Italy they distinguish *participating officers*, as protonotaries, &c. which have a real function; from *honorary ones*, which have only a title, without any duty or employ.

PARTICIPATIONIS medium. See the article MEDIUM.

PARTICIPLE, **PARTICIPICIUM**, in grammar, an adjective formed of a verb; so called, because it still participates of some of the properties of the verb; retaining the regimen and signification thereof: whence most authors confound it with the verb.

There are two kind of *participles*, the one called *active*, because expressing the subject which makes the action of the verb; as *legens, audiens, reading, hearing*.—The other called *passive*, because expressing the subject that receives the action of the verb, as *lectum, auditum, read, heard*.

As our adjectives are not declined, the *participles*, being real adjectives, are not declined neither: in the Latin, &c. where the adjectives are declined, the *participles* active are declined likewise.—Thus they say *audiens, audientis, audienti, &c.* and in the French the *participles* passive are declinable like their adjectives, as *jay lus, elle a lus, nous avons lus, &c.*

We may take this occasion to observe, that declension, or the changing or not changing the termination, is a thing perfectly accidental to the several kinds of words: the Latins, *e. gr.* have indeclinable nouns, as *cornu* and *nequam*, yet both Latins and Italians decline their adverbs, as *fortiter, fortissime; bene, benissimo, &c.* and some nations scarce conjugate their verbs at all. Indeed the English do it very little in comparison with the Latins, Greeks, French, &c.

In our language, the *participle* and gerunds are not at all distinguishable.

PARTICLE, **PARTICULA**, in physics, the minute part of a body, or an assemblage or coalition of several of the atoms whereof natural bodies are composed.

PARTICLE, in the new philosophy, is frequently used in the same sense with *atom* in the ancient Epicurean philosophy; and *corpuscle* in the latter.

Some of the more accurate writers, however, distinguish them; making *particle* an assemblage or composition of two or more primitive, and physically indivisible corpuscles or atoms; and *corpuscle*, or little body, an assemblage, or mass of several *particles* or secondary corpuscles.

Indeed, the distinction is of no great moment; and, as to most purposes of physics, *particle* may be understood as synonymous with *corpuscle*.

Particles then are, as it were, the elements of bodies: it is the various arrangement, and texture of these with the difference of the cohesion, &c. that constitute the various kinds of bodies, hard, soft, liquid, dry, heavy, light, &c.

The smallest *particles* or corpuscles cohere with the strongest attractions, and always compose bigger *particles* of weaker cohesion; and many of these cohering compose bigger *particles* whose vigour is still weaker; and thus on for divers successions, till the progression end in the biggest *particles*, whereon the operations in chemistry, and the colours of natural bodies depend, and which, by cohering, compose bodies of sensible bulks.

The cohesion of the particles of matter, the Epicureans imagined was effected by means of hooked atoms; the Aristotelians by

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rest, that is, by nothing at all. But Sir Isaac Newton shews it done by means of a certain power whereby the *particles* mutually attract or tend towards each other.

By this attraction of the *particles* he shews that most of the phenomena of the lesser bodies are effected, as those of the heavenly bodies are by the attraction of gravity.

For the laws of this attraction of the particles; See ATTRACTION.

All bodies, the same great author shews, consist of the same solid perfectly hard *particles* or corpuscles.

PARTICLE, in grammar, denotes a little indeclinable word, consisting of one or two syllables at the most.

Those are properly *particles* which are neither declined nor conjugated.

Brightland calls *particles*, *manners of words*, because rather serving to express the circumstances, and manners of other ideas and objects of the mind, than to represent any distinct objects of their own.

Particles may be reduced under three heads: the first shew the manners or qualities of words, by being added to them; called *adverbs*.

The second denote some circumstances of actions, and join words to words, sentence to sentence, &c.

The third express the emotions of the soul.

It is in the right use of *particles*, Mr. Locke observes, that more particularly consists the clearness and beauty of a good style. To express the dependance of his thoughts and reasonings one upon another, a man must have words to shew what connexion, restriction, distinction, opposition, emphasis, &c. he gives to each respective part of his discourse. This cannot be rightly understood, without a clear view of the postures, stands, turns, imitations, exceptions, and several other thoughts of the mind. Of these there are a great variety much exceeding the number of *particles*, that most languages have to express them by; for which reason it happens that most of these *particles* have diverse, and sometimes almost opposite significations.

Thus the *particle* *but* in English, has several very different significations: as in, *but* to say no more, where it makes a stop of mind in the course it was going, *but* it came to the end of it. I saw *but* two planets; here it shews that the mind limits the sense to what is expressed with a negation of all other. You pray, *but* it is not that God would bring you to the true religion, *but* that he would confirm you in your own. The former of these intimates a supposition in the mind, of something otherwise, than it should; the latter shews that the mind makes a direct opposition between that and what goes before. All animals have sense, *but* a dog is an animal: here it signifies the connection of the latter proposition with the former.

PARTICLES is also a term in theology, used in the Latin church for the crumbs or little pieces of consecrated bread, called *Mazze* in the Greek church.

In the Greek church they have a particular ceremony, called *ἡ εὐχαριστία*, of the *particles*, wherein certain crumbs of bread not consecrated, are offered up in honour of the virgin, St. John Baptist, and several other saints. They also give the name *εὐχαριστία*, *oblation*, to these *particles*.

Gabriel, archbishop of Philadelphia, has a little treatise expressing, *εὐχὰς τῶν μασσῶν*, wherein he endeavours to shew the antiquity of this ceremony, in that it is mentioned in the liturgies of St. Chrysostom, and Basil.

There has been a considerable dispute on this head, between the reformed and the catholic divines. Aubertin and Blondel explain a passage in the theory of Germanus, patriarch of Constantinople, where he mentions the ceremony of the *particles* as in use in his time; in favour of the former: Messieurs de Port Royal contest the explanation: but M. Simon in his notes on Gabriel of Philadelphia, endeavours to shew, that the passage it self is an interpolation; not being found in the ancient copies of Germanus: and consequently that the dispute is very ill grounded.

PARTICLE out of share, in astronomy. See PARTICULA exors.

PARTICULA exors, in astronomy, the difference between the equatorial triangle LAC, (Tab. Astron. f. 32.) and its fellow BLZ.

To find the *particula exors*, the menstrual eccentricity AC, and the annual argument of longitude HAD, being given; from the data in the triangle BCA, find the hypothenuse AB to the angle C, and to the angle CAB find the subtense CB. Multiply CB into half the menstrual eccentricity AC; the product is the area of the triangle ACB. Find likewise the area of a circle described by the radius of the eccentric BL. Then as the area of the circle is to 360° or 129600°; so is the area of the triangle ACB to its value in those seconds: which value is the *particula exors*.

PARTICULAR, **PARTICULARIS**, a relative term, referring to species, or individual, and opposed to general, or universal. See GENERAL, &c.

In the schools, *particular* is defined to be something included under an universal; as man under animal. Though sometimes it is also taken for an individual, as Peter. See **INDIVIDUAL**. There is this difference between *particular* and *singular*, that *particular* denotes a thing taken as a part; as Peter in respect of mankind.—Whereas *singular* denotes the part taken after the manner of a whole; as Peter considered in himself.

PARTICULAR <i>Averment.</i>	See the article	AVERMENT.
PARTICULAR <i>Cause.</i>		CAUSE.
PARTICULAR <i>Character.</i>		CHARACTER.
PARTICULAR <i>Executor.</i>		EXECUTOR.
PARTICULAR <i>Geography.</i>		GEOGRAPHY.
PARTICULAR <i>Gravity.</i>		GRAVITY.
PARTICULAR <i>Maps.</i>		MAP.
PARTICULAR <i>Nature.</i>		NATURE.
PARTICULAR <i>Qualities.</i>		QUALITY.
PARTICULAR <i>Rheumatism.</i>		RHEUMATISM.
PARTICULAR <i>Tenant.</i>		TENANT.
PARTICULAR <i>Theorem.</i>		THEOREM.
PARTICULAR <i>Winds.</i>		WINDS.

PARTICULARIST, among polemical divines, a person who holds for particular grace, *i. e.* who teaches, or believes that Christ died for the elect only; and not for mankind in general. See **GRACE**.

PARTIES, in law, are those who are named in a deed, or fine, as parties to it: *e. gr.* those who levy the fine, and to whom the fine is levied. So they who make any deed, and they to whom it is made, are both called parties to the deed.

PARTILE aspect, in astrology, an exact and full aspect of any kind.

Thus a *partile* conjunction is when two planets are precisely in the same degree of longitude and latitude: but if one of them deviate a little to the north, and the other to the south, the aspect or conjunction is no longer *partile*.

PARTING or **DEPARTING**, a method of separating gold and silver by means of aqua fortis. See **Supplement**, article **QUARTATION**.

PARTITION, the act of parting, dividing, or distributing a thing.

The denomination *Partitiones oratoria*, is also given to a dialogue of Cicero's, between him and his son; in regard the discourse is, as it were, parted or divided between them.

PARTITION, in law, a dividing of lands defended by common law or custom among coheirs, where there are two at least.

The *partition* is made four ways; whereof three are by agreement, the fourth by compulsion.

The first *partition* by agreement is, when the parcellers divide the land equally themselves into so many parts as there are coheirs.

The second is when each chuse some of their friends to make the division for them.

The third is by drawing lots, thus: having first divided the land into as many parts, as there are persons, they write every part severally in a distinct scroll, and wrapping it up, throw each into a hat, or such a thing; out of which each one draws according to superiority; and so the land is severally allotted.

The fourth *partition*, which is by compulsion, is, when one or more of the heirs, by reason of the refusal of some other, sues out a writ of *partitione facienda*; by force whereof they shall be compelled to divide.

In Kent, where land is of gavel-kind nature, they call their *partition*, *shifting*.

Partition also may be made by joint tenants, and tenants in common, by assent, by deed, or by writ.

PARTITION, in music, is the disposition of the several parts of a song, set on the same leaf; so as upon the uppermost ranges of lines are found the treble; in another the bass; in another the tenor, &c. that they may be all sung or played either jointly or separately.

PARTITION, in architecture, that which divides, or separates one room or apartment from another.

PARTITION, in heraldry. See the article **QUARTERING**.

PARTIUM prec. See the article **PRECE**.

PARTNER, and **PARTNERSHIP**. See **COMPANY**, **COMPARTNER**, and **FELLOWSHIP**.

PAR TOUT. See the article **PASS par tout**.

PARTURITION, the act of bringing forth, or being delivered of young. See **DELIVERY**.

PARTUS, in medicine and law, the delivery of a woman, or the birth of a child.

Cæsareus **PARTUS**, is that where the mother is cut open, and the child taken out at one side. See **CÆSAREAN**.

PARTY or **PARTIE**, a faction, interest, or power, considered as opposite to another. See **FACTION**.

The French and Spaniards were always of opposite *parties*: England has, for upwards of a century, been divided into two *parties*. See **WHIG** and **TORY**.

PARTY, in law. See the articles **PARTIES** and **CHARTER PARTY**.

PARTY in the military sense, is used for a small body of men, whether cavalry, infantry, or both, commanded out on any expedition.

A *party* of cavalry carried off a great number of cattle. By the French military law, those who go out on *parties* must have an order in writing from the commanding officer, and be at least twenty in number, if foot, or fifteen, if horse; otherwise they are reputed as robbers.

PARTY jury, in law. See **MEDIETAS Lingua**.

PARTY, in heraldry. See the articles **PARTI**, **PALE**, and **FESSE**.

PERVISE. See the article **PERVISE**.

PARULIS *, ΠΑΡΟΥΛΙΣ, in medicine, an inflammation of the gums, attended with a violent pain, and an imposthume: sometimes ending in an ulcer, and sometimes in a cancer, fistula, gangrene, &c.

* The word is Greek, formed of *παρ*, near, and *ουλον*, gingivæ, gum.

Sennertus orders it to be cured by revulsion, derivation, and proper gargarisms. Care is to be taken in the beginning to prevent an imposthumption.

PARVUM cape. See the article **CAPE**.

PASCHAL, **PASCHALIS**, something belonging to the Jewish passover, or to the christian Easter.

The *paschal* lamb was a lamb which the Jews eat with a deal of ceremony, in memory of their having been brought out of slavery in Egypt. It should be eaten standing, their loins girt, the staff in hand.

PASCHAL canon. See the article **CANON**.

PASCHAL taper. See the article **TAPER**.

PASCHAL rent, are rents or annual duties paid by the inferior clergy to the bishop, or arch-deacon, at their Easter visitations.

They are also called *Synodals*.

PASCHAL letter, in church-history, a circular letter, which the patriarch of Alexandria first, and afterwards the pope, anciently wrote to all the metropolitans; to inform them of the day whereon the feast of Easter was to be celebrated.

PASQUIN, a mutilated statue, seen at Rome, in a corner of the palace of the Urfini. It takes its name from a cobbler of that city, called *Paquin*, famous for his sneers and gibes; and whose shop was the resort of a number of idle people, who diverted themselves with bantering folks as they passed by.

After *Paquin's* death, as they were digging up the pavement before his shop, they found a statue of an ancient gladiator, well cut, but maimed and half spoiled. This they set up, in the place where it was found, at the corner of the deceased *Paquin's* shop; and by common consent, called it by the name of the defunct.

From that time all satires, and lampoons are ascribed to this figure, and are put in its mouth, or pasted against it; as if they came from *Paquin redivivus*.—*Paquin* usually addresses himself to *Marforio*, another statue in Rome; or *Marforio* to *Paquin*, whom they then make reply.

The answers are usually very short, poignant, and unlucky: When *Marforio* is attacked, *Paquin* comes to his assistance; and *Paquin* is assisted by *Marforio* in his turn, *i. e.* the people make the statues speak just what they please.

PASQUINADE, or **PASQUIL**, is properly a satirical libel fastened to the statue of *Paquin*.

Hence, by extension, the term becomes used for any satire, lampoon, or sneer upon the public, or upon the ruling powers.

There is this difference between a *Paquinade* and a *Satire*; that the end of the latter is to correct and reform; whereas that of the former is only to scoff and expose.

The Italians have published several books which they call *Paquinus in glassis*, *Paquin* in an ecstasy.

PASS, **PASSAGE**, in fencing, a leap, or advance upon the enemy.

Of these are several kinds; as *voluntary passes*, commencing from the left foot out of measure of the firm foot; as when the enemy is not expected.

Others, *necessary*, made after a push from the right foot; where being foisted by the enemy, as not to have time to retire, you endeavour to seize the guard of his sword.

The measure of the *Pass* is, when the two finals of the swords are so near as that they may touch one another.

There are *passes* within, above, beneath, to the right, the left; and *passes* under the sword, over the line, &c.

PASS of arms, in chivalry, a place which the ancient knights undertook to defend, *e. gr.* a bridge, road, &c. which was not to be passed without fighting the person who kept it.

The knights who held the *pass*, hung up their arms on trees, pales, columns, &c. erected for the purpose: and such as were disposed to dispute the *pass*, touched one of these armories with his sword, which was a challenge the other was obliged to accept. The vanquished gave the victor such prize as was before agreed on.

PASSA,

PASSA, *vea* PASSA, in pharmacy, a term applied to those dried grapes, which we call *raisins*. See RAISIN.

Ura PASSA, is sometimes also used, with less propriety, for figs.

PASSADE, or PASSADO, in fencing, a thrust or pass. See PASS.

PASSADE, is also a benevolence or alms given to poor passengers.

PASSADE, in the manège, signifies a turn, or course of a horse backwards or forwards on the same plot of ground; passing or repassing from one end to the other.

PASSAGE, in commerce, or right of PASSAGE, is an imposition which some princes exact by their officers or farmers, in certain narrow, close places of their territories, either by land or sea; on all vessels, vehicles, and carriages of all kinds; and even sometimes on persons, and passengers coming in or going out of ports, &c.

The *passage* of the sound, (that famous strait which carries us out of the German into the Baltic sea) is the most celebrated *Passage* in Europe. The dues thereof belong to the king of Denmark, and are paid at Elfenore or Cronenburg.

Birds of PASSAGE, are such as only come to us at certain seasons, and then disappear again; being supposed to *pass* the sea to some other climate.

Among the birds of *Passage* are the stork, swallow, nightingale, martin, woodcock, quail, &c. There are also fishes of *passage*, as herrings, mackerel, &c.

Mr. Deham produces it as a remarkable instance of instinct, that, — the stork in the *barrens* *knows* the appointed time, and the turtle, and the crane, and the swallows, observe the time of their coming — Jer. viii. 7. No doubt the temperature of the air, and their natural propensity to breed their young, are the great incentives to this migration: but how these untaught, unthinking creatures, should so exactly know the best and only proper seasons to go and come from a place that would obstruct their generation, or not afford convenient food for them and their young; or how they should know which way to steer their course, and whither to go, is a difficult consideration! *Phys. Theol.* L. VII. c. 3. See Supplement, article MIGRATION.

PASSAGE, in the manège, an action wherein the horse raises two legs together, a hind and a fore leg, in form of St. Andrew's cross; when, setting those two on the ground again, he raises the other two; and thus alternately; never gaining above a foot of ground at a time.

The beauty of the *Passage* consists in keeping the legs a good while in the air: setting that aside, the motion of the legs in the *Passage* is the same as in pacing and trotting.

PASSAGE, or PASSO, in music, a portion of an air, or tune, consisting of several short notes, as quavers, demi-quavers, &c. lasting one, two, or, at most, three measures.

What the Italians call *Contrapunto d'un sol passo*, is a portion consisting of one, two, or three measures, composed in the first notes of a piece, and which is to be afterwards imitated on the other notes of the piece, not with the same chords or tones, but only by observing the same motion, number, and figure as in the notes of the first *Passage*. — This makes one of the kinds of *Contrapunctus per saltato*.

PASSAGERS. *Vide* ALBIGENSES.

PASSALORHYNCHITES, PASSALORHYNCHITÆ, a sect of mountanians in the second century, who made profession of perpetual silence, and the better to maintain it, kept the thumb continually upon the lips: founding their practice on that of the Psalmist, *Set a guard, O Lord on my mouth*.

St. Jerom mentions his having met with some of them in his time.

PASSANT, in heraldry, a term applied to an animal in a shield, appearing to walk leisurely; or, to the ordinary posture of terrestrial animals.

Thus we say, he bears gules two lions *passants* over one another. for most beasts, except lions, they frequently use the word *tripping*, instead of *passant*.

PASSION, ΠΑΣΙΩ, ΠΑΘΟΣ, or ΠΑΘΗΜΑ, is applied to the different motions, and agitations of the soul, according to the different objects that present themselves to the senses.

In propriety, all those motions whereby the soul is carried towards any thing; as love, ambition, revenge, &c. are rather actions than *Passions*.

Those motions whereby the soul finds itself interrupted in its actions, as grief, &c. are the only real *Passions*.

We find various modifications and impressions of pleasure and pain, inseparably annexed by an established law of nature, to the several judgements we form concerning good and evil: these judgements, with their respective modifications of pleasure or pain annexed, according to the various appearances and relations of the object considered, either as good or evil, present or absent, certain or uncertain, probable or improbable, possible or impossible, and affecting the machine in a certain manner peculiar to these modifications; make what we call the *Passions*.

Now, or by what means, the mind is action and communication.

cation between soul and body is effected, we are, in a great measure, ignorant: we have but very obscure and faint notions of any thing prior, or more simple to resolve it into; except the immediate will and agency of the first cause itself.

Malebranche defines the *Passions* to be all those emotions naturally arising in the soul, on occasion of extraordinary motions of the animal spirits, and the blood. — In opposition to those motions of the soul which are common to us with pure intelligences, and which he calls *natural inclinations*.

Though the *Passions* be inseparable from inclinations; and though a man be only capable of sensible love or hatred, because he is capable of spiritual ones; yet does it appear just in that author to distinguish between them. *Passions* are much stronger and warmer than inclinations; their objects also are different, and so are their causes: in truth, *Passions* and inclinations differ just as much as sense and imagination.

In effect, the *Passions* of the soul are impressions of the author of nature, which incline us to our bodies, and all things that may be of use to their preservation: natural inclinations are impressions of the author of nature, which determine us primarily to love him, as our supreme good.

Philosophers are not agreed about the number and division of the *Passions*: the ordinary distribution is into *Passions of the concupiscible appetite*, which are pleasure and pain, desire and aversion, love and hatred: and those of the *irascible appetite*, which are anger, courage, fear, hope, and despair. — See the author on the subject of the *Passions*; Des Cartes, who considers them physically; Coeffeteau, who gives us the tableau, or picture of the *Passions*; La Chambre, the characters of the *Passions*; and Senault, the uses of the *Passions*.

Dr. Cheyne considers the *Passions* as either spiritual or animal: — *Spiritual Passions* he defines to be those sentiments produced in the soul by external objects, either spiritual ones immediately, or material ones by the mediation of the organs of the body.

Animal Passions he defines to be those effects produced by spirits or bodies, immediately on the body.

Hence, as outward objects may be considered either as goods or evils; the most natural division of the *Passions*, whether spiritual or natural, as they regard those objects, is into *placurable* and *painful*.

And, in this sense, all the *Passions* may be reduced to love and hatred; of which joy and sorrow, hope and fear, are only so many modifications, or complexions, according to the various appearances, positions, &c. of the object.

In effect, all the *Passions* may not only be reduced to two, *viz.* love and hatred; but, perhaps, to one, love; and even that may be all resolved into self-love; and this into a principal of self-preservation, or necessary invincible desire of pleasure, or happiness. The rest are only rivulets from this source; or special applications of this principle to particular occasions.

Thus, the desire of any thing, under the appearance of its goodness, suitability, or necessity to our happiness, constitutes the *Passion* of love: the desire of eschewing or avoiding any thing apprehended to be mischievous, hurtful, or destructive, constitutes hatred or aversion: the desire of a good, which appears at the same time probable, and in our power, constitutes hope; but if the good appear improbable, difficult, or impossible, it constitutes fear or despair: the unexpected gratification of desire is joy: the desire of happiness to another under pain, or suffering, is compassion; and the desire of another's punishment, is revenge or malice, &c.

The single desire of happiness, then, is the spring or motive of all our *Passions*; as those are of all our actions. Some wise and reasonable motive, or end of action, says Dr. Morgan, is certainly necessary to all wise and reasonable action; to act without a motive, would be the same thing as not to act at all, that is, such an action could answer no farther or better end than not acting; and consequently the action, as well as the agent, would be so far insignificant and useless. He who should have no object at all of his love or aversion, hope or fear, joy or grief, must be simply and purely indifferent to all action; and consequently he must either be in a state of perfect rest and inaction, or in a state equivalent to the *etc.*; wherein the action of such a being could be of no more significance, than the uncertain fluctuation of an atom, or the quivering of a feather in the air.

The natural or occasional cause of all the *Passions*, Malebranche makes to be the motion of the animal spirits, which are diffused through the body to produce and preserve a disposition therein suitable to the object perceived; to the end, that the body and mind may mutually assist each other on this occasion; it being the order of the creator, that our wills be followed by motions of the body proper to execute them; and that the motions of the body mechanically excited in us by the view of external objects, be accompanied with a *Passion* of the soul which inclines to will or nill what appears irrevocable or necessary to the body.

It is a continual impression of the will of the creator, that unites us thus intimately to a piece of matter, and occasions this reciprocation of motions and sensations; were this impression of the creator's will suspended a moment, we should be delivered from all dependence, all *Passions*, &c. For, what people usually imagine of a necessary connection between the motions of the spirits and blood, and the emotions of the soul, is wholly inconceivable.

Certain little parts of the bile, say they, move with some violence among the fibres of the brain: therefore the soul must necessarily be agitated with some *Passion*; and this *Passion* must be anger, rather than love. What relation can we conceive between the faults of an enemy, a *Passion* of contempt or hatred, and a bodily motion of the parts of the blood striking against certain parts of the brain? how can the union or alliance of two things so different as spirit or matter be effected, but solely by the omnipotent will of the author of nature?

It is a point, about which the divines and philosophers can never agree, whether this relation and connection of thoughts of the mind, and motions of the body, be the gift of nature, or the punishment of the first sin? and whether the *Passions* be the institution of nature, or the corruption thereof? Indeed, considering the good and wise purposes the *Passions* serve, and that absolute necessity they are of, it is surprizing it should ever be doubted, that they are essential to human nature.

This union or relation is found in all men, but in different degrees, and of different extent, according to the different temperaments, conditions, ages, sexes, occasions, objects, &c. Thus, *e. gr.* our union or relation to the sensible objects we have seen, is stronger than that to things we have only heard talk of. And thus, as the great have a relation to many more things, than others, their slavery is more extensive. A general, *e. gr.* retains or has a relation to all his soldiers, as they all respect him; and it is this slavery that usually occasions his generosity: the desire of being esteemed by all in whose sight he is frequently, obliges him to sacrifice more reasonable pleasures. It is thus throughout the world: vanity animates virtue, otherwise we should never have such lengths gone. Again, children do not mind the same things with grown people. Women look no further than their families and neighbourhood; but men retain to their whole country; it is for them to defend it; they mind honours, offices, &c. Nor is there a less variety resulting from the different circumstances and employments of people.

The disposition of mind in a married man differs much from that in a bachelor. The people in monasteries have both the mind and heart turned very differently from people who live in the world. They are united to much fewer things; but then the attachment is much closer and stronger. Their *Passions* move in a narrow sphere, and, like the sun's rays in a convex lens, they are collected, as it were, in a focus.

In every *Passion* there may seven things be distinguished: the first, the judgment the mind makes of an object, or the view of the relation the object bears to us. The second, a new determination of the will towards that object, supposing it to appear as good or evil. The third, the peculiar sensation of modification which accompanies them; as the sensation of love, hatred, desire, or joy; which sensations are always different in the different *Passion*, and are as it were, the characteristics thereof. The fourth, a new determination of the course of the blood and spirits towards the several parts of the body: before the sight of the object of the *Passion*, the animal spirits were pretty equally diffused throughout the body; but the presence of the new object disturbs the whole oeconomy; and the greatest part of the spirits are sent into the muscles of the arms, legs, face, &c. The fifth, is the sensible emotion of the soul, which finds itself shaken by this sudden over-flowing of spirits. The sixth, is the different sensation of love, hatred, &c. caused, not by the intellectual view of good or evil, but by the different shakes or movements the animal spirits occasion in the brain. The last, is a certain sensation of joy, or an inward satisfaction, which detains the soul in its *Passion*, and attests its being in the state it ought to be in with regard to that object.

PASSIONS, in a view to medicine, make one of the six non-naturals, and are of the utmost consequence, with respect to health or disease.

In consequence of the several judgments we form concerning objects, as either good or evil, the organs of sensation and motion, *i. e.* the nervous fibres, are variously impressed or stimulated; whence arise certain sensations, and certain modifications of motion, which it is apparent, are reciprocal, and follow mutually from each other, whether the impression be supposed first made on the body, or on the mind: that is, any strong violent motion made on the organs, will excite a painful sensation in the mind; or any such painful sensation first excited in the mind upon the bare consideration of an object will impress a violent motion on the organs. And, on the contrary, an easy and placid undulation, impressed originally by the actual impulse of objects, will excite a pleasurable sensation in the mind; or a pleasurable sensation excited in the

mind, from the mere contemplation of an object, will be followed with a like easy, placid undulation of the organs.

The painful *Passions*, then, as well as bodily pain, impress the nervous fibres with a violent motion, which brings them alternately into forcible contractions, and dilatations, or strengthens and increases their muscular force, and action. While then this pain or uneasiness of desire, annexed to the passions, and impressed on the nerves, is moderate and restrained within the bounds of nature, such stimulating desires have a good effect; as they strengthen muscular motion, keep up the circulation of the blood, promote the natural secretions, and excite a man to those actions and exercises, wherein animal life, health, and vigour consist. But where the uneasiness annexed to the *Passion* is too violent, such a continual stimulus will gradually derive a too great proportion of blood to the stimulated organs, by which the vessels will be over-stretched and distended, their muscular force will be gradually impaired, and the equilibrium of the blood and juices will be interrupted. And hence, from a mere painful sensation, will arise a complicated train of bodily illnesses and pains, in consequence of the established laws of the union and communication of soul and body. Again, while we are wearing off the uneasiness of desire annexed to any *Passion*, we feel a sensible pleasure, or agreeable emotion; and the organs, hereupon falling into easy, uniform, placid undulations, the too great current of the blood toward them is diverted, and the equilibrium is restored. As soon as the uneasiness is all gone, the pleasure ceases, and terminates in mere indolence, which disposes the person to rest and inaction: till the return of some fresh desire, stimulating to farther action, renews the same succession, and interchangeable series of pains and pleasure.

And this is the circle of animal life: as the stimulus of desire throws off the indolence of rest, and excites to action; so the gratification moderates the pain of desire, creates a pleasure at first, and then terminates in the former indolence and inaction; till fresh desires returning, stimulate to farther action, and continue the same round.

Dr. Cheyne divides the *Passions*, into acute and chronic; after the same manner, and for the same reason as diseases are so divided.

The acute *Passions*, whether pleasurable or painful, he observes, have much the same effect, and operate after much the same manner as acute diseases do. They produce a brisk circulation of the fluids, and constrict the solids for some short time. Thus, sudden gusts of joy or of grief stimulate the nervous fibres, and the coats of the animal tubes, and thereby give a greater celerity to their included fluids; and the functions of the heart and lungs being involuntary, they have their more necessary and immediate effects on them. Thus, both sudden joy and grief make us breathe short and quick, and render the pulse small and frequent: though retaining our breath sometime to reflect more intently on a painful object, forces at length a strong expiration, which becomes a sigh. Thus a sudden painful idea, making a quick circulation, and thereby throwing a great quantity of blood upward, makes it appear in the superficial vessels of the face, neck, and breast, and so produces a blush. The same principles will account for the effects of fear and anger, which make us change colour, and look red or pale as the blood is accelerated or retarded in its course. Sudden, and great fear do so convulse the nervous system, that they sometimes alter the position of the parts: thus the hair shall stand on end in a fright, and the nerves be rendered so stiff and rigid, as to stop at once the animal functions, whence fainting, and sometimes even death.

Chronic Passions, waste the nervous system gradually. Those nerves employed in considering, brooding over, and fixing such a set of ideas in the imagination, must be at length worn out and impaired; and the rest, by disuse, rendered less and inactive, lifeless and destitute of a sufficient flux of warm blood and due nourishment. Thus do long grief, dark melancholly, hopeless love, over weaning pride, &c. impair the habit; and sometimes, when long indulged, terminate in madness; the reason is, that a constant habit of fixing one thing in the imagination, begets a ready disposition in the nerves, to produce again the same image, till the thought of it become spontaneous and natural, like breathing, or the motion of the heart. Thus the Fakirs in India fix one or both hands by long holding them up so, as that they cannot bring them down again. *Elixir of Health*, &c.

Dr. Morgan seems to have gone beyond any body in explaining the origin, and effects of the *Passions*.—From a course of actual observations of the several phenomena in the body, which attend the several *Passions*, viz. the state of the pulse, respiration, warmth, digestion, &c. that author draws these general conclusions:

1^o. That all the grateful, or pleasurable *Passions* raise the vital tide, strengthen and quicken the pulse, diffuse the natural heat, and take off any antecedent stimulus, or pressure upon the abdomen and inferior organs: and, on the contrary, the painful *Passion*, sink and depels the blood, weaken the pulse, recall and concenter

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concenter the natural heat, and fix a stimulus or compression on the inferior organs.

2^o. All the *Passions* impress their characteristick sensations, or modifications of pleasure and pain, especially upon the oesophagus, and upper orifice of the stomach.

3^o. That they impress the different modifications on the muscles of the larynx, and thus discover themselves by the different modulation and tone of the voice.

And hence he infers, that the nerves of the eighth conjugation, or par vagum, are the principal instruments of the *Passions*; by means whereof they are variously impressed, modified, and organized: these, therefore, which are dispersed to all parts of the breast and abdomen, particularly to the heart, lungs, stomach, liver, oesophagus, diaphragm, intestines, the organs of generation, &c. he considers as *Patheticks of the first order*; the intercostal, which accompany all the divisions of the par vagum, he calls *patheticks of the second order*: the nerves which serve the muscles employed in respiration, and have the nearest communication with those of the par vagum, by means of the intercostal, he calls *patheticks of the third order*: and, the nerves which immediately disperse sense and motion to the face, a part of the head, and have a remoter communication with the par vagum, *patheticks of the fourth order*.

According to this gradation, then, the organs which are immediately supplied with nerves from the par vagum, or *patheticks of the first order*, will be first affected in the *Passions*; and that with the smallest degree of impeded motion; with which the parts communicating immediately with the intercostal, or *second order of patheticks*, keep pace, and are affected almost at the same time, and with the same motion: then the organs supplied with the *third order of patheticks*, or the nerves employed in the muscles of respiration, are affected: and lastly, the organs of sense and motion in the brain itself, by which sensation and imagination are performed, are put in a forcible emotion; by which the ordinary operations of sense, judgment, &c. are much disturbed.

This gradual rise and progress of the *Passions* is confirmed by fact, observation, and experience; but how they are generated, and by what steps they make these advances, requires some farther consideration.

It may be observed then, that the quantity of motion impressed on the pathetick nerves in any *Passion*, is always proportional to the strength of the desire; but such impeded motion is not always uniform, or equally diffused through the whole pathetick system; for as the largest and most numerous branches of the pathetick nerves are sent on those parts which derive their blood from the descending trunk of the aorta, viz. the stomach, spleen, kidneys, &c. upon any motion too forcibly impressed or too long continued, these inferior organs are the first and greatest sufferers; whence the blood flowing impetuously and irregularly to the parts thus stimulated, they become over-freighted; and hence arises a sense of pain, weight and oppression. By this means also the head and superior parts being deprived of their due share of blood, the pulse must sink, the natural heat diminish and retire, and a sense of cold and constriction be felt about the oesophagus, where the branches of the par vagum are very numerous; and hence the patient will be excited to sigh, groan, moan, cry out, and complain, and will discover it in the tone of the voice, and modulation of the muscles of the larynx, the characteristicks of the prevailing *Passion*.

Such is the state of nature under the painful *Passions*, where the strong desire of good is attended with an appearance of difficulty, or improbability: where the same desire is attended with a seeming probability of obtaining or effecting it, this appearance, by moderating the intenseness of the pain of the desire, and taking off the too violent action of the pathetick nerves on the inferior organs, puts the pathetick system in an easy, natural, uniform undulation; by which the equilibrium of the blood being restored, the pleasurable *Passions* of love, joy, hope, &c. will be raised: and in this case the pulse will rise, and the natural heat will be diffused, and by the action of the pathetick nerves on their proper organs the several symptoms will be produced which discover their placid emotions. Where the desire is very keen and intense, we see what a prodigious force it will impress on the nerves, by the actions of madmen, and men in a fright. In this case the stimulus of desire being exceeding strong, and the impressed motion universal, the pathetick nerves of the fourth or last order come to be affected; that is, the organs of sensation and imagination in the brain are brought into such violent vibrations, as to disturb the operations of reason.

From this violent perturbation of the pathetick nerves in the brain, madmen have their imagination as strong and vivid as sensation itself. See IMAGINATION and SENSATION.

Hence, also, we may observe the heights, or extremes of the two contrary painful, and pleasurable *Passions*; the one rising at length into a mania or raving madness, and the other sinking into an hypochondriacal melancholy. The principal seat of the one is the brain; and of the other the viscera of the abdomen, especially the spleen and mesentery. The one inflames and over-

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heats, the other chills and freezes the imagination: the one hangs over the understanding, like a glaring, dazzling light, which animates and leads us on with zeal and vehemence; the other like a thick, black, and dismal cloud, that sinks all the powers of nature into the depths of misery and despair.

Cæliac PASSION. See the article CÆLIAC.

Hypochondriac PASSION. See the article HYPOCHONDRIAC.

Hysteri PASSION. See the article HYSTERIC.

Liac PASSION. See the article LIAC.

PASSIONS in poetry, denote the *passionate* sentiments, gestures, actions, &c. which the poet gives his persons.

The *Passions* are, as it were, the life and spirit of the longer poems. Their necessity in tragedy and comedy is obvious; nor can the epopee subsist without them.

It is not enough that the epic narration be surprizing; it must likewise be moving, and *passionate* hurrying away the reader's mind, and filling it with anxiety, joy, terror, or some other violent *Passion*, and this for subjects which it knows are feigned.

Though *Passions* be always necessary, yet, all are not equally necessary, or suitable to all. Comedy has joy, and agreeable surprizes for its part: tragedy on the contrary, has terror, and compassion. The proper *Passion* of the epopee is admiration; tho' the epopee, as a medium between the two others, takes in both their kinds of *Passions*; as we see in the griefs of the fourth book of the *Æneid*, and the games and diversions of the fifth. Admiration in effect, is consistent with each; we admire with joy the things that surprize us agreeably, and with terror and grief those that amaze and afflict us.

Besides the general *Passion* which distinguishes the epic from dramatic poems, each epopee has its peculiar *Passion*, which distinguishes it from other epic poems. This peculiar *Passion* still follows the character of the hero. Thus wrath and terror reign in the *Iliad*, because Achilles is wrathful, and *caution* *temperance* *advice*, the most terrible of men. And on the contrary, the *Æneid* is all in the tender, softer *Passions*; such being the character of *Æneas*. The prudence of *Ulysses*, not allowing these excesses, we find none of them in the *Odysey*.

As to the conducting of the *Passions*, to make them have their effect, there are two things required; viz. that the audience be prepared or disposed to receive them; and that several incompatible *Passions* be not mixed together.

The necessity of disposing the audience, is founded on the natural necessity of taking up things where they are, in order to remove them elsewhere. The application of this maxim is easy; a man is calm and at ease, and you would put him in a *Passion* by a discourse made on purpose. You must begin, then, in a calm manner; by this means you join yourself to him; and afterwards walking together, he won't fail to follow you in all the *Passions* to which you lead him insensibly.

If you hew your anger at first, you will be as ridiculous and will have as little effect as Ajax in the *Metamorphoses*; in whom the ingenious Ovid gives a fine example of this failing. He begins his harangue in the height of *Passion*, and with the most violent figures, before his judges, who are in the deepest tranquility.

—*Sigala torus,*

Litora propehit, classemque in litore, vultu;

Protestantemq; manus, Agimus, pro Jupiter! inquit,

Ante rates causam, & mecum consertur Ulysses.

The necessary dispositions arise from some preceding discourse, or, at least from some action, which has already begun to raise the *Passions* ere they are mentioned. The orators themselves sometimes use this last means; for tho' ordinarily, they do not raise the *Passions* till the end of their discourse: yet, when they find their audience already moved, it would be ridiculous in them, by an unreasonable tranquillity, to lay them again.

Thus, the last time Catiline came to the senate, the fathers were so shocked at his presence, that those near the place where he sat down, rose up, retired, and left him alone. On this occasion, Cicero had too much sense to begin his oration with the usual tranquillity and coolness of exordiums. By this means he would have palled and abated the indignation of the senators against Catiline, which it was his business to spirit up, and inflame; and he would have eased the paricide of that consternation, the behaviour of the senators had given him; and which it was Cicero's business, and design to aggravate. Omitting therefore, the first part of his oration, he takes his auditors in the condition he finds them; continues and augments their passions. *Quousque tandem abutere, Catilina, patientia nostra? Quamdiu nos etiam furor iste tuus eludet? Quem ad finem sese effrenata iactabit audacia? Nihilne te nocturnum precidium palatii, nihil urbis vigiliae, nihil timor populi, nihil, &c.*

The poets are full of instances of this kind, where the *Passion* is prepared or kept up by actions. Dido in Virgil begins a discourse like Ajax: *Pro Jupiter! hic sitis, &c.* But then the motions are here well disposed; Dido is before repented under terrible apprehensions of *Æneas's* quitting her, &c. Seneca's conduct, indeed is quite opposite to this rule. If he has a *Passion* to raise, he is sure first to take from his audience any disposition they might have to be affected. If they be in grief,

grief, fear, or the expectation of something horrible, &c. He will begin with some fine description of the place, &c. In the Troades, Hecuba and Andromache, being prepared to hear the violent and barbarous death of their son Astyanax, whom the Greeks precipitated from the top of a tower; what booted it to tell them, that of the spectators that crowded from all quarters to see the execution, some placed themselves on stones, which the ruins of the walls made to project; that others shook their legs, as being placed too high, &c. *Alia rupes cuius i cacumine, erecta summos turba libavit pedes, &c.*

The second thing required in the management of the *Passions*, is, that they be found pure, and disengaged from any thing that might prevent their effect.

Polymythy, therefore, i. e. a multiplicity of fables, actions, or histories, must be avoided: all adventures much broken, and hard to be retained; and all intrigues intricate and difficult to conceive, are at once to be excluded. These embarrass the mind, and require so much attention, that there is none to spare for the *Passions*. The soul must be free and disengaged, to feel; on the contrary, we divert ourselves even from our real sorrows, by an application to other things.

But of all others, the greatest enemies to the *Passions*, are the *Passions* themselves: They oppose and destroy one another; and if two opposite ones, e. gr. joy and sorrow, meet in the same object, they will neither of them stand it. It is the nature of these habits that imposes this law: The blood and spirits cannot move gently and equally, as in a state of tranquillity, and at the same time be stopped and suspended with a violence, occasioned by admiration. Nor can they be in either of those situations, while fear calls them from the outer parts of the body, to assemble them about the heart; or rage tends them into the muscles, and makes them act there with violence very opposite to the operations of fear.

The causes and effects, therefore, of the *Passions* in the soul, are to be studied, in order to be able to manage them with all their force. Virgil furnishes two examples of what we have said about the simplicity and engagement of each *Passion*, in the deaths of Camilla and Pallas. See the *Æneid*.

PASSION, in heraldry.—*Cross of PASSION*, is a cross thus called, because, in shape of that whereon our Saviour suffered, i. e. not crossed in the middle, but nearer the top; with arms short in proportion to the length of the shaft.

PASSION-WEEK, the Week next preceeding Easter. It is thus called from our Saviour's *Passion*, i. e. his crucifixion, &c. which happened on the Friday of this week, now called *Good-Friday*.

PASSIVE, a term of relation, implying a thing to suffer, or undergo the action of some other: which, in respect hereof, is denominated *active*.

In all generations, philosophers conceive an *active* power and a *passive*.

In civil life, we say, such a person in such an election, has both an *active* voice, and a *passive*, i. e. he is both capable of electing, and of being elected.

Some also use the term *passive debt*, for a debt which we owe another, in contradistinction to an *active* debt, which is owing to us.

The chymists divide their principles, or elements into *active* and *passive*.—*Passive* are such as have no *active* force inherent in themselves, and which only act by being joined with some of the others.

Such are phlegm, and earth, some say also, salt, and, in effect, all but sulphur, or fire, which they will have the only principles of action, and motion in the universe.

PASSIVE qualities. See the article *QUALITY*.

PASSIVE understanding. See *UNDERSTANDING*.

PASSIVE prayer, in the language of mystick divines, is a total suspension, or ligature of the intellectual faculties, in virtue whereof the soul remains, of itself and as to its own power, impotent with regard to the producing of any effects. See *PRAYER*.

The *passive* state, says Fenelon, is only *passive* in the same sense as contemplation is so, i. e. it does not exclude peaceable, disinterested acts, but only unquiet ones, or such as tend to our own interest.

In the *passive* state, the soul has not properly any activity, any situation of its own: it is a mere infinite flexibility of the soul, which the feeblest impulse of grace gives motion to. *Id.*

PASSIVE in grammar, denotes a second voice or inflection of verbs, which of *active* become *passive*, by assuming, in the modern languages, new auxiliary verbs: and in the ancient, by new terminations. See *VERB, VOICE, &c.*

The English verbs become *passive*, by taking the auxiliary verb *I am*, in lieu of *I have*, where-with the *active* are conjugated: the French, by *Je suis*, in lieu of *J'ay*; the Italian, by *Jo so*, for *Jo ho*, &c.

Latin verbs become *passive*, by changing their terminations; as *amator* for *amans*, &c. *amatus* for *amatus*, &c.

English verbs *passive* are nothing else, in effect, but the verb *I am*, in all its inflections joined to the participle *passive*: as,

I am praised, in Latin *laudor*, in French *Je suis loué*; I have been praised, *J'ay été loué*, *laudatus sum*, &c.

Neuter PASSIVE, is a verb that has a *passive* conjugation, but a neuter signification.

Of these, there are a very small number in Latin, more in French, and fewer in English: as, I am entered, *ingressus sum*, *je suis entré*, &c.

Grammarians are frequently mistaken here; taking verbs for neuters *passives*, which in effect are *actives*, and only differ in that they act on themselves, by adding the pronoun personal; and which on that footing should rather be neuters *active*, than neuters *passive*.

Some admit of no genuine *passive* verbs in the modern tongues; such we mean as answer to the notion of *passive* in the ancient, where all is done by different terminations. On which footing, there should be none but *actives* *passives*, and neuters *passive*.

PASSIVE assilage. See the article *VASSALAGE*.

PASSOVER. See the article *PASSAGE*.

PASSOVER, ΠΑΣΧΑ, a solemn feast, celebrated among the Jews, on the fourteenth day of the moon next after the vernal equinox.

This feast was called by the ancient Latins and Greeks *pascha*, not from *passer*, I suffer, as Lactantius weakly imagines; but from the Hebrew פֶּסַח *Pascha*, passage, leap; the design of the feast being to commemorate the *passing* angels *passing* over the house of the Israelites, when he entered in, and destroyed the first born in those of the Egyptians.

Many weakly imagine that it was in memory of their *passing* the red sea, that the *Passover* was instituted; though it is certain the feast was held, and had its name before the Israelites took a step of their way out of Egypt; and consequently several days before their *passing* the red sea.

Beside the *Passover* celebrated in the fourteenth of the first month; there was a second *Passover* held on the fourteenth of the second month after the equinox, instituted by God in favour of travellers, and sick persons who could not attend at the first; nor be at Jerusalem on the day.

The Greeks, and even some of the catholic doctors, from the XVIIIth chapter of St. John, take occasion to conclude that Jesus anticipated the day marked for the *Passover* in the law; but the authority of three evangelists seems to evince the contrary.

F. Lamy is of opinion, that he did not attend at the *Passover* the last year of his life; which sentiment has drawn upon him abundance of opposers.

F. Hardouin maintains, that the Galileans celebrated the *Passover* on one day, and the Jews on another.

PASS-PAROLE, a command given in the head of an army, and thence communicated to the rear; by passing it from mouth to mouth.

PASS-PAR-TOUT, a master-key; or key that opens indifferently several locks belonging to the same house or apartment.

PASS-PORT, a licence, or letter from a prince, or governor, granting liberty and safe-conduct to travel, enter, and go out of his territories, freely and without molestation.

The *Pass-port* is, properly, given to friends; and the safe-conduct to enemies. See *SAFE-CONDUCT*.

Palquier takes *Passi port* to have been introduced for *passi-partout*. Balzac mentions a very honourable *Passi-port* given by an emperor to a philosopher in these terms: It shall be any one on land, or sea; hardy enough to molest Potamon; let him consider whether he be strong enough to wage war with Cæsar.

PASS-PORT is also used for a licence granted by a prince for the importing, or exporting merchandizes, moveables, &c. without paying the duties.

Merchants sometimes procure such *Passi-ports* for certain kinds of commodities; and they are always given to embassadors and ministers, for their baggage, equipage, &c.

PASS-PORT is also a licence obtained for the importing or exporting of merchandizes deemed contraband, and declared such by tariffs, &c. as gold, silver, precious stones, ammunition of war, horses, corn, wool, &c. upon paying duties.

PASS-VOLANT, or **PASSER-VOLANT**, a fagot or a pretended folder, not enrolled, whom the captain or colonel makes pass in review, or muster, to shew that his company is complete, and to receive the pay thereof to his own profit. See *FAGOT*, &c.

In France the *passi-courants* are condemned to be marked on the cheek with a flower-de-luce.

PAST-BOARD, a kind of thick paper, formed of several sheets pasted together.

There is also a coarse kind of *Past-board*, made of old paper and old *Pastboard*, beaten in a mortar with water, and reduced into a kind of pulp; to which is added a little paste, to give the mass a consistence; after which it is formed in a mould; and to finish it, laid in a press, to squeeze out all the water, and reduce it to its proper thickness.

Each kind is distinguished by numero's, which express the fineness and value: the finest is covered on both sides with a very white smooth paper, others only on one side, and others on both sides with common paper.

The chief use of *Past-board* is in the binding of books, and the making of letter-cases, hat-cases, gloves, &c. See *BOOK-BINDING*.

PASTE, in cookery, a soft composition of flour, wrought up with proper fluids, as water, milk, or the like, to serve for cakes or coffins, therein to bake meats, fruits, &c. *Paste* is the basis or foundation of pyes, tarts, patties, pasties, and other works of pastry.

PASTE is also used in confectionery, &c. for a preparation of some fruit, made by beating the pulp thereof with some fluid, or other admixture, into a soft pappy consistence, spreading it into a dish, and drying it with sugar, till it becomes as pliable as an ordinary *Paste*. See *CONFECTION*. It is used occasionally for making the crusts, and bottoms of pyes, &c.

Thus, with proper admixtures, they make almond *Pastes*, apple *Pastes*, apricot *Pastes*, cherry, currant, lemon, plum, peach, and pear *Pastes*.

PASTE is also used for a preparation of wheaten flour, boiled up, and incorporated with water; used by various artificers, as upholsterers, fadlers, book-binders, &c. instead of glue or size, to fasten or cement their cloths, leathers, papers, &c.

PASTEL. See the article *PASTIL*.

PASTER, of a horse, the distance between the fetlock or joint next the foot, and the coronet of the hoof.

This part should be short, especially in middle sized horses; because long *Pasters* are weak, and cannot so well endure travel.

PASTER joint, is the joint above the *Paster*.

The *pastern joint*, after travelling, is very apt to be crowned, i. e. to have a swelling round it beneath the skin, in form of a circle, a third of an inch broad.

PASTIL, or **PASTEL**, among painters, &c. a sort of paste made of several colours, ground up with gum-water, either together or separately; in order to make crayons to paint with on paper, or parchment. See *CRAYON*.

PASTIL, **PASTILLUS**, is also used for a dry composition, yielding a fragrant smell when burnt in a perfuming pan, to clear and scent the air of a chamber.

It is composed of odorous resins, mixed with aromatic woods, or drugs pulverized, and incorporated with mucilages of gum tragacanth. Some call these compositions *Officines of Cyprus*. There are also *Pastils* for the mouth, chewed to procure a sweet breath. These have several names, and consist of several preparations, as muscadines, conserves, &c.

PASTIL, or **PASTEL**, is sometimes also used for the plant otherwise called woad. See *WOAD*.

PASTIL, in confectionery, is a preparation of sugar with lemon-water, &c. boiled up with gum-water, strained, beat up, and by the addition of more dry sugar, worked into a pliable paste, and thus formed into round or oblong figures, and dried in the stove. See *LOZENGE*.

PASTINATION, a term sometimes used in agriculture, for the act of opening, loosening, and preparing the earth for planting.

PASTOR, originally, signifies one that (*pastor*) feeds.—Hence it was anciently used for a *shepherd*, or *advocate*; and is now appropriated to a *minister*, or one that has the cure of souls.

PASTORAL, something that relates to shepherds, *Pastores*. The poets represent the innocence of the *pastoral* life, and *pastoral* manners, in the most agreeable light. We must not imagine them so beautiful in nature as in their descriptions.

PASTORAL, in poetry denotes a composition, the subject whereof is something in the *pastoral*, at least in rural life, and the persons, shepherds; or at least rusticks.

Most authors, except the English, esteem *Pastoral* of the dramatic kind; and define it a dramatic piece, wherein the persons are clad like nymphs and shepherds, and act their own amours. The scene is always in the fields or the woods; whence Tasso calls *Pastoral*, *favola Boscareccio*.

Such are the *Pastor Fido* of Guarini, the *Aminta* of Tasso, the *Sylvia* of Mairret the French poet, and the *Comus* of Milton, &c. Tasso assumes to himself the honour of having invented *Pastoral*; but the first idea of this kind of drama seems to be Beccari's due, who made the first attempt of this kind in 1552. But Tasso's *Aminta*, which did not appear till the year 1573, effacing what had been done by Beccari, the first author was forgot, and Tasso was left as the inventor.

It is certain this kind of *pastoral* fable, composed according to the rules of the stage, was unknown among the ancients. The Greeks and Latins have indeed introduced shepherds in their eclogues; but these eclogues had nothing theatrical in them; nor were the shepherds ever brought upon the stage.

This kind of dramatic *Pastoral* is as yet but little known among us; nor have we any thing considerable under the title of *Pastorals*, but country pieces after the manner of the eclogues, or idyllions of the ancients.

Every *Pastoral*, even in this last view, should have a little plot or fable, which may deserve the title of a *pastoral scene*. It must be simple, and but one; yet, not so as to refuse all digressions, provided they be but short. This rule of the plot is every where observed by Virgil.

PASTORAL column. See the article *COLUMN*.

PASTORAL staff. See the article *CROSIER*.

PASTRY, that branch of cookery, which teaches the preparation of *Paste* with several savoury ingredients of flesh, fruits, spices, sugar, butter, &c.

Pastry is chiefly conversant in the making of pies, pasties, patties, cakes, biscuits, &c.

PASTURE, **PASTURA**, in our law-books, is any place where cattle are occasionally fed.

By which it differs from *pasua*, which is a place set wholly apart for feeding, and never plough'd. *

* *Pastura omne genus pascendi significat, sive in pratis, sive in stipula; sive in agris, sive in campis: Sed Pasua est locus principatus, deputatus pecoribus pascendis, ut patet in monasteriis, moris, maris, & sicut non cultis nec aratis.* Lindwood.

PASTURE ground is properly that which is not cultivated; that is, it is neither meadow, nor arable; but reserved for the feeding of cattle.

The best domains are those consisting in *Pasture*; they need no tilling. Holland is a country abounding much in *Pasture*. *Admeasurement of PASTURE*. See *ADMEASUREMENT*.

PASTUS, the procuration, or provision, which the king's, or lord's tenants, are bound to make for them at certain days, or seasons, or as often as they make a progress to their lands.

This, in many places, has been converted into a pecuniary fee; as in the procurations of the clergy.

PASTY, in cookery, a work of pastry; being a preparation of some proper meat, as beef, venison, lamb, or the like, well boned, beaten up to a pulp, and highly seasoned; put up in a paste, and then baked in an oven.—They also make veal *pasties*, umble *Pasties*, kidney *Pasties*, marrow *Pasties*, &c.

PATARINS. Vide *ALBIGENSES*.

PATAVINITY, **PATAVINITAS**, among critics, a fault objected to Titus Livy, which he derived from his country Padua, by the ancients called Patavium.

Afinius Pollio, as we are informed by Quintilian, taxed Livy with *Patavinity*.—But what this *Patavinity* consisted in, has given the critics a world of pain to find out.

Paolo Beni, professor of eloquence in the university of Padua, is of opinion, it must be understood of the inclination of that historian to pompey's party. — But would Pollio have reproached him with an inclination from which he himself was not exempt?

Pignorius will have the *Patavinity* to consist in Livy's retaining the vicious orthography of his countrymen of Padua, who wrote *sibi* and *quasi*, for *sibi* and *quasi*: which he proves from several ancient inscriptions.

F. Rapin takes the *Patavinity* to be only a faulty pronunciation, which shocked the delicate ears of the people in the court of Augustus; and favoured a little of the country.

Morhof believes it to be a certain turn of expression, and some phrases peculiar to the Paduense.—All we know for certain, is, that it was a fault in the language of Livy, not in the sentiments or manners. In all probability, it is one of those delicacies that are lost in a dead language. M. Balzac could not ridicule his dotard better than by supposing he valued himself on having discovered the *Patavinity* objected by Pollio to Livy.

Dan. Georg. Morhof has an exquisite treatise, *De Patavinitate Liviana*, printed at Kiel in 1685; where he explains very learnedly, the urbanity and peregrinity of the Latin tongue.

PATE, in fortification, a kind of platform, like what they call an horse-shoe; not always regular, but generally oval, encompassed only with a parapet, and having nothing to flank it. It is usually erected in marshy grounds, to cover a gate of a town, or the like. See *HORSE-SHOE*.

PATEE, or **PATTEE**, a term in heraldry for a cross, small in the centre, and widening towards the extremes. *V. Tab. Her. fig. 76*. The field is sable, a cross *patee*, argent, by the name of Cross.

This form of a cross is also called *formé*.

Petty PATES. See the article *PETTY*.

PATELLA, in anatomy, a bone which covers the forepart of the joint of the knee; called also *mole*, *scutula*, and popularly, the *knee-pan*.—See *Tab. Anat. (Osteol.) fig. 3. n. 21. fig. 7. n. 25*.

The *Patella* is roundish on the outside, somewhat of the figure of a shield, and covered with a smooth cartilage, and is about two inches in diameter; over it slide the tendons of the muscles which extend the leg, as on a trochlea, or pulley.

But its more immediate use is to hinder the leg from being bent forwards in extension; which would of necessity be the case in this articulation, did not this bone, like a bolster, check its rolling forwards; in the same manner as the olecranon does the wing of the cubitus backwards.

In an erect posture, when one foot is set forwards, the whole weight of the body bears on the *Patella*; which, in this situation, hinders the knee from bending backwards, and straining the muscles that inflect it behind.—Hence it was that Galen's wrestler, who had dislocated his patella, found so much pain in going down hill.

PATENA, in the Romish church, the cover or lid of the chalice, made of the same metal therewith, serving to hold the particles of the host, and given the people to kiss, when they make an offering.

It has its name *Patena*, a *patendo*; and this is a general name, in Columella, for any broad flat vessel.

PATENTS, or *letters PATENT*, in law, the king's letters, sealed with the great-seal; serving to convey the title or property of some

some grant, favour, privilege of a new establishment, or the like. See **LETTERS PATENT**.

They have their name because delivered open, *ut patent omnibus*; by way of contradistinction from *letters de cachet*, which are sealed.

It is to be noted, that *Patents* differ from *writs*: a coroner is made by writ, not by *Patent*. See **WRIT**.

To this office enacted 18 Jac. I. belong a Clerk, &c.

PATENTEE, is he to whom the king grants his letters patent. See **LETTERS PATENTS**.

PATERA *, among antiquaries, a goblet, or vessel, used by the Romans in their sacrifices; wherein they offered their consecrated meats to the gods; and wherewith they made libations.

* The word is Latin, formed from *pater*, I am open; *quod patet*, because it had a great aperture: in contradistinction to bottles, &c. which have only narrow necks, or whose aperture is less than the body of the vessel.

On medals, the *Patera* is seen in the hands of several deities; and frequently in the hands of princes, to mark the sacerdotal authority joined with the imperial, &c.

Hence F. Joubert observes, that beside the *Patera*, there is frequently an altar, upon which the *Patera* seems to be pouring its contents.

The *Patera* was of gold, silver, marble, brass, glass, or earth; and they used to enclose it in urns with the ashes of the deceased, after it had served for the libations of wine and liquors at the funeral.

The *Patera* is an ornament in architecture, frequently seen in the Dorick freeze, and in the tympan of arches.

PATERERO. See the article **PEDRERO**.

PATERNITY, the quality of a father.

There is an immediate relation between the *Paternity* of the father, and the filiation of the son, in the mystery of the trinity.

Divines have a long time disputed, whether *Paternity* be a real and specific character, which absolutely distinguishes the father from the son; or whether it be a mere relation of economy, and subordination? On the one hand, if *Paternity* be supposed incommunicable to the son, and if it constitute a real and positive distinction; this seems to amount to tritheism.

On the other hand, if *Paternity* be only regarded as a mode, or a term of order and economy; there is no essential and intrinsic difference between the father and son: which is nothing less than Sabellianism.

PATER-NOSTER, the Lord's-prayer, a form so called from the two initial words thereof in Latin.

PATER-NOSTER is also used for a chaplet or string of beads; because, serving to number the rehearsals of that prayer.

PATER-NOSTERS, in architecture; a sort of ornaments cut in form of beads, either round, or oval; used on baguettes, astragals, &c.

PATER-NOSTRE, in heraldry. A cross *Pater-nostre*, is a cross made of beads: as represented in *Tab. Herald. Fig. 77*. This cross is to be so shadowed in drawing, as that the sphericity of the beads may appear; to distinguish them from banners.

PATH of the *Vertex*, a term frequently used by Mr. Flamsteed in his doctrine of the sphere, signifying a circle, described by any point of the earth's surface, as the earth turns round its axis.

This point is considered as vertical to the earth's centre; and is the same with what is called the *vertex* or zenith in the Ptolemaick projection.

The semi-diameter of this *Path* of the vertex is always equal to the complement of the latitude of the point or place that describes it; that is, to the place's distance from the pole of the world.

PATHETIC *, **ΠΑΘΗΤΙΚΟΣ**, something that relates to the passions; and particularly, that is proper to wake or excite them.

* The word comes from the Greek *παθος*, passion, emotion.

The *pathetic* and sublime have a near affinity. See **STYLE**.

PATHETIC, in music, something very moving, expressive, or passionate; capable of exciting pity, compassion, anger, or the like. In this sense, we say the *pathetic* style, a *pathetic* figure, *pathetic* song, &c.

The chromatic genus, with its greater and lesser semi-tones, either ascending or descending, is very proper for the *pathetic*; as is also an artful management of discords; with a variety of motions, now brisk, now languishing, now swift, now slow. Nieuwentyt tells us of a musician at Venice, who excelled in the *pathetic* to that degree, that he was able to play any of his auditors into distraction; he adds, that the great means he made use of, was the variety of motions, &c.

PATHETICI, in anatomy, the fourth of the ten pair of nerves, which arise out of the medulla oblongata.—See *Tab. Anat. (Osteol.) fig. 5. litt. m.m.* See also the article **NERVE**.

The *Pathetici* are the smallest nerves of the brain; they have their origin in the lower part of the medulla oblongata, behind the nates and testes.

They have their name *Pathetici*, from their serving to move the eyes in the various passions; and they are by some also called *amatorii*, from the great use made thereof by lovers, in ogling, &c.

PATHOGNOMONIC, **ΠΑΘΟΓΝΟΜΟΝΙΚΟΣ**, in medicine, an essential sign or characteristic; or a symptom peculiar to, and inseparable from some disease; and every stage thereof.

Thus Blancard, and after him Harris, &c.—But the truth is, there is nothing in all medicine that answers to the idea of a *Pathognomonic*; disease and symptoms are too complicated. And we are to judge of the former not by any one sign, but by the concurrence of several.

PATHOLOGY *, **ΠΑΘΟΛΟΓΙΑ**, that part of medicine which considers diseases, both those of the body, and those of the mind; their natures, causes, symptoms, &c.

* The word is formed from the Greek *παθος*, passion, suffering, and *λογος*, discourse.

PATHOS, **ΠΑΘΟΣ**, passion, a term frequently used in speaking of the movements which the orator excites in his audience.

There is a world of *Pathos* in his discourse.—We sometimes also use the word for energy or stress.

PATIENT, among physicians, a person under the direction of a physician, or surgeon, to be cured of some disease.

Agent and PATIENT. See the article **AGENT**.

PATIENTIÆ *musculus*, in anatomy. See **LEVATOR SCAPULÆ**.

PATONCE, in heraldry—a *Crofs* **PATONCE**, is a cross fretty at the ends: from which it only differs in this, that the ends instead of turning down like a flower de luce, are extended somewhat in the patee form.—*Vid. Tab. Herald. fig. 78*. He bears gules, a cross *Patonce*, argent, by the name of Latimer.

PATRES *confcripti*, in antiquity, a denomination given to the senators of Rome.

The first hundred senators appointed by Romulus, were called simply *Patres*, fathers; another hundred being added by Romulus and Tatius, upon the union of the two people; these latter were called *Patres minorum gentium*, and the former *majorum gentium*.

At length Tarquinius Priscus making up the number three hundred, the two latter classes were called *Patres confcripti*; because, *adscripti*, or wrote down to the former.

Those afterwards chosen from among the knights, were called *Patres adlecti*.

Gloria PATRI. See the article **GLORIA**.

Dower ex assensu PATRIS. See the article **DOWER**.

PATRIARCH, **PATRIARCHA**, one of those first fathers who lived towards the beginning of the world; and who became famous by a long line of descendants.

Abraham, Isaac, Jacob, and his twelve sons, are the *Patriarchs* of the Old Testament: Seth, Enoch, &c. were antediluvian *Patriarchs*. The number of children is the benediction and character of a *Patriarch*.

PATRIARCH is also used in Christendom for the bishops in possession of some of the grand sees, independent of the papal jurisdiction.

The patriarchate has been always esteemed the supreme dignity in the church: so that to rise by degrees, the bishop had only under him the territory of the city whereof he was bishop; the metropolitan commanded a province, and had for suffragans the bishops of his province; the primate was the chief of a diocese, and had several metropolitans under him; and the *Patriarch* had under him several dioceses, and the primates themselves were under him.—But this order was not always observed.

Usher, Pagi, de Marca, and Morinus, attribute the establishment of the grand *Patriarchates* to the apostles. They suppose that the apostles, according to the description of the world then given by geographers, pitched on the three principal cities in the three parts of the known world, *viz.* Rome in Europe; Antioch in Asia; and Alexandria in Africa: and thus formed a trinity of *Patriarchs*.

Others, far from attributing this institution to the apostles, maintain that the name *Patriarch* was unknown at the time of the council of Nice; and that for a long time afterwards, *Patriarchs* and primates were confounded together; as being all equally chiefs of dioceses, and equally superior to metropolitans, who were only chiefs of provinces. Hence it is that Socrates gives the title *Patriarch* to all the chiefs of dioceses, and reckons ten of them. In effect, it does not appear, that the dignity of *Patriarch* was appropriated to the five grand sees of Rome, Constantinople, Alexandria, Antioch, and Jerusalem, till after the council of Chalcedon in 451. For when the council of Nice regulated the limits and prerogatives of the three *Patriarchs* of Rome, Antioch, and Alexandria, it did not give them the title of *Patriarchs*, though it allowed them the pre-eminence and privileges thereof. Thus, when the council of Constantinople adjudged the second place to the bishop of Constantinople, who till then, was only a suffragan of Heraclea; it said nothing of his *Patriarchate*.

Nor is the term *Patriarch* found in the decree of the council of Chalcedon, whereby the fifth place is assigned to the bishop of Jerusalem; nor did these five *Patriarchs* govern all the churches.

There

There were still many independent chiefs of dioceses, who, far from owning the jurisdiction of the grand *Patriarchs*, called themselves *Patriarchs*; such as that of Aquileia; nor was Carthage ever subject to the *Patriarch* of Alexandria.

The authority of the *Patriarchs* grew by insensible degrees, till at length all affairs of moment, within the compass of their *Patriarchate*, came before them; either at first hand, or by appeal from the metropolitans.

They consecrated bishops, appointed the time of Easter, &c. Nothing in short was done without consulting them; and their decrees were executed with the same regularity and respect as those of princes.

The Latin church was unacquainted with *Patriarchs* till the sixth century; and the churches of Gaul, Britain, &c. were never subjected to the authority of the *Patriarch* of Rome, whose authority only extended to the suburbicary provinces.—There was no primacy, no exarchate or *Patriarchate*, owned here; but the bishops, with the metropolitans, governed the church in common.

Indeed, after the name *Patriarch* became frequent in the west, it was attributed to the bishops of Bourges, and Lyons; but it was only in the first signification, viz. as heads of dioceses.—Du Cange adds, that there have been some abbots, who have bore the title of *Patriarchs*.

PATRIARCH, is also applied to the chiefs of several churches in the east, who live out of communion with the Roman church; Such are the *Patriarch* of the Armenians, residing in the monastery of St. Gregory; the *Patriarch* of the Abyssinians, called *Abuna*; the *Patriarchs* of the Copti, the Jacobins, &c. See ARMENIANS, COPTI, JACOBINS, &c.

PATRIARCHAL, in heraldry.—A *Patriarchal Cross*, is that where the shaft is twice crossed; the lower arms or traverses being longer, and the upper shorter.—Such a cross is said to belong to *Patriarchs*, as the triple cross does to the pope.

PATRICIAN, **PATRICIUS**, in ancient Rome, a title given to the descendants of the hundred, or, according to others, of the two hundred first senators chosen by *Romulus*, and by him called *patres*, fathers.

Patricians therefore, were originally the ancient nobility; in opposition to the plebeians.

But the cognizance and character of these ancient families being almost lost and extinguished, by a long course of years, and frequent changes in the empire; a new kind of *Patricians* were at length set on foot; who had no pretensions from birth, but whose title depended wholly on the emperor's favour. This new *Patriate*, *Zosimus* tells us, was erected by Constantine, who conferred the quality on his counsellors, calling them *patritii*, not because descended from the ancient fathers of the senate, but because they were the fathers of the republic, or of the empire.

This dignity, in time became the highest of the empire. Justinian calls it *summam dignitatem*: in effect, the *Patricians* seem to have had the precedence of the *consulares*, and to have taken place before them in the senate: though F. Faber asserts the contrary. What embroils the question is, that the two dignities often met in the same person; for that the *Patriate* was only conferred on those who had gone through the first offices of the empire, or had been consuls.

Pope Adrian made Charlemaign take the title of *Patrician*, &c. he assumed the quality of emperor; and other popes have given the title to other kings and princes, by reason of its eminence.

PATRICIAN, **PATRICIUS**, is also a title of honour frequently conferred on men of the first quality in the time of our anglo-saxon kings. See THANE.

PATRICIANS, in ecclesiastical writers, denote ancient sectaries who disturbed the church in the beginning of the third century: thus called from their founder *Patricius*, preceptor of a marconite called Symmachus.

His distinguishing tenet was, that the substance of the flesh is not the work of God, but that of the devil; on which account his adherents bore an implacable hatred to their own flesh; which sometimes carried them so far as to kill themselves. They were also called *Tatianites*; and made a branch of the Encratites. See TATIANITE.

PATRIMONY, **PATRIMONIUM**, a right or estate, which a person inherits from his ancestors.

The name *Patrimony* was also anciently given to the effects, or revenues wherewith a church or religious house was endowed. In which sense authors still lay the *patrimony* of the church of Rimini, of Milan, &c. The duchies of Urbino and Spoleto, are called St. Peter's *Patrimony*. The church of Rome had *Patrimones* in several countries, in France, Africa, the Alps, Sicily, &c. To make what belonged to the churches the more respected, they usually give their *Patrimones* the names of the saints they held in the highest veneration.

Thus the church of Ravenna, called its inheritance the *Patrimony* of St. Apollinaris; that of Milan the *Patrimony* of St. Ambrose, &c. as is observed by Fra Paolo.

PATRIASSIANS, **PATRIASSIANI**, a name given to the Sabellians, because they did not believe it was the son, but the father himself that suffered and was crucified.* See SABELLIAN.

* The council of Antioch held by the Eusebians in 345, says, that those whom the Romans call *Patripassians*, the Eastern people

called *Sabellians*: it adds the reason of the name *Patripassians* in their condemnation; viz. that by the incarnation of the father, they rendered him comprehensible and passible.

The *Patripassian* heresy was first broached by Praxeas, who was seconded by Victorinus, at the beginning of the third century.—They confessed Christ to be God, and that God suffered and died for us; but they confounded the divine persons, and denied in effect the trinity; meaning by father, son, and spirit; not three persons, but one person under three names. So that he who suffered for us, was, according to them, as much father as son. Tertullian wrote expressly against Praxeas.

Hermogenes espoused the error of the *Patripassians*, whence they came to be denominated also *Hermogenians*.—Afterwards Noetius gave into it, which occasioned them the name of *Noetians*.—His disciple Sabellius the Libyan followed, about the year 250, whence they were called *Sabellians*.—Lastly, because Sabellius was of Pentapolis, and the heresy spread much there; it was called the *Pentapolitan doctrine*.

PATROLL, or **PATROUILLE**, anciently **PATOU**, in war, a round, or march made by the guards, or watch, in the night-time, to observe what passes in the streets, and to secure the peace and tranquillity of the city or camp.

The *Patroll* consists generally of a body of five or six men, detached from a *corps de guard*, and commanded by a sergeant.

PATRON, **PATRONUS**, a term used in various acceptations, though all reducible to the relation of a protector, or guardian. In the church of Rome, a saint, whose name a person bears, or under whose protection he is put, and whom he takes particular care to invoke; or a saint in whose name a church, or order is founded; or a person who first established it, and who is chosen protector of it; are called the *Patrons* thereof.

Thus St. Peter and St. Paul are the *Patrons* of the church of St. Genievieve, St. Dionysius the *Patron* of the city of Paris, St. George of England, St. Benedict the *Patron* of the Benedictines, St. Michael of the armorers, St. Ignatius of the Jesuits, &c.

PATRON, **PATRONUS**, among the Romans, was an appellation given to a master, who had freed his slave.

Hence, as the right, and relation of master expired, that of *Patron* commenced.

For the Romans, in giving their slaves their freedom, did not despoil themselves of all rights and privileges in them: the law still subjected the freed-men to considerable services and devoirs toward their *Patrons*, the neglect whereof was always very severely punished.

The principal right which *Patrons* had, was that of being the legal heirs of their freed men, if they died without lawful issue; born after their enfranchisement, and testate.

By the Paphian law it was further provided, that if the estate of the freed man were 100000 sesterces, and he had three children, the *Patron* should have a child's portion.

PATRON, was also a name which the people of Rome gave to a person of power under whose protection they put themselves.

The common people usually chose some person of eminence and authority, to whom they paid all kind of honour and respect; denominating themselves his *clients*: and the *Patron* on his side granted them his credit and protection.

By this reciprocal relation was the *Patron* bound to his client, and the client to his *Patron*.

PATRON, in the canon and common law, denotes a person who founds, or endows a church or benefice, and reserves to himself the right of patronage.

The king is *Patron paramount* of all ecclesiastical benefices in England.

PATRON, in navigation, is a name given in the Mediterranean, to the person who commands the vessel and seamen; sometimes to the person who steers it: the former, in other places, being called *master*; the second pilot.

PATRONAGE, **PATRONATUS**, the right of giving or disposing of a church or benefice, properly belonging to the founder or endower thereof.

Patronage consists in having the nomination, or presentation to the benefice by him founded or endowed; in having the honourable rights of the church, in being interred in the chancel, &c.

Of *Patronages*, some are *lay*; others *ecclesiastical*.

Lay PATRONAGE, is a right attached to the person, either as founder, or as heir of the founder; or as possessor of a fee to which the *Patronage* is annexed.

Ecclesiastical PATRONAGE, is that which a person is entitled to by virtue of some benefice which he holds.

If an ecclesiastic have a right of *Patronage* on his own account, independent of his ecclesiastical capacity; this is still *lay-patronage*. *Lay-patronage* again is *real* or *personal*.

Real PATRONAGE is that attached to the glebe, or to certain lands and hereditaments.

Personal PATRONAGE is that belonging immediately to the founder of the church, and transmissible to his children and family, without being annexed to any fee.

Personal Patronage cannot be alienated or sold; *real* may, together with the glebe to which it is annexed. There must ever be some body or matter to fix it to, in order to its being transferred to another.

The origin of the right of *Patronage*, we find in the 10th canon of the council of Orange: where it is expressed that a founder may present to the diocesan the clerks he thinks proper for his church. And by a law of Justinian it is ordained, that the founders of churches may not put clerks in them on their own authority, but only present them to the bishop. Some canonists look on the right of *Patronage*, as a kind of ecclesiastical servitude.—The right of *Patronage* sleeps, but is not lost, while a person is out of the communion of the church.

Arms of PATRONAGE, in heraldry, are those, a top whereof are some marks of subjection and dependance.—Thus the city of Paris bears three flower de lices in chief, to shew her subjection to the king.

The cardinals on the top of their arms bear those of the pope, who gave them the hat, to shew that they are his creatures.

PATRONYMIC*, ΠΑΤΡΟΝΥΜΙΚΟΝ, among grammarians, is applied to those names, which the Greeks gave to the race, or lineage; and which were taken from him who was the chief, or founder thereof.

* The word is formed from the Greek, πατήρ, father, and ονμα, name. Thus the descendants of Æacus, were called Æacidae; and those of Hercules, Heraclidae.

These *Patronymic* names the Romans called *gentilitia*, which amount to much the same with our *sur-names*.

Thus, those of the present reigning family in France, we call the Bourbons; those of the late in England, the Stuarts, &c.

PATROON-galley. See the article **GALLEY**.

PATROUILLE. See the article **PATROLL**.

PATTES, in heraldry, the paws of a beast. See **PAW**.

PAVAGE, PAVAGIUM, in our old law-books, money paid towards the paving of streets, or high-ways.

PAVAN, or **PAVANE**, a grave kind of dance, borrowed from the Spaniards; wherein the performers made a kind of wheel, or tail before each other, like that of a peacock: whence the name.

The *Pavane* was anciently in great repute; and was danced by gentlemen with cap and sword; by those of the long robe with their gowns, by princes with their mantles, and by the ladies with their gown tails trailing on the ground.

It was called the *grand ball*; from the solemnity wherewith it was performed.—To moderate its gravity, it was usual to introduce several flourishes, palfades, capers, &c. by way of epifodes.—Its tablature or score is given at large by Thoinot Arbeau in his *Orcheographie*.

PAVEMENT*, a layer or stratum of stone, or other matter, serving to cover and strengthen the ground of divers places, for the more commodious walking on, or for the passage of carriages.

* The word is formed from the Latin *pavimentum*, of *pavire*, to beat down the earth, in order to make it firm and strong.

In England, the *Pavements* of the grand streets, &c. are usually of flint, or rubble stone; courts, stables, kitchens, halls, churches, &c. are paved with tiles, bricks, flags, or fire-stone; sometimes with a kind of free-stone, and rag-stone.

In some cities, *e. gr.* Venice, the streets, &c. are paved with brick; churches sometimes are paved with marble, and sometimes with mosaic work, as the churches of St. Mark at Venice.—In France, the public roads, streets, courts, &c. are all paved with gres or grit, a kind of free-stone.

In Amsterdam, and the chief cities of Holland, they call their brick *Pavement* the *burgher-masters Pavement*, to distinguish it from the stone or flint *Pavement*, which usually takes up the middle of the street, and which serves for carriages: the brick which borders it being destined for the passage of people on foot.

Pavements of free-stone, flint, and flags, in streets, &c. are laid dry, *i. e.* in a bed of sand; those of courts, stables, ground rooms, &c. are laid in a mortar of lime and sand; or in lime and cement, especially if there be vaults or cellars underneath. Some macons, after laying a floor dry, especially of brick, spread a thin mortar over it; sweeping it backwards and forwards to fill up the joints.—Thirty two statute bricks laid flat *pave* a yard square; sixty four of edge-wise.

The square tiles used in paving, called *paving-bricks*, are of various sizes, from 6 to 12 inches square.

Pavements of churches, &c. frequently consist of stones of several colours; chiefly black and white, and of several forms, but chiefly squares, and lozanges, artfully disposed.—Indeed, there needs no great variety of colours to make a surprizing diversity of figures and arrangements. M. Truchet, in the memoirs of the French academy, has shewn by the rules of combination, that two square-stones divided diagonally into two colours, may be joined together chequerwise sixty four different ways: which appears surprizing enough; since two letters, or figures can only be combined two ways.

The reason is, that letters only change their situation with regard to first and second; the top and bottom remaining the same: but in the arrangement of these stones, each admits of four several situations, in each whereof the other square may be changed 16 times, which gives 64 combinations.

Indeed, from a further examination of these 64 combinations, he found there were strictly only 32 different figures; each figure being repeated twice in the same situation, though in a

different combination; so that the two only differed from each other by the transposition of the dark and light parts.

PAVEMENT of terrate, is that which serves for a covering in manner of a plat-form; whether it be over a vault, or a wooden floor.

Those over vaults are usually stones squared, and bedded in lead.—Those on wood, called by the Latins, *pavimenta contignata*, are either stones with beds for bridges, tiles for ceiling of rooms, or lays of mortar made of cement and lime, with flints or bricks laid flat: as is still practised by the eastern and southern people a-top of their houses.

All those *Pavements* which lie open, were called by the Latins *pavimenta subdila*.

Mosaic PAVEMENT. See the article **MOSAIC work**.

Tessellated PAVEMENT. See the article **TESSELLATED**.

Projection, or perspective of a PAVEMENT. See **PERSPECTIVE**.

PAVILLION*, in architecture, signifies a kind of turret, or building usually insulated, and contained under a single roof; sometimes square, and sometimes in form of a dome: thus called from the resemblance of its roof to a tent.

* The word comes from the Italian *paviglione*, tent, and that from the Latin *pavilio*.

Pavillions are sometimes also projecting pieces, in the front of a building, marking the middle thereof.—Sometimes the *Pavillion* flanks a corner, in which case it is called an *angular Pavillion*.—The Louvie is flanked with four *Pavillions*: The *Pavillions* are usually higher than the rest of the building. There are *Pavillions* built in gardens, popularly called summer-houses, pleasure-houses, &c.—Some castles or forts consist only of a single *Pavillion*.

PAVILLION, in war, denotes a tent raised on posts, to lodge under in the summer-time. See **TENT**.

PAVILLION is also sometimes applied to flags, colours, ensigns, standards, banners, &c. all which, authors usually confound with one another.

The custom of bearing *pointed Pavillions*, as at present, first came from the Mahometan Arabs, at the time when they conquered Spain.—Till then, all colours were stretched on cross pieces like church banners; whence they were called in Latin, *avilla quasi velilla*, a diminutive of *vela*, sails.

The pirates all along the coasts of the Atlantic and Barbary, bear hexagonal *Pavillions*, gules, charged with a little Turk, dressed in his turban; though contrary to their law, which prohibits the making any image of a man; from an opinion that those who make the figure here, will be obliged to furnish a soul for it at the day of judgment, or in default thereof be damned.

But this portrait, it seems, is that of Hali Sulficar, Mahomet's son-in-law, to whose party the Africans adhere: and who appointed his picture to be represented on their banners: imagining himself so terrible to the christians, that the mere sight of his image would put them to flight; as we are told by Leunclavius.

PAVILLION, in heraldry, denotes a covering in form of a tent, which invests, or wraps up the armories of divers kings, and sovereigns depending only on God and their sword.

The French heralds hold, that none but foreign monarchs may bear the *Pavillion* intire, and in all its parts.

The *Pavillion* consists of two parts: the top, which is the chapeau, or coronet; and the curtain which makes the mantle.—Those who are elective, or have any dependance, lay the heralds, must take off the head, and retain nothing but the curtains.

The use of *Pavillions* and mantles in armories is derived from the ancient lambrequins, which are sometimes found stretched out in form of coverings; and tucked back on either side. Others will have it derived from the ancient tournaments, wherein were expoled the arms of the knight in rich tapestry work, on tents and *Pavillions* which the chiefs of the quadrils planted to shelter themselves in, till the time of entering the lists.

PAVIOUR's level. See the article **LEVEL**.

PAUL's art. See the article **ART**.

Hermits of St. PAUL. See the article **HERMIT**.

PAULIANISTS, PAULIANISTÆ, a sect of hereticks, so called from their founder Paulus Samosatenus, a native of Samoiata, elected bishop of Antioch in 262.

This Heresiarch denied the distinction of persons in the trinity, with Sabellius: and taught with Artemonius, that the word descended into Jesus; and that after having performed by him what he purposed to do, he re-ascended to his father.

He distinguished two persons in J. C. the Word, and the Christ: The latter, according to him, was only God in regard of his holiness: accordingly, he did not baptize in the name of the Father and the Son, &c. For which reason the council of Nice ordered those baptized by him to be rebaptized.

Being condemned by Dionysius Alexandrinus in a council, he abjured his errors, to avoid deposition; but soon after he resumed them, and was actually deposed by another council in 270.

PAULICIANS*, a branch of the ancient Manichees, so called from their chieftain, one Paulus, an Armenian, in the seventh century.

* They were also called *publicani*, *populicani*, and *publicani*.

The *Paulicians*, by their number, and the countenance of the emperor,

PAY

emperor Nicephorus, became formidable to all the east. To the other opinions of the Manichees, they are said to have added an abhorrence of the cross; and to have employed it in the most servile offices, out of despatch.

The empress Theodora, tutored of the emperor Michael in 845, would oblige them either to be converted, or to quit the empire: Upon which several of them were put to death, and more retired among the Saracens; but they were not all exterminated.

Towards the end of the IXth century, they were able to maintain war against the emperor Basil; and even preached long after this in Bulgaria; from whence they spread into several other parts of Europe.

PAVO, in astronomy, a southern constellation called the PEACOCK.

PAUPER, in law. See *FORMA pauperis*.

PAUSARY, PAUSARIUS, in ancient Rome, an officer, who in the solemn pomp, or processions of the goddess Isis, directed the stops, or pauses.

In these ceremonies, there were frequent stands at places prepared for the purpose; wherein the statues of Isis and Anubis were set down; much after the manner of resting places in the procession of the holy sacrament in the Romish church.—These rests were called *mansiones*; the regulation whereof was the office of these *Pausarii*.

From an inscription quoted by Salmasius it appears, that the Romans had a kind of college, or corporation of *Pausaries*.

PAUSARY, PAUSARIUS, was also a name given to an officer in the Roman galleys, who gave the signal to the rowers, and marked the times and pauses; to the end they might act in concert, and row all together.

This was always done with a musical instrument: Hyginus says, that in the ship Argo, Orpheus did the office with his lyre.

PAUSE *, a stop or cessation of speaking, singing, playing, or the like.

* The word is formed from the Latin *ponere*, which we find used in Lucretius and Plautus in the same sense.

The use of pointing in grammar, is to make the proper *Pauses* in certain places.

There is a *Pause* in the middle of each verse: in a hemistich, it is called the rest, or repose.

Pauses or silences are the same in poetry, as the odd rests in music, which serve to make the odd notes even &c. St. Austin instructs us how these pauses are to be made according to the laws of music.

PAUSE, in music, a character of silence, and rest; called also by some, a *mute figure*; because it shews that some part or person is to be silent, while the others continue the song.

Pauses are used either for the sake of some fugue or imitation, or to give a breathing time, or to give room for another voice, &c. to answer what this part sung; as in dialogues, echoes, &c. The ancients had two kinds of *Pauses*: the one called by the Italians, *initial Pauses*: because first placed at the beginning of the piece, though sometimes after, and regularly before the circle O, or the semi-circle C.—They had also *Pauses* to mark silences, after the characters of the measure, and in the course of the piece.

General *Pause*, denotes a general cessation, or silence of all the parts.

Demi Pause, a cessation for the time of half a measure.

They also say, *Pause of a minima*, *pause of a semibreve*, *long pause*, and *pauses of a croma*, and *semi-croma*; which are names given by the Italians, to express the different values, or durations of *Pauses*. For the signs or characters of *Pauses*. See *CHARACTER*.

PAW, PATTE, in heraldry, the fore-foot of a beast cut off short.—If the whole leg be cut off, it is called *Gambe*.—Lions-paws are much used in armoury.

PAWN-broker. See the article *BROKER*.

PAWNAGE. See the article *PANNAGE*.

PAX Dei. See the article *PEACE of God*.

PAX Ecclesiæ. See the article *SANCTUARY*.

PAX Regis *. See the article *PEACE of the king*.

* *Longe debet esse Pax Regis a pace sua, ubi residens fuerit, a quatuor partibus loci illius, hoc est quatuor miliaria & tres quarentena, & novem acra latitudine, & novem pedes, & novem palmas, & novem granis bordi, &c. Leg. Edv. Confess.*

Ad PACEM redire, to restore to the peace, is to reverse an outlawry; whereby a person is restored to the benefit of the king's peace *.

* *Rex potest dare quod suum est, hoc est pacem suam, quam utlagatus amisit.* Bracton. Lib. 3.

PAYMENT, the discharge of a debt, either by money really told, or by bills of exchange, &c. See *DEBT*, &c.

Prompt PAYMENT, a popular term in England and Amsterdam: it is when a debtor acquits what he owes before the expiration of the term granted by the creditor.

The ordinary discount for prompt Payment on most merchandizes is 1 per cent.

PAY, in the sea-language. The seamen say, *pay more cable*, i. e. let out more cable. See *CABLE*.

Pay cheap, is used in turning the anchor out of the boat, to denote, turn it out faster.

PEA

PEACE, Pax, in its general signification, stands in opposition to war.

PEACE, in our law books, &c. is restrained to a quiet, and inoffensive carriage towards the king, and his people. Lamb. *Einmuth*.

Where any man stands in danger of harm from another, and makes oath thereof before a justice of the peace; he must be secured by good bond, which is called *peacemaking*.

Time of PEACE, is when the courts of justice are open, and the judges and ministers of the same may by law protect men from wrong and violence, and distribute justice to all. See *Coke on Litt.*

PEACE of the king, *Pax Regis*, mentioned in the Stat. 6 Ric. II. &c. is that security which the king promises his subjects, and others taken into his protection; both for life and goods. See *PROTECTION*.

PEACE of God and the church, *Pax Dei & ecclesiæ*, mentioned in our ancient law books, is that rest and cessation which the king's Subjects had from trouble and suit of law, between the terms.

PEACE of the plough, that whereby the plough, plough-tackle, and plough-cattle, are secured from disturbances. See *Fitzh. Nat. Br.*

Thus fairs may be said to have their *Peace*, because no man may be troubled in them for any debt contracted elsewhere.

Homage of PEACE. See the article *HOMAGE*.

Clerk of the PEACE. See *CLERK of the Peace*.

PEACH-WATER. See the article *WATER*.

PEACOCK, PAVO, in astronomy, a constellation of the southern hemisphere; unknown to the ancients; and not visible in our northern parts of the world.

PEACOCK'S-TAIL. See the article *TAIL*.

PEAN, in heraldry, is when the field of a coat of arms is sable, and the powderings, or.

PERCH fishing. See the article *FISHING*.

PEARL, PERLA, or MARGARITA, in natural history, a hard, white, shining body, usually roundish, found in a testaceous fish, resembling an oyster; and ranked in the number of Gems.

The fish wherein the *Pearls* are found, is three or four times the size of the common oysters; and is called by naturalists, the *concha margaritifera*.

Each fish ordinarily yields ten or twelve *Pearls*; though an author who treats well of their production, pretends to have seen an hundred and fifty in the same fish; but those in different degrees of perfection. The most perfect drop out first; the rest remaining longer at the bottom of the shell.

The formation of *Pearls* has puzzled both ancient and modern naturalists; and given occasion to a great number of hypotheses, many of them wild and extravagant enough. Pliny, and from him Solinus, &c. will have them to be formed of the dew: the fish, say they, rises every morning to the surface of the water, and there opens its shell, to imbibe the dew of heaven; which like a liquid *Pearl*, insinuating into the body of the pearl-oyster, fixes by its salts, and there assumes the colour, hardness, and form of *Pearl*; as some other liquors are converted into crystals in the earth; or the juice of flowers into honey and wax in the body of the bee: But this, how plausible soever, is apparently false: for the pearl-oysters grow fast to the rocks, and no body ever yet saw any of them appear on the surface of the water.

Others will have *Pearls* to be the eggs of the fishes they are found in: but neither does this consist with the phenomena. For *Pearls* are found throughout the whole substance of the oyster, in the head, the coat that covers it, the circular muscles that terminate it in the stomach, and in general in all the fleshy and muscular parts; so that there is no appearance that *Pearls* should be in the oysters, what the eggs and spawn are in fowls and fishes. For beside that there is no particular place destined for their formation; anatomists have not been able to find any thing about them that bears any relation to what passes in this respect in other animals.—This indeed may be said, that as in a hen there is an infinity of little eggs, in form of seed; some whereof grow and ripen, whilst the rest continue long nearly in the same state, so in each oyster there is usually found one *Pearl* much larger, and that ripens much faster than the rest. This *Pearl* sometimes grows big enough to hinder the oyster from shutting, in which case the fish rots and dies.

Others, with M. Geoffroy the younger, rank *Pearls* among the bezoars; as comprehending under that class all stones formed in layers or strata in the bodies of animals. See *BEZOAR*.

M. Reamur, has a very curious piece on the subject of the formation both of the shells and *Pearls*, in the memoirs of the French academy, anno 1717. He observes that *Pearls* are formed like other stones in animals, as those e. g. in the bladder, kidneys, &c. and that they are apparently the effects of a disease of the fish.—In effect, they are all formed of a juice extravasated out of some broken vessels, and detained, and fixed among the membranes.

To evince the possibility of this, he shews that the shells of sea-fishes, as well as those of fowls, &c. are wholly formed of

a glutinous stony matter, oozing out of the body of the animal. Now it is no wonder that an animal, which has vessels wherein circulates a sufficient quantity of stony juice to build, thicken and extend a shell, should have enough to form stones also, in case the juice destined for the growth of the shell shall chance to overflow, and burst forth in any cavity of the body, or among the membranes.

To confirm this system he observes, that the inner surface of the common *Pearl*-muscle, found on the coasts of Provence, is of a *Pearl*, or mother of *Pearl* colour, from one part of its extent, which he determines, to another; after which it becomes reddish: now there are *Pearls* of two colours found in the shell; and the colours of the *Pearls* are precisely the same with those of the shell; nay, more, each kind of coloured *Pearl* is found in the corresponding coloured part of the shell; which shews, that in the same place wherein the transpiration of a certain juice had formed, and would have continued to form a coat, or layer of shell of a certain colour; the vessels which conveyed that juice being broke, there is formed a little mass or collection of the juice, which hardening, becomes a *Pearl* of the same colour with the part of the shell to which it corresponds. Add to this, that the silver, or *Pearl*-coloured part of the shell is formed of strata, or layers over one another, like an onion; and the reddish part of little cylindrical, short fibres applied against one another. The *Pearls* of the two colours have also this difference of texture; not but they are both composed of concentric couches; but those of the reddish *Pearls* are much less sensible; and, besides, they have threads, which, like radii, proceed from their centre to their circumference.—These circumstances seem effectually to determine the formation of *Pearls*, and to establish the new system beyond contradiction.

As to the formation of the *Pearl*-fish, though it is the most natural opinion, that this fish, like all others, produces eggs or spawn, whose exterior surface at first is soft and viscous, but changes and hardens by degrees into a shell; yet we must not leave unmentioned the popular, tho' erroneous hypothesis of the Paravas, viz. that in rainy weather the brooks of the neighbouring lands that empty themselves all along the coasts, run near two leagues on the surface of the sea without mixing therewith. For a while, the suspended water, they say, retains its natural colour and sweetness; but at length, the heat of the sun condensing it, forms it into a kind of light transparent froth; this done, it presently divides into an infinity of parts, each whereof appears as if animated; moving this way and that like little insects. The fishes sometimes catch at them as they pass by: but they soon abandon them. By degrees their skin thickening and hardening, they at length become heavy enough to sink to the bottom, and assume the figure of *Pearl* oysters. The perfection of *Pearls*, whether round, in form of pears, or olives, or irregular, consists chiefly in the lustre and clearness of the colour; which jewellers call the *water*. There are some whose water is white; which are those most esteemed in Europe. The water of others borders on the yellow, which some Indians and Arabs prefer to the white. Others are of a lead-colour, others border on black, and others are quite black. They are all liable to change with wearing: in 80 or 100 years they usually become of little value; especially the white ones, which often turn yellow, and spoil in 40 or 50 years time.

The difference of colours doubtless arises from the different parts of the oyster wherein they are formed. When the seed happens to be thrown into the mesentery or liver, or the parts corresponding thereto, it is no wonder if the impurities of the blood change the natural white.

In Europe, *Pearls* are sold by the carat-weight, the carat containing four grains.—In Asia, the weights used for *Pearls* are different, in different states.

The term *Pearl* is only properly applied to what grows independent of the shell.—The shell itself is rather call'd *naker* of *Pearl*. Those pieces which have grown thereto, and have been since separated by the address of the workman, are called *veins* of *Pearls*; which are in effect nothing but roundish excrescences, or pieces of the shell, though frequently used for real *Pearl*.

Pearls, F. Bouhours observes, have this advantage over precious stones dug out of rocks, &c. that the latter owe their lustre to the industry of men; nature only, as it were, hews them out and leaves the finishing of them to art: but the former are born with that beautiful water which gives them their value. They are found perfectly polished in the abysses of the sea; and nature has put the last hand to them ere they are separated from their mother.

Pearls of unusual figures, i. e. neither round, nor in the pear form, are called *baraguan*, and ours *Scotch*-*pearls*: those of unusual sizes, are called *parangons*; such were that of Cleopatra valued by Pliny at centies H.S. or 80000 l. sterling; that brought in 1574 to Philip II. of the size of a pigeon's egg, valued at 144000 ducats; that of the emperor Rudolph, mentioned by Boetius, called *la pergrina*, or the incomparable, of the shape of a muscade pear, and weighing 30 carats, and that mentioned by Tavernier, in the hands of the emperor of Persia, in 1633, bought of an Arab for 320000 toman, which at 3 l. 9 s. the toman, amounts 110400 l. sterling.

Pearls are of some use in medicine; but it is only the small-

est sort, called *seed* of *Pearls* that are there used. The quality required, is, that they be white, clear, and transparent; and truly oriental. They serve to make cordial potions, formerly much valued, but now fallen much from their ancient reputation; and scarce ordered by any but charlatans.

The ladies also use certain preparations of *Pearls*, as they are made to believe, for their complexions; such as the whites of *Pearls*, flowers, essences, spirits, tinctures, &c. of *Pearl*; but they are all apparently deceits.

OUNCE PEARLS. See the article **OUNCE**.

PEARL-fisheries.—*Pearls* are caught in the seas of the East-Indies; in those of America; and in some parts of Europe.

PEARL-fisheries of the East, are—1^o. The island of Bahren, or Baharem, in the Persian gulph. This the Portuguese were masters of while they held Ormus and Mascata; but it has been returned to the Sophi of Persia, since the time that prince, with the assistance of the English, took from them Ormus; and the Arabs Mascata.

2^o. The fishery of Catifa, on the coast of Arabia Felix, over-against Bahren.

3^o. That of Mañar, a sea-port in the isle of Ceylon. The *Pearls* here fished, are the finest in all the east for their water and roundness; but they seldom exceed four carats.

Lastly, there are *Pearls* fished on the coast of Japan; but they are coarse and irregular, and little valued.

The *Pearls* of Bahren and Catifa, are those commonly sold in the Indies; they border a little on the yellow, but the eastern people do not value them the less for it; they esteem it the sign of their being ripe and mature, and are persuaded, that those which have this yellowish tincture naturally, never change their colour; and that on the contrary, those of the white water do not hold above 30 years ere the *Pearl* assumes a filthy yellow colour, by reason of the heat of the climate, and the sweat of the persons who wear them.

American PEARL-fisheries, are all in the great gulph of Mexico, along the coast of the Terra-firma. There are five of them—

1^o. The fishery of Cubagna, an island five leagues from New Andalusia, in 10 deg. north lat.

2^o. That of the island Marguerites, or *Pearl* island.

3^o. That of Comogote near the Terra-firma.

4^o. That of the river De la Hach, called *la Rencheria*.

5^o. That of St. Martha sixty leagues from the river de la Hach. The *Pearls* of these three last fisheries are usually of a good weight; but ill formed, and of a livid-water. Those of Cubagna seldom exceed 5 carats; but are found in abundance. But the greatest quantity, and the finest, both with regard to weight and water, are those of the island Marguerites.

PEARL-fishery in Chinese Tartary, is near the city Ni-peh-sua, situate on a lake of the same name: the *Pearls* here are less beautiful than those of Baharem; and the fishery less plentiful. It was this fishery that occasioned the war between the Chinese and Muscovites, terminated toward the end of the last century, by the jesuits Pereira and Gerbillon; when the lake, which is of great extent, was divided between the two nations, each whereof had pretended to the whole. There are some *Pearl* fisheries also in the South-Sea, but they are very inconsiderable.

PEARL-fisheries of Europe, are in some places on the coasts of Scotland, and in a river of Bavaria: but the *Pearls* found here are no ways comparable to those of the East-Indies, or of America; though they serve for necklaces, which are sold sometimes for a thousand crowns and upwards.

Manner of fishing for PEARLS in the East-Indies.—There are two seasons of *Pearl*-fishing in the year; the first in March and April, the second in August and September: the more rain there falls in the year, the more plentiful are the fisheries.

In the opening of the season, there appear sometimes two hundred and fifty barks on the banks. In the larger barks are two divers, in the smaller, one. Each bark puts off from shore ere sun-rise, by a land-breeze, which never fails; and returns again by a sea-breeze, which succeeds it about noon.

As soon as the barks are arrived at the place where the fish lie, and have cast anchor, each diver binds a stone six inches thick, and a foot long under his body; which is to serve him as ballast, and prevent his being driven away by the motion of the water; and to enable him to walk more steadily among the waves.

Beside this, they tie another very heavy stone to one foot, whereby they are sunk to the bottom of the sea in a moment. And as the oysters are usually strongly fastened to the rocks, they arm their fingers with leathern mittens, to prevent their being wounded in scraping them violently off; and some even carry an iron rake for the purpose.

Lastly, each diver carries down with him a large net, in manner of a sack, tied to his neck by a long cord, the other end whereof is fastened to the side of the bark. The sack is intended for the reception of the oysters gathered from the rock, and the cord is to pull up the diver when his bag is full, or when he wants air.

In this equipage he precipitates himself, sometimes above 60 foot under water. As he has no time to lose there, he is no sooner arrived at the bottom, than he begins to run from side to side,

PEA

side, sometimes on a sand, sometimes on a clayey earth, and sometimes among the points of rocks; tearing off the oysters he meets withal, and cramming them into his budget.

At whatever depth the divers be, the light is so great, that they easily see whatever passes in the sea, with the same clearness as on land. And to their consternation, they sometimes see monstrous fishes, from which, all their address in mudding the water, &c. will not always save them; but they become their prey: and of all the perils of the fishery, this is one of the greatest and most usual.

The best divers will keep under water near half an hour, the rest do not stay less than a quarter. During which time, they hold their breath without the use of oils, or any other liquors; only acquiring the habit by long practice.

When they find themselves straitened, they pull the rope to which the bag is fastened, and hold fast by it with both hands; when the people in the bark, taking the signal, heave them up into the air, and unload them of their fish, which is sometimes five hundred oysters, sometimes not above fifty.

Some of the divers need a moment's respite to recover breath; others jump in again instantly, continuing this violent exercise without intermission, for many hours.

On the shore they unload their barks, and lay their oysters in an infinite number of little pits, dug four or five foot square, in the sand; raising heaps of sand over them to the height of a man, which, at a distance, look like an army ranged in battle.

In this condition they are left, till the rain, wind, and sun, have obliged them to open, which soon kills them. Upon this the flesh rots and dries, and the *Pearls*, thus disengaged, tumble into the pit upon taking the oysters out.

The flesh of the fish is excellent, and it what some naturalists maintain be true, *viz.* that the *Pearls* are stones, formed there by the ill constitution of the body, as sometimes happen in men: this disease does not alter the humours: at least, the Paravas, who eat them, do not find any difference between those that have *Pearls*, and those that have none.

After clearing the pits of the grosser filth, they sift the sand several times, to separate the *Pearls*. But what care soever they take herein, they always lose a great many. After cleaning and drying the *Pearls*, they are passed through a kind of sieve, according to their sizes. The smallest are sold as seed *Pearls*; the rest are put up by auction, and sold to the highest bidder.

Manner of fishing for PEARL in the West-Indies.—The season for fishing there is usually from October to March. In this time there let out from Cartagena ten or twelve barks, under the convoy of a man of war called *Larmadilla*. Each bark has two or three slaves for divers.

Among the barks there is one called *Capitana*; to which all the rest are obliged to bring at night what they have caught in the day, to prevent frauds. The divers never live long, by reason of the great hardships they sustain; continuing sometimes under water above a quarter of an hour.—The method is the same as in the East-India fisheries.

The Indians knew the value of their *Pearls* before the discovery of America; and when the Spaniards arrived there, they found great quantities stored up, which the Americans set great value on. But they were almost all imperfect, and their water yellow and smoky, by reason they used fire in opening the fishes. In the *Dictionnaire de commerce*, is a table of the value of *Pearls*, communicated to the author by an able hand. As *Pearls* make a very curious article in commerce, and as their value is a thing little known among us; we shall here give the reader an abridgment of the same, reduced to our money on the foot of 1 s. 6 d. sterling the French livre, or 4 s. 6 d. the French crown.

Value of all kinds of PEARLS, with regard to their different weights.

Seed Pearls.	l.	s.	d.	per oz.
Seed Pearls not perforated, fit for grinding, are worth	00	09		
Fine seed Pearls perforated for small necklaces or embroidery,	01	01		
Ditto a little larger,	01	16		

Ragged or irregular Pearls.

Of 500 to the ounce, are worth	03	00
300	06	00
150	11	02
100	18	00
60	33	15
30	75	00

Regular round Pearls.

One of; a grain is worth	00	00	2½
Of a grain	00	00	4½
Of a grain and half	00	01	0
Of 2 grains	00	02	0
Of 2 grains and half	00	04	6
Of 3 grains	00	07	6

PEA

	l.	s.	d.	per oz.
Of 4 grains, or one carat	00	18	0	
Of 5 grains	01	10	0	
Of 6 grains	02	05	0	
Of 7 grains	03	01	0	
Of 8 grains, or two carats,	04	10	0	
Of 9 grains	06	00	0	
Of 10 grains	08	05	0	
Of 11 grains	09	15	0	
Of 13 grains	13	05	0	
Of 15 grains	21	00	0	
Of 17 grains	27	00	0	
Of 20 grains, or 5 carats	37	10	0	
Of 22 grains	52	10	0	
Of 24 grains, or 6 carats	82	10	0	
Of 26 grains	99	00	0	
Of 28 grains, or 7 carats	150	00	0	
Of 32 grains, or 8 carats	225	00	0	
Of 36 grains, or 9 carats	262	10	0	
Of 40 grains, or 10 carats	300	00	0	

As to *Pearls* in form of pears, though equally perfect, and of equal weight with the round ones, their value is much inferior: however, when two are found that match well, their value is less but by one third.

Falsè PEARLS are counterfeit or fictitious *Pearls*, resembling the true ones in water or colour: popularly called *beads*.

These anciently were only made of glass; with a kind of coating of quick-silver within-side; afterwards they used wax, covered over with a fine brilliant fish glue.

There has since been invented in France, another manner of making them, to near the natural ones in lustre and water, that they deceive a good eye. These are what the ladies now generally wear in defect of true *Pearls*; but necklaces whereof they despise; and the large ones are generally too dear.

Method of making falsè PEARLS.—This curious invention is owing to the *Sieur Janin*; and is the more to be valued, in that, it is not only very simple, but prevents the ill effects of those falsè *Pearls*, made with quick-silver within, or with fish glue without.

That ingenious artist having observed, that the scales of a little fish called the *bleak*, found plentifully in the river *Marne*, had not only all the lustre of the real *Pearl*; but that after beating them to powder in water, they returned to their former brilliance upon drying; he bethought himself of setting a piece, or little mass thereof in the cavity of a bead, or grain of guaiac, which is a kind of counterfeit opal made of glass, and bordering much on the colour of *Pearl*. The difficulty was to get it in there, and when in, to spread it equally throughout the bead.

A little glass tube six or seven inches long, and a line and half in diameter, but very sharp at one end, and a little crooked, served for the introducing of the matter, by blowing it with the mouth, after having taken up a drop of this mixture with the pointed extremity of the tube; and to spread it throughout the inner circumference, he contented himself to shake it gently a long time, in a little osier basket lined with paper.

The pulverised scales, fastened by this motion in the inside of the bead, resume their lustre as they dry. To increase this lustre, in winter, they lay the beads in a hair sieve, or a bolting-cloth, which they suspend to the ceiling, and under it, at six foot distance, they lay heaps of hot ashes. In summer they suspend them in the same manner, but without any fire.

The *Pearls*, thus well dried, become very brilliant; and nothing remains but to stop up the aperture, which is done by melted wax, conveyed into it with a tube like that used in introducing the peccer'd scales.

After clearing off the superfluous wax, they perforate the *Pearls* with a needle, and string them; and thus they commence a necklace.

Mother of PEARL, is the shell not of the *Pearl* oyster, but of another sea fish of the oyster kind.

This shell within-side is very smooth, and polished, and of the whiteness and water of *Pearl* itself; and it has the same lustre without-side, after the first laminae or leaves which make the outer coat of this rich shell fish, have been cleared off with aqua fortis and the lapidaries mill. It is used in inlaid works, and in several toys, as snuff-boxes, &c.

Vens of PEARL are certain excrescences, or prominent places, in form of half *Pearls*; sometimes found in the bottoms of the *Pearl* shells.

The lapidaries have the address to saw off these protuberances, to join them together, and to use them in several works of jewelry, as if they were really *Pearls*.

PEARL, in heraldry, is used by such as blazon with precious stones instead of colour and metals, for argent, or white.

PEARL, pin, or web, in medicine, an unnatural speck, or thick film over the eye. See *PANNUS*.

PEARLED crowns. See the article *CROWN*.

PEARS. See the articles *FRUIT*, and *DWARF pears*.

PECCANT, in medicine, an epithet given to the humours of the body, when they offend either in quantity or quality, *i. e.* when they are either morbid, or in too great abundance.

Most

PEC

Most diseases arise from *peccant* humours, which are either to be corrected by alteratives and specifics, or else to be evacuated.

PECK, a measure, or vessel used in measuring grains, pulic, and the like dry substances.

The standard, or Winchester *Peck*, contains two gallons; each gallon of con weighing about eight pound Troy. Four *Pecks* make a bushel; four bushels a comb or carmuck. Besides the general, or Winchester *Peck*, there are local *Pecks*, containing some more, some less; as, the Lancaster *Peck* containing six gallons, &c.

PECQUETS duct, in anatomy, the thoracic duct; thus called from its discoverer Pecquet.

PECTEN arboris, in botany, is the grain of the wood of any tree.

PECTEN, in anatomy, is used by some authors for the pubes, or lower part of the hypogastrium; usually covered with hair.

PECTINEUS, or **PECTINÆUS**, in anatomy, the third of the fifteen muscles of the thigh; so called, because it has its origin in the fore part of the os pectinis.—See *Tab. Anat. (Myol) fig. 2. n. 35*.

Its insertion is in the thigh, under the left trochanter. The *pectineus*, with the psoas and iliacus, draw the thigh forwards, and of consequence bend it.

PECTINIS os, in anatomy, the same with os pubis. See *Os Pubis*.

PECTORAL, something relating to the breast, *pectus*. See *Breast*.

In the Romish church, bishops, and regular abbots wear a *pectoral cross*, i. e. a little cross of gold, hanging from the neck down the breast.

PECTORAL medicines, or simply **PECTORALS**, are remedies proper to strengthen and relieve the breast; or medicines intended against diseases of the breast, and lungs.

Their ordinary intention is either to attenuate, or to thicken the humours of those parts, which cause coughing, &c. and render them fit to be expectorated, or spit out.

PECTORAL wine. See the article *WINE*.

PECTORALE, or **PECTORAL**, in the Jewish law. See *RATIONAL*.

PECTORALIS, in anatomy, a muscle which possesses almost the whole breast, and moves the arm forwards.

It arises by a fleshy and semicircular beginning, from the clavicle, sternum, and cartilages of the six superior ribs; and covering a great part of the breast, is inserted by a short, but strong and broad tendon into the upper and inner part of the humerus, between the biceps and deltoides. See *Tab. Anat. (Myol) fig. 1. n. 22*.

Its fibres, near their insertion, decussate one another. Those which come from the clavicle, or first ribs, are on the lower side of the tendon, and those from the inferior ribs on the upper side of the tendon.

Naturalists observe a special mark of providence in the size and strength of the *Pectoral* muscle in different animals. It is by the action of this muscle, that the flying of birds is chiefly performed: accordingly it is much larger and stronger in birds than in any animals not made for flight.

Borelli observes, that in men the *Pectoral* muscles are small; scarce the 50th or 70th part of all the other muscles: but in birds they are vastly large, equalling, nay, exceeding in bulk and weight all the other muscles of the bird together.

PECTORALIS internus. See *TRIANGULARIS*.

PECTORIS os, the same as *sternum*. See *STERNUM*.

PECTORIS triangularis. See the article *TRIANGULARIS*.

PECULATE, **PECULATUS**, in the civil law, the crime of pilfering the publick money, by a person who has the management, receipt, or custody thereof: so called, *quasi pecunie abusus*.

Civil lawyers use *peculate* for any theft of a thing either sacred, religious, public, or fiscal.—*Peculate* in the case of publick money is prosecuted even on the criminal's heir.

PECULIAR in the canon law, a particular parish, or church, which hath jurisdiction within itself, for probate of wills, &c. exempt from the ordinary, and the bishops courts.

There are *royal Peculiars*, and *ecclesiastical Peculiars*.

The king's chapel is a *royal Peculiar*, exempt from all spiritual jurisdiction, and reserved to the visitation and immediate government of the king himself, who is supreme ordinary.

It is an ancient privilege of the see of Canterbury, that whosoever any manors or advowsons do belong to it, they forthwith become exempt from the ordinary, and are reputed *Peculiars*. In the province of Canterbury there are fifty seven such *Peculiars*.

Court of PECULIARS, is a court where the affairs of *Peculiars* are transacted.

PECULIUM*, the stock which a person in the power or property of another, as a slave, a minor, or the like may acquire by his own industry, without any advance or assistance from his father or master; but merely by their permission.

PED

* The word is usually derived a *pecunia* & *pecoribus*; because the whole estate anciently consisted in money and cattle.

PECULUM is also used among the Romanists, for what each monk or religious reserves, and possesses to himself.

Some say that the *Peculium* of a religious, when preferred to a cure, does not cease to belong to the monastery: and that the property thereof never absolutely resides in the religious himself.

PECUNIA, money. See the article *MONEY*.

PECUNIA, in our old law books, is sometimes used for cattle; and sometimes for other goods, as well as money.

In the emendation of the laws of Edward the Confessor by William the first, it is ordered that no *vivus pecunia*, living money, i. e. cattle, be bought or sold, except within cities, and that before three sufficient witnesses.

So in doomsday book, *pecunia* is frequently used, *pro pecude*; as pasture and *pecuniam callem*.

PECUNIA ecclésiæ, was anciently used for the estate of the church.

PECUNIA sepulchralis, was money formerly paid to the priest at the opening of the grave, for the good and behoof of the deceased's soul; and which our saxon ancestors called *gyal-pist*; and *cin-a-jombol-on*.

PEDAGE, **PEDAGIUM**, *Toll*, or a local due exacted on persons, goods, and carriages, passing through certain places.

Pedage is usually levied for the repairing of roads, bridges, and causeways, the paving of streets, &c. Anciently, those who had the right of *Pedage*, were to keep the roads secure, and answer for all robberies committed on passengers between sun and sun; which is still observed in some parts of England, and in Italy, where there are guards called *Scutierarii*, established for the security of merchants, particularly at Terracina, on the road between Rome and Naples.

PEDAGOGUE*, or **PEDAGOGUE**, ΠΑΙΔΑΓΩΓΟΣ, a tutor or master, to whom is committed the discipline and direction of a scholar, to be instructed in grammar and other arts.

* The word is formed from the Greek παιδαγωγος, *puerorum ductor*, leader of boys.

M. Fleury observes, that the Greeks gave the name *Pedagogues* to slaves appointed to tend their children, lead them, and teach them to walk, &c. The Romans also gave the same denomination to the slaves who were intrusted with the care and instruction of their children.

PEDALS, the large pipes of an organ, so called, because played and stopped with the foot. See *ORGAN*.

The *Pedals* are the largest pipes in the machine, they are made square and of wood; they are usually thirteen in number.—They are of modern invention, and serve to carry the sounds an octave deeper than the rest.

PEDANEUS, in the civil law, a petty judge, who has no formal seat of justice, but hears causes standing, and without any tribunal.

The word seems formed from *stans in pedibus*; and is used among the ancients by way of opposition to those magistrates, who were seated in the curule chair, in *sella curuli*, or had a tribunal or bench raised on high.

The Roman *Pedanei*, therefore, were such as had no tribunal, nor *procurum*, but rendered justice *de plano*, or *plano pede*.

From the eighty second novel, it appears that the emperor Zeno established these *Pedanei*, in the fee of every province; and that Justinian ordered eleven of them at Constantinople, in manner of an office; granting them power to judge in any sum as high as three hundred crowns.

PEDANT, a school-master, or pedagogue, who professes to instruct and govern youth, and teach them the humanities, and the arts. See *PEDAGOGUE*.

PEDANT is also used for a rough, unpolished man of letters, who makes an impertinent use of the sciences, and abounds in unseasonable criticisms, and observations.

Dacier defines a *Pedant*, a person who has more reading than good sense.

Pedants are people ever armed with quibbles and syllogisms; they breathe nothing but disputation and chicanery, and pursue a proposition to the last limits of logic.

Malebranche describes a *Pedant* as a man full of false erudition, who makes a parade of his knowledge, and is ever quoting some Greek or Latin author, or hunting back to a remote etymology.

St. Evremont says, that to paint the folly of a *Pedant*, we must represent him as turning all conversation to some one science or subject which he is best acquainted withal.

There are *Pedants* of all conditions, and of all robes. Wicquefort says, an ambassador always attentive to formalities, and decorums, is nothing else but a political *Pedant*.

PEDANTRY, or **PEDANTISM**, the quality, or manner, of a *Pedant*. See *PEDANT*.

To swell up little, and low things, to make a vain show of science, to heap up Greek and Latin without judgment, to tear those to pieces who differ from us about a passage in Suetonius, or the etymology of a word, to stir up all the world against a man

P E D

a man for not admiring Cicero enough, to be interested for the reputation of an ancient, as if he were our next of kin, is what we properly call *Peutuv*.

PEDESTAL*, in architecture, the lowest part of an order of columns; being that which sustains the column, and serves it as a foot or stand on.

* The word is formed from the Latin, *pes pedis*, foot, and *statu*, column.

The *Pedestal*, called by the Greeks, *Stylobates* and *Stereobates*, consists of three principal parts, *viz.* a square trunk or dye, which makes the body; a cornice, the head; and a base, the foot of the *Pedestal*.

The *Pedestal* is properly an appendage to a column; not an essential part thereof; though M. le Clerc thinks it is essential to a complete order.

The proportions and ornaments of the *Pedestal*, are different in the different orders: Vignola, indeed, and most of the moderns, make the *Pedestal* and its ornaments in all the orders, one third of the height of the column, including the base and capital: but some deviate from this rule.

M. Perrault makes the proportions of the three constituent parts of *Pedestals* the same in all the orders, *viz.* the base one fourth of the *pedestal*, the cornice an eighth part; and the body or plinth of the base two thirds of the base itself. The height of the dye is what remains of the whole height of the *Pedestal*.

Tyrian **PEDESTAL**, is the simplest, and the lowest of all.—Palladio and Scamozzi make it three modules high; Vignola 5. Its members in Vignola are only a plinth for a base, the dye, and a talon crown'd for a cornice.—This has rarely any base. See **TUSCAN**.

Doric **PEDESTAL**, Palladio makes four modules, five minutes high, and Vignola five modules four minutes.—In the antique we not only do not meet with any *Pedestals*; but even, not with any base in the *doric* order.—The members in Vignola's *doric* *Pedestal*, are the same with those in the *tuscan*, with the addition of a mouchette in its cornice.

Ionian **PEDESTAL**, in Vignola and Serlio, is six modules high; in Scamozzi five; in the temple of Fortuna Virilis it is seven modules twelve minutes.—Its members and ornaments are mostly the same with those of the *doric*, only a little richer. The *Pedestal* now usually followed, is that of Vitruvius; though we do not find it in any work of the antique.—Some, in lieu thereof, use the attic base, in imitation of the antique.

Corinthian **PEDESTAL** is the richest and most delicate of all. In Vignola it is seven modules high, in Palladio five modules one minute, in Serlio 10. modules fifteen minutes, in the Coliseum ten modules two minutes. Its members in Vignola are as follows: in the base are a plinth for a socle, over that a tore carved; then a reglet, a gula inverted and enriched, and an astragal.—In the dye are a reglet, with a conge over it, and near the cornice a glet, with a conge underneath.—In the cornice is an astragal, a frieze, fillet, astragal, gorge, and a talon. See each under its proper article.

Composite **PEDESTAL**, in Vignola, is of the same height with the *corinthian*, *viz.* seven modules, in Scamozzi six modules two minutes, in Palladio six modules seven minutes, in the goldsmiths arch seven modules eight minutes.

Its members in Vignola, are the same with those of the *corinthian*; with this difference, that whereas these are most of them enriched with carvings in the *corinthian*, they are all plain in the *composite*.—Nor must it be omitted, that there is a difference in the profiles of the base and cornice in the two orders. The generality of architects, Daviler observes, use tables or panels, either in relief or creux, in the dyes of *Pedestals*; without any regard to the character of the order. Those in relief, he observes, only fit the *tuscan* and *doric*; the three others must be indented; but this, he adds, is a thing the ancients never practised, as being contrary to the rules of solidity and strength.

Square **PEDESTAL**, is that whose height and width are equal—as, that of the arch of the lions at Verona, of the *corinthian* order; and such, some followers of Vitruvius, as Serlio, Philander, &c. have given to their *tuscan* orders.

Double **PEDESTAL**, is that which supports two columns, and is larger in width than height.

Continued **PEDESTAL**, is that which supports a row of columns without any break or interruption; such is that which sustains the fluted ionic columns of the palace of the Tuileries on the side or the garden.

PEDESTALS of statues, are those serving to support figures or statues.

Vignola observes, there is no part of architecture more arbitrary, and wherein more liberty may be taken, than in the *Pedestals* of statues; there being no laws prescribed for them by antiquity: nor any even settled by the moderns.

There is no settled proportion for these *Pedestals*; but the height depends on the situation, and the figure they sustain. Yet, when on the ground, the *Pedestal* is usually two thirds, or two fifths of that of the statue: but always the more massive the statue, the stronger must be the *Pedestal*.

Their form, character, &c. are to be extraordinary and ingenious.

P E D

nious, far from the regularity and simplicity of the *Pedestals* of columns. The same author gives us a great variety of forms, oval, triangular, multangular, &c.

PEDESTRIAN statue. See the article **STATUE**.

PEDICLE*, **PEDICULUS**, in botany, *foot-stalk*; that little stalk whereby the leaf, fruit, or flower is sustained, and connected to its branch, or stem.

* The word is a diminutive of the Latin, *pes*, foot.

Flowers will keep fresh a long time after gathering, by immersing their *Pedicles* in water. The great secret of preserving fruits for the winter, is to seal up their *Pedicles* with wax. Cherries with the shortest *Pedicle*, are esteemed the best. The pistil of the flower sometimes becomes the *Pedicle* of the fruit. See **PISTIL**.

PELLEIAN, ΠΕΛΛΑΙΟΣ, in antiquity.—The city of Athens was anciently divided into three different quarters; one, on the descent of a hill; another on the sea-shore; and a third in a plain between the other two.

The inhabitants of the middle regio were call'd Πεδιαιος, * *Pedicians*; or, according to Aristotle, *Pediaci*: those of the hill, *Diacrians*; and those of the shore, *Paralians*.

* The word is formed from the Greek *pedion*, plain, flat.

These quarters usually compos'd of many different factions: Pisistratus made use of the *Pedicians* against the *Diacrians*.

In the time of Solon, when a form of government was to be chosen, the *Diacrians* would have it Democratic; the *Pedicians* demanded an Aristocracy; and the *Paralians* a mixed government.

PEDIAEUS, in anatomy, is the second of the extensor muscles of the foot, *pes*; whence its name.

It has its origin in the lower part of the perone, and annular ligament; and is divided into four tendons, which are inserted into the external part of the first articulation of the four toes.—Its use is to extend the foot together with the first of the extensors, called *extensor communis*.

PEDICULARIS * *morbus*, in medicine, the lousy distemper; a disease arising from some uncommon corruption in the body, which generates infinite quantities of lice on the skin.

* The word comes from the Latin *pediculus*, louse.

Herod is said to have died of the *Pedicular* disease.

PEDIGREE, a descent or genealogy. See **DESCENT**.

PEDIMENT, in architecture, a kind of low pinnacle; serving to crown an ordonnance, or finish a frontispiece; and placed as an ornament over gates, doors, windows, niches, altars, &c.—See *Tab. Architect.* fig. 24.

The pinnacles of the ancient houses, Vitruvius observes, gave architects the first idea of this noble part; which still retains the appearance of its original.

The parts of the *Pediment* are, the tympanum, and its cornice. The first is the panel, naked, or area of the *Pediment*, represented by *e*, in *Tab. Architect.* fig. 34. enclosed between the cornice *f, f*, which crowns it, and the entablature, which serves it as a base or socle.

Architects have taken a great deal of liberty in the form of this member: nor do they vary less as to the proportion of the *Pediment*.—The most beautiful, according to Daviler, is that where its height is about one fifth of the length of its base.

It is described thus: divide the line *a b* (*Tab. Architect.* fig. 34.) which is the length of the base, into two equal parts, in the point *c*, by means of the perpendicular *f d*; in this perpendicular, take the part *e d*, equal to *a c*; and from the point *d*, as a centre, describe the arch *a e b*. The point of the perpendicular cut in *e*, will be the top of the *Pediment a e b*; and the cornice, and the triangular space included therein, the tympanum.

Vitruvius calls the *Pediments*, fastigium; a word which signifies a roof raised or pointed in the middle, this form among the Romans was peculiar to temples. All their dwelling-houses were covered in the plat-form manner: Salmastius on Solinus observes, that Cæsar was the first who obtained leave to roof his house with a ridge, after the manner of the temples.

Pliny tells us, that *Pediments* were first made to place statues upon, whence they were called *plastræ*.

The *Pediment* is usually triangular, and sometimes an equilateral triangle, this is called also a *pointed Pediment*.—Sometimes it is circular; though Felibien observes, that we have no instance of round *Pediments* in the antique, beside those in the chapels of the Rotondo. Sometimes its upper cornice is divided into three or four sides, or right lines: Sometimes the cornice is cut, or open a top; which is an abuse introduced by the moderns, particularly by Michael Angelo. For the design of this part, at least over doors, windows, &c. being chiefly to shelter those underneath from the rain, to leave it open in the middle, is to frustrate its end.

Sometimes the *Pediment* is formed of a couple of scrolls, or wreaths, like two consoles joined together. See **CONSOLE**. Sometimes again the *Pediment* is without a base, or its lower cornice is cut out, all but what is bestowed on two columns or pilasters, and on these an arch or sweep raised, in lieu of an entablature: of which Serlio gives an instance in the antique, in

a corinthian gate a Foligny, in Umbria; and Daviler, a more modern one, in the church of St. Peter at Rome.

Under this kind of *Pediments*, do also come those little arched cornices, which form pediments over doors and windows, supported by two consoles, in lieu either of entablature or columns.

Sometimes the *Pediment* is made double, i. e. a left *Pediment* is made in the tympanum of a larger, on account of some projection in the middle; as in the frontispiece of the church of the great Jesus at Rome: but this repetition is an abuse in architecture, though authorized by some very good buildings, as the large pavilion of the Louvre, where the caryatides support three *Pediments* one in another.

Sometimes the tympanum of the *Pediment* is cut out, or left open, to let in light; as we see under the portico of the capital at Rome. Lastly, this open *Pediment* is sometimes triangular, and enriched with sculpture, as roses, leaves, &c. as we find in most of the gothic churches.

M. Le Clerc observes, that the modillions in the cornice of the *Pediment* should always answer exactly over those of the entablature. Indeed Vitruvius says, the ancients did not allow any modillions at all in *Pediments*.

The same M. Le Clerc observes, that the cornice which serves the *Pediment* as a base, should have no cymatium; by reason the cymatium of the rest of the entablature, when it meets the *Pediment*, passes over it.

This change of determination occasions a considerable difficulty; the cymatium, in this case, appearing too broad in the turn of the angle. To remedy which, the architects have recourse to several expedients.

A pointed *Pediment* may crown three arches; but a circular *Pediment* can only crown one agreeably.

One would never see above two *Pediments* over each other in the same frontispiece; and even where there are two, it would be proper to have the lower circular, and the upper pointed.

PEDILIBUS, cutting off a foot; a punishment anciently inflicted among us: as appears by the laws of William the conqueror. *Interdumque de quibusdam, vel suspenduntur, pro aliquo culpa, vel evanescunt oculi, abscinduntur pedes, vel testiculi, vel manus, &c. Leg. Henr. cap. 1.*—So *Isidorus*, *sub panna perditionis dexteri sui pedis, &c.*

PEDIS unum digitum abductor	See the articles	ABDUCTOR.
ad unum pollicis PEDIS		ADDUCTOR.
ad unum PEDIS		DORSUM.
flexor pollicis PEDIS		FLEXOR.
PEDIS interossei		INTEROSSEI.
PEDIS perforans		PERFORANS.
PEDIS perforatus		PERFORATUS.
PEDIS transversalis		TRANSVERSALIS.
Transcriptio PEDIS finis		TRANSCRIPTIO.
PED. TUM arabitio		ARRAIATIO.

Pedo-BAPTISM. See **Pædo-Baptism**.

PEDOMETER *, or **PODOMETER**, way-wiser; a mechanical instrument, in form of a watch; consisting of various wheels with teeth, catching in one another; all disposed in the same plane; which by means of a chain or string fastened to a man's foot, or to the wheel of a chariot, advance a notch each step, or each revolution of the wheel; so that the number being marked on the edge of each wheel, one may number the paces, or measure exactly the distance from one place to another.

* The word is formed from the Greek *πους*, *pes*, foot; and *μετρον*, *metron*, measure.

PEDOMETER, is sometimes also used for the common surveying wheel, an instrument chiefly used in measuring roads; popularly called the *aven-wisger*. See **PERAMBULATOR**.

PEDRERO, **PETERERO**, or **PATERERO**, a small piece of ordnance, used on board ships; for the discharging of nails, broken iron, or partridge shot on an enemy attempting to board. See **ORDNANCE**.

They are generally open at the breech, and their chamber made to take out, to be loaded that way, instead of at the muzzle.

PEDUNCULI Cerebelli, in anatomy, two medullary processes of the cerebellum, whereby that part is joined to the medulla oblongata. See **CEREBELLUM**.

Willis, who first gave them the name, observed in them three distinct processes on either side, the two first whereof go to the testes, the second directly from the cerebellum to the medulla oblongata, decussating the former, and fastening the processus annularis. The third, springing from the hinder process of the cerebellum, is inserted into the medulla oblongata; looking like an additional chord to it.

PEEK, in the sea language, a term used in various senses.—*E. gr.* an anchor is said to be a-peek, when the ship being about to weigh, comes over her anchor, so that the cable hangs perpendicularly between the hauls and the anchor;—the bringing of a ship into which position they call *heaving a-peek*.

A ship is said to *ride a-peek* when lying with her main and fore-yards hoisted up, one end of her yards is brought down to the throuds, and the other raised up an end; which is chiefly done when the lies at rest in rivers, lest other ships, falling foul on her, should break her yards.

To *ride a broad-peek*, denotes much the same, excepting that the yards here are only raised to half the height.

To *peek the miffen*, is to put the miffen yard perpendicular by the mast.

PEEK is also used for the room in the hold, from the bitts forward to the stem; in this place men of war keep their powder, and merchant-men their victuals.

PEER, PAR, primarily denotes an equal, or one of the same rank and condition.—Hence in some councils or assemblies, we find, with the consent of our peers, bishops, abbots, &c.

PEER, afterwards was applied to the vassals or tenants of the same lord, who were obliged to serve, and attend him in his courts.

They were called *Peers, pares*, because equal in function; and *Peers in fees, or fees*, because holding fees of the lord, or because their business in court was to fit and judge under their lord of disputes arising concerning fees.

The number of *Peers* required to sit in a court, was at least four; and when there happened to be too many *Peers* in the same lordship, the lord usually chose out twelve, who had the title of *Peers* by way of distinction and eminence.

There are also instances of women who have assisted at judgments, on account of their tenements, not of their being wives of *Peers*. The origin of these *Peers* of fees is as ancient as that of the fees they were appointed to judge of; from these we derive our common juries, and our peers of the realm.

PEER of the Realm, denotes a noble lord, or person who has a seat, and vote in the upper house of parliament, which is hence called the *house of Peers*.

The house of lords have a right to take cognizance, originally of all public accounts; and to enquire into any misapplication, or default in the distribution of public monies, or of any other mismanagement whatsoever. *Vide* life of qu. Anne, p. 85.

There are five degrees of peerage, or nobility, viz. that of a duke, marquis, earl, viscount, and baron. See each under its proper article.

It is the king who confers the *Peerage*, by honouring the person with some of those titles by patent. See **NOBILITY**.

PEERS, PARS, of France, are the 12 grand lords of that kingdom.

The institution of these *Peers* is very uncertain; some refer it to Hugh Capet, at the time when the dukes and counts changed the offices they then held of the king into perpetual fiefs. But this is impossible; Champagne, one of the titles, not being then erected into a county. Indeed Paquier observes, that it is an old tradition, that there have been 12 *Peers* in all ages.

Of these *Peers* six are dukes, and six counts, *comtes*; of these again, six are ecclesiastics, and six lay-men. The archbishops of Rheims, and the bishops of Laon, and Langres, are dukes and *peers*; the bishops of Noyons, Chalons on the Marne, and Beauvais, are counts and *peers*.

The dukes of Burgundy, Normandy, and Aquitaine, are lay *Peers* and dukes; and the counts of Flanders, Champagne, and Tholouse, lay *Peers* and counts.

These lay *Peers* all assist at the coronation of the kings in ceremony, and by way of representatives; where each performs the functions attached to his respective dignity: tho' their peerships be in reality all, except that of Flanders, reunited to the crown. Six lords of the first quality are chose to represent them.—The ecclesiastic *Peers* usually assist in person.

At present, the title *Peer*, in France, is bestowed, as in England, on every lord or person, whose fee is erected into a lordship or peership.

The word *Peer*, according to Paquier, is derived from patricius, the first dignity in the eastern empire, on the model whereof he supposes these *Peers* to have been instituted. But others with more probability derive the title from the *pares curias*, or of *Peers* of fees, because of their being equal to each other.

These *pares curias*, on whose model they suppose the *Peers* of realms to have been erected, were a kind of vassals depending all on the same lord, whom they were obliged to attend and assist in court.

All feudal matters or disputes among vassals relating to their fees or dependences, were terminated by the superior lord of the two contending parties, and by their *Peers* in fee.

If the process were between the lord and the vassal, the lord took no cognizance of it, and the *Peers* alone judged it.

Hence, all lords or nobles being *pares nobilitate*, i. e. all equally entitled to the privileges of nobility, are denominated *pares regni*, *Peers of the realm*.

Some authors attribute the first institution of *Peers* of the realm to Charlemagne; but with little probability; since most of the fiefs which bear the names of dutchies, &c. or give titles to the *Peers*, were not erected into dutchies, &c. till long after. The Dukes, &c. in those days being no more than simple governors of provinces, without any other title or privileges.

The more probable opinion is, that *Peers* were first instituted by Philip the young, of France, about the year 1179; and that they first acted in capacity of *Peers* at the coronation of his son.

PEER, or PIER*, in building, denotes a mass of stone, &c. opposed, by way of fortels, against the force of the sea, or a great river; for the security of ships, that lie at harbour in any haven.

* The word in this sense is formed from the French, *piere*, stone. Such

PEG

Such are the *Peer* of Dover described by Camden, *Brit. an.* the haven and *Peer* of great Yarmouth, mentioned 22 Car. II. *PEERS* are also used in architecture for a kind of pilasters or buttresses, raised for support, strength, and sometimes for ornament.

PEERAGE, the dignity of a *Peer* attached to a duchy, earldom, barony, or the like.

The kings of England and France confer *Peerage* at pleasure. His late majesty of England offered his parliament to resign that branch of his prerogative, and to have the number of *Peers* limited.

The reason insisted on, was the inconvenience accruing to the state from an arbitrary and immoderate use thereof; the prince having it hereby in his power to throw what number of his creatures he pleases into the upper-house of parliament.

The twelve *Peers* created at once in the late reign, was a main argument in behalf of the *Peerage* bill.—It is recorded as a saying of king Charles, that if his friends could but secure him a house of commons, he would put his whole troop of guards into the upper-house, but he would have the *Peers*.

To hold land in *PEERAGE*, in the ancient customs, was a tenure which obliged the person to assist the lord's bailiff in his judgments; as all the ancient vassals, called *Peers*, did.

PEGASUS, among the poets, a horse imagined to have wings; being that whereon Bellerophon was fabled to be mounted when he engaged the Chimæra.

The opening of the fountain Hippocrene, on mount Helicon, is ascribed to a blow of *Pegasus's* hoof.—It is feigned to have flown away to heaven; where it became a constellation. Hence

PEGASUS, in astronomy, the name of a constellation of the northern hemisphere, figured in form of a flying horse.

The stars in this constellation in Ptolemy's catalogue are 20, in Tycho's 19, in the Britannic catalogue 93. Their longitudes, latitudes, magnitudes, &c. are as follow.

Names and situation of the Stars.	Sign.	Longit.	Latitude North.	Magnit.
	♈	0	0	0
Preced. } In the triangle over Pegasus's mouth	♈	25 58 39	33 18 39	4
North }	♈	29 49 57	36 09 30	4 5
	♈	24 43 41	19 38 14	6
	♈	24 36 55	18 46 05	6
	♈	29 49 32	31 28 35	6 7
	♈	23 37 56	15 21 40	6
	♈	25 21 39	18 22 36	6
Pegasus's mouth	♈	27 33 32	22 07 16	3
Poster. and south. in the triangle	♈	0 41 04	29 02 49	4 5
In the heel of the preced. foot	♈	4 37 10	36 39 05	4
	♈	25 39 21	15 06 56	6
	♈	3 34 17	34 05 10	6
	♈	2 04 04	28 28 58	6
	♈	8 25 13	40 15 40	6
	♈	8 19 10	38 46 07	6
	♈	6 54 27	36 07 07	6
	♈	1 35 20	23 01 46	6
	♈	0 16 21	17 46 20	5
	♈	1 06 39	19 06 36	7
20	♈	3 01 42	23 37 20	6
	♈	2 51 41	21 47 57	5
South of two in the head.	♈	0 58 06	15 42 01	5
	♈	11 39 57	37 40 34	6
In the preced. kneec.	♈	10 04 09	34 17 48	4
25	♈	8 31 30	30 51 42	6 7
North in the head	♈	2 28 46	16 21 48	4
	♈	15 04 15	41 03 45	8
In the heel of the hind foot	♈	8 48 51	29 58 44	6 7
	♈	15 15 13	40 59 52	4 5
	♈	19 42 07	44 24 30	5
30	♈	4 48 30	15 01 47	6
Small one against the ear	♈	7 37 52	20 51 42	4 5
North in the ear, or rather inform	♈	15 10 56	35 34 03	5 6
	♈	11 55 26	28 34 40	6 7
In the top of the main, proceed of little Δ)	♈	5 42 45	13 09 56	6
35	♈	6 08 55	13 21 09	5
North of the triangle	♈	8 11 58	17 18 50	6 7
	♈	6 33 16	12 53 28	6
Poster. and south. in the same	♈	19 41 51	38 29 08	6
40	♈	13 48 43	27 09 30	6 7

PEL

Names and situation of the Stars.	Sign.	Longit.	Latitude North.	Magnit.
	♈	15 0 29	25 54 02	6 7
	♈	15 17 33	25 56 59	6
	♈	11 59 06	17 42 03	3
Preced. of the contig. stars in the neck	♈	20 35 43	34 25 43	5 6
South in the hind knee	♈	21 24 12	35 07 01	3
North. in the same knee	♈	45		
	♈	16 29 36	25 05 48	6
Last of the contig. in the neck	♈	13 37 19	18 27 18	5
Preced. of the two in the breast	♈	18 43 48	28 43 12	4
Subseq.	♈	20 02 13	22 23 32	4
North of two in the mane	♈	13 57 01	15 43 34	6
50	♈			
South of the same	♈	14 14 06	14 30 06	6
	♈	19 56 37	25 11 47	6
	♈	16 21 59	16 46 18	6
In the rife of the hind leg Scheat.	♈	25 02 13	31 08 06	2
In the shoulder of the wing Markab	♈	19 09 13	19 24 37	2
55 or the neck	♈			
Preced. of the north in the finall □	♈	17 14 16	13 53 52	5
That under Scheat.	♈	24 28 48	28 28 37	5 6
Preced. of South. in □ of neck.	♈	17 31 19	12 58 10	6
Last of north.	♈	18 06 39	13 57 58	6
Last of fourth.	♈	18 03 32	12 47 24	6 5
60	♈			
	♈	26 16 35	29 13 44	6
	♈	27 53 40	30 05 17	6
North of two under the wing in the body)	♈	26 44 08	20 33 57	6
Preced. of five in the belly	♈	0 10 38	31 31 39	6
65	♈	1 11 12	32 39 01	6
	♈	25 50 08	22 44 22	6 7
Preced. of two behind Markab.	♈	22 10 23	14 57 25	6
Second and north in the belly	♈	02 09 28	32 52 21	6 7
South of two under the wing	♈	27 38 15	24 47 52	6
	♈	29 01 51	26 09 20	6 7
70	♈			
That behind Markab. (and 63 ^d)	♈	23 45 06	14 45 25	5 6
That in a right line with the 69 th	♈	29 04 02	23 10 09	6
Third and middle in the belly	♈	03 35 42	31 01 57	6
	♈	4 56 31	32 53 00	6
	♈	27 25 39	17 37 36	7
75	♈			
Preced. in the middle of the wing	♈	28 12 34	19 00 48	6
	♈	28 23 55	16 40 02	6
	♈	26 00 19	11 07 40	6
Fourth in the belly	♈	4 46 00	28 18 95	5 6
South of five in the belly	♈	5 45 24	27 16 20	6
80	♈			
	♈	27 24 45	9 24 26	6 7
	♈	2 57 24	20 32 38	7
Middl. in the mid. wing.	♈	1 49 59	18 13 41	6
	♈	28 22 33	10 45 59	6
North. in the mid. wing.	♈	3 03 01	20 35 00	6
85	♈			
North in the extrem. of the wing.	♈	5 45 50	23 09 16	6
	♈	7 37 33	24 34 42	6
	♈	2 22 00	11 42 38	5 6
In the navel, Andromeda's head	♈	9 58 50	25 41 00	2
	♈	5 09 17	15 46 15	6
90	♈			
Tip of the wing, Algenib	♈	2 25 18	9 13 22	5
South in extrem. of the wing.	♈	4 49 50	12 35 12	2
	♈	7 17 42	17 01 40	6

PEGMATES, or rather *PEGMARES*, in antiquity, a name given to certain gladiators, as well as artificers, among the Romans. The ancients sometimes exhibited shews of a sort of moving machines, called *pegmata*: these were scaffolds variously adorned, somewhat after the manner of those now raised for fire-works. These scaffolds being made to play, and rise aloft, either threw up into the air the matters wherewith they were charged; and among the rest, men, who were thus sacrificed to afford the people diversion; or else they precipitated them into holes dug in the ground, where they lighted their funeral piles; or finally into the dens of wild beasts.

Both the miserable people thus sacrificed, and the workmen that made and played the machines, were called *pegmates*, or *pegmares*.

According to Caubon, fire was set to the scaffold; and the *pegmates* were to save themselves through the flames, and the wreck of the machine.

Lipfius only says, that the *pegmates* were such gladiators as fought on scaffolds erected for that purpose. They were also called *petauriste*, q. d. flyers in the air.

PELAGIE *, in natural history, a term used to express such fish-shells and fishes, as never, or very rarely, are found near the shoars;

P E L

floors; but always reside in the deep, or in those parts of the bottom of the sea, which are most remote from Land. See Shell.

* The word is formed of the Greek *πελος*, marine, belonging to the sea.

PELAGIANS, PELAGIANI, ancient hereticks, well known in the church by the writings of St. Augustin.

The author of this sect, *Pelagius*, properly called *Morgan*, was a monk of Banchor; but the learned are at a loss whether it was of the monastery of Banchor in Wales, or that of the same name and order in Ireland. But he was cotemporary with St. Jerom, and St. Augustin, and quitted his country to go and live in the east, according to the custom of the monks of those days, who were not attached to particular houses like those of our time.

Pelagius absolutely denied all original sin, which he held to be the mere invention of St. Augustin, and taught that men are entire masters of their actions, and perfectly free creatures: in opposition to all predestination, reprobation, election, &c.

He owned indeed, that the natural power of man needed to be assisted by the grace of God, to enable him to work out his own salvation; but by this grace he only meant outward assistance, viz. the doctrines of the law and of the Gospel.

Though, when pressed by those words of St. Paul, *Deus est enim qui operatur in nobis*, &c. he owned that it is God, in effect, that makes us will what is good, when he warns and excites us by the greatness of the glory we are to obtain, and by the promises of rewards; when he makes us love him by revealing his wisdom, &c.

These are Pelagius's own words, as cited by St. Augustin; who computes him, and newts that besides these exterior graces, there are required other real and interior ones.

Pelagius owned further, that the will of man is indeed aided by a real grace; but he added, that this grace is not absolutely necessary in order to live well; but that it only helps us to do well with the more ease.

Julian, one of his adherents, went further yet; and owned that the assistance of grace was absolutely necessary to enable us to do perfect works.

In effect, the grand doctrine of the *Pelagians* was, that a man might accomplish all the commands of God by the mere power of nature; and that the gifts of grace were only necessary to enable him to act well more easily, and more perfectly.

PELECAN. See the article **PELLICAN**.

PELECOID angle. See the article **ANGLE**.

PELECOIDES *, in geometry, a figure in form of a hatchet.

* Whence its name from the Greek *πέλεκυς*, hatchet, and *ειδος*, form. Such is the figure BCDA, *Tab. Geometry*, fig. 45, contained under the two inverted quadrantal arcs AB and AD, and the semicircle BCD.

The area of the *Pelecoides* is demonstrated to be equal to the square AC; and that, again, to the rectangle EB.—It is equal to the square AC, because it wants of the square on the left hand, the two segments AB and AC, which are equal to the two segments BC and CD, by which it exceeds on the right hand.

PELLETS, in heraldry, a name given those roundlets which are black.—Called also *agrestes* and *gun-stones*.

PELLICAN, or **PELECAN**, among chymists, a kind of double vessel, ordinarily of glass; used in working on liquors, by circulation.

PELLICAN also denotes an instrument used by surgeons, &c. to draw teeth.

PELLICAN, again, is the name of an ancient piece of ordnance, carrying a ball of six pounds; by the French made eight feet and half, and by the Dutch nine feet long. See **CANNON**.

PELLICAN, the name of a bird. See *Supplement*, article **ONOCROTALUS**.

PELLICLE, **PELLICULA** *, a thin film or fragment of a membrane or skin. See **MEMBRANE**.

* The word is a diminutive of *pellis*, skin.

The epidermis or cuticula, is a little *Pellicle*, covering the derma, cutis, or skin. See **CUTICLE**.

The valves of the veins and arteries are insensible *Pellicles*, which open and shut to promote the circulation.

When any chymical solution is evaporated in a gentle heat till a thin skin or film arises a-top, it is called an evaporation to a *Pellicle*, in this case there is but just liquor enough left to keep salts in fusion.

PELLS, Clerk of the **PELLS**. See **CLERK of the Pells**.

Controllers of the Pells. See **CONTROLLER**.

PELLUCID *, a term of the same import with diaphanous, or transparent.

* The word is formed of the Latin *pellucet*, or *perlucet*, I shine through.

Pellucid stands opposed to opaque.

PELLUCIDITY, diaphaneity, or transparency. See **TRANSPARENCY**, &c.

PELTA, **HEATH**, in antiquity, a kind of buckler, used among the ancients.

The *Pelta* was small, light, and more manageable than the pama.

P E N

It appears from Virgil, and other authors, that the *pelta* was the buckler used by the Amazons: and Xenophon observes, that the *pelta* of the Amazons was shaped like a leaf of ivy.—Pliny speaking of the Indian fig-tree, says its leaves are of the width of the Amazonian *pelta*.—Servius on the *Aeneid* says, the *pelta* resembled the moon in her first quarter.

PELVIS, in anatomy, the lower part of the cavity of the abdomen; thus called from its resemblance to a basin, or ewer, called in Latin *pelvis*.

The *pelvis* is always much larger in women than in men, to give room for the growth, &c. of the fetus.

It is well fortified with bones, to screen the contents from external injuries.—The ossa ilia, coxendicis, pubis, and the sacrum, comprehend or inviron the *pelvis*.

PELVIS of the kidneys, is a large membranous sinus, or cell in the concave part of the kidneys.—See *Tab. Anat.* (Splanchn) fig. 4. litt. c. d. &c.

From the twelve papillæ of the kidneys there arise twelve canals, called *stylule membranaceæ*. These at length are collected into three large branches, which being at last united into one, form the *pelvis*; and this again, contracting itself, terminates in a membranaceous pipe, called the *ureter*.

The urine, then separated from the blood by the urinary pipes, conveyed to them by the papillæ, and taken up by the stylule membranaceæ, is brought into the *pelvis*, and thence is discharged into the ureter, thence into the bladder, &c. See **URINE**.

PEN, according to Camden, originally signifies a high mountain, which was thus called among the ancient Britains, and even the Gauls.—And hence that tall range, which parts Italy and France, is called *apennines*.

PEN, is also a little instrument, usually formed of a quill, and serving to write withal.

Dutch Pens, are those made of quills, which have been passed through hot ashes, to take off the grosser fat and moisture thereof.

Fountain PEN. See the article **FOUNTAIN pen**.

PEN slock, a sort of sluice or flood-gate placed in the water of a mill-pond, or the like, to retain or let it go at pleasure.

PENAL action. See the article **ACTION**.

PENALTIES negative. See the article **NEGATIVE**.

PENANCE, **POENITENTIA**, is properly the exercise of penitence; and may be defined a punishment, either voluntary, or imposed by legal authority, for the faults a person has committed.

The Romanists define *penance*, a sacrament wherein a person who has the requisite dispositions, receives absolution at the hands of the priest, of all sins committed since baptism.

To a legitimate *penance* they require three things, contrition, abolition, and satisfaction.

Their priests receive a power of administering the sacrament of *penance*, when they receive the priesthood; but to exercise this power, it is required they have the jurisdiction of an ordinary, i. e. that they have a benefice, either original or delegated; with the approbation of the bishop to hear confessions.

PENANCE is particularly used in the Romish church, for the penalty which a confessor imposes, for satisfaction of the sins whereof a person is absolved.

The ancient discipline, Du Pin observes, was very severe on the head of *penance*; for great crimes people were excluded the communion of the church, expelled the assemblies of the faithful, obliged to fast, and to mortify themselves publicly, even at the church door, cut their hair, go always on foot, &c.

He adds, that those who had done public *penance*, were never admitted into the clergy; and that public *penance* was never granted more than once. Those who fell a second time were never to be reconciled to the church, and were to look for pardon only at the hands of God.

PENANCE, in our canon-law, is an ecclesiastical punishment, chiefly adjudged to the sin of fornication.

The punishment is thus prescribed by the canons: the delinquent is to stand in the church porch on some Sunday bare head and bare foot, in a white sheet, with a white wand in his hand; here bewailing himself, and begging every one to pray for him, then to enter the church, falling down, and kissing the ground; and at last to be placed on an eminence in the middle of the church, against the minister, to declare the foulness of his crime, odious to God, and scandalous to the congregation.

If the crime be not notorious, the canons allow the punishment to be commuted at the parties request, for a pecuniary mulct, for the benefit of the poor, &c.

PENATES, in the ancient mythology, a term applied to all the domestic gods, whom the ancients adored in their houses: whence they are ordinarily confounded with the lares. See **LARES**.

Authors are not at all agreed about the origin of the *dii penates*, who were properly the tutelary gods of the Trojans, and were only adopted by the Romans, who gave them the title of *penates*.

De

PEN

De Meziriac, in his notes on Dido's epistle to Æneas, relates at large what he has met withal in the ancient writers on this subject: Dionysius Halicarnassus tells us, that Æneas first lodged these gods in the city Lavinium; and that his son Ascanius, afterwards, upon building the city Alba, translated them thither; but that they returned thence miraculously to Lavinium. The same author adds, that in Rome there is still seen a dark temple, shaded by the adjacent buildings, wherein are the images of the Trojan gods, with the inscription *Penates*, which signifies *Penites*.

These images represent two young men sitting, each of which holds a lance. I have seen, adds Dionysius, several other statues of the same gods in ancient temples; who all appear like young men dressed in a habit of war.

Varro fetches these *Penates* from Samothrace to Phrygia, to be afterwards transported by Æneas into Italy.—Macrobis, who relates this from Varro, adds also, that they were called *Penates* from the Latin words *per quos penitus spiramus*, which seems a mere subtilty. But the real etymology must be sought in the Phrygian, not the Latin tongue.

Cicero, in Aulus Gellius, derives the name hence, *quod penes nos nasci junt*. Yet in his book *de Nat. Deor.* he says, it is formed from *penis*, provision; or, perhaps, adds he, *quod penitus insident*; others say, *quic clement in penatibus*.

Romulus distinguishes among the *Penates*: he makes an order of *Penates* of the heavens, such as Pallas in the ethereal region, Jupiter in the middle region, and Juno in the lowest; besides, *Penates* of cities, *Penates* of private families, &c.—On which footing the *dii penates* were the guardian or tutelary gods of every thing.

It is a popular question among the learned, who were the *Penates* of Rome? some say Vesta, others Neptune and Apollo; Vives says Castor and Pollux, with whom agrees Vossius, who adds, that the reason for their chusing Castor and Pollux in quality of *Penates*, might be the important service they did the Romans in the war against the Latins.

Nor are authors more unanimous on the subject of the *Penates*, which Æneas brought into Italy. Some say they were Neptune and Apollo who built the walls of Troy; others Jupiter, Juno, and Minerva; and others Cælus and Terra.

PENCIL, *Peter-PENCE*. See the article *PETER-PENCE*.

PITCHING-PENCE. See the article *PITCHING-PENCE*.

PENCIL*, an instrument used by painters, for the application of their colours.

* The word comes from the Latin *peniculus*, *penicillus*, or *penicillum*, which signify the same, formed by diminution of *penis*.

There are *Pencils* of various kinds, and made of various matters: the most usual are of badgers and squirrels hair, those of swans-down, and those of boars bristles; which last are bound on to a stick bigger, or less, according to the uses they are destined for; and when large, are called *brushes*.—The others are inclosed in the barrel of a quill.

The ancients, M. Felibien observes, had *Pencils* made of little pieces of sponge; whence, doubtless, the story of the painter, who, not able to express the foam of a Horse, succeeded by throwing the sponge at the picture.

PENCIL case. See the article *PORT crayon*.

PENCIL of rays, in optics, is a double cone, or pyramid of rays, joined together at the base; one of which hath its vertex in some point of the object, and has the crystallin humour, or the glass GLS (*Tab. Opticks*, fig. 39.) for its base; and the other has its base on the same glass, or crystallin, but its vertex in the point of convergence; as at C. See *RAY*, &c.

Thus BGSC is a *Pencil* of rays; and the line BLC is called the axis of that *Pencil*. See *AXIS* and *RAY*.

Optic PENCIL. See the article *OPTIC*.

PENDANT, *Ear-ring*, an ornament, of some precious matter, wore by the ladies; hung by a hole made for that purpose through the ear; and frequently enriched with diamonds, pearls, and other precious stones.

The *Pendants* of the European ladies are nothing in comparison with those wore by the East-Indians, both men and women; among whom it is the fashion to lengthen out the ears, and to enlarge the hole, by putting in *Pendants* of the size of saucers, set with stones.

The queen of Calicut, Pyrrard tells us, and other ladies of her court, have their ears, by this means, weighed down as low as their breasts, and even lower; imagining this a main point of beauty; and the holes in them were large enough to pass the fist through.

The Moncois, who are the common people there, are not allowed to wear their ears so long as the Naires, who are the Nobility; three fingers length are the utmost stretch allowed the former.

In the West-Indies, Columbus named a certain coast Oreja, by reason he found people with holes in their ears big enough to pass an egg through.

They make holes too in their lips and nostrils, and hang *Pendants* at them: which is also practised by the Mexicans and other nations.

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PEN

PENDANT, in heraldry, a term applied to the parts hanging down from the label, to the number of three, four, five, or fix at most.—These must be specified in blazoning, when there are more than three.—They resemble the drops at the bottom of the triglyphs in the dome freeze.

PENDANT barometer. See the article *BAROMETER*.

PENDANT feathers, in falconry, are those feathers, which grow behind the thighs of an hawk.

PENDANTS, among florists, a kind of globules growing on stamina, or chives. Such are those in the middle of tulips, lilies, &c. See *APICES* and *STAMINA*.

PENDANTS of a ship, are those long colours, or streamers, cut pointing towards the end, and there divided into two parts; hung out at the head of masts, or at the yard-arm ends.

The *Pendants* are chiefly used for shew, though sometimes for distinction of squadrons.—See *Tab. Ship*, fig. 1. n. 8c.

PENDANT, or *PENNANT*, is also used for a short rope, which at one end is fastened to the head of the mast, or to the yard, or the clew of the sail, and at the other end, hath a block and shiver, to reeve some running rope into.

The *Pendant* of the tackle is made fast to the head of the mast; and the *Pendants* of the back-stays are fastened to and hang down on the inside of the shrouds.—All the yard-arms, except the mizen, have of these *Pendants*, into which the braces are reeved.

PENDENTIVE, in architecture, the whole body of a vault, suspended out of the perpendicular of the walls, and bearing against the arc-boutants.

Daviler defines it, a portion of a vault between the arches of a dome, usually enriched with sculpture: Felibien, the plane of the vault contained between the double arches, the forming arches, and the ogives.

The *Pendentives* are usually of brick, or soft stone; but care must be taken that the joints of the masonry be always laid level, and in right lines proceeding from the sweep whence the rise is taken.

The joints too must be made as small as possible, to save the necessity of filling them up with slips of wood, or of using much mortar.

PENDULOUS, *hanging down*; a name which botanists give to those heads of flowers which hang downwards; the stalk not being able to sustain them upright.

PENDULUM, in mechanicks, any heavy body so suspended as that it may vibrate, or swing backwards and forwards, about some fixed point, by the force of gravity.

The vibrations, or alternate ascent and descent, of the *Pendulum*, are called its *oscillations*. See *OSCILLATION*.—The point on which it vibrates, is called the *center of suspension or motion*. See *CENTER* and *SUSPENSION*.—And a right line passing through the center, parallel to the apparent horizon, is called the *axis of oscillation*.

The vibrations of a *Pendulum* are all isochronal, or affected in spaces of time perfectly equal.

And hence the *Pendulum* becomes the most accurate chronometer, or instrument for measuring time, in the world.

Hence also its vibrations are proposed as an invariable and universal measure of lengths for the most distant countries and ages.

For a vibration being once found precisely equal to a second of time of the sun's mean motion; if *v. gr.* the horary foot (as M. Huygens calls the third part of his second *Pendulum*) compared to the English standard foot, be as 392 to 360; it will be easy, by calculation, to reduce all the other measures of the world to these feet; the lengths of *Pendulums*, reckoned from the point of suspension, to the center of the ball, being to each other, as the squares of the times wherein the several oscillations are performed; and therefore reciprocally are the squares of the numbers of oscillations performed in the same time.—On this same principle, M. Mouton, canon of Lyons, has a pretty treatise, *de mensura posteris transmittenda*.

M. Huygens lays down the length of a *Pendulum* that shall swing seconds, to be three feet, three inches, and two tenths of an inch; according to Sir J. Moor's reduction; which agrees perfectly with M. Mouton's *Pendulum* eight inches one tenth long, to vibrate one hundred and thirty two times in a minute: so that this may safely be relied on as a true measure.—Note, the lengths of *Pendulums* are usually measured from the centre of motion. The first who observed this noble property, the isochronism of *Pendulums*, and made use thereof in measuring time, Sturmius tells us, was Ricciolus; after him Tycho, Langrenus, Wendelme, Melenne, Kircher, and others, hit on the same thing; though without any intimation of what Ricciolus had done.—Huygens first applied the *Pendulum* to clocks.

Pendulums are either *simple* or *compound*.

Simple PENDULUM, is that consisting of a single weight, as A, considered as a point, and an inflexible right line, as AC, considered as void of gravity, suspended on a centre C, and voluble about it. *Tab. Mechanicks*, fig. 36.

Compound PENDULUM, is that which consists of several weights,

so fixed as to retain the same distance both from one another, and from the centre about which they vibrate.

Doctrine and Uses of PENDULUMS.—1^o A *Pendulum* raised to B, through the arch of the circle BA; will fall, and again rise, through an equal arch, to a point equally high, D, and thence will fall to A, and again rise to B; and thus continue rising and falling reciprocally for ever.

For suppose H I a horizontal line, and B D parallel thereto; if the ball A, which we here consider as a point, be raised to B; the line of direction BH, being perpendicular from the centre of gravity B to the horizontal line H I, falls without-side the base, which is in the point C.—The ball therefore cannot rest, but must descend.

But being retained by the thread BC, from falling perpendicularly through BH; it will fall through the arch BA. Consequently, when the centre of gravity arrives at the bottom; A has the same force, it would have acquired in falling from K; and will therefore be able to rise equally high as if it had, *i. e.* in descending through the first half of its vibration, it acquires a velocity by the continual acceleration of its fall: and as this velocity is always proportionable to the height whence it falls, as being in some measure the effect thereof; it is still able to make it remount to the same height, supposing, according to the system of Galileo, that the velocities are always the square roots of the heights.

Since then the thread prevents the *Pendulum* going off in the tangent AI, it must ascend through the arch AD, equal to that AB.

All the force therefore which it had acquired by falling, being exhausted; it will return by the force of gravity through the same arch AD, and again will rise from A to B; and thus for ever.

Experience confirms this theorem, in any finite number of oscillations; but if they be supposed infinitely continued, there will arise a difference. For the resistance of the air, and the friction about the centre C, will take off part of the force acquired in falling; whence it will not rise precisely to the same point whence it fell.

Thus the ascent continually diminishing; the oscillation will be at last stopped, and the *Pendulum* will hang at rest.

2^o If the simple *Pendulum* be suspended between two semi-cycloids CB and CD (*Tab. Mechanicks, fig. 37.*) whose generating circles have their diameter CF equal to half the length of the thread CA; so as the thread in oscillating be wound about them; all the oscillations, however unequal in space, will be isochronal, or performed in equal times; even in a resisting medium.

For since the thread of the *Pendulum* CE, is wound about the semi-cycloid BC; the centre of gravity of the ball E, which is here considered as a point, by its evolution, will describe a cycloid BEAD; as is shewn from the doctrine of infinites; but all ascents and descents in a cycloid are isochronal, or equal in time: therefore the oscillations of the *Pendulum* are also equal in time. See CYCLOID.

Hence, if with the length of the *Pendulum* CA, a circle be described from the centre C; since a proportion of the cycloid near the vertex A, is almost described by the same motion; a small arch of the circle will almost coincide with the cycloid.

In little arches of a circle, therefore, the oscillations of *Pendulums* will be isochronal as to sense; however, unequal in themselves; and their ratio to the time of perpendicular descent through half the length of the *Pendulum*, is the same with that of the circumference of a circle to its diameter.

Hence, also, the long *Pendulums* are, that oscillate in arches of a circle; and the *small* oscillations are isochronal; which agrees with experiment: for in two *Pendulums* of equal lengths, but oscillating in unequal arches, provided neither arch be very great, you will scarce discern any inequality in an hundred oscillations.

Hence, also, we have a method of determining the space which a heavy body, falling perpendicularly, passes over in a given time. For the ratio which the time of one oscillation has to the time of the fall through half the length of the *Pendulum*, being thus had; and the time wherein the several vibrations of any given *Pendulum* being found; we have the time of the fall through half the length of the *Pendulum*. And hence may collect the space it will pass over in any other time.

The whole doctrine of *Pendulums* oscillating between two semi-cycloids, both theory and practice, we owe to the great Huygens; who first published the same in his *Horologium Oscillatorium sive demonstrationes de motu pendulorum, &c.*

3^o The action of gravity is less in those parts of the earth where the oscillations of the same *Pendulum* are slower, and greater where they are swifter.

For the time of oscillation in the cycloid, is to the time of perpendicular descent through the diameter of the generating circle, as the periphery of the circle to the diameter.

If then the oscillations of the same *Pendulum* be slower, the per-

pendicular descent of heavy bodies is likewise slower, *i. e.* the motion is less accelerated, or the force of gravity is less: and conversely.

Hence, as it is found by experiment, that the oscillations of the same *Pendulum* are slower near the equator, than in places less remote from the pole; the force of gravity must also be less towards the equator than towards the poles. And consequently the figure of the earth is not a just sphere, but a spheroid.

This M. Richer found by an experiment made in the island Cayenna, about four degrees from the equator; where a *Pendulum* 3 foot, 8 lines $\frac{2}{3}$ long, which at Paris vibrates seconds, was to be shortened a line and a quarter to reduce its vibrations to seconds.

M. des Hayes, in a voyage to America, confirms the observation of Richer; but adds, that the diminution established by that author, appears too little.

M. Couplet the younger, upon his return from a voyage to Brazil and Portugal, falls in with M. des Hayes, as to the necessity of shortening the *Pendulum* towards the equator more than Richer has done. He observed, that even at Lisbon the *Pendulum* which swings seconds, must be two lines $\frac{1}{2}$ shorter than that of Paris; which is shorter than that of Cayenna, as fixed by Richer; though Cayenna be in 24 degrees less latitude than Lisbon.

The truth is, this diminution does not proceed regularly: Meff. Picart and de la Hire, found the length of the *Pendulum* which beats seconds exactly the same at Bayonne, at Paris, and at Uranibourg in Denmark, though the first be in 43 $\frac{1}{2}$ of latitude, and the last in the latitude 55 $\frac{3}{4}$.

Hence M. de la Hire takes occasion to suspect that the diminution is only apparent; and that *i. gr.* the iron yard, where-with M. Richer measured his *Pendulum*, might be lengthened by the great heats of the isle of Cayenna; not the *Pendulum* shortened by the approach towards the line.

To confirm this, he tells us he found, by very careful experiments, that an iron bar, which expoled to the frost was six foot long; was lengthened $\frac{3}{4}$ of a line by the summer's Sun.

4^o If two *Pendulums* vibrate in similar arches, the times of the oscillations are in the subduplicate ratio of their lengths.

Hence the lengths of *Pendulums* vibrating in similar arches, are in a duplicate ratio of the times wherein the oscillations are performed.

5^o The numbers of isochronal oscillations performed in the same time by two *Pendulums*, are reciprocally as the times wherein the several oscillations are performed.

Hence the lengths of *Pendulums* vibrating in similar and small arches, are in the duplicate ratio of the numbers of oscillations performed in the same time, but reciprocally taken.

6^o The lengths of *Pendulums* suspended between cycloids, are in a duplicate ratio of the times wherein the several oscillations are performed.

And hence they are in a duplicate ratio of the numbers of oscillations performed in the same time, but reciprocally taken: and the times of oscillations in different cycloids are in a subduplicate ratio of the lengths of the *Pendulums*.

7^o To find the length of a *Pendulum*, which shall make any assigned number of vibrations in any given time.

Let the number of vibrations required be 50 in a minute, and the length of the string, counted from the point of suspension, to the centre of oscillation, or round ball at the end of it be required: it is a fixed rule that the lengths of *Pendulums* are to each other, as the squares of their vibrations and contrariwise: now it is agreed that a *Pendulum* vibrating seconds (or 60 times in a minute) is 39 inches, and $\frac{1}{2}$ of an inch; say therefore as the square of 50 (which is 2500) to the square of 60, which is 3600 so is 39, 2, to the length of the *Pendulum* required: which will be found 56 inches $\frac{1}{2}$.

Note, in practice, since the product of the mean time will always be 1411200 (that is the product of the square of 60, multiplied by 39, 2) that is 3600 \times 39, 2. you need only divide that number by the square of the number of vibrations assigned; and the quotient will give the length of a *Pendulum*, which shall vibrate just so many times in a minute.

8^o The length of a *Pendulum* being known, to find the number of vibrations it will make in a given time.

This being the reverse of the former; say, as the length given, suppose 56, 4, is to the length of the standard *Pendulum* swinging seconds, *viz.* 39, 2; so is the square of the vibrations of the standard *Pendulum* in the given time, *v. gr.* a minute, to the square of the vibrations sought: that is, as 56, 4 : 39, 2 :: 3600 : 2500.—And the square root of 2500, will be 50, the number of vibrations sought.

But for use, here, (as in the former problem) you need only divide 1411200 by the length; and it gives the square of the vibrations; as there you divided by the square of the vibrations to find the length.

On these principles, Mr. Derham has constructed a table of the vibrations

PEN

vibrations of *Pendulums* of different lengths in the space of a minute.

Pend. length in inches.	vibrat. in a Minute.	Pend. length in inches.	vibrat. in a Minute.
1	375.7	30	68.6
2	265.6		
3	216.9	39.2	68.0
4	187.8		
5	168.0	40	59.5
6	153.3	50	53.1
7	142.0	60	48.5
8	132.8	70	44.9
9	125.2	80	42.0
10	118.8	90	39.6
20	84.0	100	37.5

Note, These laws, &c. of the motion of *Pendulums* can scarce hold strictly, unless the thread that sustains the ball, be void of weight, and the gravity of the whole weight be collected in a point.

In practice, therefore, a very fine thread, and a small ball, but of a very heavy matter, are to be used. A thick thread, and a bulky ball, disturb the motion strangely; for in that case, the *Pendulum*, of simple, becomes compound; it being much the same as if several Weights were applied to the same inflexible rod in several places.

The use of *Pendulums* in measuring time in astronomical observations, and on other occasions where a great degree of preciseness is required, is too obvious to need a description. Either the length of the *Pendulum* may be adjusted before its application, and made to vibrate the desired time, *v. gr.* seconds, half-seconds, &c. by article VI. or it may be taken at random, and the times of the vibrations afterwards determined from article VIII.

For the use of the *Pendulum* in measuring remote inaccessible distances, &c. by means of sound, &c. See SOUND.

PENDULUM Clock, a clock which derives its motion from the vibration of a *Pendulum*.

It is controverted between Galileo and Huygens, which of the two first applied the *Pendulum* to a clock. For the pretensions of each, see CLOCK.

After Huygens had discovered that the vibrations made in arches of a cycloid, however unequal they were in extent, were all equal in time; he soon perceived that a *Pendulum* applied to a clock, so as to make it describe arches of a cycloid, would rectify the otherwise unavoidable irregularities of the motion of the clock; since, though the several causes of those irregularities should occasion the *Pendulum* to make greater or less vibrations; yet, in virtue of the cycloid, it would still make them perfectly equal; and the motion of the clock, governed thereby, would therefore be preserved perfectly equable.

But the difficulty was to make the *Pendulum* describe arches of a cycloid; for, naturally, the *Pendulum* being tied to a fixed point, can only describe arches of circles about the same.

Here M. Huygens hit on a secret which all the world is now the better for: the iron rod or wire which bears the bob or bottom, he tied at the top to a filken thread, placed between two cycloidal cheeks, or two little arches of a cycloid, made of metal. Hence the motion of vibration, applying incessantly from one to the other of those arches, the thread, which is extremely flexible, easily assumes the figure thereof; and by means hereof it is demonstrated, that the weight suspended at the other end of the rod, will describe a just arch of a cycloid.

This is doubtless one of the most useful and ingenious inventions many ages have produced: by means whereof, we have clocks which will not err a single second in several days.

It is true, the *Pendulum* is still liable to its irregularities, how minute soever they may be; and M. de la Hire thinks there is still room to improve it.

The silk thread by which it is suspended, he observes, shortens in moist weather, and lengthens in dry; by which means the length of the whole *Pendulum*, and consequently the times of the vibrations, are somewhat varied.

To obviate this inconvenience, M. de la Hire, in lieu of a silk thread, used a little fine spring; which was not indeed subject to shorten and lengthen; but which he found grew stiffer in cold weather, and then made its vibrations faster than in warm.

He had therefore recourse to a stiff wire or rod, firm from one end to the other. Indeed, by this means he renounced the advantages of the cycloid; but he found, as he says, by experience, that the vibrations in arches of circles are performed in times as equal, provided they be not of too great extent, as those in cycloids. But the experiments of Sir J. Moor and others, have demonstrated the contrary.

The ordinary causes of the irregularities of *Pendulums*, Mr. Derham ascribes to the alterations in the gravity, and tempera-

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ture of the air; which increase and diminish the weight of the ball, and by that means make the vibrations greater and less: an accession of weight in the ball being found by experiment to accelerate the motion of the *Pendulum*.

A weight of six pound added to the ball, Mr. Derham found, made his clock gain 13 seconds every day.

A general remedy against the inconveniences of *Pendulums*, is to make them long, the bob heavy, and to vibrate but a little way: this is the usual means in England; the cycloidal cheeks being generally overlooked.

To correct the motion of *PENDULUM* clocks; the usual method is to screw and let down the ball; but a very small alteration here having a very great effect, Mr. Derham prefers Huygens's method, which is to have a small weight or bob to slide up and down the rod above the ball, which is to be immovable: though he improves on the method, and recommends having the ball to screw up and down, to bring the *Pendulum* near its gage; and the little bob to serve for the nicer corrections, as the alteration of a second, &c.

Mr. Huygens orders the weight of this little corrector to be equal to that of the wire, or 50th of that of the great ball; he adds a table of the alterations the several shiftings thereof will occasion in the motion of the *Pendulum*; wherein it is observable, that a small alteration towards the lower end of the *Pendulum*, makes as great an alteration in time, as a greater rising or falling does when higher.

PENDULUM Royal, a name given among us to a clock, whose *Pendulum* swings seconds, and goes eight days; shewing the hour, minute, and second.

The numbers of such a piece are thus calculated; first cast up the seconds in twelve hours, and you will find them to be $43200 = 12 \times 60 \times 60$. The swing wheel must be 30 to swing 60 seconds in one of its revolutions: now let $\frac{1}{2} 43200 = 21600$ be divided by 30, and you will have 720 in the quotient, which must be broken into quotients; the first of them mu- 12 for the great wheel which moves round once in twelve hours. 720 divided by 12, gives 60 8) 96 (12 which may also be conveniently broken into two quotients, as 10 and 6, or 5 and 12, or 8 and 7 1; 8) 64 (8 which last is most convenient: and if you take all your pinions 8, the work will stand thus. 30

According to this computation, the great wheel will go about once in twelve hours, to shew the hour; the second wheel once in an hour, to shew the minutes; and the swing wheel once in a minute, to shew the seconds. See CLOCKWORK.

PENDULUM level. } See the articles { LEVEL.
PENDULUM watch. } WATCH.

PENETRABILITY. See the article IMpenetrability.

PENETRATION, **PENETRATIO**, the act whereby one thing enters another, or takes up the place already possessed by another.

The schoolmen define *Penetration* the co-existence of two or more bodies, so, as one is present, or has its extension in the same place as the other.

Philosophers hold the *Penetration* of bodies absurd, *i. e.* that two bodies should be at the same time in the same place: and accordingly, impenetrability is laid down as one of the essential properties of matter.

What we popularly call *Penetration*, only amounts to the matter of one body's being admitted into the vacuity of another. Such is the *Penetration* of water through the substance of gold. See GOLD.

PENICILLA *, in pharmacy, a lozenge; or form of medicine made round by rolling. See LOZENGE.

* It is thus called from *penicillus*, a Pencil, which it is supposed to resemble in shape.

PENICILLUS, among churgeons, is used for a tent, to be put in wounds or ulcers. See TENT.

PENIDIUM, in pharmacy, *barly sugar*; a preparation of sugar, made by boiling it up with a decoction of barley, till it become brittle; which done, it is turned out upon a marble anointed with oil of sweet almonds, and kneaded with the hands like paste; and while yet hot, drawn out into sticks twisted like cords.

Penidia are good against colds, to moderate the acrimonies of the breath, and to promote expectoration, &c.

Dr. Quincy uses the word *Penidium*, for a kind of clarified sugar, with a mixture of starch, made up into little lumps.

PENINSULA *, in geography, a portion, or extent of land, joining to the continent by a narrow neck or isthmus; the rest being encompassed with water.

* The word is compounded of the Latin, *penes* and *insula*, *q. d.* almost island, which the French pertinently enough render *pres-que isle*.

Such is Peloponnesus, or the Morea; such also are Africa, Judand, &c.

Peninsula is the same with what is otherwise called *Cheersonesus*. See CHERSONESUS.

PENIS, in anatomy, a part of the body, called also the *yard*; and

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and by the way of eminence the *member*, or *cirile member*, as being one of the principal organs of generation in the male kind.—See *Tab. Anat. (Splanchn)* fig. 1. litt. z. fig. 8. litt. e b, &c. fig. 10. litt. d. fig. 15. litt. e e. n n. (Angiol.) fig. 1. n. 67.

It is fastened to the lower part of the os pubis, and the upper part of the ilion: its body consists of the two corpora cavernosa, the corpus cavernosum urethrae, and the urethra itself.

The *corpora cavernosa* of the penis, called also *corpora nervosa* & *spongia*, &c. have two distinct origins in the os pubis; whence they proceed, growing both in bulk and thickness, till they meet the corpus cavernosum of the urethra, where they join; leaving an interstice or channel for its passage along them; and thus they continue their progress, connected together by a membranous body called the *septum*, and terminating at length in the glans.

The *cavernous body* of the urethra, includes the urethra or urinary passage. Its form, contrary to that of the other cavernous bodies, is largest at the two extremes, and smallest in the middle. That part included between the two origins of the cavernous bodies of the penis, Mr. Cowper calls the *bulb* of the urethra: its other extremity being dilated, forms the body called the *glans*.

The Penis receives arteries from the internal iliac branches, and umbilical arteries; and these at length subdividing into innumerable branches, from the capillary extremities thereof arise so many veins, in whose channels are apertures corresponding to so many cells, which communicating with each other, empty themselves into larger venous ducts, running on the superior surface of the Penis: some whereof join the veins of the prepuce; others make one large trunk, called *vena Penis*, which marching on the dorsum Penis to the prostates, there divides and enters the internal iliac on either side.

The Penis has nerves from a trunk composed of a coalescence of the third of the os sacrum, and a branch of the great crural: these ascending the cavernous bodies, expand themselves over the upper surface thereof, and are thence distributed to all parts of the Penis.

It has lymphaducts very numerous on its surface under the skin, which discharge themselves into the glandulae inguinales. See SEED and URINE.

The Penis has two pair of muscles, and an odd one; the odd muscle is called *accelerator urinae*: its upper part, which covers the bulb, serves to freighten the veins passing through it from the corpus cavernosum of the urethra, and thus hinders the reflux of the blood in erection; and by repeated contractions, drives the blood into the bulb toward the glans. Its elongation serves also to compress the channel of the urethra, and to force out the contained seed or urine.

The first pair of muscles are called the *erectores Penis*. By their action the Penis is sustained, and drawn towards the pubes; and by the assistance of the suspensory ligament of the Penis, the *vena Penis* is applied to the transverse ligament of the ossa pubis, and the reflux blood hindered from passing that way; whereby the corpora cavernosa become distended.

The last pair of muscles are the *transversales Penis*, which vary in various subjects, and are sometimes wanting: their use is to dilate that part of the cavernous body of the urethra, to which they are fastened.

The Penis has also three glands, first discovered by Mr. Cowper; that all empty themselves into the urethra, and from the tenacity of the liquor they separate, are called the *mucous glands*.

The whole compages of the Penis is invested with a cellule membrane, of admirable texture; which again is covered with a thin nervous coat; and that with a cuticula and cutis: the duplication of the cutis on the glans, makes the prepuce.

It is tied to the lower part of the glans by a ligament called the *frenum*. By another ligament, called *suspensorium*, the Penis is held up to the ossa pubis.

The use of the Penis is for evacuating the seed, and urine.—Indeed Dr. Drake, from a view of its structure, thinks it originally intended for the former only; and that the conveyance of the urine was not considered by nature in the mechanism of this part.

He adds another use, viz. the incitement to venery, and the propagation of the species.—In effect, without such an instrument, the seed of the most perfect animals could not be conveyed to the place of procreation: add to this, that an alternation of erection and flaccidity is absolutely necessary; the first for the performance of its office, the second for the security of the part.

Without an erection, it were impossible to emit and lodge the seed where it ought to be; and with a constant one, it would be almost as impossible to secure the part from injuries: not to mention the loss of infirmation, which would be the consequence of constant erection.

The cause of the erection of the Penis is the blood distending the corpora cavernosa; as is evident from many experiments;

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among the rest, from tying the Penis of a dog in coitu, in which nothing is found but blood. And hence, in the bodies of criminals that hang long after death, the Penis becomes erected, by the blood's falling to the inferior parts, and stopping there.—The cavernous body of the urethra is erected by the muscular accelerators, embracing the veins of its bulb.

PENITENCE, POENITENTIA, is sometimes used for a state of repentance, and sometimes for the act of repenting. See REPENTANCE and IMPENITENCE.

PENITENCE is also used for a discipline, or punishment attending repentance; more usually called *Penance*. See Penance.

PENITENCE, also gives the title to several religious orders, consisting either of converted debauchees, and reformed prostitutes; or of persons who devote themselves to the office of reclaiming them. Of this latter kind is the

Order of PENITENCE of St. Magdalen, established about the year 1272, by one Bernard, a citizen of Marseilles, who devoted himself to the work of converting the courtizans of that city.

Bernard was seconded by several others; who forming a kind of society, were at length erected into a religious order by pope Nicholas III. under the rule of St. Augustin.

F. Gelnay adds, that they also made a religious order of the Penitents, or women they converted, giving them the same rules and observances which they themselves kept.

Congregation of PENITENCE of St. Magdalen at Paris, owed its rise to the preaching of F. Tisseran, a Franciscan, who converted a great number of courtizans about the year 1492. Louis, duke of Orleans gave them his house for a monastery; or rather, as appears by their constitutions, Charles VIII. gave them the Hotel, called *Boisignies*, whence they were removed to St. George's chapel in 1572. By virtue of a brief of pope Alexander; Simon, bishop of Paris, in 1497, drew them up a body of statutes, and gave them the rule of St. Augustin.

To qualify a woman for admission, it was required that she had committed the sin of the flesh.—None were admitted who were above 35 years of age.

Till the beginning of the last century, none but Penitents were admitted; but since its reformation by Mary Alvequin, in 1616, none have been admitted but maids; who, however, still retain the ancient name Penitents.

PENITENTS, an appellation given to certain fraternities, or societies of persons who assemble together for prayers, make processions bare-footed, their faces covered with linen, and give themselves discipline, &c.

There are *coibite Penitents* in Italy, at Avignon, and at Lyons.—There are also *blue Penitents*, and *black Penitents*, which last assist criminals at their death, and give them burial.

Mabillon tells us, that at Turin there are a set of Penitents kept in pay, to walk through the streets in procession, cut their shoulders with whips, &c.

PENITENTS, or converts of the name of Jesus, a congregation of religious at Seville, consisting of women, who had led a licentious life: founded in 1550.

This monastery is divided into three quarters: one for professed religious; another for novices; a third for those under correction.

When these last give signs of a real repentance, they are removed into the quarter of the novices, where, if they do not behave themselves well, they are remanded to their correction. They observe the rule of St. Augustin.

PENITENTS of Orvieto, are an order of nuns, instituted by Anthony Simoncelli, a gentleman of Orvieto.—The monastery he built, was at first destined for the reception of poor girls, abandoned by their parents, and in danger of losing their virtue.

In 1662, it was erected into a monastery, for the reception of such as, having abandoned themselves to impurity, were willing to take up and consecrate themselves to God by solemn vows.—Their rule is that of the Carmelites.

These religious have this in peculiar, that they undergo no noviciate. All required is, that they continue a few months in the monastery in a secular habit; after which they are admitted to the vows.

PENITENTIAL, POENITENTIALE, an ecclesiastical book, retained among the Romanists, wherein is prescribed what relates to the imposition of penance, and the reconciliation of Penitents. See Penance and PENITENCE.

In the capitulars of Charlemaign, the priests are enjoined to study well their Penitential.—There are various Penitentials; the Roman Penitential, that of venerable Bede, that of pope Gregory III. &c.

PENITENTIARY, POENITENTIARIUS, an office, or tribunal in the court of Rome; wherein are examined and delivered out the secret bulls, graces, or dispensations relating to conscience, confession, &c.

The expeditors of the Penitentiary are sealed up with red wax, and sent clove; directed to the confessors.

PENITENTIARY is also an officer, or dignity, in some cathedrals, vested with power from the bishop to absolve cases referred to him; on which account he is also called the *bishop's ear*.

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In some places there is a *grand-penitentiary*, and a *sub-penitentiary*. Anathasius says, that pope Simplicius chose some among the Roman priests to preside over penances.

At present the pope has his *grand Penitentiary*, who is a cardinal and the chief of the other *penitentiary* priests established in the patriarchal churches of Rome, who consult him in all difficult cases.

He presides in the *Penitentiary*, dispatches dispensations, absolutions, &c. and has under him a regent, and twenty four proctors, or advocates of the sacred *Penitentiary*.

PENNA. See the article PINNA.

PENNATA *folia*, winged leaves, among botanists, are such leaves of plants, as grow directly one against another, on the same rib or stalk : as those of ash, walnut-tree, &c.

PENNON, or PENON, a standard with a long tail, anciently belonging to a simple gentleman ; properly used as a guidon, to place over a tent.

It is opposed to the *banner*, which was square ; and hence, when any one was to be made a banneret, the ceremony consisted in cutting off the tail of his *Pennon*, and thus converting it into a banner.

PENNY, or PENY *, in commerce, an ancient English coin, which had formerly considerable course ; but is now dwindled into an imaginary money, or money of account.

* Camden derives the word from the Latin *Pecunia*, money. See PECUNIA.

The ancient English *Penny*, *Penig*, or *Penig*, was the first silver coin struck in England ; nay, and the only one current among our Saxon ancestors ; as is agreed by Camden, Spelman, Dr. Hicks, &c.

The *Penny* was equal in weight to our three-pence ; five of them made one shilling, or filling faxon ; and thirty a mark or mancuse, equal to our 7s. 6d.

Till the time of king Edward I. the *Penny* was struck with a cross so deeply indented in it, that it might be easily broke, and parted, on occasion, into two parts ; thence called *half-pennies* ; or into four, thence called *fourthings*, or *farthings*.—But that prince coined it without indenture ; in lieu of which he first struck round half-pence and farthings.

He also reduced the weight of the *Penny* to a standard ; ordering that it should weigh thirty two grains of wheat, taken out of the middle of the ear.—This *Penny* was called the *Penny sterling*.—Twenty of these pence were to weigh an ounce ; whence the *Penny* became a weight, as well as a coin.

The *Penny sterling* is now nigh dissolved as a coin ; and scarce subsists, but as a money of account, containing the twelfth part of a shilling, or the two hundred and fourtieth part of a pound.

The course of exchange between England and France, is settled on the foot of so many pence sterling, for a French crown of three livres.

The French *Penny*, or *denier*, is of two kinds ; the Paris *Penny*, called *denier Paris* ; and the *Penny* of Tours, *denier Tournais*. See DENIER.

The Dutch *Penny*, called *Penink*, is a real money, worth about one fifth more than the French *Penny Tournais*.—The *Penink* is also used as a money of account, in keeping books by pounds, florins and patards ; twelve *Peninks* make the patard ; and twenty patards the florin.

At Hambourg, Nuremberg, &c. the *Penny* or *Pfennig* of account, is equal to the French *Penny Tournais*. Eight of them make the *krieux* ; and sixty the florin of those cities ; and ninety the French crown, or 4s. 6d. sterling.

PENNY, in ancient statutes, &c. is used for all silver money.

And hence the *ward-penny*, *over-penny*, *hundred-penny*, *ribbing-penny*, and *brothal-penny*. See PENCE, &c.

BIRD half-PENNY

Half-PENNY

Rete PENNY

Schar PENNY

Ward PENNY

See the article

BIRD half-penny.

HALF-penny.

RETE penny.

SCHAR penny.

WARD penny.

PENNY-WEIGHT *, a Troy weight, containing twenty four grains ; each grain weighing a grain of wheat gathered out of the middle of the ear, well dried.

* The name took its rise hence, that this was actually the weight of one of our ancient silver pennies.

Twenty of these *penny-weights* make an ounce Troy. A *penny-weight* of gold bullion standard, is worth four shillings ; and of silver bullion, three-pence. See GOLD and SILVER.

PENNY POST. See the article PENNY-POST.

PENON. See the article PENNON.

PENSA *libra*, in our ancient customs, a pound of money paid by weight, not by tale.

PENSION, PENSIO, a yearly appointment, or sum of money paid any one for services, or considerations already paid.

That which in the two temples is called a *Parliament*, and in Lincoln's Inn a *Council*, is in Gray's-Inn termed a *Pension* ; viz.

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an assembly of the members of the society, to consult of the affairs of the house.

PENSIONS also denote certain annual payments of each member to the house, for certain occasions.

When a *Pension writ* is issued, none filed thereby in the inn of court shall be discharged, or permitted to come into commons, till all duties be paid.

Hence a *Pension order* in the same inn, is a peremptory order against such of the society as are in arrear for *Pensions*, and other duties.

PENSIONARY, or PENSIONER, a person who has a *Pension*, appointment, or yearly sum, payable during life, by way of acknowledgment ; charged on the estate of a prince, company, particular person, or the like.

In the Romish countries it is frequent to have *Pensions* on benefices : these were anciently granted with a great deal of ease, under pretence of infirmities, poverty, &c.—But since the XIII Century, these pretences were carried so far, that the incumbents, or titularies of benefices were little more than farmers.

This obliged the spiritual powers to fix the causes, and the quantities of *Pensions*.—*Pensions* are now only creatable by the pope ; and are never to exceed one third of the revenue ; two thirds being still to remain to the incumbent.

PENSIONARY, is also the appellation of the first minister of the states of the province of Holland.

The *Pensionary* is chairman in assemblies of the states of that province ; he proposes the matters to be consulted on, collects the votes, forms and pronounces the resolutions of the states ; he also opens letters, confers with foreign ministers, &c.

He is charged with inspecting the finances, preserving the rights of the province, maintaining the authority of the states, and seeing to the observation of the laws, &c. for the good of the state. He assists in the college of deputy-councillors of the province, who represent the sovereignty in the absence of the states ; and he is perpetual deputy of the states general of the United Provinces. His commission is only given for five years ; after which it is deliberated whether or no it shall be renewed. Indeed there is no Instance of its having been revoked. Death only puts a period to the functions of this important minister. Formerly he was called the *advocate of the province* : the title *Pensionary* was only given at the time Baunevelt had the office. Orotius calls him in Latin *adversus jurisprudentis* ; Merula, *advocatus generalis* ; and Matthæus, professor at Leyden, *consiliarius pensionarius*, which is the quality the states give him in their instruments.

PENSIONARY, is also the first minister of the regency of each city, in the province of Holland. His office is to give his advice in matters relating to the government, either of the city in particular, or of the state in general ; and in assemblies of the states of the province is speaker in behalf of his city.

Yet, the functions of these *Pensionaries* is not alike every where : In some cities they only give their advice ; and are never found in assemblies of the magistrates, except when expressly called thither : in others they attend constantly ; and in others they even make the propositions on the part of the burgher-masters, draw up their conclusions, &c.—They are called *Pensionaries*, because they receive an appointment or *Pension*.

Gentlemen PENSIONERS, a band of gentlemen, whose business it is to guard the king's person in his own house ; and who for that end wait in the presence chamber. They were first set on foot by king Henry VII. the number is forty ; and each is obliged to keep three double horses and a servant, who is to be armed : so that they properly make a troop of guards, and have accordingly been mustered by their own officers : but this part of duty, to which they are sworn, the king usually dispenses with. Their officers are a captain, lieutenant, standard-bearer ; and clerk of the cheque.—Their ordinary arms are gilt pole-axes, with which they attend the king to and from the chapel-royal ; receiving him in the presence-chamber, or coming out of his private lodging ; as also at all great solemnities. Their *Pension* 100*l.* per annum.

PENSTOCK. See the article PEN.

PENTACHORD *, an ancient musical instrument with five strings.

* Whence the name of *πεντε*, five, and *χορδη*, string.

The invention of the *Pentachord* is referred to the Scythians : the strings were of bullocks leather, and they were struck with a plectrum made of goats horn.

PENTACROSTICK, a set of, or series of verses so disposed, as that there are always found five acrosticks of the same name, in five divisions of each verse. See ACROSTICK.

PENTAGON *, in geometry, a figure of five sides, and five angles. See FIGURE.

* The Word comes from the Greek *πενταγωνος*, *quinguanulus*, compounded of *πεντε*, five, and *γωνια*, angle. See POLYGON.

If the five sides are equal, the angles are so too ; and the figure is called a regular *Pentagon*, as fig. 47. *Tab. Geometry*.—Most citadels are regular *Pentagons*.

The most considerable property of a *Pentagon* is, that one of its

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its sides, *i. e.* DE, is equal in power to the sides of a hexagon, and a decagon inscribed in the same circle ABCDE : that is, the square of the side DE is equal to the sum of the squares of the sides D a and D b.

Pappus has also demonstrated, that twelve regular *Pentagons* contain more than twenty triangles inscribed in the same circle, *lib. 5. probl. 45.*

The dodecahedron, which is the fourth regular body, consists of twelve *Pentagons*.

Projection or perspective of a PENTAGON. See PERSPECTIVE.

PENTAGRAM, an instrument whereby designs, prints, &c. of any kind, may be copied in any proportion; without a person's being skilled in drawing.

The instrument is otherwise called a *Parallelogram*.

The common *Pentagraph* (represented *Tab. Miscel. fig. 6.*) consists of four brass or wooden rulers, two of them from fifteen to eighteen inches long, the other two half that length. At the ends, and in the middle of the longer rulers, as also at the ends of the shorter, are holes, upon the exact fixing whereof the perfection of the instrument chiefly depends. Those in the middle of the long rulers are to be at the same distance from those at the end of the long ones, and those of the short ones; so that when put together, they may always make a parallelogram.

The instrument is fitted together for use, by several little pieces, particularly a little pillar, N^o 1. having at one end a screw and nut, whereby the two long rulers are joined; and at the other a little knot for the instrument to slide on. The piece N^o 2. is a rivet with a screw and nut, wherewith each short ruler is fastened to the middle of each long one. The piece N^o 3. is a pillar, one end whereof being hollowed into a screw, has a nut fitted to it. At the other end is a worm to screw into the table; when the instrument is to be used, it joins the ends of the two short rulers. The piece N^o 4. is a pen, portraiture, or pencil, screwed into a little pillar. Lastly, the piece N^o 5. is a brass point, moderately blunt, screwed likewise into a little pillar.

Use of the PENTAGRAPH, or Parallelogram.—1. To copy a design in the same scale or bigness as the original: screw the worm N^o 3. into the table; lay a paper under the pencil N^o 4. and the design under the point N^o 5. This done, conducting the point over the several lines and parts of the design, the pencil will draw or repeat the same on the paper.

2. If the design be to be reduced—*i. gr.* into half the space; the worm must be placed at the end of the long ruler N^o 4. and the paper and pencil in the middle. In this situation conduct the brass point over the several lines of the design as before; and the pencil at the same time will draw its copy in the proportion required; the pencil here only moving half the lengths that the point moves.

Hence, on the contrary, if the design be to be enlarged by one half, the brass point, with the design, must be placed in the middle, at N^o 3. the pencil and paper at the end of the long ruler, and the worm at the other.

3. To enlarge or reduce in other proportions, there are holes drilled at equal distances on each ruler, *viz.* all along the short ones, and half way of the long ones; in order for placing the brass point, pencil, and worm in a right line therein; *i. e.* if the piece carrying the point be put in the third hole, the two other pieces must be put in its third hole.

If then, the point and design be placed at any hole of the great rulers, and the pencil with the paper at any hole of the short ruler, which forms the angle therewith; the copy will be less than half the original. On the contrary, if it be placed at one of the holes of that short ruler, which is parallel to the long ruler, the copy will be greater than half the original.

The construction of this instrument requires a degree of accuracy, which most of our instrument-makers are strangers to; for which reason there are very few of the instruments that succeed. Few will do any thing tolerably but brass lines; and many of them not even those.

PENTAMETER *, in poetry, a kind of verse, consisting of five feet or metics. See VERSE and FOOT.

* The word is derived from the Greek *πενταμετρον*, *q. d.* five measures.

The two first feet of a *Pentameter*, may be either dactils or spondees; the third must be always a spondee; and the two last anapaests.

It is usually joined to hexameters, in elegies, epistles, epigrams, and other little pieces. There is no work extant of *Pentameters* alone.

PENTAPETALOUS plants, are such whose flower consists of five leaves.

PENTAPOLIS, PENTAPOLIS, in geography, &c. a country wherein are five cities.

The name *Pentapolis* has been given to several countries, particularly the valley wherein stood the five infamous cities destroyed by the shower of fire and brimstone, in the time of Abraham. It is commonly supposed, this country was the place where now stands the lake Asphaltites, or dead sea: Sanfon places it in the neighbourhood of this lake, but without any proof. D'Hebelot calls this the *Pentapolis of the Judonites*.

The most celebrated of all others was the *Pentapolis cyrenaica*

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or *Pentapolis of Egypt*, whose five cities were Berenice, Arsinoe, Ptolemais, Cyrene, and Apollonia.

Among the ancient geographers and historians, we likewise read of the *Pentapolis of Libya*, now called *Mysrata*; the *Pentapolis of Italy*; and the *Pentapolis of Asia minor*.

PENTAPTOTON, in grammar, a noun which has only five cases.

PENTASTICH, PENTASTICHON, in poetry, a stanza, or division of a poem, consisting of five verses.

PENTASTYLE, in architecture, a work wherein are five rows of columns.

Such was the portico begun by the emperor Gallienus, and which was to have been continued from the Laminian-gate to the bridge Milvius, *i. e.* from the Porto del popolo, to the Ponte-mole.

PENTATEUCH*, in the sacred learning, the five books of Moses, at the head of the old testament: *viz.* Genesis, Exodus, Leviticus, Numbers, and Deuteronomy.

* The word is formed from the Greek *πεντατευχος*, which signifies the same, compounded of *πεντε*, five, and *τευχος*, volume.

Pere Simon, in his *Hist. Crit. du V. Test.* produces a great number of passages to prove that Moses was not wholly the author of the *Pentateuch*, as we now have it. Indeed, those apparent interpolations at the end, are sufficient to determine that point; it being absurd to suppose Moses the author of the account of his own death and burial, and of the comparison between him and the succeeding prophets in Israel.

These interpolated passages are usually attributed to Esdras; who, on his return from the Babylonish captivity, is supposed to have published the old testament, or at least a part of it, corrected and enlarged.

There are two famous *Pentateuchs*, or editions of the *Pentateuch*, which have a long time disputed the preference, both as to antiquity, and as to character; *viz.* that of the Jews, called the *Jewish* or *Hebrew Pentateuch*, wrote in the Chaldean or Assyrian character; and that of the Samaritans, wrote in the Samaritan or Phœnician character.—Each is maintained to be the ancient Hebrew; though the generality of the critics give it in behalf of the latter.

Indeed, as to the point of matter, they are generally pretty conformable to each other, each has all the interpolated passages above-mentioned, though the Samaritan has one or two more, which are not in the Hebrew: the first a passage in Deut. xxvii. 4. where an altar is enjoined to be built, and sacrifices to be offered on mount Ebal, or rather mount Gerizim; which passage was doubtless foisted in to countenance the Samaritan worship, and represent it of equal antiquity with that of the temple of Jerusalem. See SAMARITANS.

Mr. Whiston, however, declares, he sees no reason to accuse the Samaritan of corruption, in these points, but rather the Jewish; and earnestly contends that the former is an uncorrupted copy of the books of Moses, originally derived from the first separation of the ten tribes themselves, in the days of Jeroboam.—But the contrary of this is apparent from the mere confessed interpolations ascribed to Esdras, who lived several hundred years after the time of Jeroboam.

But the grand difference is in the letter or character: the Jewish being in the Chaldean or Assyrian character, and the Samaritan in the Phœnician, *i. e.* the Canaanitish character; this latter seems to have an advantage over the vulgar Jewish *Pentateuch*.—Yet is Prideaux of opinion, the latter is only a transcript from the former out of the Chaldean into the old Hebrew character. One great reason he gives, is, that there are many variations in the Samaritan, manifestly occasioned by mistaking the similar letters in the Hebrew Alphabet; which letters having no similitude in the Samaritan character, it is evident the variations must have arisen in transcribing from the vulgar Hebrew into Samaritan; and not the contrary way.

Add to this, that Simon, Allix, and many other learned men, take the Chaldean or Assyrian character to have been the character always in use among the Jews; and the Samaritan or Canaanitish, or as it is also called the old Hebrew character, to have never been used by the Jews before the captivity, in any manner, either in books, or on medals.

Hence the *Pentateuch* must have been transcribed into that character; and that, probably, to render it legible to the inhabitants of Samaria, who, upon their introduction of the *Pentateuch*, might probably be versed in no other character.

Usher takes the Samaritan *Pentateuch* to have been compiled by Dositheus a Samaritan, mentioned by Origen to have adulterated the *Pentateuch*.—Dupin supposes it the work of some modern Samaritan, whom he imagines to have compiled it chiefly out of the different copies of the Palestine and Babylonian Jews, and the Septuagint; because it sometimes agrees with one, and sometimes with another.

PENTATHLON, PENTAGON, in antiquity, the five exercises performed at the Grecian games, and for which prizes were proposed. See EXERCISE, GAME, &c.

These exercises were wrestling, boxing, leaping, running, and quoit-playing.—He who bore away the prize in them all, was called *Pentathlus*; by the Latins, *quingertus*; as the five exercises themselves were by those latter people called *quingertium*.

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PENTATONON, in the ancient music, a concord, by us called the redundant sixth.

It consists of four tones, and a major and minor semitone; whence the name, *Pentatonon*, q. d. five tones.

PENTECONTERUS, ΠΕΝΤΗΚΟΝΤΕΡΟΣ, a vessel with fifty oars.

PENTECOST*, ΠΕΝΤΗΚΟΣΤΗ, Whitsuntide; a solemn feast of the church, held in commemoration of the descent of the Holy Ghost on the apostles; as described in the acts. See **WHITSUNTIDE**.

* It has its name from the Greek ΠΕΝΤΗΚΟΣΤΗ, q. d. quinquagesimus 50th, because held on the fiftieth day after Easter. See **EASTER**.

In the ancient church, *Pentecost* finished the paschal time, or easter-season; wherein, as Tertullian, St. Jerom, &c. observe, Hallelujah was sung every where, the office celebrated standing, no fasting allowed, &c.

The Jews likewise had a feast they called *Pentecost*, or *quingagesimus*, solemnized in memory of the laws being given to Moses 50 days after their departure out of Egypt.

PENTECOSTALS, **PENTECOSTALIA**, anciently, were pious oblations made at the feast of *Pentecost*, by the parishioners to their parish priest; and sometimes by inferior churches or parishes, to the principal or mother church.

These parish *Pentecostals* were also called *Whitsun-farthings*; and their sum was divided into four parts, of which one went to the priest, one to the poor, one towards the repair of the church, and one to the bishop of the diocese.

PENTERYNGUS, in antiquity, a sort of pillory, with five holes; wherein were fastened the legs, arms, and heads of criminals, to prevent their stirring.

PENTHEMIMERIS*, in the Greek and Latin poetry, part of a verse, consisting of two feet, and one long syllable.

* The word is Greek, ΠΕΝΘΗΜΙΜΕΡΗΣ; compounded of ΠΕΝΤΗ, five, ΗΜΕΡΗΣ, half, and ΜΕΡΗΣ, part.

PENULTIMA*, or **PENULTIMATE**, in grammar, denotes the syllable, or foot, immediately before the last.

* The word is formed from the Latin *pen* and *ultimus*, almost last.

Hence *antepenultimate* is that before the *Penultimate*, or the last but two.

PENULTIMATE, in music. M. Brossard will have it the same with what the Greeks called *paranete*; though others will not allow the *paranete* to be the *penultimate* chord, but the next thereto.

PENULTIMATE of the *separate*, *paranete diazeugmenon*, is a name the ancients gave to one of the chords of their lyre or fyttem; corresponding to the *d*, *la*, *re*, of the third octave of the modern fyttem.

PENULTIMATE of the *acute*, *paranete hyperboleon*, a chord of the ancient fyttem, answering to the *g*, *re*, *sol*, of the third octave of the modern fyttem.

PENUMBRA, in astronomy, a faint, or partial shade, observed between the perfect shadow and the full light in an eclipse.

The *Penumbra* arises from the magnitude of the sun's body: were he only a luminous point, the shadow would be all perfect; but by reason of the diameter of the sun, it happens that a place which is not illuminated by the whole body of the sun, does yet receive rays from a part thereof.

Thus suppose S the sun (*Tab. Astron. fig. 47.*) and T the moon, and the shadow of the latter to be projected on a plane as GH. The true proper shadow of T, viz. GH, will be encompassed with an imperfect shadow, or *Penumbra*, HL and GE, each portion whereof is illuminated by an entire hemisphere of the sun.

The degree of light or shadow of the *Penumbra* will be different in different parts, as those parts lie open to the rays of a greater or lesser part of the sun's body; thus from L to H, and from E to G, the light continually diminishes; and in the confines of G and H, the *Penumbra* becomes lost and confounded with the total shade; as, near E and L, it is confounded with the total light.

A *Penumbra* must be found in all eclipses, whether of the sun, the moon, or the other planets, primary or secondary; but it is most considerable with us in eclipses of the sun; as is the case here referred to.

In eclipses of the moon, the earth is encompassed indeed with a *Penumbra*; but it is only sensible to us on the earth near the total shadow: an observer placed on a plane, whereon the shadow falls, might observe the whole *Penumbra*, as in eclipses of the sun. Thus an eye placed at I or F, would only see the semi-diameter of the sun; the rest being hid behind the moon. Going from I towards H, more and more of the sun is hid, till it be lost in the shadow itself, &c.

Hence we have eclipses of the sun when the shadow never touches the earth, provided the *Penumbra* do but reach it; and hence there is a difference observed in eclipses of the sun, as the shadow itself, or a greater or less degree of the *Penumbra* passes over a place.—But eclipses of the moon appear the same in all places where they are visible.

When the shadow itself falls on the earth, the eclipse is said to be total or central; when only the *Penumbra* falls on it, the eclipse is said to be partial.

The *Penumbra* extends infinitely in length, inasmuch as to

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each point of the diameter of the sun, there answers a space infinite in length into which no rays enter from that point; though there do from others. Two rays drawn from the two extremities of the earth's diameter, and which proceed still diverging, form the two edges of the *Penumbra*; which, of consequence, is continually growing in width, and is infinite also in this sense.—All that infinite space is the *Penumbra*, except the triangle of the shadow included in it.

The figure of this space comprehending the shadow, is a trapezium, one of whose sides is the diameter of the earth; the opposite side parallel thereto is an infinite line, i. e. the width of the *Penumbra* projected to infinity, and the two other sides are two rays drawn from the two extremities of the diameter of the sun, through those of the diameter of the earth, and which prolonged back beyond the sun, will intersect in a certain point, making an angle equal to the apparent diameter of the sun; which angle may be called the *angle of the Penumbra*.

Now the *Penumbra* will be the greater, as this angle, or, which is the same thing, as the star is greater, the planet remaining the same; and if the diameter of the planet be increased, the star remaining the same, it will be the same as if the diameter still receded from the angle of the *Penumbra*.

M. de le Hire examines the different degrees of the *Penumbra*, and represents them geometrically by the ordinates of a curve, which shall be among themselves, as the several parts of the sun's disk, wherewith a body placed in the *Penumbra* is enlightened.

PENY. See the article **PENNY**.

PEP and **PEPIA**. See the article **PIP**.

PEPASMUS*, ΠΕΠΑΣΜΟΣ, in medicine, the digesting, and ripening of morbid humours.

PEPASTIC*, or **PEPTIC**, ΠΕΠΑΣΤΙΚΟΣ, or ΠΕΠΤΙΚΟΣ, in medicine, a kind of medicament of the consistence of an em-plaster; proper to bring vitious and corrupt humours to a head, and dispose them for suppuration.

* The words are formed from the Greek ΠΕΠΑΣΣΑΙ, to digest, or ripen.

Butter, roots of mallows, of flowers-de-lis, onions and leaves of oxylapathum are esteemed good *Pepasticks*, or maturatives. The word is also used for such medicines as promote the digestion of food in the stomach.

PEPPER, **PIPER**, an aromatic fruit, of a hot, dry quality, chiefly used in the seasoning of meats.

It is the product of a shrub growing in several parts of the East-Indies, chiefly Java, Sumatra, Malacca, and the coasts of Malabar. The plant is very weak and of the reptile kind, and for that reason usually planted at the foot of the larger trees, as the areca, coco, &c.

Pepper grows in bunches or clusters, at first green; as the grains ripen they grow redish; and at last, after being exposed a while to the sun, they become black, in the condition we see them.

The fruit is gathered in November. It must be chosen large, full, not wrinkled, without dust, with a good many white grains in it; and care must be taken the largest berries have not been picked out, as is often done, to make white *Pepper*.

White Pepper, *Piper album*, is the fruit of the same plant with the black, and is prepared from it by moistening it with the sea-water, and then exposing it to the sun, and casting away the outer bark, which abandoning the grains, leaves them white.

Indeed, M. Dellon, a late traveller, says, they strip off the skin, by beating it before it be quite dry; or by soaking it in water after it has dried, and then beating it.

Many authors, and among the rest Pomet, will have the *white Pepper* to be natural, and the fruit of a different plant from the black; but M. Dellon, who expressly declares the contrary from his own long experience, seems to put the matter past doubt.

White Pepper must be chosen after the same manner as black; with this further care, that it hath not been dyed white.—*Pepper* that is fold ground, is very apt to be sophisticated; the black with burnt crust of bread, &c. the white with beaten rice.

Long Pepper, *Piper longum*, is thus denominated from its form, which in length and thickness equals a child's finger; it consists of an assemblage of grains, or seeds joined close to one another, of a brownish colour, bordering without on red, and within on black; and grows by a long pedicle to a plant, like that of the black *Pepper*, but lower, and its leaves smaller and greener.—Its taste resembles that of the former, but it is less sharp.

There are three kinds of this *Pepper*, that of the East-Indies, that of America, and that of Ethiopia, called also grain of Zelim; though the first alone is the proper *long Pepper*, the rest resembling it but little.

It must be chosen new, large, heavy, well filled, hard to break, and without dust or mixture; its chief use is in medicine, where it enters several galenical compositions, among the rest Venice treacle.

Guinea Pepper, *Piper indicum*, is a reddish pod, of a coral colour, much esteemed by the Americans, from among whom it

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is brought, and by them called *chile*, and by the French, *garden coral*.

It is now cultivated pretty commonly in France, especially in Languedoc, where it is used in making vinegar, and is likewise comitted with sugar. It must be chosen new, in large pods, dry, entire, and red.

There are four kinds of this, the first called by the Americans *chilbotes*; the second, very small, *chiltepin*; both of a very pungent taste; the third, *tonalibiles*, moderately hot, and eaten by the natives like other fruit with bread; the fourth, *chilpe-lagua*, moderately pungent, sometimes used by the Spaniards in the preparation of chocolate; there is also a fifth kind called *agy*, growing in Peru.

Jamaica PEPPER, called by the Dutch *amomi*, by the Spaniards *pimiento de Jamaica*, is the fruit of a tree, growing plentifully in Jamaica, and other American islands.

It is a real aromatic, and may supply the defect of cloves, nutmeg, and cinnamon; whence it is called also by the English, *all-spice*. The French call it the *round clove*, from its round shape, and its taste resembling that spice.

PEPSIS *, in medicine, the coction, or digestion of foods, or humours in the body. See **COCTION** and **DIGESTION**.

* The word is Greek, *πεψις*, which signifies boiling.

PEPTIC, in medicine. See **PEPASTIC**.

PEPUZIAN, a sect of ancient hereticks, otherwise called *Phrygians*, or *Cataphygians*.

They had their name *Pepuzians*, from a pretence that Jesus Christ appeared to one of their prophetesses in the city *Pepuza* in Phrygia, which was their holy city. See **QUINTILIANS**.

PER accidens. See the article **ACCIDENS**.

PERACUTUM menstruum. See **MENSTRUUM**.

PERAMBULATION of the forest, the surveying, or walking about a forest, or the limits of it, by justices or other officers thereto appointed, to set down the metes and bounds thereof, and what is within the forest, and what without.

PERAMBULATIONE facienda, is a writ commanding the sheriff to make *Perambulation*, and set down the bounds of two or more manors, whose limits are not so well known.

The writ *de perambulatione facienda*, is only issued where the lords of both manors agree to have such perambulation. If one of them refuse, the other must seek his remedy by a writ *de rationabilibus finibus*. See **RATIONABILIBUS**.

PERAMBULATOR, in surveying, an instrument for the measuring of distances; called also *pedometer*, *way-wiser*, and *surveying wheel*. See **PEDOMETER** and **WAY-WISER**.

Its advantages are its handiness, and expedition: its contrivance is such, that it may be fitted to the wheel of a coach; in which rate it performs its office, and measures the road without any trouble at all.

There is some difference in its make: that now most usual, as most convenient, is as follows.

Construction of the PERAMBULATOR or way-wiser.—The *Perambulator* (represented *Tab. Survey. fig. 23.*) consists of a wheel two feet seven inches and a half in diameter; consequently half a pole, or eight foot and three inches in circumference. On one end of the axis is a nut three quarters of an inch in diameter, divided into eight teeth, which upon moving the wheel round, fall into the eighth teeth of another nut *e*, fixed on one end of an iron rod *Q*, and thus turn the rod once round, in the time the wheel makes one revolution. This rod lying along a groove in the side of the carriage of the instrument, has at its other end a square hole, into which fits the end *b* of the little cylinder *P*. This cylinder is disposed under the dial-plate of a movement, at the end of the carriage *B*, in such manner as to be moveable about its axis. Its end *a* is cut into a perpetual screw, which falling into the thirty two teeth of a wheel perpendicular thereto; upon driving the instrument forward, that wheel makes a revolution, each sixteen pole. On the axis of this wheel is a pinion with six teeth, which falling into the teeth of another wheel of sixty teeth, carries it round every hundred and sixtieth pole, or half a mile.

This last wheel then carrying a hand or index round with it, over the divisions of the dial-plate, whose outer limb is divided into one hundred and sixty parts, corresponding to the one hundred and sixty poles; points out the numbers of poles passed over. Again, on the axis of this last wheel is a pinion containing twenty teeth, which falling into the teeth of a third wheel that has forty teeth, drives it once round in three hundred and twenty poles, or a mile. On the axis of this wheel is a pinion of twelve teeth, which falling into the teeth of a fourth wheel that has seventy two teeth, drives it once round in twelve miles.

This fourth wheel, carrying another index, over the inner limb of the dial plate, divided into twelve, for miles, and each mile subdivided into halves, quarters, and furlongs, serves to register the revolutions of the other hand, and to keep account of the half miles and miles passed over, as far as twelve miles.

Use of the PERAMBULATOR or way-wiser.—The application of this instrument is obvious from its construction. Its proper

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office is in the surveying of roads, and large distances, where a great deal of expedition, and not much accuracy is required. —It is evident that driving it along, and observing the hands, has the same effect as dragging the chain, and taking account of the chains and links. See the article **CHAIN**.

PER ARSIN, and *thesin*, in music.—*Per* is a Latin Preposition, signifying by, during; *arsis* and *thesis* are Greek words, the first whereof signifies elevation or rising; the second position, or setting down.

Per thesin, then signifies in falling, or during the latter time of the measure: *per arsin*, in rising, or in the first time of the measure. A long, counter-point, fugue, &c. are said to be *per thesin*, when the notes descend from acute to grave: on the contrary, they are *per arsin*, when the notes ascend from grave to acute. See **ARSIS**. Fugue *per ARSIN* and *thesin*. See **FUGUE**.

PERCEPTION, **PERCEPTIO**, in philosophy, the act of *perceiving*, or apprehending a thing: or that simple idea which we conceive of a thing without making any affirmation, or negation.

If that idea exhibit any image to the mind, it is called *imagination*; if it exhibit none, it retains the general name of *Perception*.

Thus when we hear the word *tree*, the idea we then form in the mind, is called an *imagination*. But when we hear of a thing whereof no image can be framed, as of doubting, the idea we then have is a meer *Perception*.

The faculty or power of *Perception*, constitutes what we call the *understanding*. See **POWER**, **FACULTY**, and **UNDERSTANDING**.

It may be observed, that the ideas we receive by *Perception* are often altered by the judgment, without our taking notice of it; thus a globe being set before our eyes, the idea thereby impressed, is a flat circle, variously shadowed: but being accustomed to perceive what kind of appearances convex bodies are wont to make in us; the judgment alters the appearances into their causes; and from that variety of shadow or colour, frames to itself the *Perception* of a convex figure of one uniform colour.

This, in many cases, by a settled habit, is performed so readily, that we take that for the *Perception* of our senses, which is really an idea formed by the judgment; so that one serves only to excite the other, and is scarce taken notice of itself: as a man who reads or hears with attention, takes little notice of the characters or sounds, but of the ideas which are excited in him thereby.

The faculty of *Perception* seems to be that which puts the distinction between the animate, and inanimate parts of the creation. Vegetables, some of them, have some degree of motion, and upon different applications of other bodies, alter their figures and motions; so as hence to obtain the name of *sensitive plants*: which, however, is the result of mere mechanism, and no otherwise produced, than the shortening of a rope by the effusion of water. But *Perception* is a metaphysical principle, and is found in some degree in all animals; and in them alone.

PERCH, *pole*, or *rod*, a long measure, much used in surveying and measuring of land.

Among the old Romans, and still among geometricians, the *perica*, *perch*, is ten foot; and they otherwise call it the *cattana*, *fumi*, and *decempeda*.

In England, the statute *Perch* contains sixteen foot and a half; and for coppice-woods, &c. eighteen foot.—Forty square *Perches* make a rood, and one hundred and sixty an acre.

The customary *Perch* is various in various counties: in Staffordshire it is twenty-four foot; in the forest of Sherwood twenty-one, the foot there being eighteen inches, the measure whereof is marked in the chancel wall of Edwynstow, and in the church of St. Mary in Nottingham.

In Herefordshire, a *Perch* of walling is sixteen foot and a half; a *Perch* of ditching twenty-one foot, &c.—In France, the *Perch* is from eighteen to twenty-three, and even twenty-seven of their feet.

PERCH-fishing. See the article **FISHING**.

PERCHANT, among fowlers, a decoy-bird, which the fowler has fastened by the foot, and which flutters about the place where it is tied, to draw other birds to it, and give the fowler an occasion of catching them.

PERCOLATION. See **FILTRATION**.

PERCUSSION, in physics, the impression a body makes in falling or striking upon another; or the shock or collision of two moving Bodies; which meeting alter each others motion. See **MOTION** and **COLLISION**.

PerCUSSION is either *direct* or *oblique*.

Direct PERCUSSION, is where the impulse is given in the direction of a right line perpendicular to the point of contact.

In spheres therefore, the *PerCUSSION* is *direct*, when the line of direction passes through both their centres.

Oblique PERCUSSION, is where the impulse is given in the direction of a line oblique to the point of contact. See **OS- LIQUE**.

In bodies either perfectly hard, or perfectly soft, and so void of all elasticity, the laws of *Percussion* are easily determined: but since even the hardest bodies have their share of elasticity, and in elastic bodies the laws are very different, and much more intricate, having been first ascertained in the *Philosophical Transactions*, by Sir Ch. Wren, Dr. Wallis, and Mr. Huyens; we shall lay down each a-part.

Laws of PERCUSSION in bodies not elastic.—1°. If a body in motion, as A (*Tab. Mechanick*, fig. 40.) strike directly against another at rest, B; the first will lose just as much of its motion as it communicates to the second; so that the two will proceed thence with an equal velocity, as if collected into one mass. If A therefore be triple of B, it will lose one fourth of its motion; so that if before it moved through a line of twenty-four foot in a minute, it will now only move eighteen.

2°. If a moving body A, strike against another already in motion, B; the first will increase the velocity of the latter; but will lose less of its own motion than if the latter had been at rest: since all here required, is that some degrees of motion be added to those the latter already had, to make them both proceed with an equal velocity.

Suppose, e. gr. the body A, with twelve degrees of motion, to strike against the other B, less by half, and at rest; the first will transfer four degrees of its motion to the latter, and retain eight to itself: but if it strike with twelve degrees of motion on the other already moving with three degrees, it will only communicate two degrees; for A being double of B, this needs only half the motion to make it proceed with the same velocity.

3°. If a moving body A, strike on another B, either at rest, or moving more slowly, and either in the same direction, or in a contrary one; the sum of the momenta, if the bodies move in the same direction, or their difference, if they move in a contrary one, will be the same after the *Percussion* as before.

4°. If two equal bodies A and B meet each other with equal velocities; after the congress, they will both remain at rest.

5°. If a body A, strike directly on another at rest B; its celerity after the stroke is to its celerity before it, as the weight of A is to the sum of the weights of A and B: if therefore the weights were equal, the celerity after the shock will be half of what it was before it.

6°. If a body in motion A, strike directly on another moving more slowly, but in the same direction; the velocity after the shock will be equal to the sum of the momenta, divided by the sum of the weights.

7°. If two equal bodies moving with different velocities, strike directly against each other; after the conflict, they will proceed with the semi-difference of the velocities wherewith they were moved before it.

8°. If two bodies A and B meet directly with velocities that are reciprocally as their weights; after the conflict, they will both remain at rest.

9°. If two bodies A and B meet directly with the same velocity, the celerity after the impulse will be to that before it, as the difference of the weights to their sum.

10°. If two bodies meet directly with any velocity whatever, the celerity after the stroke will be equal to the semi-difference of the momenta, divided by the sum of the weights.

To determine the momentum lost by the conflict: multiply the celerity which the body had before the conflict, into its mass: thus have you the momentum before the conflict. In like manner, multiply the celerity after the conflict into the mass: thus have you the momentum after the conflict. The latter moment therefore being subtracted from the former, leaves the loss. And hence may the magnitudes of the strokes be estimated.

11°. A direct or perpendicular stroke is to an oblique one, as the whole sine is to the sine of the angle of incidence.

Laws of PERCUSSION in elastic bodies.—In bodies perfectly elastic, the force of elasticity is equal to the force wherewith they are compressed; that is, the collision of two such bodies on each other is equivalent to the motion which either of them would acquire, or lose, by mere simple impulse. This force exerting itself contrary ways, a motion equivalent thereto must be subtracted from the motion in the impelling body, and added to that in the body impelled by mere impulse, to find their velocities after *Percussion*. See *ELASTICITY*.

12°. If a body strike directly on an immovable obstacle, either one, or both of them being elastic, the body will be reflected with the same velocity wherewith it struck, and in the same line. For if the elasticity were away, the whole force of the striking body would be spent in overcoming the resistance of the obstacle; and consequently all the motion would cease: it follows that the whole force is employed in compressing the elastic body; by which means it acquires an elastic force equal thereto: since then the elasticity, when the compressing force is spent, reduces the body into its former state, it repels the other with the same force wherewith it struck, consequently it will rebound with the same velocity. And because an elastic body restores itself in the same direction wherein it was compressed (there being no reason why it should change its direction) the body will rebound in the same right line.

13°. If an elastic body strike obliquely on an immovable obstacle, it will rebound in such manner as to make the angle of reflection equal to the angle of incidence. See *REFLECTION*.

14°. If an elastic body A, strike directly against another at rest, B; after *Percussion* A will remain at rest, and B will proceed with the same velocity which A had before the shock; and in the same direction.

For if the bodies were not elastic, each would proceed after the stroke in the same direction, and with half the velocity; but since the elastic force acts in the same direction wherein the compression is made, and is equal to the compressing force; it repels A with half its velocity, and therefore stops its motion; but it drives B further, with half its velocity, and therefore accelerates its motion. It is therefore carried after the shock with the whole celerity wherewith A was carried before it; and A remains at rest.

Hence, since A (*Tab. Mechan. fig. 41.*) transfers all its force to B, B in like manner will transfer it to C; C again to D, and D to E. Wherefore if there be several equal elastic bodies, mutually touching each other, and A be struck against B; all the intermediate ones remaining at rest, the last alone, E, will be moved; and that with the velocity wherewith A struck against B.

15°. If two equal elastic bodies A and B meet directly, and with equal velocity, each will rebound with the same velocity wherewith it struck, and also in the same direction.

For, setting aside the elasticity, both would remain at rest: their whole force therefore is spent in the compression; and their elastic force whereby they rebound in the former direction, is equal thereto: this force therefore acting equally on each body A and B, will produce the same celerity in each; and that, equal to the former. So that they will rebound with the celerity wherewith they struck.

16°. If two equal elastic bodies A and B strike directly against each other with unequal velocities, after the shock they will rebound with interchanged velocities.

For suppose the bodies to concur with the velocities $C + c$ and C : if they meet with the same velocity C , after the shock, they would both move with the same velocity C . If B were at rest, and A should strike upon it with the celerity c , after the shock, A would remain at rest, and B be moved with the celerity c . Therefore the excess of celerity c , wherewith A is carried, is transferred wholly by the conflict to B: A therefore is moved with the celerity C , and B with the celerity $C + c$. Hence, after *Percussion*, they recede from each other with the same velocity as before they concurred.

17°. If an elastic body A, strike on another equal one, indued with a less degree of motion B; after *Percussion*, both will proceed in the same, viz. in the former, direction, and with interchanged velocities.

For suppose A to strike with the velocity $C + c$, upon B moving with the velocity C . Since by reason of the equal velocities C and C , there arises no impulse; it is the same thing as if A struck on B with the sole celerity c , on B at rest. But in that case A would remain at rest, and B would move with the velocity c : therefore, after *Percussion*, A will move with the sole celerity C , and B with the celerity $C + c$, both according to the former direction, there being nothing to change that direction.

18°. If a moving body A, strike on another B; the stroke will be the same as would be made by the body A striking on B at rest, with the difference of their velocities.

Hence, since the elastic force is equal to the *Percussion*; it acts on the bodies A and B with the difference of the velocities they had before the congress.

19°. To determine the velocities of any two elastic bodies A and B, after striking directly on each other with any velocities.—If the elastic body A strike on B, either at rest, or moving faster than A; the velocity *v. gr.* of A after *Percussion*, is found thus: as the sum of the weights is to double of either of them, suppose, in this case, of B; so is the difference of the velocities before the congress, to a velocity, which subtracted from the velocity of A before the impulse (in the other case added to it) leaves the velocity of A after the congress.

If the two elastic bodies A and B meet each other; the velocity of A after the impulse is found thus: as the sum of the weights, is to the double of either of them, suppose of B; so is the sum of the velocities before collision, to a velocity which subtracted from the velocity of A before collision, leaves its celerity after collision.

20°. If an elastic body A strike directly on another at rest, B; its velocity after *Percussion* will be to its velocity before it, as the difference of weights is to their sum: but the velocity it communicates to B, is to the same, as double the weight of A, to the sum of the weights.

After *Percussion* therefore, the velocity of A is to the velocity of B, as the difference of weights to the double of A.

21°. If two elastic bodies, A and B, strike directly on each other with velocities that are reciprocally proportional to their weights; after collision, they will rebound with the same velocity wherewith they met.

22°. In the direct collision of bodies the same respective velocity is preserved, i. e. in a direct concurrence, the difference of velocities is the same before and after the shock; and in a direct mutual encounter, the difference of velocities after the shock is the same with their sum before it.

Hence they retire from each other after the impulse, with the same velocity wherewith they met.

23°. In the collision of elastic bodies there is not always preserved the same momentum, or as the Cartesians express it, the same quantity of motion; but this is sometimes increased, and sometimes diminished.

It is a mistake therefore of Cartes and his followers, that the same quantity of motion is still preserved in the world.

24°. If two elastic bodies, A and B, meet, or overtake each other directly; the sum of the factums of the masses into the squares of the velocities remains the same before and after the congress. Hence the same quantity of force is likewise preserved in the congress.

25°. To determine the motion of two bodies A and B, (fig. 42.) striking obliquely against each other, whether they be elastic, or not elastic. The motion of the body A along AC is resolvable into two others, in the directions AE and AD; and the motion of B along BC into two others according to BF and BG; and the velocities through AD and BF are to the velocities through A C and BC, as the right lines AD, BF, AC, BC; now, since the right lines AE and BG are parallel, the forces acting according to these directions are not mutually opposite, and must therefore be considered in the congress. But since the lines AD and BF, or, which is the same, EC and GC, constitute the same right line perpendicular to DC; it is the same as if the bodies A and B should meet directly with velocities that are as EC and GC. Find therefore the velocity of A and B according to the rules above laid down.

Suppose, e. gr. the velocity of the rebounding body A to be as CH; since the motion along AE is not changed by the congress, make CK = AE, and complete the parallelogram HCKI; the diagonal CI will represent the motion of A after the congress: for after Percussion, the body will move according to the direction CI, and with a velocity as CI. In the same manner it will be found, that the rebounding body B will move along the diagonal of the parallelogram CM; in which LM = BG. The velocities therefore after Percussion are as CI to CM.

Center of PERCUSSION, is that point wherein the shock or impulse of the percussive body is the greatest.

The center of Percussion is the same with the center of oscillation, if the percussive body revolve round a fixed axis. See OSCILLATION.

If all the parts of the percussive body be carried with a parallel motion, or with the same velocity; the center of Percussion is the same with the center of gravity.

PER deliquium. See the article DELIQUIMUM.

PER descensum; by descent, in chymistry, a particular manner of distillation. See DISTILLATION.

PERDONATIO ulagarie, in law, a pardon for one who is outlawed.

PERDUE *, a soldier placed in a dangerous, and almost desperate post.—Thus we say, *enfans perdus*, for the forlorn hope of an army.

* The word is French, and literally signifies lost.

To lie *perdue*, is to lie flat on the belly, or to lie closely in wait. PEREGRINARIY, PEREGRINARIUS, in the ancient monasteries, a monk, to whom was committed the care of receiving, and entertaining strangers, or visitors.

PEREGRINE, PEREGRINUS, a term applied among astrologers to a planet, when found in a sign where it has none of its five essential dignities.

PEREMPTORY, in law, an epithet applied to an action, exception, &c. signifying them to be absolute, final, and determinate; and not to be altered, renewed, or restrained.

Thus in our law-books we find *peremptory action*, *peremptory contest*, *peremptory exemption*, &c.

PERENNIAL, in botany, is applied to those plants whose roots will endure many years.

Perennials are of two kinds; the one retain their leaves all the winter, called *ever-green*.

The other cast the leaves in winter, called *deciduous* or *per-defols*.

PERENNIAL Wind. See the article WIND.

PERFECT, something to which nothing is wanting; or that has all the requisites of its nature and kind.

PERFECT, in arithmetic. *Perfect Number* is that, all whose aliquot parts added together, make the same number, with the number whereof they are such parts.

PERFECT, in grammar. *Preter* or *preterit-perfect* tense, is an inflection, marking a time perfectly past; as *I have heard*: *pluperquam-perfect*, is an inflection, expressing the time more than perfectly past; as *I had heard*, &c.

PERFECT, in music, denotes something that fills and satisfies the mind, and the ear.—In which sense we say, *perfect cadence*, *perfect concord*, &c.

The ancients had two kinds of modes, the major and minor; and each of these again was either *perfect*, or *imperfect*.

The word *perfect*, when joined with the words *mode*, and *time*, usually expresses triple time, or measure; in opposition to double time, which they called *imperfect*. See TIME.

PERFECT, in physiology. A *perfect* animal is used by some writers for that which is born by univocal generation; in opposition to insects, which they pretend to be produced by

equivocal generation. See GENERATION.

PERFECT flowers, are such as have petals, pistil, stamina, and apices. See FLOWER.

PERFECT mixts } See the articles { MIXTS.
PERFECT plants } PLANTS.

PERFECTION, the state or quality of a thing perfect. See PERFECT.—This is of divers kinds: *physical*, *moral*, and *metaphysical*.

Physical or *natural* PERFECTION is that, whereby a thing has all its powers, or faculties, and those too in their full vigour; and all its parts both principal and secondary, and those in their due proportion, constitution, &c.—In which sense a man is said to be *perfect*, when he has a sound mind in a sound body.

This *Perfection* is by the schoolmen frequently called *essentia*, by reason a thing is hereby enabled to perform all its operations.

Moral PERFECTION is an eminent degree of virtue, or moral goodness; to which men arrive by often repeated acts of piety, beneficence, &c.

This some subdivide into absolute or *inherent*, which is actually in him to whom we attribute it; and *imputative*, which exists in some other, and not in him it is attributed to.

Metaphysical, or *transcendental*, or *essential* PERFECTION, is the possession of all the essential attributes, or of all the parts necessary to the integrity of a substance: or it is that whereby a thing has, or is provided of every thing belonging to its nature.

This is either *absolute*, where all imperfection is excluded; such is the *Perfection* of God: or *secundum quid*, and in its kind.

PERFECTISSIMATE, PERFECTISSIMATUS, a quality, or dignity, whereof we find mention made in the code.—*Perfectissimi* were those to whom the emperors trusted the presidency of any province.—Alciat imagined the name had been only given to the governors of Hispania Tarraconensis, and Noricum; but Calvin has shewn the contrary in his *Lexicon juridicum*. The *perfectissimi* were inferior to the *clarissimi*, though the former word imply most perfect.

PERFIDIA, in music, a term borrowed from the Italians, signifying an affectation of doing always the same thing, of pursuing the same design, continuing the same motion, the same song, the same passage, and the same figures of notes.

Such are the stiff or constrained basses, as those of chacones, and many others, because depending wholly on the caprice of the composer.

PERFORANS manus, in anatomy, a muscle of the hand; call'd also, from its action, *flexor tertii internodii digitorum manus*. See Tab. Anat. (Myol.) fig. 2. n. 18.

It arises fleshy from the fore and upper part of the ulna, and the ligament which joins that and the radius; and after forming a pretty thick fleshy body, it is split into four round tendons; which passing under the annular ligament, and through the flits in the tendons of the former, are inserted into the third bone of each finger. See FINGER.

PERFORANS pedis, in anatomy, a muscle of the foot, call'd also *profundus*; and from its action, *flexor tertii internodii digitorum pedis*, & *flexor magnus*.

It rises from the upper and back-part of the tibia, and passing under the inner ancle, and ligament that ties the tibia and os calcis together, it divides into four tendons, which passing the holes of the perforatus, are inserted into the third phalanx of the lesser toes.

There is a small cannea, or fleshy substance, that arises from the os calcis, and which joins the tendons of this muscle where the lumbricals begin.

PERFORATIVE. Vide TREPANUM.

PERFORATUS manus, in anatomy, a muscle of the fingers, thus call'd from the perforation of its tendons by those of the perforans; it is also call'd sometimes *flexor secundi internodii*, from its action; and sometimes *sublimis*, from its situation. See Tab. Anat. (Myol.) fig. 2. n. 17.

It arises tendinous from the internal protuberance of the humerus, and the upper part of the radius before; and being parted into four, passes under the annular ligament; whence it sends several tendons into the upper-part of the phalanx of each finger: every tendon having at the first internode, a slit or perforation for the admission of the tendons of the perforans.

PERFORATUS pedis, in anatomy, a muscle of the foot, call'd also *flexor pedis*, & *sublimis*.

It arises from the inner and lower part of the calcaneum, and sends a tendon to every bone of the second phalanx of each of the four less toes.—In this, as also in the *perforans* of the hand, there is a slit in each tendon about the first joint, which lets through the tendon of the perforans.

PERFUME, an agreeable artificial odour, striking the sense, or organ of smelling.

The generality of *Perfumes* are made or composed of musk, ambergrace, civet, rose and cedar-woods, orange-flowers, jessamine, jonquills, tuberose, and other odoriferous flowers.

Therein also enter storax, frankincense, benzoin, cloves, mace, and other like drugs, commonly call'd *aromatics*.—Some *Perfumes* are also compos'd with aromatic herbs,

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or leaves, as lavender, marjoram, sage, thyme, hyssop, &c.

Perfumes were anciently much in use, particularly those wherein musk, ambergris, and civet enter; but they are now generally disused, since people have become sensible of the harm they do the head.—In Spain and Italy however, they are still very common.

PERFUMES, *suffitus*, in pharmacy, &c. are topical or external medicines, composed of certain powders and gums, which being mixed together, and thrown on the coals, produce a vapour or smoke, salutary in several diseases. See **SUFFITUS**. Fits of the mother are cured by the fume of partridge feathers, old leather, &c. Bunt mercury is sometimes applied by way of *suffitus*, called fumes of cinnabar.

There are dry *Perfumes*, made up in troches, pills, &c. of olibanum, mastic, aloes, &c. and moist viscous ones mixed with the juices of herbs, &c.

PERIANTHIUM *, or **PERIANTHEUM**, in botany, the little green leaves which compass the bottom of a flower, called by Dr. Grew the empalement, and by others the calyx.

* The word is formed from the Greek *περι*, about, and *ανθος*, flower.

The use of the *Perianthium* is to be a support, security, and as it were bands to the other parts of the flower.—Mr. Ray observes, that flowers, whose leaves or petals are strong, as tulips, have no *Perianthium*, as needing none. Carnations, &c. whose petals are long and slender, have their *Perianthium* of one piece; others, as the knap-weed, &c. have it of several pieces, and found in divers rounds, and all with a counter-changeable respect to each other, for the greater strength and security of themselves, and the petals, which they include.

PERIAPTON, *περιαπτον*, a kind of medicine, otherwise called *periamma*, or *amulet*; which being tied about the neck, is supposed to prevent, or cure diseases.

PERICARDIARY, an epithet given to worms generated in the pericardium, or capula of the heart.

M. Andry makes these one of the twelve kinds of worms engendered in the human body: they sometimes occasion convulsions, the paroxysms whereof last but a little while, but return incessantly.

These worms are accompanied with a frightful paleness of the face, a low pulse, and violent pains of the stomach and breast.—

They sometimes occasion a palpitation of the heart. M. Andry adds, that they have been known to occasion sudden death.

PERICARDIUM *, *περικαρδιον*, in anatomy, a membranous capula, or pouch, which includes the heart.

* The word is formed from the Greek *περι*, about, and *καρδια*, heart.

The *Pericardium* consists of a double membrane; the inner arising from the coats of the vessels of the heart, and the outer from the mediastinum. Its figure resembles that of the heart, being conoidal; and it embraces the heart laxly, allowing room for its pulsation.

It is connected either immediately, or by vesiculae emitted from it, to the sternum, back, and jugulum, and in human bodies to the tendinous part, or centre of the diaphragm; whereas in brutes it is loose.

Its use is supposed to be to defend the heart; as likewise to contain a soft serous humour, which serves to lubricate and moisten the heart, and to prevent any inflammation, that might probably arise from the dry friction of the heart and its capula. But this latter use is controverted; for some take the humour found in it to be unnatural; and will have it forcibly separated by the convulsive agonies supervening in the article of death. In effect, anatomists are puzzled to find whence it should come, or from what vessels it is secreted.

Dr. Keil, in his treatise of animal secretion, shews that the liquor in the *Pericardium* must be the most fluid of any separated from the blood, because its particles unite first, and are secreted first. For those particles which unite first, will have the greatest attractive force, consequently their particles must be the most spherical and most solid; and therefore their contact will be the least of any, and they the most fluid. See **FLUIDITY**. In the memoirs of the French academy, M. de Mortal gives an instance of a *Pericardium*, which being opened, the liquor contained therein was found congealed into a confluence fit to be cut with a knife, and lay two fingers thick about the heart.

PERICARPIA *, *περικαρπια*, a name sometimes given to medicines that are applied to the wrist: otherwise called *epicarpia*. See **EPICARPIUM**.

* The word is compounded of *περι*, about, and *καρπος*, carpus, the wrist.

PERICARPUS, or **PERICARPIUM** *, in botany, a pellicle, membrane, or other substance encompassing the fruit, or seed of a plant. See **FRUIT**, **SEED**, &c.

* The word is formed of the Greek *περι*, about, and *καρπος*, fruit.

PERICHORUS *, in antiquity, a name given by the Greeks, to their profane games and combats, i.e. to such as were not consecrated to any of the gods. See **GAMES**.

* The word is formed from the Greek *περι*, and *χωρα*, country.

Perichorus, in the original signifies near or neighbouring; apparently, because none of the people of the neighbourhood attended at these obscure exercises.—The champions here did not fight in honour of any god, or hero, as in the others; but only for the prize sake.

PERICRANIUM *, *περικρανιον*, in anatomy, a thick, solid coat or membrane, covering the out-side of the cranium, or skull.

* The word is formed from the Greek: *περι*, about, and *κρανιον*, head or skull.

Some call it by the general name of *Periosteum*, because of its adhering to the bone: others divide it into two membranes; the under whereof immediately investing the skull, they call *periosteum*, and the upper the *Pericranium*. In effect, it is one double membrane, consisting, as most others do, of two coats. It is supposed to have its origin from the dura mater; which passing through the sutures of the skull, by means of several filaments forms this thick membrane: at least, it is found connected to the dura mater by fibres transmitted from it to the membrane through the sutures.

About the origin of the temporal muscles the two coats of the *Pericranium* part; the outer passing over those muscles, and the inner still adhering close to the cranium.

PERIDROME; **PERIDROMUS**, in the ancient architecture, the space, or aisle in a periptere, between the columns and the wall. See **PERIPTERE**.

Salmasius observes, that the *Peridromes* served for walks among the Greeks.

PERIEGETES, *περιηγητης*, a Greek term, signifying a person who leads or conducts another about a thing, to shew it him, &c.

It is applied in antiquity to geographers; especially to those who described the sea coasts: thus Dionysius is siled *Periegetes*, for publishing a geography in hexameter verses; which Eustathius has commented on: both in Greek.

The name *Periegetes* was also given to those who conducted strangers about in cities, to shew them the antiquities, monuments, curiosities, &c. thereof.—They were the same with what they now call the antiquaries in Italy.

PERIGÆUM, **PERIGEE**, in astronomy, that point of the sun's or moon's orbit, wherein they are at their least distance from the earth.

In which sense *Perigee* stands opposed to *apogee*. See **APOGEE**.

PERIGEE, in the ancient astronomy, denotes a point in a planet's orb, wherein the centre of its epicycle is at the least distance from the earth.

PERIHELIMUM *, in astronomy, that point of the orbit of a planet, or comet, wherein it is at its least distance from the sun.

* The word is formed from the Greek *περι*, and *ήλιος*, sol, sun.

Perihelium stands opposed to *aphelium*. The ancient astronomers, instead of this term, used *perigæum*: because they placed the earth in the centre.

PERIMETER *, in geometry, the ambit, or extent that bounds a figure or body. See **FIGURE**.

* The word is formed from the Greek *περι*, and *μετρον*, measure.

The *Perimeters* of surfaces, or figures, are lines; those of bodies are surfaces.

In circular figures, &c. instead of *Perimeter*, we say circumference or periphery.

PERINEUM *, or **PERINEUM**, in anatomy, the space between the pudendum and the fundament; properly, the ligamentous seam which connects those two parts, called by the Latins, *interfamineum*.

* The word is Greek, *περινηος* or *περινηος*, formed from *περι* and *νηος*, to inhabit.

PERINDE *valere*, in the canon law, a dispensation granted a clerk, who being legally incapable of a benefice, or other ecclesiastical function, is *de facto* admitted to it.

The *Perinde valere* is a kind of writ, thus called from two words therein, signifying the dispensation to be equivalent or tantamount to a legal capacity.

PERIOCHA, *περιοχη*, an argument, indicating the sum of a discourse.

PERIOD, *περιοδος*, in astronomy, the time taken up by a star or planet in making a revolution; or the duration of its course, till it return to the same point of the heavens. See **REVOLUTION**.

The sun's, or properly the earth's *Period*, is three hundred and sixty five days, five hours, forty nine minutes. That of the moon is twenty seven days, seven hours, forty three minutes, &c. The *Periods* of the comets are now many of them pretty well ascertained. See **COMET**.

There is a wonderful harmony between the distances of the planets from the sun, and their *Periods* round him; the great law whereof is, that the squares of the periodic times are ever proportional to the cubes of their mean distances from the sun.

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The several *Periods* and mean distances of the several planets are as follow.

	Days	h.	'	"	mean Dist.
Saturn	10579	6	36	26	953800
Jupiter	4332	12	20	35	520110
Mars	688	23	27	30	152369
Earth	365	6	9	30	100000
Venus	224	16	49	24	72333
Mercury	87	23	15	53	38710

PERIOD, in chronology, denotes an epocha, or interval of time, by which the years are accounted; or a series of years, whereby, in different nations, and on different occasions, time is measured.

Such are the *Calippic*, and *Metonic Periods*, two different corrections of the Greek calendar; the *Julian Period*, invented by Joseph Scaliger; the *Victorian Period*, &c.

Calippic PERIOD, is a series of seventy-six years, returning in a perpetual circle; which elapsed, the new and full moons are supposed to return to the same day of the solar year.

The *Calippic Period* is an improvement on the *Metonic* of nineteen years, which proving inaccurate, Calippus the Athenian multiplied it by four, and thus arose the *Calippic Period*.

Constantinopolitan PERIOD. See *Julian PERIOD*.

Dionysian PERIOD. See *Victorian PERIOD*.

Hipparchus's PERIOD, is a series of three hundred and four solar years, returning in a constant round, and restoring the new and full moons to the same day of the solar year; according to the sentiment of Hipparchus.

This *Period* arises by multiplying the *Calippic Period* by four. Hipparchus assumed the quantity of the solar year to be 365 days, 5 hours, 55' 12". And hence concluded that in one hundred and four years Calippus's *Period* would err a whole day. He therefore multiplied the *Period* by four, and from the product cast away an entire day. But even this does not restore the new and full moons to the same day throughout the whole *Period*; but they are sometimes anticipated 1 day, 8 hours, 23' 29" 20".

Julian PERIOD, a series of seven thousand nine hundred and eighty Julian years; arising by the multiplication of the cycles of the moon, the sun, and indictions into one another; commencing from the first day of January in the Julian year.

The *Julian Period* is also produced by multiplying the *Victorian Period* by fifteen. Since every year in the *Julian Period* has its particular cycles of the moon, sun, and indictions: e. g. only the first has the moon's cycle one, the sun's cycle one, and cycle of indictions one; all the years of this *Period* are accurately distinguished from each other.

This *Period* was invented by Scaliger, as a common receptacle of epocha's, to facilitate the reduction of years of a given epocha to those of another epocha likewise given. It agrees with the Constantinopolitan epocha, or *Period* used by the Greeks, except in this, that the cycles of the sun, moon, and indictions are reckoned differently; and in that the first year of the Constantinopolitan *Period* differs from that of the *Julian Period*.

Metonic PERIOD, or *cycle*, called also the *cycle of the moon*, is a series of nineteen years, which elapsed, the new and full moons, are supposed to return to the same day of the solar year: it was thus called from its inventor Meton.

Victorian PERIOD, an interval of five hundred and thirty two Julian years, which elapsed, the new and full moons return on the same day of the Julian year, according to the sentiment of the inventor Victorinus or Victorinus, who lived in the time of pope Hilary.

Some ascribe this *Period* to Dionysius Exiguus; and hence call it the *Dionysian Period*: others call it the *great paschal cycle*; because it was invented for computing the time of Easter.

The *Victorian Period* is produced by multiplying the lunar cycle nineteen, by the solar circle eighteen; the product of which is five hundred thirty two. But neither does this restore the new and full moons to the same day throughout its whole duration, by 1 day, 16 hours, 58' 59" 40".

PERIOD, in grammar, denotes a little compass of discourse, containing a perfect sense; distinguished at the end by a point or full stop (.) and its members or divisions marked by comma's, colon's, &c. See *SENTENCE*, *POINT*, &c.

De Colonia defines *Period* a short, but perfect sentence, consisting of certain parts of members, depending one on another, and connected together by some common vinculum.

The celebrated definition of Aristotle is, a *Period* is a discourse which has a beginning, a middle, and an end, all visible at one view.

The *Periods* allowed in oratory are three: a *Period* of two members, called by the Greeks *dicolos*, and the Latins *bimembris*: a *Period* of three members, *tricolos*, *trimembris*; and a *Period* of four, *quadrimebris*, *tetracos*.

A strict oratorical *Period* does not allow of either more or fewer than these: it is possible indeed to introduce a *Period* of one

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member, called by Aristotle *monocolos*, or simple *Period*; but it will be reputed a flaw, and is a thing never practised by the masters.

The *Period* may be likewise prolonged to five or six members; but then it changes its name, and instead of *Period*, commences what they call a *periodical discourse*.

A *Period* of two members Cicero supplies us with: *Ergo et mihi mea pristinae vitae consuetudinem, C. Caesar, interclusam aperuisti; et his omnibus ad bene de republica sperandum quasi signum aliquod sustulisti.*

A *Period* of three members the same Cicero gives us in the exordium of his *Manilian oration*: *Nam cum antea per aetatem hujus auctoritatem loci contingere non audem; statueremque nihil hic nisi perfectum ingenio, elaboratum industria offerri oportere; omne meum tempus amicorum temporibus transmittendum putavi.*

A *Period* of four members he gives us in that admirable description of the punishment of parricides. *Ita vivunt, ut ducere animam de caelo non queant: ita moriuntur, ut eorum ossa terra non tangat: ita jactantur fluctibus, ut nunquam obliuantur: ita postremo episcuntur, ut ne ad saxa quidem mortui conquiscant.*

The laws and measures of *Periods* are pretty strictly regarded by orators, at least they are so by the ancient ones: in ordinary discourse, and in the modern tongues authors are much less severe. In oratory, the members of *Periods* are to be equal, or nearly equal; that the pauses or rests of the voice at the close of each member may be nearly equal: but in writing not intended for rehearsal, this is disregarded.

Common discourse allows of *Periods* both longer and shorter than oratory; which admits of none less than two members, nor greater than four. Short, mutilated *Periods* break the stream, and check the course of the sublime; and long ones embarrass and keep the mind too long in suspense; and even strain the voice, which is never to stop but at the ends of *Periods*. Philareus, Hemogenes, Terence, &c. confine the just *Period* (called by the Latins, *Ambitus* and *Circuitus*) to four members; agreeable to the dictum.

*Quatuor e membris plenum formare ailebis
Rhetora circuitum, five ambitus ille coetor.*

Of which sentiment is Cicero, who in his *Orator* says, *Constat ille ambitus et plena comprehensio e quatuor fere partibus, quae membra dicuntur, ut et aures implant, et ne brevior sit quam satis sit, neque longior.*—An instance of a periodical discourse the same author gives us in the opening of his oration for Archias the poet: *Si quid in me sit ingenii, judices, quod sentis quam sit exiguum; aut si qua exercitatio dicendi, in qua me non infior mediocriter esse versatum; aut si hujus rei ratio aliqua ad optimarum artium studiis et disciplina profecta, a qua ego confiteor nullum etatis meae tempus abhorruisse; earum rerum omnium vel in primis hic A. Licinius fructum a me repetere prope suo jure debet.*

Periods are said to be either *rotundi*, round, or *quadrati*, square, according to their different economy, and cadences.

Square PERIOD is that consisting of three or four equal members, formally distinguished from each other—as, that of Cicero on the punishment of parricides.

Round PERIOD is that whose members or parts are so connected, and fitted into each other, as that the junctures or commissures are scarce seen; but the whole slides equally round, without any notable stops or inequalities.—Such are the dicolos and tricolos of Cicero above-mentioned.

PERIOD is also used for the character (.) wherewith the *Periods* of discourse are terminated and expressed; this is popularly called a *full-stop* or *point*. See *POINTING*.

Father Buffier observes two difficulties in the use of the *Period*, or point; i. e. in distinguishing it from the colon, or double point; and in determining justly the end of a *Period* or perfect sentence.

It is observed that the supernumerary members of a *Period*, separated from the rest by colons and semicolons, usually commence with a conjunction. Yet it is certain these same conjunctions sometimes rather begin new *Periods*, than supernumerary members of old ones. It is the sense of things, and the author's own discretion, that must make the proper distinction which of the two in effect it is. No rules will here be of any service, unless this be admitted as one; that when what follows the conjunction is of as much extent as what precedes it, it is usually a new *Period*; otherwise not.

The second difficulty arises hence, that the sense appears perfect in several short detached phrases, wherein it does not seem there should be *Periods*: a thing frequent in free discourse; as, *we are all in suspense: make your proposals immediately: you will be to blame for detaining us longer.* Where it is evident, that simple phrases have perfect senses like *Periods*, and ought to be marked accordingly; but that the shortness of the discourse making them easily comprehended, the pointing is neglected.

PERIOD, in numbers, is a distinction made by a point or comma, after every sixth place, or figure: and is used in numeration, for the reader distinguishing and naming the several figures or places: which see under *NUMERATION*.

PERIOD,

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PERIOD, in medicine, is applied to certain diseases which have intervals, and returns, to denote an entire course, or circle of such disease; or its progress from any state through all the rest, till it return to the same again.

Galen describes *Period* as a time composed of an intension and remission; whence it is usually divided into two parts, the paroxysm or exacerbation, and remission.

In intermitting fevers, the *Periods* are usually stated and regular; in other diseases, as the epilepsy, gout, &c. they are vague or irregular.

PERIOD is also used, by some writers, for the state of a distemper or disease.

PERIOD of the blood, **PERIODUS sanguinis**, the circle of the blood, or the tour it makes round the body, for the support of life. See **CIRCULATION**.

PERIODEUTA, ΠΕΡΙΟΔΕΥΤΗΣ, a church officer among the Greeks; established by the council of Laodicea, in towns, &c. where there were no bishops.

The *Periodeuta* were a kind of rural deans, so called, according to Zonaras, because always on the road, going from one quarter to another to keep the people in their duty.

Hence, Gregory of Thessalonica calls them *ambulanters, walkers*. Balsamon calls them *enarches*, by which name they are known among the Greeks at this day.

PERIODIC, PERIODICAL, something that terminates and comprehends a period.

A *periodical month*, is the space of time wherein the moon dispatches her period or *periodic motion*, viz. 27 days, 7 hours, 43 minutes, in which time she returns to the same point of the zodiac, wherein she was when she left the sun.

PERIODICAL diseases, are such as decline and rise again with similar symptoms, alternately.

In the *Philosophical Transactions*, Dr. Musgrave gives us an instance of a *periodic* rally; and Dr. Cole an instance of a *periodic* convulsion.

PERIODIC, in grammar, is applied to a style or discourse that has numbers; or which consists of just and artful periods.

PERIODICAL Winds. See the article **WIND**.

PERIOECI*, ΠΕΡΙΟΙΚΟΙ, in geography, such inhabitants of the globe as have the same latitudes, but opposite longitudes; or live under the same parallel, and the same meridian, but in different semi-circles of that meridian, or opposite points of the parallel.

* The word is formed from the Greek περί, about, and οἰκω, I inhabit. These have the same common seasons throughout the year; and the same phenomena of the heavenly bodies; but their hours, or times of the day, are opposite to each other. When *vi. gr.* with the one it is mid-day; with the other it is mid-night.

PERIOPTHALMIUM*, in natural history, a thin skin which birds can draw over their eyes to defend them, without shutting their eye-lids. — other wise called the nictitating membrane. See **NICTITATING membrane**.

* The word is compounded of the Greek περί, about, and οφθαλμῶ, eye.

PERIOSTEUM*, or **PERIOSTIUM**, in anatomy, a membrane, pretty tough, and extremely sensible, covering the whole exterior surface of all the bones of the body, the teeth only excepted. See *Tab. Anat. (Splanchn.) fig. 13. litt. g. g.* See also **BONE**.

* The word is originally Greek, περιosteon, formed of περί, about, and οστος, bone.

The *Periosteum* is derived from the dura mater, and consists principally of fibres detached thence; besides which it receives other fibres from the membrana communis of the muscles, or, as Dr. Havers imagines, from the fleshy fibres of the belly of the muscles, which intersect the former. — That part of it which covers the cranium or skull, is by a peculiar name called the *pericranium*.

The *Periosteum* is very thin every where; though not every where alike. It adheres closely to the bone; and in some places is observed to send fibres into the very substance thereof. Its principal use is to defend the muscles and tendons from being fretted in their action by the attrition of the hard substance of the bones; and to give notice, by its sensibility, of any thing that might annoy the bones. — Indeed, this last use is controverted; some of the latest anatomists maintaining that the *Periosteum* is wholly insensible.

PERIPATETIC philosophy, the system of philosophy, taught and established by Aristotle, and maintained by his followers, the *Peripateticks*.

A specimen of the *peripatetic* philosophy, see under **ARISTOTELIAN**.

PERIPATETICKS, ΠΕΡΙΠΑΤΗΤΙΚΟΙ, a sect of philosophers, the followers of Aristotle; or the maintainers of the *peripatetic* philosophy: called also *Aristotelians*.

Cicero tells us that Plato left two excellent disciples, Xenocrates and Aristotle, who founded two sects, which only differed in name: the former taking the appellation of *Academicks*, who were those that continued to hold their conferences in the

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academy, as Plato had done before: the others who followed Aristotle, were called *Peripateticks*; from περιπατω, I walk, because they disputed walking in the lyceum.

Animomius fetches the name *Peripatetic* from Plato himself, who only taught walking; and adds that the disciples of Aristotle, and those of Xenocrates, were equally called *Peripateticks*; the one *Peripateticks* of the academy, the other *Peripateticks* of the lyceum: but that at length, the former quitted the title *Peripatetic*, for that of academic, on occasion of the place where they assembled, and the latter retained simply that of *Peripatetic*. See **ACADEMIC**.

The greatest and best part of Aristotle's philosophy, he borrow'd from his master Plato: Serranus affirms confidently, and says he is able to demonstrate it, that there is nothing exquisite in any part of Aristotle's philosophy, dialectics, ethics, politics, physics, or metaphysics, but is found in Plato. And of this opinion are many of the ancient authors, Clemens Alexandrinus, &c.

Gale endeavours to shew, that Aristotle borrowed a good deal of his philosophy both physical about the first matter; and metaphysical about the first being, his affections, truth, unity, goodness, &c. from the sacred books; and adds from Clearchus, one of his (Aristotle's) scholars, that he made use of a certain Jew, who assisted him therein.

Aristotle's philosophy preserved itself in *paris naturalibus*, a long time; none of his followers or commentators having dared to make any innovations therein, till the beginning of the XIIIth century; when it began to be new modelled. — A reformed system of *peripateticism* was first introduced into the schools, in the university of Paris; from whence it soon spread throughout Europe; and has subsisted in the universities to this day, under the name of *school philosophy*.

The foundation hereof is Aristotle's doctrine, frequently misunderstood, and oftener misapplied: whence the retainers thereto may be denominated *reformed Peripateticks*.

Out of these have sprung, at several times, several branches, the chief are the Thomists, Scotists, and Nominalists; see each under its proper article, **THOMIST**, **SCOTIST**, and **NOMINAL**.

PERIPETIA*, ΠΕΡΙΠΕΤΕΙΑ, in the drama, that part of a tragedy wherein the action is turned, the plot unravelled, and the whole concludes.

* The word is formed from the Greek περιπτω, something falling into a different state, formed of περί, about, and πτω, cada, I fall.

The *Peripetia* is properly the change of condition, whether happy or unhappy, which the principal person or persons undergo; arising from some discovery or incident, which gives a new turn to the action.

The *Peripetia* therefore coincides with the catastrophe, or unravelling; unless we make the *Peripetia* to depend on the catastrophe, &c. as an effect on its cause.

The *Peripetia* is sometimes induced by remembrance or discovery, as in the Oedipus, where the messenger, sent from Corinth to invite Oedipus to the crown, informs him that Polybus and Meropé were not his father and mother; which begins a discovery, that Laius whom he had killed, and Jocasta whom he had then to wife, were his father and mother; and throws him into the deepest distress. — This instance Aristotle calls a *double Peripetia*.

The qualities of the *Peripetia* are, that it be probable and necessary; in order to which it must be the natural result, at least the effect, of the foregoing actions, or of the subject itself; and must not start out from any foreign, or collateral cause. Sometimes the *Peripetia* is occasioned without any discovery; as in the Antigone of Sophocles, where the change in Creon's fortune is produced by the effect of his own obstinacy; and sometimes by a mere change of the will, which, though the least artful, yet, Mr. Dryden observes, may be so managed, as to become exceedingly beautiful.

These two cases Aristotle calls *simple Peripetias*; in these, the change only consists in a passage out of trouble and action, into tranquillity and rest. See **FABLE**, **ACTION**, &c.

PERIPHERY*, in geometry, the circumference or bounding-line of a circle, ellipsis, parabola, or other regular curvilinear figure.

* The word is formed from the Greek περιφερει, circumference, I surround; of περί, about, and φερω, I bear or carry.

The *Periphery* of every circle is supposed to be divided into 360 degrees, which are again subdivided, each into 60 minutes; the minutes into seconds, &c.

The divisions of degrees, therefore, are fractions, whose denominators proceed in a sexagesuple ratio: as, the minute is $\frac{1}{60}$, second $\frac{1}{3600}$, third $\frac{1}{216000}$. See **SEXAGESIMAL**.

But these denominators being troublesome; in their stead are used the indices of their logarithms; hence the degree, being the integer, or unit, is marked by $^{\circ}$, the minute by $'$, second by $''$, &c.

Geometricians demonstrate, that a circle is equal to a triangle, whose base is equal to the *Periphery*, and altitude to the radius. See **TRIANGLE**.

Hence it follows, that circles are in a ratio compounded of

their peripheries and radii. But they are also in the duplicate ratio of their radii; therefore the *Peripheries* of circles are to each other as their radii: and since the *Periphery* of one circle is to its radius, as the *Periphery* of any other to its radius; the ratio of the *Periphery* to the diameter is the same in all circles.

Angle at the PERIPHERY. See the article *ANGLE*.

PERIPHRASIS, in rhetoric, *circumlocution*; a circuit or tour of words, much affected by orators, to avoid common and tame manners of expression.

* The word in the original Greek, περιφρασις, signifies *circumlocution*, formed of περι, about, and φρασις, I speak.

The *Periphrasis* is of good use on many occasions; and we are frequently forced to have recourse to it, to make things be conceived, which are not proper to name.

It is often a piece of politeness to suppress the names, and only intimate, or design them. These turns of expression are also particularly serviceable in oratory; for the sublime admitting of no direct citations, there must be a compass taken to influence the authors, whose authority is borrowed. A *Periphrasis*, by turning round a proper name to make it understood, amplifies and raises the discourse; but care must be taken it be not too much swelled, nor extended *mal à propos*, in which case it becomes flat and languid.

PERIPLUS, ΠΕΡΙΠΛΟΥΣ, a voyage or navigation round a certain sea, or sea coast.

Arrian has described all the coasts of the black sea, after having inspected them in quality of general of the emperor Adrian, to whom he dedicates the description under the title of *Periplus of the euxine sea*.

*PERIPNEUMONIA**, ΠΕΡΙΠΝΕΥΜΟΝΙΑ, in medicine, an inflammation of some part of the thorax, properly of the lungs; attended with an acute fever, and a difficulty of breathing. See LUNGS, &c.

* The word is formed from the Greek, περι, about, and πνευμον, lungs.

The *Pneumonia* is distinguished into *vera*, or true; and *notha*, or spurious.

The *true PERIPNEUMONY* is a real inflammation of the substance of the lungs, attended with a symptomatic fever, and a cough; by the former of which it is distinguished from an Asthma; and by the latter from a pleurisy.

Its usual causes are, want of exercise, hard study, suppression of natural evacuations, a moist air, or the like.—When it arises from a phlegmon, the patient spits pure blood; when it is erysipelatous, the sputum is yellow, and not much tinged with red. In this last, the breast is not so much contracted, but the fever is more violent.

The *Peripneumonia* is more dangerous, though less painful than the pleurisy: its usual way of going off is by expectoration of well concocted, reddish, yellow or white matter. The flowing of the mercuries, or any hæmorrhage, a diarrhoea, abscesses about the ears, or other parts, are also good prognosticks.—The medicines prescribed are mostly the same that obtain in asthmatic and pleuritic cases.

Spurious or bastard PERIPNEUMONY, is a disease of the lungs, arising from a heavy pituitous matter generated throughout the whole mass of blood, and discharged upon the lungs.

It is known by the viscosity, paleness, and slowness of the blood, ropiness of the saliva, paleness, and want of scent of the urine, swellings and obstructions in the minutest vessels, short breath, oppression in the thorax, &c. Worn out, phlegmatic, cold, phthirical, caranous, constitutions, are most liable to it. It begins with a feculence, indolence, weariness, difficulty of breathing, oppression of the breast, and feverishness; and goes on, without any great appearance of danger, to death itself, without any prognostic thereof in the urine, pulse, &c. It is cured by blood-letting, clysters, thin diet, diluters, abstersgents and aperients. See *Saturnient*, *Acute PERIPNEUMONY*.

*PERIPHERE**, ΠΕΡΙΦΕΡΟΣ, in the ancient architecture, a building encompassed on the out side with a series of miniature columns, forming a kind of ile or portico all around.

* The word is formed of the Greek, περι, circum, about, and φερα, ala, wing, g. d. winged on every side.

Such were the basilica of Antonine, the septizon of Severus, the portico of Pompey, &c.

Peripteres were properly temples, which had columns on all the four sides, by which they were distinguished from *prostyle*, and *amphiprostyle*, the one of which had no columns before, and the other none on the sides.

M. Perrault observes, that *Peripteron* in its general sense includes all the species of temples which have portico's of columns all around, whether the columns be diptere, or pseudo-diptere, or simply *Periptere*, which is a species that bears the name of the genus, and which has its columns distant from the wall by the breadth of an intercolumniation.—For the difference between *Periptere* and *peristyle*, see *PERISTYLE*.

*PERISCH**, ΠΕΡΙΣΧΙΟΙ, in geography, those inhabitants of the earth, whose shadows do, in one and the same day, successively turn to all the points of the horizon. See *SHADOW*.

* And hence the name, from the Greek περισχιστοι, g. d. circum- and σχις, of περι, about, and σχις, shadow.

Such are the inhabitants of the frozen zones, or those who live within the compass of the arctic and antarctic circles; for, as the sun never goes down to them after he is once up, but moves always round about, so do their shadows; inasmuch that, in the same day, they have their shadows on all sides.

*PERISKYTIISM**, or *PERISKYPHISM*, in chirurgery, an operation performed by the ancients on the cranium. See *CRANIUM*.

* The word is formed from the Greek, περι, and σκυτιζω, to lay, or cut the skin.

The *Periskytism* is an incision which they made under the coronal suture, reaching from one temple across to the other, and penetrating to the bone of the cranium: its intention was to separate the pericranium from the skull.

PERISSACHOREGIA, a term found in the code, about the meaning whereof authors are much divided.

Alciat, and some others, will have it to be the name of an office, viz. that of curator of the annona or provisions; from περισσων, abundance, and χορηγος, to lead, or bring.—Others take it to be the office of a magistrate who was to look to the augmentation of the annona, and the distribution of the same.

Dom. Maeri will have it to signify a donative, or distribution made to the soldiers, over and above their pay. See *DONATIVE*.

*PERISTALTIC**, ΠΕΡΙΣΤΑΛΤΙΚΟΣ, in medicine, a motion proper to the intestines, wherein their several parts are successively contracted from above downwards, or from the pylorus to the anus; in a manner somewhat resembling the creeping of a worm: whence it is also called the *vermicular motion*. See *INTESTINES*.

* The word is formed from the Greek περιστάλλω; and literally implies something driven or pressed all around.

The *peristaltic motion* is performed by the contraction of the circular and longitudinal fibres, whereof the fleshy coat of the intestines is composed. It is by means hereof that the chyle is driven into the orifices of the lacteal veins, and the excrements are pressed downwards, and at last expelled.

When this motion comes to be depraved, and its direction changed, so as to proceed from below upwards, it produces what we call the *iliac passion*. See *ILIAC PASSION*.

M. Perrault, in an express treatise on the *peristaltic motion*, observes, that though it is ordinarily only attributed to the intestines, yet it is really an action common to all those parts of the body which alter, prepare, concoct the several humours and spirits, which are the matter and instruments of animal action.—In effect, he gives the name to all the motions whereby the cavities of the body are pressed or compressed.

PERISTAPHYLINUS, in anatomy, a name which some give to a muscle of the uvula, more properly denominated *pterygo-staphylinus*. See *UVULA* and *PTERYGOSTAPHYLINUS*.

*PERISTYLE**, ΠΕΡΙΣΤΥΛΙΟΝ, in the ancient architecture, a place or building, encompassed with a row of columns on the inside; by which it is distinguished from the periptere, where the columns are disposed without-side.

* The word is formed from the Greek περι, about, and στύλος, column.

Such was the hypæthre temple of Vitruvius; and such are now some basilica's in Rome, several palaces in Italy, and most cloisters of religious.

PERISTYLE is also used by modern writers for a range of columns, either within, or without a building.

Thus we say, the corinthian *Peristyle* of the portal of the Louvre, &c.

PERISYSTOLE, ΠΕΡΙΣΥΣΤΟΛΗ, in medicine, the pause or interval between the two motions of the heart, or pulse, viz. that of the systole or contraction, and that of the diastole or dilatation.

*PERITONÆUM**, or *PERITONEUM*, in anatomy, a thin soft membrane, covering and containing all the viscera of the lower belly.—See *Tab. Anat. (Splanchn) fig. 1. lit. u. u. fig. 3. lit. b. b.* See also *VISCERA* and *ABDOMEN*.

* The term is Greek, περιτοναιον, or περιτονειον, derived from the verb περιτονω, circumtendo, I stretch all around.

The figure and size of the *Peritonæum* answer to those of the lower belly, which it lines throughout; its internal surface is smooth, and lined with an unctuous humour, serving to prevent its wounding the intestines, and other parts it touches, as well as to lubricate and facilitate their motion. When the glands which furnish it are obstructed, the *Peritonæum* grows thick, as is frequently found in dropsies.

The external surface is fibrous and unequal, that it may adhere more firmly to the muscles of the abdomen, linea alba, oïla pubis, ischium, ilium sacrum, and the vertebrae lumbares, to which it is fastened; and from the last whereof, many suppose it to have its origin.

It is also connected to the inferior or convex surface of the liver, which it suspends: and the part employed in this action, is called the *ligamentum suspensorium hepatis*.

The *Peritonæum* is double every where, but most apparently so from the navel to the os pubis, and near the lumbar vertebrae; as appears

appears not only from its extraordinary thickness in both, but from its spontaneous parting in the latter, to receive the kidneys. It is perforated in the upper part to give passage to the œsophagus, aorta, and cava; in the under, for the fundament, the neck of the matrix, and the vessels that go to the thighs; and in the fore-part to give passage to the umbilical vessels.

Its exterior coat has two processes; which in men fall down into the scrotum, wrap up the spermatick vessels, and dilating make the tunica vaginalis of the testicles; in women they form a cover for the round ligament of the womb.

The *Peritonæum* receives veins and arteries from the mammariæ, diaphragmaticæ, epigastricæ, sacre, and lumbares: ne ves from the os sacrum and loins. Ol. Rudbeckius pretends to have likewise discovered lymphatics, but these being scarce visible, except in hydropic cases, are not much taken notice of.

In morbid cases, great quantities of serum have been found between the duplicatures of this membrane, when there was none in the cavity of the abdomen: This constitutes the true tympany.

The use of the *Peritonæum* is to contain, and keep in their place the viscera of the abdomen; this is so manifest, that when ever this membrane happens to be broke, or extraordinarily dilated, some of the parts are apt to fall down, and to form those tumors called *hernias* or *ruptures*. See *HERNIA*.

PERITROCHUM, in mechanics, a wheel, or circle, concentric with the base of a cylinder, and moveable together with it, about an axis.—Such is the wheel AB, *Tab. Mechanicæ*, fig. 44. moveable on the axis EF. The axis, with the wheel, and levers fixed therein to move it, make that mechanical power, called *axis in peritrochio*.

Axis in peritrochio, in mechanics, one of the six mechanical powers, or simple machines, contrived for the raising of weights.—See its structure, doctrine, application, &c. under the article *Axis in peritrochio*.

PERJURY, *PERJURIUM*, in law, the crime of swearing falsely in a lawful oath, administered by one who has authority, in any matter relating to an issue, or cause in question; whether it be of the person's own accord, or by subornation of another. If a man calls me *perjured*, I have my action upon the case. If he calls me *forsworn*, no action lies, because the forswearing may be extra-judicial.—*Perjury* is usually excepted out of general acts of grace.

The punishment of *Perjury* is collisfrigium, the pillory, or burning the criminal in the forehead with a P, rooting up his trees, and confiscating his goods.

PERMANENT air. } See the article { **AIR**.
PERMANENT quantity } See the article { **QUANTITY**.

PERMEABLE, denotes a body considered as its pores are capable of letting somewhat pass through them. See *PORE*.

PER MINIMA, in medicine, denotes a perfect mixture of the smallest particles of several bodies, or ingredients.

PER MINIMA, in pharmacy, denotes an intimate and perfect mixture of natural bodies; wherein their very *minima*, i. e. their atoms, or first component particles are supposed to be accurately blended together.

If silver and lead be melted together, they will thus mingle *per minima*.

PERMITTIT—*quare non PERMITTIT*. See the article *QUARE*.

PERMUTATION, the truck, or exchange of one thing for another.

The commerce of the first inhabitants of the world was performed wholly by way of *Permutation*.

PERMUTATION, in the canon law, a real and actual exchange of two benefices.

Permutation is a means of bringing benefices into commerce without simony.

The conditions acquired to a canonical *Permutation*, are, 1^o That there be benefices *permuted* on either side, though the revenues be unequal; and in case of inequality, no compensation is to be made in money, but only a pension is to be charged on the greater. 2^o That each of the *Permuted* quit their benefices, and make a procuration *ad resignandum*. 3^o That the *Permutation* be followed by a collation of the ordinary. 4^o That the ordinary be informed of the cause of the *Permutation*. 5^o That those to whom the presentation or election to the benefices belongs, give their consent; or in case of their refusal, that the consent of the diocesan be had.

The chief rules of *Permutation* are, that if one of the *compemutants* cannot enjoy, he re-enters with full right into the benefice he has quitted; and that if he die before he have accomplished the *Permutation* on his part by the taking of possession, the *compemutant* who has accomplished, retains both benefices, unless they fall into the regale.

PERMUTATIONS of quantities, in algebra, the changes, alternations, or different combinations of any number of quantities.

PERMUTATIONE archidiaconatus & *exclusivæ eidem annexæ cum ecclesiâ & prebendis*, is a writ issued to an ordinary, commanding him to admit a clerk to a benefice upon exchange made with another. *Reg. of writs*.

PER MY & *per tout*—A joint tenant is said to be seized of the land he holds jointly, *per my et per tout*, i. e. he is seized by every parcel, and by the whole, *tantum tenet, & nihil tenet; & totum conjunctum, & nihil separatum*. *Bract.*

PERNANCY, in law, the taking, or receiving any thing—from the French, *prendre*, to take.

Tithes in *Pernancy*, are tithes taken, or which may be taken, in kind.

PERNIO (in medicine) a disease afflicting the hands and feet in the winter time, popularly called a *kibe* or *chilblain*.

The parts affected swell, inclining from a white to a bluish colour, itch and ache; yet the tumor vanishes without any exulceration, upon anointing the part with petroleum, or the like.

PERNOR of profits, he who takes, or receives the profits of anything—from the French, *preneur*, taker.

PERONE, in anatomy, a bone of the leg, more usually called *fibula*. Hence

PERONEUS anticus, *longus* or *primus*, a muscle of the leg, arising fleshy and tendinous from the head to the middle of the perone; whence, running as in a pulley, through the channel on the hind part of the outer ankle bone, it is inserted into the upper end of the bone of the metatarsus, which joins the great toe. The office of this muscle is to draw the foot upwards. See *Tab. Anat. (Myol.) fig. 1. n. 76. fig. 2. n. 46. fig. 6. n. 43. fig. 7. n. 28.*

PERONEUS posticus, *brevis* or *secundus*, a muscle sometimes also called *semifibularis*, arising fleshy and sharp on the back part of the perone; whence, continuing down the outer side of the bone till below the middle, it forms a smooth, strong, flat tendon, which runs through the same channel at the bottom of the malleolus externus, with the longus, to the out-side of the os metatarsi of the little toe. Its office is to pull the foot upwards. See *Tab. Anat. (Myol.) fig. 1. n. 76. fig. 6. n. 43. fig. 7. n. 28.*

PERORATION, *PERORATIO*, in rhetoric, the epilogue, or last part of an oration; wherein, what the orator had insisted on through his whole discourse is urged afresh, with greater vehemence and passion.

The *Peroration* consists of two parts, 1. recapitulation, wherein the substance of what was dilated throughout the whole speech, is collected briefly, and cursorily; and summed up with new force and weight.

2. The moving the passions which is so peculiar to the *Peroration*, that the masters of the art call this *sedes affectuum*. See *PASSIONS*.

The passions to be raised in the *Peroration* are various, according to the various kinds of orations: in a panegyric, love, admiration, emulation, joy, &c. In an invective, hatred, contempt, &c. In a deliberation, hope, confidence, or fear.

The qualities required in the *Peroration* are, that it be vehement and passionate; and that it be short: because, as Cicero observes, tears soon dry up.

The *Peroration* was Cicero's master-piece, here that great orator not only let his judges and auditors on fire, but even seemed to burn himself; especially when he was to raise pity and commiseration towards the accused; where, as he himself tells us, he frequently filled the forum with weeping and lamentation. He adds, that where there were several orators to speak for the same person, the *Peroration* was always reserved to him; and subjoins, that if he excelled herein, it was not owing to genius, but the grief himself shewed.—This is abundantly evident in his *Milonian Peroration*, where he says, *Sed finis sit: neque enim præ lacrymis jam loqui possum, & hic se lacrymis defendi vetat*—and in that for *Rabirius Posthumus*: *Sed jam, quoniam, ut spero, fidem quam potui, tibi præstiti, Posthume, reddam, etiam lacrymas quas debeo—sum indicat tot hominum fletus quam sis carus tuis, & me dolor debilitat, includitque vocem*.

PERPENDICULAR, in geometry, a line falling directly on another line, so as to make equal angles on each side; called also a *normal* line.

Thus the line IG. (*Tab. Geometry; fig. 57.*) is perpendicular to the line KH, i. e. makes right and equal angles therewith. From the very notion of a *Perpendicular*, it follows; 1. That the *Perpendicularity* is mutual; i. e. if a line, as IG be perpendicular to another, KH; that other is also perpendicular to the first.

2. That only one *Perpendicular* can be drawn from one point in the same place.

3. That if a *Perpendicular* be continued through the line it was drawn perpendicular to; the continuation will also be perpendicular to the same.

4. That if there be two points of a right line, each of which is at an equal distance from two points of another right-line; that line is perpendicular to the other.

5. That a line which is perpendicular to another, is also perpendicular to all the parallels of the other.

6. That a perpendicular line is the shortest of all those which can be drawn from the same point to the same right-line.

Hence the distance of a point from a line, is a right-line, drawn from the point perpendicular to the line or plane; and hence

the altitude of a figure is a *Perpendicular* let fall from the vertex to the base.

To erect a *PERPENDICULAR* GI on any given point G, in a right line ML: one foot of the compasses being in G, with any interval at pleasure, cut off equal parts on each side G H and G K; from the points K and H, with an interval greater by half than K I strike two arches intersecting in I; the right line G I is *perpendicular* to M L.

Perpendiculars are best described in practice by means of a square; one of whose legs is applied along that line to or from which the *Perpendicular* is to be let fall or raised.

To erect a *PERPENDICULAR* on the end of a given line, suppose at P; open your compasses to any convenient distance, and setting one foot in C, describe the arch RPS; lay a ruler from S through C, it will find the point R in the arch, whence draw P R, which is *perpendicular* to P M.

To let fall a *PERPENDICULAR* on a given line, M P; from a given point L, fig. 57. n. 2. let one foot of the compasses in L, and with the other cross the given line in the points M and G. Then setting the compasses in G and M, strike two arches intersecting each other in a; then lay a ruler from L to a, and the line K L described thereby is the *Perpendicular* required. A line is said to be *perpendicular* to a plane, when it is *perpendicular* to more than two lines drawn in that plane.

A plane is said to be *perpendicular* to another plane, when a line in one plane is *perpendicular* to the other plane.

PERPENDICULAR to a parabola, is a right line cutting the parabola in the point in which any other right line touches it, and is also itself *perpendicular* to that tangent.

PERPENDICULARITY of Plants, is a curious phenomenon, in natural history, first observed by M. Dodart, and published in an express Essay on the affectation of *Perpendicularity* observable in the stems or stalks of all plants, in the roots of many, and even in their branches as much as possible.

The matter of fact is, that tho' almost all plants rise a little crooked, yet the stems shoot up *perpendicularly*, and the roots sink down *perpendicularly*: even such as by the declivity of the soil come out inclined, or such as are diverted out of the *Perpendicular* by any violent means, again redress or straighten themselves, and recover their *Perpendicularity*, by making a second and contrary bend or elbow, without rectifying the first. A common eye looks on this affectation without any surprize; but a man that knows what a plant is, and how formed, finds it a subject of astonishment.

In effect, each seed contains in it a little plant, already formed, and needing nothing but to be unfolded: the little plant has its little root; and the pulp, which is usually separated into two lobes, is the foundation of the first food the plantule draws, by its root, when it begins to germinate.

Now if a seed in the earth be so disposed, as that the root of the little plant be turned downwards, and the stem upwards, and even *perpendicularly* upwards; it is easy to conceive that the little plant coming to unfold itself, its stalk and root need only follow the direction they have, to grow *perpendicularly*. But it is known the seeds of plants, whether sown of themselves, or by the help of man, fall in the ground at random; and among an infinite number of situations with regard to the stalk of their plant, the *perpendicular* one upwards is but one.

In all the rest therefore, it is necessary the stalk redress or rectify itself, in order to get out of the ground: but what force is it, that effects this change, which is certainly a violent action? is it that the stalk finding a less load of earth above it, goes naturally that way where it finds the least obstacle? were this so, the little root when it happens to be uppermost, must for the same reason follow the same direction, and mount on high.

M. Dodart, therefore, to account for two such different actions, has recourse to another system: he supposes that the fibres of the stalks are of such a nature, as that they contract and shorten by the heat of the sun, and lengthen out by the moisture of the earth: and on the contrary, that the fibres of the roots contract by the moisture of the earth, and lengthen by the heat of the sun.

When, then, the plantule is inverted, and the roots a-top; the fibres which compose one of the branches of the root are not equally exposed to the moisture of the earth; the lower part is more exposed than the upper. The lower therefore must contract the most; which contraction is again promoted by the lengthening of the upper, whereon the sun acts with the greatest force. Of consequence, therefore, this branch of the root must recoil towards the earth, and insinuating through the pores thereof must get underneath the bulb, &c.

By inverting this reasoning, it is easy to shew how the stalk comes to get uppermost.

In a word, we may imagine, that the earth attracts the root to itself, and that the sun contributes to its descent; and on the contrary, that the sun attracts the stem, and the earth, in some measure sends it towards the same.

As to the second straightening, viz. that of the stalks in the open air, he takes it to arise from the impression of external causes, particularly the sun and rain. For the upper part of a

stalk that is bent, is more exposed to the rain, dew, and even sun, &c. than the under. Now both these causes, in a certain structure of the fibres, tend equally to straighten the part most exposed, by the shortening they successively occasion in it; for moisture shortens by swelling, and heat by dissipating. Indeed, what that structure is which gives the fibres such different qualities, or whereon it depends, is still a mystery.

M. de la Hire accounts for the *Perpendicularity* of the stems or stalks of plants thus: he imagines that in plants the root draws a coarser and heavier juice; and the stem and its branches a finer and more volatile one. And, in effect, most naturalists conceive the root as the stomach of the plant, where the juices of the earth are subtilized, so as to become able to rise through the stem to the extremity of the branches. This difference of juices supposes larger pores in the roots than the stalk, &c. and in a word, a different texture; which difference must be found even in the little invisible plant inclosed in the seed: in this plantule, therefore, we may conceive a point of separation; such as that all on one side, i. e. the root, shall be unfolded by the grosser juices, and all on the other side, by the more subtle juices.

Suppose, now, the plantule when its parts begin to unfold, to be entirely inverted; the root a-top, and the stalk below: the juices which enter the root will still be coarsest, and when they have opened and enlarged the pores, so as to admit juices of a determinate weight, those juices still pressing the root more and more, will drive it downwards, and this the more, as the root is more extended or enlarged: for the point of separation being conceived as the fixed point of a lever, they will act by the longer arm. At the same time the volatile juices having penetrated the stalk, will tend to give it a direction from below upwards; and by reason of the lever, will give it more and more every day. Thus is the little plant turned on its fixed point of separation, till it be perfectly erect.

The plant thus erected, the stalk, we know, should continue to rise *perpendicularly*, to give it the more firm bidding, and enable it to withstand the effort of wind and weather.

The manner wherein this is effected, M. Parent lays down thus: the nutritious juice being arrived at the extremity of a rising stalk; if it evaporate, the weight of the air which encompasses it on all sides, will make it ascend vertically; and if it do not evaporate, but congeal, and remain fixed to that extremity whence it was ready to go off, the weight of the air will give it the same direction; so that the stalk will have acquired a very little new part, vertically laid over it: just as in a candle held any how obliquely to the horizon, the flame still continues vertical, by the pressure of the atmosphere. The new drops of juice that succeed, will follow the same direction; and as all together form the stalk, that must of course be vertical, unless some particular circumstance intervene.

As to the branches, which are at first supposed to proceed laterally out of the stalk in the first embryo of the plant; though they should even come out in a horizontal direction, yet, must they raise themselves upwards by the constant direction of the nutritious juice; which at first scarce meets any resistance in a tender, supple branch; and even afterwards, though the branch grow more firm, yet will it act with the more advantage: since the branch being become longer, furnishes it with a longer arm or lever. The slender action of a little drop becomes very considerable, by its continuity; and by the assistance of such favourable circumstances. Hence may be accounted for, that regular situation and direction of the branches, which all, and always nearly, make the same constant angle of 45° with the stem and with one another.

M. Astruc accounts for the *Perpendicularity* of the stems, and their redressing themselves, on these two principles. 1^o That the nutritious juice arises from the circumference of the plant, and terminates in the pith. 2^o That fluids contained in tubes either parallel or oblique to the horizon, gravitate on the lower part of the tubes, and not at all on the upper.

For hence it easily follows, that in a plant posited either obliquely or parallel to the horizon, the nutritious juice will act more on the lower part of the canals than the upper, and by this means, insinuate more into the canals communicating therewith, and be collected more copiously therein; thus the parts on the lower side will receive more accretion, and be more nourished than those on the upper; the consequence whereof must be, that the extremity of the plant will be obliged to bend upwards.

The same principle brings the seed into its due situation at first: in a bean planted upside down, the plumbe and radicle are easily perceived with the naked eye, to shoot, at first, directly, for about an inch; but thereupon they begin to bend, the one downward, and the other upward. The like is seen in a heap of barley to be made into malt, or in a quantity of acorns laid to sprout in a moist place, &c. each grain of barley in the first case, and each acorn in the second, has a different situation; and yet, all the sprouts tend directly upward, and the roots downward, and the curvity or bend they make is greater or less as their situation approaches more or less to the direction wherein no curvature at all would be necessary. Now, two such opposite

opposite motions cannot arise without supposing some considerable difference between the two parts : the only one we know of, is, that the plume is fed by a juice, imported to it by tubes parallel to its sides, whereas the radicle imbibes its nourishment at all the pores in its surface. As oft, therefore, as the plume is either parallel, or inclined to the horizon, the nutritious juice feeding the lower parts more than the upper, will determine its extremes to turn upward, for the reasons already assigned. On the contrary, when the radicle is in the like situation, the nutritious juice penetrating more copiously through the upper part than the under, there will be a greater accretion of the former than the latter; and consequently the radicle will be bent downwards. And this mutual curvity of the plume and radicle must continue, till such time as their sides are nourished alike, which cannot be till they are perpendicular. *Mémoires de l'Acad. Royale des Scienc. an. 1708.*

PERPETUAL, something that endures always, or that lasts for ever.

PERPETUAL, is sometimes also used for a thing that lasts, or holds during a person's life.

Thus offices, &c. held *durante vita*, are sometimes called *perpetual* offices.—In this sense, M. Fontenelle is said to be *perpetual* secretary of the royal academy of sciences. Hence the French call him absolutely, *M. le Perpetuel*.

PERPETUAL action. See the article **ACTION**.

PERPETUAL glands, in anatomy, are those which are natural : thus distinguished from the adventitious ones.

PERPETUAL Lamp. See the article **LAMP**.

PERPETUAL motion, in mechanics, is a motion which is supplied and renewed from itself, without the intervention of any external cause : or, it is an uninterrupted communication of the same degree of motion from one part of matter to another, in a circle, (or other curve returning into itself) so as the same momentum still returns undiminished upon the first mover.

To find a *perpetual* motion, or to construct an engine, &c. which shall have such a motion, is a famous problem that has employed the mathematicians of two thousand years; though none perhaps have prosecuted it with attention and earnestness equal to those of the present age.

Infinite are the schemes, designs, plans, engines, wheels, &c. to which this longed for *perpetual* motion has given birth : it were as endless as impertinent to give a detail of them all.

Nor does any of them deserve particular mention, since they have all equally proved abortive. It would rather be of the nature of an affront than a compliment, to distinguish the pretenders hereto; when the very thing they are commemorated for, carries with it so disagreeable an idea.

In effect, there seems but little in nature to countenance all this assiduity and expectation : among all the laws of matter and motion, we know of none yet, which seem to lay any principle or foundation for such an effect.

Action and re-action are allowed to be ever equal; and a body which gives any quantity of motion to another, always loses just so much of its own : but under the present state of things, the resistance of the air, the friction of the parts of machines, &c. do necessarily retard every motion.

To keep the motion on foot, therefore, either 1st there must be a supply from some foreign cause, which in a *perpetual* motion is excluded.

Or, 2^{dly}, all resistance from the friction of the parts of matter must be removed; which necessarily implies a change in the nature of things.

For, by the second law of nature, the changes made in the motions of bodies, are always proportional to the impressed moving force, and are produced in the same direction with it; no motion then, can be communicated to any engine, greater than that of the first force impressed.

But, on our earth, all motion is performed in a resisting fluid; and must therefore of necessity be retarded; consequently a considerable quantity of its motion will be spent on the medium.

Nor is there any engine or machine wherein all friction can be avoided; there being in nature no such thing as exact smoothness, or perfect congruity; the manner of the cohesion of the parts of bodies, the small proportion the solid matter bears to the vacuities between them, and the nature of those constituent particles not admitting it.

This friction, therefore, will also in time sensibly diminish the impressed, or communicated force; so that a *perpetual* motion can never follow, unless the communicated force be so much greater than the generating force, as to recompense the diminution made therein by all these causes: but *nil dat quod non habet*, and the generating force cannot communicate a greater degree of motion than it hath itself.

The whole business of finding a *perpetual* motion, therefore, comes to this, *viz.* to make a weight heavier than itself, or an elastic force greater than itself.

Or, 3^{dly} and lastly, there must be some method of gaining a force equivalent to what is lost, by the artful disposition and combination of mechanic powers : to which last point, then,

all endeavours are to be directed : but how, or by what means such force should be gained, is still a mystery.

The multiplication of powers or forces, it is certain, avails nought; for what is gained in power is still lost in time, so that the quantity of motion still remains the same.

All mechanicks cannot really make a little power equal, or superior to a larger; and where-ever a less power is found in equilibrio with a larger, *v. gr.* twenty five pounds with a hundred, it is a kind of deception of the sense: the equilibrium is not strictly between one hundred and twenty five; but between one hundred pounds, and twenty five moving, or disposed to move four times as fast as the one hundred.

To consider the weights one hundred and twenty five as fixed, and immoveable; the twenty five may seem, some how, raised beyond themselves; which is one of the sham-miracles of mechanicks, that has deceived millions; but which is easily dissipated by considering the four degrees of velocity, which are to be given to the twenty five pounds, and which require a force equal to the excess of one hundred above twenty five pounds.

A power of ten pounds moved with ten times the velocity of the one hundred pounds, would have equalled them in the like manner; and the same may be said of all the possible products equal to one hundred. But in fine, there must still be one hundred pounds of power on each side, what way soever they be taken; whether in the matter, or in the velocity.

This is an inviolable law of nature; by which nothing is left to art, but the choice of the several combinations that may produce the same effect.

PERPETUAL oculation. See the article **OCCULTATION**.

PERPETUAL pills, *pillule PERPETUÆ*, among physicians, are pills made of regulus of antimony; which being swallowed and voided fifty times, will purge every time, with undiminished force.

PERPETUAL, or *endless screw*. See **SCREW**.

PERPETUAL virginity. See the article **VIRGIN**.

Circle of PERPETUAL apparition. See the article **CIRCLE**.

PERPETUITY, *PERPETUITAS*, in the canon law, the quality of a benefice that is irrevocable, or whose incumbent cannot be deprived; except in certain cases determined by law.

It is asserted with reason, that the *Perpetuity* of benefices is established by the ancient canons, and that priests are inseparably attached to their churches, as by a spiritual marriage. It is true, by the corruption of the times, the secular priests being fallen into great disorder, and even contempt, the bishops anciently called the religious to their assistance, and committed to them the cure of souls, and the administration of parishes; still remanding them back again to their cloisters, when they thought fit, and again revoking them *ad nutum*.

But this vague and uncertain administration only lasted to the XIIth Century, when benefices returned to their eternal *Perpetuity*.

PER QUÆ servitio, is a writ judicial, issuing on the note of a fine; and lyes for the cognize of a manor, feignory, church rent, or other services, to compel the tenant of the land, at the time of the fine levied, to attourn to him.

PERQUISITE, *PERQUISITUM*, any thing gotten by a man's own industry, or purchased with his own money.—In contradistinction to that which descends to him from his father, or his ancestors.

PERQUISITES of courts, are those profits which arise to a lord of a manor, by virtue of his court-baron; over and above the certain yearly profits of his lands; as fines of copy-holds, heriots, amerciements, waives, strays, &c.

PERRIWIG. See the article **PERRUKE**.

PERRON, in architecture, a stair-case lying open, or without side the building : properly, the steps before the front of the building, which lead into the first story when raised a little above the level of the ground.

Perrons are made of different forms and sizes, with regard to the space and height they are to lead to.—Sometimes the steps are round, or oval; more usually they are square.

PERRUKE, or **PERRIWIG**, was anciently used for a long head of natural hair; such particularly, as there was care taken in the adjusting and trimming of.

* *Menage* derives the word by a long detour, from the Latin *pilus*, hair. The several stages of its passage, according to the critic, are *pilus*, *pelus*, *pelutus*, *peluticus*, *peluticus*, *peluticus*, *peruca*, *peruca*.

The Latins called it *coma*; whence part of gaul took the denomination of *Gallia comata*, from the long hair, which the natives wore as a sign of freedom. An ancient author says that Abolom's *Perruke* weighed two hundred shekels.

PERRUKE, is now used for a set of false or borrowed hair, curled, buckled, and sewed together on a frame, or cawl; anciently called *capillamentum*, or *falsæ Perruke*.

It is doubted whether or no the use of *Perrukes* was known among the ancients. It is true, they used false hair; Martial and Juvenal make merry with the women of their time, for making themselves look young with their borrowed hair; with the men who changed their colours according to the seasons;

and with the dotards, who hoped to deceive the definies by their white hair.

But these seem to have scarce had any thing in common with our *Perrukes*; and were at best only composed of hair painted and glued together. Nothing can be more ridiculous than the description Lampridius gives of the emperor Commodus's *Perruke*: it was powdered with scrapings of gold, and oiled (if we may use the expression) with glutinous perfumes for the powder to hang by.

In effect, the use of *Perrukes*, at least on their present footing, is not an hundred years old: the year 1629 is reckoned the epocha of long *Perrukes*; at which time they began to appear in Paris; whence they spread by degrees throughout the rest of Europe.

At first it was reputed a scandal for young people to wear them, by reason the loss of their hair at that age was attributed to a disease, the very name whereof is a reproach: but at length the mode prevailed over the scruple; and now all ages and conditions wear them; foregoing, without any necessity, the conveniences of their natural hair.

It was some time, though before ecclesiasticks came into the fashion: the first who assumed the *Perruke* were some of the French clergy in the year 1660; nor is the practice yet well authorized. The cardinal Grimaldi in 1684, and the bishop of Lavaur in 1688, prohibited the use of the *Perruke* to all priests without a dispensation and necessity. M. Thiers has a treatise express, to prove the *Perruke* indecent in an ecclesiastic, and directly contrary to the decrees and canons of councils. A priest's head embellished with an artificial hair curiously adjusted, he esteems a monster in the church; nor can he conceive any thing so scandalous as an abbot with a florid countenance, heightened with a well curl'd *Perruke*.

PERRY, a drink made of pears, after the like manner as cyder is made from apples.

The best fruit for this use, are such as are least fit for eating; *e. gr.* the borbery-pear, horse-pear, boreland pear, and choak-pear: and always the redder they are the better.

The method of preparing *Perry*, is perfectly the same with that of cyder.—Only note, that the fruit must be perfectly ripe. Some mix crabs with them to mend the liquor.

PER SE, in the schools, is sometimes opposed to *per accidens*.—in which sense a thing is said to agree with another *per se*, when the agreement is not owing to any accidental event, but is found in the intrinsic principles of things themselves.

PER SE is sometimes also opposed to *per aliud*.—In which sense God alone is said to have a being *per se*, as not deriving it from any other, but having it necessarily and of himself.

PER SE, again, sometimes signifies as much as, of its own nature, or in virtue of its own entity.—Thus the sun is said to give light *per se*; and thus quantity is extended *per se*.

PER SE, among logicians—A thing is said to be known *per se*, *per se notum*, when we immediately perceive it upon the first proposing of the terms.—As, that the whole is greater than its parts.

Philosophers go so far as to consider the mode of a thing existing *per se*, or that which constitutes its existence such; which they call *per se*, *per se*.

Object PER SE. See the article **OBJECT**.

PER SE, in chymistry. When a body is distilled singly, and without the usual addition of any other matter to raise it; it is said to be distilled *per se*.

The genuine spirits of harts-horn, are those raised *per se*, in opposition to those distilled with the addition of lime.

PERSECUTION, **PERSECUTIO**, literally imports any pain, affliction, or inconvenience, which a person designedly inflicts on another.

PERSECUTION, as a term, is restrained to the sufferings of christians, in behalf of their religion; particularly to those of the primitive christians, under the heathen emperors Nero, Decius, Dioclesian, &c.

We usually reckon ten of these persecutions; Nero set on foot the first.

Lactantius has wrote the history of the deaths of *Persecutors*, though some question whether that work be really his or not: but bishop Burnet, who has turned it into English, makes no great doubt of it.

PERSEVERANCE, in theology, a christian virtue, whereby we are enabled to persist in the way of salvation to the end. The final *Perseverance* of the saints is an article much controverted between the Arminians and Calvinists: the latter of whom maintain it impossible for grace to be lost; and therefore make *Perseverance* to the end, a necessary consequence thereof: which the former deny; esteeming the most confirmed believers never to be out of a possibility of falling.

PERSEUS, in astronomy, a constellation of the northern hemisphere; whose stars, in Ptolemy's catalogue are twenty nine; in Tycho's as many; and in the Britannic catalogue sixty seven, the longitudes, latitudes, magnitudes, &c. whereof are as follows:

Names and situation of the stars.	Sign.	Longit.	Latitude North.	Magnit.
In Andromeda's foot, according to Ptolemy and Tycho; according to Bayer in Perseus.	8 8 08	36 35 23 45	4	
In the middle of the sword	10 18	13 36 49 13	5	
5	14 19	14 40 13 15	6	
	11 52	02 36 18 37	6	
	12 09	56 34 26 01 6	7	
	15 39	10 38 57 37	6	
	19 02	06 41 13 15	6	
	15 45	38 35 09 28	6	
South in the hilt of the sword against North.	19 56	48 40 43 20	5 6	
10	20 12	34 41 03 20	6	
Small one under the hand	19 44	42 38 57 41	6	
	20 39	23 39 28 49	7	
	22 47	39 37 06 23	7	
North of the informes before Medu-	16 32	13 23 13 10	6	
In the preced. shoulder (a's head	20 19	25 31 36 07	4	
15	18 25	56 26 57 26	6	
In the upper arm dusa's head	24 23	27 37 26 50	4	
South of the informes before Me-	17 29	12 20 55 32	4	
Preced. of inform, under Medusa's	16 36	35 17 46 05	5	
In Perseus's head (head	23 35	34 20 12	5	
20	18 08	09 20 44 42	6	
Subseq. and lefs. before Medusa's	16 51	09 14 24 47	5 6	
(head	19 34	36 21 42 15	4	
Preced. in Medusa's head	18 13	28 17 24 46	6	
Last of inform, under Medusa's head	25 42	10 34 30 05	3	
In the hinder shoulder	27 10	38 27 27 42	5 6	
25	20 34	30 20 33 13	4	
In the upper part of the arm	24 49	20 30 38 35	4	
South. in Medusa's head	21 50	42 22 23 47	2 3	
In the middle of the back, Algol	23 21	12 26 04 21	4	
Bright one in Medusa's head	22 01	38 20 55 56	4 5	
In the lower part of the arm	26 52	43 30 42 10	6 7	
30	24 38	48 24 49 51	6	
That under Algol.	26 54	54 30 33 42	6	
	25 07	54 23 38 05	5 6	
Against the preced. and south side	27 46	04 30 05 20	2	
35	28 35	25 29 30 00	2	
A lucid one against the hind part	28 17	42 28 00 24	5	
Preced. the lucida of the hind. part	28 03	15 26 03 51	6	
Middle of three in the side	29 26	13 27 56 05	5	
40 (hip	0 29	07 27 15 21	3	
Another following these against the	26 48	20 13 53 28	6	
Over the heel of the inner foot	29 30	16 22 07 03	4	
In the lower thigh	26 49	11 12 38 36	3 4	
In the heel of the south. foot	28 05	52 12 40 25	6	
In the heel of the same foot	2 54	03 26 20 30	7	
45	3 46	55 29 33 04	5	
In the upper thigh	28 47	44 11 17 54	3	
In extrem. of south. foot	1 21	25 19 04 53	3	
In south. knee	0 39	15 14 54 06	5	
In south. leg. 50	5 26	24 28 51 00	5	
Preced. against north. knee	5 10	54 26 12 08	4 5	
Preced. in the upper leg	2 56	50 16 26 27	6	
Subseq. in upper leg	3 03	45 16 44 25	7	
55	6 28	58 26 40 09	5	
Inform. over north. knee	7 54	41 21 27 20	6	
That following south. knee	4 49	30 18 53 20	5	
That following north. knee	7 30	02 28 24 56	5	
South. of those contiguous thereto	7 37	09 28 08 30	6	
North 60	7 59	23 28 58 11	7	
In the calf of the upper leg	7 17	48 24 35 00	6	
	4 51	10 12 51 48	6 5	
	5 37	12 12 17 47	7	
In the heel of the upper foot	5 37	19 12 07 44	7	
65	8 55	46 20 49 11	6	
In the sole of the same foot	9 16	20 18 58 00	5	
	10 48	29 20 52 59	6	

PERSIAN, or the **PERSIAN tongue**, one of the living oriental languages; spoke in the empire of Persia.

The *Persian* has two particularities not found in any of the other eastern tongues, the one that it has an auxiliary verb, answering to the verb *εἶμι* of the Greeks; the other, that it has no Aoristus

ristus.—Both these it borrowed from the Macedonians, after the conquest of Alexander.

PERSIAN Wheel, in agriculture, is a machine for raising a quantity of water sufficient to overflow lands bordering on the banks of rivers, &c. where the stream is too low to do it alone. See **WHEEL**.

PERSIAN of PERSIC, in architecture, a name common to all statues of men, serving instead of columns, to support entablatures.—See *Tab. Architect.* fig. 37. They only differ from *caryatides*, in that those represent statues of women.

The *Persian* is a kind of order of columns, first practised among the Athenians, on occasion of a victory their general Paulanias obtained over the *Persians*. As a trophy of this victory, the figures of men dressed in the *Persian* mode, with their hands bound before them, and other characters of slavery, were charged with the weight of doric entablatures; and made to do the office of doric columns. See *Tab. Architect.* fig. 37.

Persian columns, M. le Clerc observes, are not always made with the marks of slavery; but are frequently used as symbols of virtues, vices, of joy, strength, and valour, &c. as when made in the figures of Hercules to represent strength, and of Mars, Mercury, Fauns, Satyres, &c. on other occasions.

PERSIAN Era, and **Year**. See **EPOCH** and **YEAR**.

PERSIAN Bibles

PERSIAN Coins

PERSIAN Money

} See the articles **BIBLE**, **COINS**, **MONEY**.

PERSON, **PERSONA**, an individual substance, of a rational or intelligent nature.

The father and son are reputed, in law, as the same *Person*; an ambassador represents the *person* of his prince.

In theology, the godhead is divided into three *Persons*; but here the word *Person* carries a peculiar idea, very different from that attached to it every where else; being only used for want of another term more pertinent and expressive.

The word *Person*, *persona*, is said to be borrowed *à personando*, from personating, or counterfeiting, and is supposed to have first signified a mask; by reason, says Boethius, *in larva con-cava sonus volvatur*: and hence the actors who appeared masked on the stage, were sometimes called *larvati*, and sometimes *personati*.

The same author adds, that as the several actors represented each their single individual person, viz. Oedipus, or Chremes, or Hecuba, or Medea; for this reason, other people, who were also distinguished by something in their form, character, &c. whereby they might be known, came also to be called by the Latins *personae*, and by the Greeks *πρόσωπα*.

Again, as these actors rarely represented any but great and illustrious characters; the word came at length to import the mind, as being a thing of the greatest regard and dignity among human matters.—And thus men, angels, and even God himself were called *Persons*.

Things merely corporeal, as a stone, a plant, or a horse, were called by them *hypostasies*, or *supposita*; but never *Persons*.

Hence also the learned imagine, the same name *Person* came to be used to signify some dignity, whereby a *Person* is distinguished from another; as a father, husband, judge, magistrate, &c.

In which sense we are to understand that of Cicero: Cæsar never speaks of Pompey, but in terms of honour and respect; but he does many hard and injurious things against his *Person*.

This for the name *Person*.—As for the thing, we have already defined *Person*, an individual substance of a reasonable nature; which is the same as Boethius's definition.

Now a thing may be individual two ways; 1. Logically, as it cannot be predicated of any other; as Cicero, Plato, &c. 2. Physically, in which sense a drop of water separated from the ocean, may be called an individual. *Person* is an individual nature in each of these senses: Logically, says Boethius, since *Person* is not spoke of universals, but only of singulars and individuals; we do not say the *Person* of an animal or a man, but of Cicero and Plato; and physically, since Socrates's hand or foot are never considered as *Persons*.

This last kind of individual is denominated two ways; positively, as when the *Person* is said to be the whole principle of acting; for, whatever thing action is attributed to, that do the philosophers call a *Person*: and negatively, as when we say, with the Thomists, &c. that a *Person* consists in this, that it does not exist in another as a more perfect being.

Thus, a man, though consisting of two very different things, viz. body and spirit, is not two *Persons*; since neither part alone is a whole principle of action; but one *Person*, since the manner of his consisting of body and spirit, is such as constitutes one whole principal of action; nor does he exist in any other as a more perfect being, as, e. gr. Socrates's foot does in Socrates, or a drop of water in the ocean.

So Christ, though consisting of two different natures, viz. the divine and human, is not two *Persons*, but one divine *Per-*

son; the human nature, in him, not being a whole principle of action, but existing in the other more perfect one. By the union of the divine and human nature, one individual, or whole is constituted; that is, one principal of acting: for whatever Christ's humanity does, that does his divinity joined therewith: so that there is but one *Person* in Christ; and one operation, which is called *Theandric*.

PERSON, in grammar, is a term applied to verbs and pronouns, which being conjugated, are applicable to three different *persons*.

I love, is a verb used in the first *Person*; *thou lovest*, designates the second *Person*; *he loveth*, marks the third: and thus in the plural number.

I, thou, he, are pronouns of the first, second, and third *Persons*.

Verbs agree with their nouns in tense, number and *Person*.

PERSON, **PERSONA**, in dramatic poetry, the name, and part of an actor; or of him presented by the comedian.

At the head of dramatic pieces come the *dramatis personae*, the list of actors, and characters that are to appear on the stage.

The ancient tragedy was only a simple chorus: Thespis was the first who introduced a *Person* to relieve the chorus; and Æschylus added a second. See **TRAGEDY**.

F. Bossu observes, that in the epic and dramatic poem, the same *Person* must reign throughout, i. e. must sustain the chief part through the whole piece, and the characters of all the other *Persons* must be subordinate to him.

Quod PERSONA nec prebendarii, &c. See the article **QUOD**.

PERSON, **PERSONA**, in law. See **PERSON**.

PERSONABLE, **PERSONABILIS**, in law, implies the being able to hold, or maintain a plea in court.

That is, as the civilians would express it; *habere personam standi in judicio*.

Thus they say, the defendant was judged *personabile* to maintain this action: old *Nat. Brev.* 142.

The tenant pleaded that the demandant was an alien, born in Portugal, without the ligeance of the king; and judgment was asked, whether he should be answered? the plaintiff said he was made *personabile* by parliament, Kitch. fol. 124.

PERSONABLE is also used to signify a capacity to take any thing granted or given.

PERSONAL, something that concerns or is restrained to the *person*.

In disputes among the learned, there is ever something *personal* intermixed; in ethics it is a maxim that all faults are *personal*, i. e. they do not pass to our descendants.

PERSONAL Action, in law, is that levied directly, and solely against the person, in opposition to a real or mixed action. See **ACTION**.

PERSONAL Goods, or **Estate**, is that consisting of money, moveables, &c. which every person has in his own disposal.—In opposition to lands and tenements, which are called *real estate*. See **ESTATE**.

Theft is defined a felonious taking away another man's moveable, or *personal goods*.

PERSONAL Tythes, are tythes paid of such profits as come by the labour and industry of a man's person: as, by buying and selling, gains of merchandize, handicraft, &c.

PERSONAL Chattels

PERSONAL Covenant

PERSONAL Distress

PERSONAL History

PERSONAL Patronage

PERSONAL Privilege

PERSONAL Service

} See the articles **CHÂTELS**, **COVENANT**, **DISTRESS**, **HISTORY**, **PATRONAGE**, **PRIVILEGE**, **SERVICE**.

Pronoun PERSONAL, or **Verb PERSONAL**, in grammar, a verb or pronoun, conjugated in all the three persons.

They are thus called, in opposition to *impersonals*, which have only the third person.

PERSONALITY, **PERSONALITAS**, in the schools, the quality of a *person*; or that which constitutes an individual in the quality of *person*.

The philosophers being used to consider matter, and form in every other thing, do the same in *person*.—The matter of person, according to them, is a singular substance, endued with reason. For substance may, at the pleasure of God, either be, or not be a person; inasmuch as the human nature in Christ is not a person. The form of person which they call *subsistency*, *suppositality*, and *personality*, is that by which the fore said substance becomes individual.

The school divines are divided about what it is that distinguishes the several *Personalities* in the trinity: some will have it to be only the different relations: others, as Floraventius, contend for some incommunicable substance: S. Bonaventure, and S. Thomas, take it to be different origins that distinguish the *Personalities*; which opinion is the most followed.

PERSONALITY, or PERSONALTY, in law.—An action is said to be in *Personality*, when it is brought against the right person.

PERSONATI, among botanists, denote such flowers as express the gaping mouths of certain living creatures.

PERSONIFYING, or PERSONALIZING, the feining a *person*; or attributing a *person* to an inanimate being; or giving it the figure, sentiments, and language of a *person*.

The poets have *personified* all the passions; and even made divinities of them, which were worshipped by the heathens; as the goddesses of passion, the god sleep, the furies, envy, and discord, and fame, fortune, victory, &c.

Personifying is essential to poetry, especially to the epopœia.

PERSPECTIVE, the art of delineating visible objects on a plain surface, such as they appear at a given distance or height, upon a transparent plane, placed perpendicular to the horizon, between the eye and the object. This we particularly call

Linear PERSPECTIVE, as regarding the position, magnitude, form, &c. of the several lines, or contours of objects, and expressing their diminution *.

* This is a branch of mathematics: some make it a member of optics; others a rivulet therefrom: its operations are all geometrical.

Aerial PERSPECTIVE, is that which regards the colour, lustre, strength, boldness, &c. of distant objects, considered as seen through a column of air, and expresses the diminutions thereof †.

† This is a part of painting, and consists wholly in the conduct of the colours, their different tints, or degrees, force, weakness, &c.

A third kind of *Perspective* is called

Specular PERSPECTIVE, which represents the objects in conical, spherical, or other mirrors, erect and clear, whereas on other planes they appear confused and irregular. See MIRROR.

But to return to the doctrine of

Linear PERSPECTIVE: Suppose a glass-plane HI (*Tab. Perspect. fig. 1.*) raised perpendicular to an horizontal plane: and the spectator S, directing his eye O, to the triangle ABC: if now we conceive the rays AO, OB, OC, &c. in their passage through the plane, to leave their traces or vestigia, in a, b, c , &c. on the plane; there will appear the triangle abc ; which, as it strikes the eye by the same rays aO, bO, cO , by which the species of the triangle ABC is carried to the same; it will exhibit the true appearance of the triangle ABC, though the object should be removed; the same distance and height of the eye being preserved.

The business of *Perspective* then, is to shew by what certain rules the points a, b, c , &c. may be found geometrically: and hence also, we have a mechanical method of delineating any object very accurately.

Perspective is either employed in representing the *Iconographies*, and ground-plots of objects, as projected on *perspective* planes.

Or in *Scenographies*, and representations of the bodies themselves.

The general laws of each are subjoined; in order to which it is necessary to premise the following *lemma's*.

1. That the appearance of a right line is ever a right line; whence, the two extremes being given, the whole line is given. 2. That if a line FG (*fig. 12.*) be perpendicular to any right line NI drawn on a plane, it will be perpendicular to every other right line through the same point G drawn on the same plane. 3. That the height of the point appearing on the plane, is to the height of the eye, as the distance of the objective point from the plane, to the aggregate of that distance, and the distance of the eye.

Laws of the projection of plane figures, or ICNOGRAPHIC PERSPECTIVE, are as follows.

To exhibit the PERSPECTIVE appearance, b , of an objective point, H, (*fig. 2.*) From the given point draw HI perpendicular to the fundamental line DE. From the fundamental line DE cut off IK = IH: through the point of sight F draw a horizontal line FP; and make FP equal to the distance of the eye SL: lastly, from the point I to the point of sight F, draw FI; and from K to the point of distance P, the line PK. The intersection b is the appearance of the objective point. Hence, 1. Since the appearance of the extreme points of a right line being given, the appearance of the whole line is given; the *icnographic* projection of any rectilinear figure may be had by this method. And, 2. Since any number of points of a curve line may by this means be projected on the *perspective* plane; the projection of curve lines may likewise be effected after the same manner. And, 3. Therefore, this method will suffice for mixtilinear figures; and is consequently universal. There are indeed other methods delivered by other authors, but this is the most usual.—To conceive its *force and effect*, it will be proper to illustrate it with some examples.

To find the PERSPECTIVE appearance of a triangle, ABC, (*fig. 3. n. 2.*) whose side AB is parallel to the fundamental line DE.

To the fundamental line DE draw a parallel at an interval equal to the altitude of the eye. Assume a fundamental point V, opposite to this either directly or obliquely, as the case requires. Transfer the distance of the eye from V to K. From the several angles of the triangles ACB, let fall perpendiculars, A 1, C 2, B 3: set off these perpendiculars upon the fundamental line DE opposite to the point of distance K. From 1, 2, 3, draw right lines to the fundamental or principal point V 1, V 2, V 3. From the points A, B and C of the fundamental line DE draw other right lines AK, BK, CK, to the point of distance K.

Since a, b and c are the appearances of the points A, B and C; the right lines ca, ab and bc , being drawn, abc will be the appearance of the triangle ACB.

After the same manner is a triangle projected on a plane, where the vertex C is opposite to the eye: all here required, is, that its situation on the geometrical plane be changed, and the vertex C be turned towards the fundamental line DE.

To exhibit the PERSPECTIVE appearance of a square ABCD (*fig. 4.*) seen obliquely, and having one of its sides AB in the fundamental line.

The figure being viewed obliquely assume the principal point V in the horizontal line HR, in such manner as that a perpendicular to the fundamental line may fall without the side of the square AB, at least, may not bisect it; and make VK the distance of the eye. Transfer the perpendiculars AC and BD to the fundamental line DE; and draw the right lines KB, KD, as also AV, VC. Then will A and B be their own appearances; and c and d the appearances of the points C and D. Consequently acd B is the appearance of the square ABCD. If the square ABCD should be at a distance from the fundamental line DE; which yet rarely happens in practice, the distances of the angles A and B must likewise be transferred to the fundamental line: as is evident from the preceding problem. And since, even the oblique view is not very common; in what follows, we shall always suppose the figure to be posited directly opposite to the eye; unless, where the contrary is expressly mentioned.

To exhibit the appearance of a square ABCD (*fig. 5.*) whose diagonal AC is perpendicular to the fundamental line.

Continue the sides DC and CB till they meet the fundamental line in 1 and 2. From the principal point V set off the distance of the eye to K and L. From K to A and 1 draw right lines KA and K 1; and from L to A and 2, the right lines LA, L 2. The intersections of these lines will exhibit the appearance of the square ABCD viewed angle-wise.

To exhibit the appearance of a square ABCD (*fig. 6.*) wherein another, IMGH is inscribed; the side of the greater, AB, being in the fundamental line; and the diagonal of the less, perpendicular to the fundamental. From the principal point V, set off, each way, on the horizontal line HR, the distances VL and VK; draw VA and VB; and KA and LB; then will acd B be the appearance of the square ACDB. Produce the side c of the inscribed square IH, till it meet the fundamental line in 1; and draw the right lines K 1, and KM; then will $ibgm$ be the representation of the inscribed square IHGM. Hence is easily conceived the projection of any figures inscribed in others.

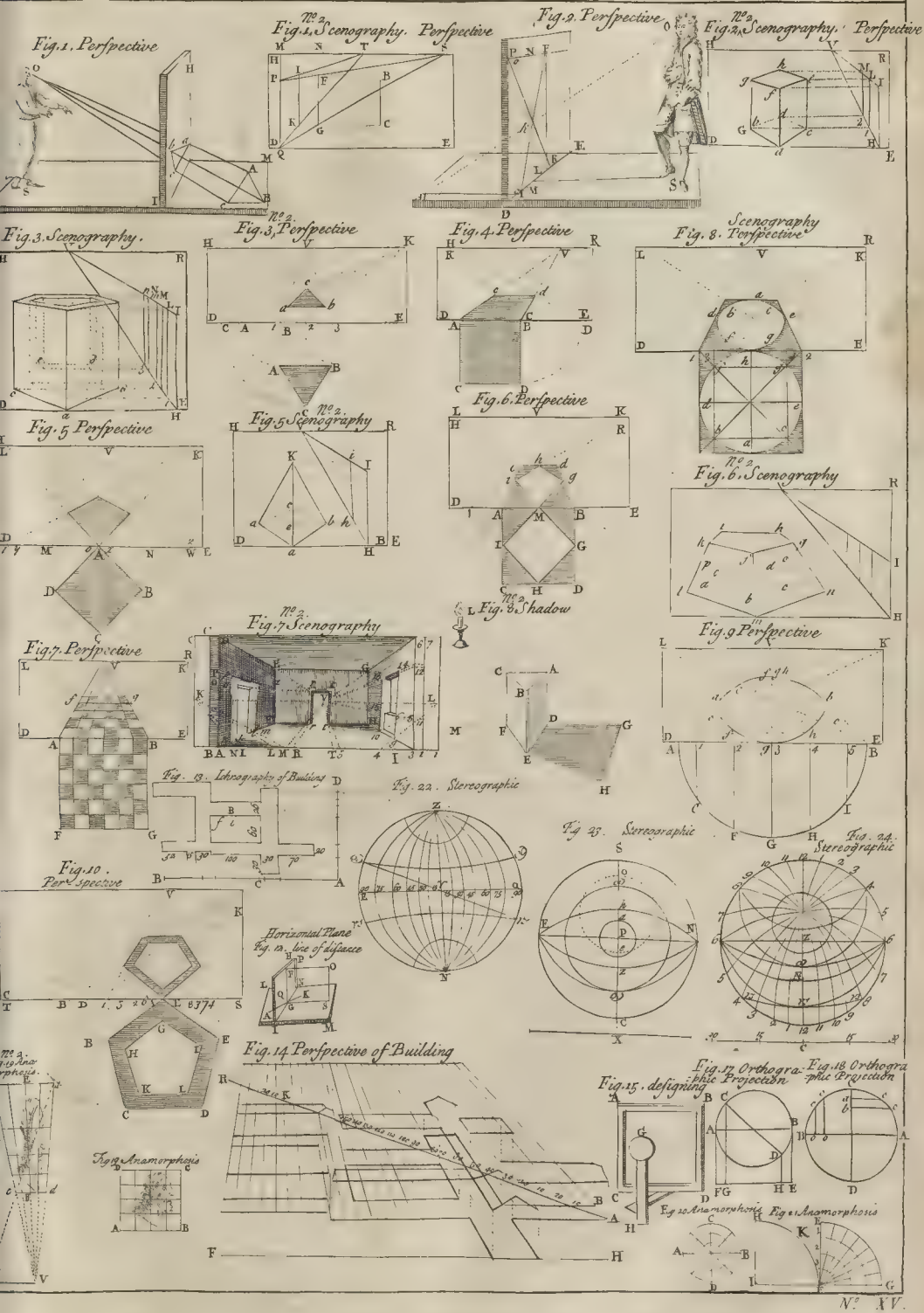
To exhibit the PERSPECTIVE of a pavement, consisting of square stones, viewed directly. Divide the side AB (*fig. 7.*) transferred to the fundamental line DE into as many equal parts as there are square stones in one row. From the several points of division, draw right lines to the principal point V; and from A to the point of distance K, draw a right line AK; and from B to the other point of distance L, draw another LB. Through the points of the intersections of the corresponding lines draw right lines on each side, to be produced to the right lines AV, and BV. Then will AFG B be the appearance of the pavement AFG B.

To exhibit the PERSPECTIVE of a Circle.—If the circle be small, circumscribe a square about it. Draw diagonals and diameters ba and de (*fig. 8.*) intersecting each other at right angles; and draw the right lines fg and bc parallel to the diameter de through b and f ; as also through c and g draw right lines meeting the fundamental line DE in the points 3 and 4. To the principal point V draw right lines V 1, V 2, V 3, V 4; and to the points of distance L and K, draw the right lines L 2 and K 1. Lastly connect the points of intersection, a, b, d, f, g, h, c, e , with arches ab, bd, df, fg , &c. Thus will $abdfbg$ eca , be the appearance of the circle.

If the circle be large, on the middle of the fundamental AB (*fig. 9.*) describe a semi-circle; and from the several points of the periphery, C, F, G, H, I, &c. to the fundamental line, let fall perpendiculars C 1, F 2, G 3, H 4, I 5, &c. From the points A, 1, 2, 3, 4, 5, &c. draw right lines to the principal point V, as also a right line from B to the point of distance L; and another from A to the point of distance K. Through the common intersections draw right lines as in the preceding problem; thus shall we have the points c, f, g, h, i , which are the representations of these A, C, F, G, H, I, and these being connected as before, give the projection of the circle.

Hence appears not only how any curvilinear figure may be projected

Tab: Perspective



jected on a plane; but also how any pavement, consisting of any kind of stones, may be delineated in *Perspective*. Hence also appears what use the square is of in *Perspective*, for even in the second case we use a square divided into certain areolæ, and circumscribed about the circle; though it be not delineated on the geometrical plane in the diagram.

To exhibit the PERSPECTIVE of a regular Pentagon, having a broad limb, terminated by lines parallel thereto.—1^o From the several angles of the exterior pentagon A, B, C, D, E, (fig. 10.) to the fundamental line T S, let fall perpendiculars A O, B I, C 2, D 3, E 4; which, as in the former, transfer to the fundamental line. Connect the points 1, 2, 3, 4 to the principal point V; and the points 1, 2, 3, 4, to the point of distance K. Thus will the common intersections represent the appearance of the exterior pentagon. 2. If now, from the inner angles G H L, the perpendiculars G O, H 5, K 6, L 7, M 8, be in the like manner let fall; and the rest be done as in the former; we shall have the representation of the inner pentagon. The pentagon A B C D E, therefore, with its limb, is represented in *Perspective*.

This problem is added for the sake of an instance of the projection of a figure that has a broad limb, or edge.

It must be here observed, that if the magnitudes of the several parts of an object, be given in numbers, together with the height and distance of the eye; its figure is to be first constructed by a geometrical scale; and the fundamental point, with the point of distance, to be determined by the same.

Nor is it always necessary, that the object be delineated under the fundamental line: in the projection of squares and pavements it is best let alone. But where it is necessary, and space is wanting, draw it a-part; find the divisions in it, and transfer them to the fundamental line in the plane.

Threads being hung in the principal point, and the point of distance, and thence stretched to the points of the divisions of the fundamental line; the common intersection of the threads will give the projection of the several points without confusion; a thing much to be feared from the multiplicity of lines to be drawn.

SCENOGRAPHIC PERSPECTIVE; or the projection of bodies on a plane.—

On a given point, C, (fig. 1, n. 2.) to raise a perspective altitude answerable to the given objective altitude P Q. On the fundamental line, raise a perpendicular P' Q', equal to the given objective altitude. From P and Q to any point, as T, draw right lines P' T, and Q' T. From the given point C draw a line C K parallel to the fundamental line D E; and meeting the right line Q' T, in K. In K, erect a perpendicular to K C, viz. I K; this I K is the perspective altitude required.

To exhibit the PERSPECTIVE of a solid.—Find the projection of its base in the *ichnographic Perspective*; and in the several points thereof erect the perspective altitude: Thus will the scenography of the solid be finished, except for what relates to the shadow; which must be superadded from the laws of shadows, delivered under the article SHADOW.—For an example,

To exhibit the scenographic PERSPECTIVE of a cube, viewed angle-wise.—Since the base of a cube viewed angle-wise, and standing on a geometrical plane is a square viewed angle-wise; draw a square on the perspective plane, after the manner laid down above: raise the side of the square H I (fig. 2, n. 2.) perpendicularly in some point of the fundamental line D E; and to any point V, of the horizontal line H R, draw right lines V I and V H. From the angles d, b, and c; draw c 1, d 2, parallel to the fundamental line D E. From the points 1 and 2 raise L 1 and M 2 perpendicular to the same. Lastly, since H I is the altitude to be raised in d, L 1 in c, and b and M 2 in d; in a raise f a perpendicular to d E; and in b and c, raise b g and c e perpendicular to b c 1; and lastly raise d b perpendicular to d 2; and let a f be equal to H I, b g = c e = L 1, and b d to M 2; if then the points g, b, e, f, be connected by right lines, the scenography will be finished.

This method is general; but its application is not equally obvious in every case; see it further illustrated under the article SCENOGRAPHY.

PERSPECTIVE of building, &c.—In the practice hereof, great regard is had to the height of the horizontal line; all above the horizontal being seen in the upper part, and all below it in the under part: whence *Perspective* becomes divided into the *high*, and *low sight*; both which may be illustrated by what follows.

To represent a building (v. gr. palace, college, &c.) in *Perspective*.

1. Take the *ichnography*, or ground-plan of the building; its lengths, breadths, and depths, by actual measuring, and take its altitude with a quadrant.

2. Make a scale divided into two or three hundred equal parts, either actually, or so as that each division signify ten parts: by this scale lay down the ground plan: as in figure 13.

This done, having a long rule, and a square, which by sliding on the rule helps you to draw your perpendiculars easier, reduce it into *Perspective*, in its scenographic appearance.

Then having drawn a line towards the bottom of the paper for the front or base line as F L, (fig. 14.) divide it into as many equal parts as you find the building has in the *ichnography*, or more if you please: this will serve for a scale to determine the several heights, &c. and to these divisions, with a black lead

pencil draw lines from the centre, when you have chosen it, which choice requires judgment on two accounts.

For, if the centre be too nigh the front-line, then the depth of the whole building will fore-shorten too much; and if too far off, it will not fore-shorten enough. This may be illustrated thus, set an open tankard, or the like, on a stand, so as that it be a little lower than your eye; if you be at a great distance from it, you can see very little or nothing into it; if you come nigher to it by degrees, you will perceive the farther edge seem to be raised a little higher than that next you, so that you may see a little way into it; if you come very nigh it, you see too deep into it, or more than can well be expressed in picture. We shall therefore find some one place, which we must conclude the most convenient for the draught, and which may be in general determined to be as far off the front-line as the front-line is long: this rule, though it has just grounds, yet we sometimes dispense with *pro re nata*; that we may express things with the better appearance.

4. Consider how to place this centre with such advantage as that you may express those things most, which are chiefly designed; for as to the bottom and top lines of the sides of the building that run from us in or nigh the direct line to the centre, though you see the upper part very well, yet the sides that fall between the ground-line and top, fall so very near one another, that it would be very difficult to express particulars in them; so that the centre must be well chosen in reference to this.

Those buildings therefore, which you would see most off, must be placed as far off as you think convenient from the direct line that runs to the centre: and the farther they are, the plainer they will be.

Place then those things you would see least off, nighest the direct line; and see whether the others fall according to your mind; but this must be done after you have drawn your diagonal, which is the next thing.

5. Having pitched on your centre, and having from it drawn lines to every division of the front-line, you are to determine your diagonal, A R, thus: having with a pair of compasses, measured the length of the front-line, take your compasses, and putting one foot in the centre, see where the other will reach in the horizon: (on both sides if you please) where it rests, from that point draw a thwart line to the left division of the front; and this will be truly drawn, or pretty nigh to the truth. That it is so, you may consider how it falls in respect of the two last centre-lines: for if where the next line from the left is intersected by the diagonal, you draw a parallel to the front between them, as at A 10, you will have a rhombus; if then all the sides be pretty equal, you may be sure you are nigh the right; but if the sides that run towards the centre be too long, then things will not fore-shorten enough; and if the sides be not long enough, they will fore-shorten too much.

6. After the front-line is thus divided, the centre fixed, and the diagonal placed, take the breadth of the chapel A B, which in the *ichnography* is shewn to be twenty parts; because this line is perpendicular, it must run toward the centre, therefore reckon twenty in the diagonal, and the rule laid parallel to the front in that point, will give you a point in the centre-line, which will give the breadth of the chapel; and consequently a line drawn from A to B puts it into the *ichnographic Perspective*. The length of the chapel being seventy divisions in the front-line; reckon seventy from B, parallel to the front-line, and there you will have a point at C.

The depth of the building from the chapel northward, being one hundred and fifteen from the chapel, I reckon from D; (where it cuts the diagonal at ten) onwards in the diagonal; and at one hundred and fifteen in the diagonal; with my rule as before parallel in this place in the front, I have the point Z in the central line. Its breadth being thirty, I reckon three divisions, and there is the just breadth there; and so on in every particular part.

Having placed the *ichnography* into *Perspective*, you may then give every thing its proper height thus:

7. The height of the chapel being thirty, I reckon thirty on the front-line, and with this length by a square clapt to the front-line, I drop a perpendicular to that height; and so where the other side of the chapel is placed, having reckoned the height upon a supposed parallel, there I draw another line in that height; then joining these several heights by several lines, you have the profiles of each building.

To diversify these several lines, that they confound you not, make the *ichnography*, when you lay it into *Perspective*, in discontinued crooked lines, the heights in pricked lines, and the tops of each building in continued lines, as the centre-lines are in the table. You will likewise find the centre, though it is not here expressed, as likewise the point of distance, by continuing the diagonal up to the supposed horizon, where it and the eye are placed.

Having done thus, your art must be employed for the particular expressions of things, by drawing and shadowing, which is the life of this half formed figure, which we leave to the painter.

It remains that we speak of the low-sight: And here, we suppose the horizontal line just the height of the eye, about five foot from the basis; though it is generally placed higher, even to a third part of the height of the building, that the side building may be expressed the more gracefully.

The diagonal is best determined by dividing the last division of the basis-line into five parts at G, taking four of these, sometimes the whole five, because we determined before, that the length of the front-line was the distance of the eye in the horizon to the point of distance: but here we take four, and then make this the distance in the horizon between the eye and the point of distance. You may then either graduate the plan at the several interjections of the diagonal with the centre lines, or else suppose it so; and then raise the buildings as you will find by *Perspectives* enough of this sort every where to be met with.

PERSPECTIVE, is also used for a kind of picture or painting, frequently seen in gardens, and at the ends of galleries; designed expressly to deceive the sight by representing the continuation of an alley, a building, landscape, or the like.

PERSPECTIVE aerial, } See the articles } **AERIAL**.
Alley in PERSPECTIVE, V. }
Architecture in PERSPECTIVE, } **ARCHITECTURE.**

PERSPECTIVE, Plain, Plane, is a glass, or other transparent surface, supposed to be placed between the eye and the object, perpendicular to the horizon, unless the contrary be expressly mentioned.

Such is the plane, HI (fig. 1.) between the eye O, and the object ABC, cutting the optic rays in a, b, c.

This, some call the *section*; some the *table*, and others the *glass*.

PERSPIRATION, **PERSPIRATIO**, in medicine, the action of evacuating the superfluous juices of the body, through the pores of the skin.

When this evacuation is copious enough to be perceived by the senses, as in sweat, the *Perspiration* is said to be *sensible*; where it escapes the notice of the senses, as is the case in the ordinary state of the body, the *Perspiration* is said to be *insensible*.

The word *Perspiration* used simply, and without any adjective, is to be understood of *insensible Perspiration*.

This evacuation was indeed known to the ancients, Hippocrates, Galen, &c. but it was Sanctorius, the famous Paduan physician, who first brought it under any stated rules. To him we owe both the invention and perfection of the doctrine of *insensible Perspiration*.

The vessels through which the *Perspiration* is performed, lie obliquely open under the squamæ or scales of the cuticle or scarf-skin: They are inconceivably small: from a calculation of Leewenhoeck, it appears that the mouths of one hundred twenty-five thousand of them, may be covered with a common grain of sand.

Through these vessels there is continually transfusing a subtle humour, from every point of the body, and throughout the whole expanse of the cuticle.

The matter evacuated this way, is found by certain experience to be more than equal to that evacuated all the other ways, i. e. by stool, urine, &c. Sanctorius found in Italy, under the circumstances of a moderate diet, middle age, and easy life, that the matter insensibly perspired was $\frac{1}{2}$ of that taken in for food: so that there only remained $\frac{1}{2}$ for nutrition, and for the excrements of the nose, ears, intestines, bladder, &c.

The same author shews, that as much is evacuated by *insensible Perspiration* in one day, as by stool in fourteen days; particularly, that in the space of a night's time, about sixteen ounces is ordinarily sent out by urine, four ounces by stool; and above forty ounces by *insensible Perspiration*.

He also observes, that if a man eat and drink eight pound in a day, five pound of it is spent in *insensible Perspiration*; and adds as to the times, that within five hours after eating there is perspired about one pound; from the 5th to the 12th hour about three pound; and from the 12th to the 16th scarce half a pound.

The benefits of *insensible Perspiration* are so great, that without it, Borelli says, animal life could not be preserved.

The great subtilty, equability, and plenty of the matter, thus perspired, its increase after sleep, &c. constitute the grand symptoms of a perfect state of health; and the chief means of preserving the same. On the contrary, the departing from this is the first true sign, and, perhaps, the original cause of diseases.

Perspiration is performed, preserved, and increased by the viscera, vessels, and fibres; by motion or exercise as far as the first appearance of sweat, by moderate use of venery; by sleep of seven or eight hours, the body well covered yet not loaded with bed-cloaths, cheerfulnefs, light fermented yet solid food, not fat; pure, heavy air, &c.—The contraries of all these, as also the increase of the other excretions, diminish, prevent, and deprave it.

Hence we see the cause, effect, &c. of this perspirable matter, its use in preserving the part soft and flexible, and in supplying what's lost, but chiefly in preserving the nervous papillæ

moist, fresh, lively, and fit to be affected by objects, and to transmit their impressions.

Too much *Perspiration* occasions weakness, swoonings, sudden death; too little, or none at all, occasions the capillary vessels to dry, wither, and perish. Hence also the larger emunctories come to be obstructed; hence the circulation is disturbed, sharp humours retained; and hence putridity, crudity, fevers, inflammations, and imposthumes.

To determine the state and conditions of the *Perspiration*, so necessary for judging of those of the body, Sanctorius invented a weighing chair, whereby he examined the quantity, degree, &c. of *Perspiration* in several circumstances of the body, under several temperatures of the air, and in the several intervals of eating, drinking, sleeping, &c.

Some of the more extraordinary phenomena observed herewith, are, that for some time after eating the *Perspiration* is least of all. That between the fifth and twelfth hour after meals *Perspiration* is greatest. That riding either on horseback, in a coach or ship, &c. brisk motion on the ice, &c. but above all, a brisk friction of the skin; promote *Perspiration* supprisingly: and that *Perspiration* is naturally always much less in women than in men.

PERTICATA*, or **PARTICATA terre**, in our old law books, is the fourth part of an acre; or a piece of ground containing one perch in breadth, and forty in length. See **ROOD**, and **PERCH**.

* *Continet in integra superficie 40 perticas.* See **PERCH**.

PERU—*Balsam* of **PERU**. See the article **BALSAM**.

PERVIGILIUM, in medicine, excessive waking or watching. See **WAKEFULNESS**.

PERVISE, or **PARVISE**, a term in our old law books, signifying, according to Selden in his notes on Fortescue, an afternoon's exercise, or moot, which the pleaders held for the instruction of the younger students; bearing originally the same name with the parvise in Oxford. See **MOOR**.

M. Somner says, that **PERVISE** signifies *palatii atrium vel area illa a fronte aule Westmonasteriensis, tunc the Palace-yard*; and Spelman thinks that the lawyers turned thither to meet their clients, not to hold moots.

PERUVIAN-bark. See **CORTEX peruvianus**.

PERUVIAN Emerald. See the article **EMERALD**.

PES, a long measure, in English better called a *foot*. See **FOOT**.

PES jersile, the jersile foot contains eighteen inches *.

* *Notandum est quod pes lorette usitatus tempore Ric. Offset in arventatione cassillerum, factus est, signatus & sculptus in pariete cancellie ecclesie de Edwynstone & in ecclesia B. Marie de Nottingham, & dictus pes continet in longitudine octodecim pollices, & in errantatione quorundam cassillerum pertica, 20, 21, & 22 pedum usque fuit, &c.*

Pes monetæ, in ancient records, signifies a true and reasonable adjustment of the real value of all current coin.

PESA, an old law term, for a weigh, or certain weight of cheese, wool, &c. See **WEIGH**.

PESADE, or **PESATE**, in the manage, that action taught a horse, wherein he rises with his fore feet, and bends them up to his body, without stirring the hind feet.

The *Pesade* is the first lesson taught a horse, in order to bring him to curvets, &c. unless he perform this well, he will never go well in any air: yet is he not to be taught it at the first riding.

PESAGE, **PESAGIUM**, a custom or duty paid in certain markets, &c. for weighing of merchandises, or wares.

PESATE. See the article **PESAGE**.

PESSARY*, or **PESSUS**, in medicine, a solid medicament of the length and thickness of the finger, but of a pyramidal form; conveyed into the natural parts of a woman, to provoke, or to put a stop to the menses, to prevent a descent of the matrix, or on other occasions in disorders of those parts.

* The word is formed from the Greek, *Πεσάγον*, or *μισθόν*, which signifies the same.

The *Pessary* consists of a piece of cork, or light wood, or of a little linnen bag full of powders, incorporated with wax, oil, and cotton; crammed close together, to make it solid enough for intromission.

At one end it is fastened to a little ribbon, by which it may be drawn out at pleasure.

PESTILENCE*, in medicine, an epidemical, malignant, and contagious disease, usually mortal; popularly known under the name of *plague*.

* The word is formed from the Latin, *pestis*, which signifies the same. See **PLAGUE**.

PEST-house, a lazaretto or infirmary, where goods, persons, &c. infected, or suspected to be infected with some contagious disease, are disposed and provided for.

PESTILENTIAL fevers, among physicians, are such as do not only afflict the patient with a vehement heat, but also with some malignant, and venomous quality, and in some degree approach to the nature of the plague.

PESTIS. See the article **PLAGUE**.

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PETALA*, in botany, the leaves of a flower; so called to distinguish them from the folia, or leaves of the plant.

* The word is formed from the Greek *πέταλον*, a leaf, which, in that language, serves indifferently for the leaves of the plant, and those of the flower.

By flower is properly meant, that assemblage of parts, called *Petala*, *filamina*, *apices*, and *pistil*, which serve for the propagation of the kind.

The coloured leaves, called *Petala*, which encompass the other parts, are in reality no more than cases or covers to secure and screen the generative organs; unless, as Mr. Bradley conjectures, they may also serve to secrete some fine juice for the nourishment of the seed.

The most easy division of flowers, in regard to the matter of generation, is into simple ones, i. e. those formed of stamina and pistil only; and compound flowers, whose stamina and pistil are encompassed with *Petala*, called by Dr. Grew the *filiation*, and by Mr. Ray *folia*.

Compound flowers again, are either encompassed with a single *petalum*, or piece; or with several pieces; the first of which are called *monopetalus*, the second *polypetalus* flowers.

Again, from the regular or irregular configuration of the *Petala*, M. Jussieu makes another division of flowers into classes; as regular and irregular *monopetalus*; regular and irregular *polypetalus*, &c.

Nature shews a world of art in the folding up of the *Petala* in the perianthium, before they begin to blow or expand: of these foldings Dr. Grew notes the following varieties, viz. the clove couch, as in roses; the concave couch, as in blattaria flore albo; the single plait, as in pease-blossoms; the double plait, as in blue-bottles; the couch and plait together, as in marigolds, &c. the rowl, as in ladies bower; the spire, as in mallows; and lastly, the plait and spire together, as in convolvulus doronic folio.

The calyx, or perianthium sometimes serves plants in lieu of *Petala*.

PETALISMUS, **ΠΕΤΑΛΙΣΜΟΣ**, in antiquity, a kind of exile or banishment, for the term of five years. See **BANISHMENT**.

The *Petalism* at Syracuse was nearly the same thing as the *ostracism* at Athens, except that the latter was for ten years, and the former only for five.

The *Petalism* was performed by the people's writing the name of the person condemned, on a leaf: whence the term, from *πέταλον*, leaf.

PETALODES, **ΠΕΤΑΛΩΔΗΣ**, a name given to urine, when it seems to have little leaves, flakes, or scales in it.

PETAMINARIUS*, in antiquity, a name given to certain persons who performed extraordinary feats of activity; took perilous leaps, vaults, &c.

* The word is formed from the Greek, *πέταμα*, volo, I fly.

Some authors write it *petimariarius*; and derive it from *petimen*, which, according to Servius, signifies the bunch of a camel; alluding to the manner wherein these operators bend the body in exhibiting postures, &c.

PETARD, in war, a kind of engine of metal, somewhat in shape of a high-crowned hat; serving to break down gates, barricades, draw-bridges; or the like works which are intended to be surprized.

The *Petard* may be considered as a piece of ordnance, very short, narrow at the breech, and wide at the muzzle; made of copper mixed with a little brass; or of lead with tin; usually about seven inches long, and five broad at the mouth; weighing from forty to fifty pound.

Its charge is from five to six pounds of powder, which reaches to within three fingers of the mouth: the vacancy is filled with tow, and stopped with a wooden tampon; the mouth being strongly bound up with a cloth tied very tight with ropes. It is covered up with a madrier or wooden plank, that has a cavity cut in it to receive the mouth of the *Petard*, and is fastened down with ropes after the manner expressed in *Tab. Fortification, fig. 5*.

Its use is in a clandestine attack, to break down gates, bridges, barriers, &c. to which it is hung; which it does by means of the wooden plank.—It is also used in countermines, to break through the enemies galleries, and give vent to their mines.

Some, instead of gun-powder for the charge, use one of the following compositions, viz. gun-powder seven pounds, mercur. sublimat. one ounce, camphor eight ounces; or gun-powder six pound, mercur. sublimat. three ounces, and sulphur. three; or gunpowder six, beaten glass, an ounce, and camphor. 4.—*Petards* are sometimes also made of wood, bound round with iron hoops.

The invention of *Petards* is ascribed to the French Huguenots in the year 1579: their most signal exploit was the taking the city Cahors by means hereof, as we are told by d'Aubigne.

PETECHIÆ, spots in the skin, like flea-bites, which come out in some fevers, which are hence called *petechial* or *spotted fevers*.

PETECHIAL, an appellation given to a malignant, epidemical

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kind of fever; wherein the skin breaks out in *Petechiæ*, or purple spots.

The *Petechial fever* is also called *febris lenticulari*; and *pulicaris*. See *Supplement, article FEBRIS PETECHIALIS*.

PETERERO. See the article **PEDRERO**.

PETER pence, an ancient levy, or tax of a penny on each house throughout England, paid to the pope.

It was called *Peter-pence*, because collected on the day of St. Peter ad vincula; by the Saxons it was called *Rome sush*, i. e. the fee of Rome, and also *Rome-fee*, and *Ronia-pennyng*, because collected and sent to Rome; and lastly, it was called *Hearth-money*, because every dwelling house was liable to it, provided there were thirty pence *vice pecunie* belonging to it; nay, and every religious house; the abbey of St. Albans alone excepted.

This *Peter-pence* was at first given as a pension or alms, by Ina king of the west Saxons, in the year 725, being then in pilgrimage at Rome: and the like was done by Offa king of the Mercians, throughout his dominions in 794.

It was not intended as a tribute to the pope, but chiefly for the support of the English school or college at Rome; the pope, however, went halves with the college; and at length swallowed almost the whole.

At first it was only an occasional contribution; but it became at last a standing tax; being established by the laws of king Canute, Edward the Confessor, the Conqueror, &c.

The bishops who are charged with the collecting it, employed the rural deans and archdeacons therein.

Edward the III^d first forbade the payment; but it soon after returned, and continued till the time of king Henry VIII, when Polydore Virgil resided here as the pope's receiver-general. It was abolished under that prince, and restored again under Philip and Mary; but it was finally prohibited under queen Elizabeth.

PETIT Cape. See the article **CAPE**.

PETIT Serjanty, in law. See the article **SERJEANTY**.

PETIT Jury. See the article **JURY**.

PETITA Terra. See the article **SUMMONS**.

PETITIO Indulgarum, in the civil law, the same as *imparsu* in common law. See **IMPARLANCE**.

PETITIO Principii, in logic, a begging the question, or a precarious supposing a thing to be true, or taking it for granted, when it really remains either dubious, or else is expressly denied.

PETITION, **PETITIO**, a supplication in form, made by an inferior to his superiour; especially to one having some jurisdiction.

PETRA limes, in our ancient customs, a stone of wool. See **STONE**.

PETRARIA, in ancient writers, is sometimes taken for a quarry of stone.

In other places *Petraria* is used for a sort of engine of war, where-with stones were cast on the enemy; chiefly used in sieges, &c.

PETRE oil, **ΠΙΤΡΕΑΙΟΝ**, the same as *petroleum*. See **PEIROIL**.

PETRIFICATION*, or **PETRIFICATION**, in physiology, the act of converting fluids, woods, and other matters into stone.

* The word is formed from the Greek *πέτρος*, stone, and the Latin *facio* or *facio*, to become, or to make.

The faculty of petrifying wood is ascribed to several springs, lakes, &c. and the ancient naturalists mention a river whose waters turned bodies into marble, by mere contact; nay, which being drunk, petrified the viscera of the drinker.

Flumen habent Ciconæ, quod petum facies reddat

Viscera, quod tactis inducit marmora rebus.

Seneca relates, that the mud of this river was of such a nature as to harden and glue together the parts of bodies. As, says he, the dust of Puzzuoli, by barely touching water becomes stone; so this water, by touching any solid, penetrates and grows to it: Whence things cast into it are immediately taken out stones. Pliny observes very well, that wood cast into this river is presently found covered with a stony bark or rind; and subjoins the names of several other rivers which do the same: particularly the river Silarus near Taentum, whose waters are nevertheless found very wholesome.—To Pliny's list we might add many more among ourselves; particularly the lake Lohmond in Scotland, Loch Neagh in Ireland, &c.

But, in effect, there does not seem any real transmutation of the woody nature into the nature of stone, in any of these cases: all that is done is this, the stony particles which before floated in the liquor are now lodged on the surface, or deposited in the pores of these substances, in such manner, and in such plenty, as to leave little else but the appearance of a stone.

Petrifications are most frequently nothing else but incrustations of stony particles, which surround the bodies immersed, and as salts shoot upon and adhere to them.

Varenius has a conjecture, that waters only petrify woods by means of certain minute, sharp, and pointed particles lodged therein, which cut the longitudinal fibres of the wood in an infinite number of points, and thus destroy the form by which they were distinguished from stone.

Near Nactivan is a little river, whose water the people turn off into

into little canals; where, they say, in a little time it *petrifies*; and of this *petrified* water they pretend is built a large caravan-
yera in the neighbourhood.

Petrifications from waters, or juices of the earth are incontestable. In the place called *les Caves Goutieres* in France, the water falling from the upper parts of the cave to the ground, immediately hardens into little stones, of such figures as the drops falling either singly, or upon one another, chance to exhibit. Of this kind of caves we have also several in England, Pool's hole is one of the most remarkable. Mr. Derham mentions another on the top of Bredon-hill in Worcestershire; to which we may add another called the *Elve-hole* in Witherlack in Westmoreland; lined a-top with these stalactical stones, hanging like icicles; which are manifestly nothing else but exudations or exfiltrations of some *petrifying* juices out of the rocky earth there. See Supplement, *Articles* PETRIFICATION and SPAR.

PETROBRUSSIANS, a religious sect, which arose in France, and the Netherlands, about the year eleven hundred and twenty six; so called from their leader, *Peter Bruys*, a provincial.

The chief of Bruys's adherents was a monk, one Henry; from whom the *Petrobrussians* were also called *Hemicians*.—Peter the venerable abbot of Clugny, has an express treatise against the *Petrobrussians*; in the preface to which, he reduces their opinions to five heads.

1. They denied that children before the age of reason can be justified by baptism; in regard it is our own faith that saves by baptism. 2. They held that no churches should be built, but that those that already are, should be pulled down; an inn being as proper for prayer as a temple, and a stable as an altar. 3. That the cross ought to be pulled down and burned, in regard we ought to abhor the instruments of our Saviour's passion. 4. That Jesus Christ is not in the eucharist, and that this sacrament is vain. 5. That sacrifices, alms, prayers, &c. do not avail the dead.

F. Langlois objects manichæism to the *Petrobrussians*; and says they maintained two gods, the one good, the other evil; but this we rather esteem an effect of his zeal for the catholic cause, which determined him to blacken the adversaries thereof, than any real sentiment of the *Petrobrussians*.

PETROJOANNITES, the followers of Peter John, or Peter Joannis, i. e. Peter the son of John, who lived in the XIIth century; whose doctrine was not known till after his death; when his body was taken out of his grave and burnt.—His opinions were, that he alone had the knowledge of the true sense wherein the apostles preached the gospel; that the reasonable soul is not the form of man; that there is no grace infused by baptism; and that Jesus Christ was pierced with a lance on the cross ere he expired.

PETROL, PETROLEUM, *q. d. petra-oleum*, oil of petre, or rock oil, an oleaginous juice, issuing out of the clefts of rocks; and found floating on the waters of certain springs.

Beside artificial and vegetable oils, i. e. those drawn from plants, &c. by expression; there are also natural and mineral oils issuing of themselves from the entrails of the earth, called by a common name *Petrols*, or *Petroles*.

These, according to all appearance, must be the work of subterraneous fires, which raise, or subline the more subtle parts of certain bituminous matters that lie in their way. These parts being condensed into a liquor by the cold of the vaults of rocks, are there collected, and ooze thence through clefts and apertures, which the disposition of the ground furnishes them withal.

Petrol, then, is a liquid bitumen, only differing by its liquidity from other bitumens, as asphaltum, jet, amber, and the like substances.

The naphtha, which is either a liquid, or at least a very soft bitumen, is nearly ally'd to *Petrol*.

Hitherto there has been little *Petrol* found, except in hot countries. Olearius says he saw above thirty springs of it near Scamachia in Persia: there are also *Petrols* in the southern provinces of France; but the best are those in the duchy of Modena, first discovered by Aristot. a physician, in 1640, in a very barren valley, twelve leagues from the city of Modena.

Three canals are there dug with great expence in the rock; by which three different kinds of *Petrol* are discharged into little basins or reservoirs: the first, as white, clear, and fluid as water, of a brisk penetrating smell, and not disagreeable; the second of a bright yellow, less fluid, and of a less brisk smell than the white; the third of a blackish red, of thicker consistence, and a smell more approaching that of bitumen.

M. Boulduc has made several experiments on the *Petrol*, described in the *Hist. of Acad. of Science*, an. M. dccc. xv. He observes, that he could not raise from it any phlegm or saline spirit by any distillation, either in balneo-marie, or in a sand heat: all that would rise was oil; and that at the bottom of the pellican remained an exceeding small quantity of a thickish, brownish matter.

Hence, to use *Petroleum* in medicine, it ought to be preferred just as it is. It is a remedy nature has prepared to our hands:

it is found very warm and penetrating; and is commended in many outward complaints, rheumatick and athrick pains, and paralytick limbs. See Supplement, *Article* PETROLEUM.

PETRONELL, a sort of harquebuis or hand-gun. See HARQUEBUIS.

PETROSA *ossa*, in anatomy, a denomination given to the fifth and sixth bones of the skull, called also *ossa temporum*, because they shew the age of man; the hairs hereon turning grey before any of the rest.

Their upper part is squamous, or scaly, the lower is *petrous*, i. e. hard or stony, and hence they come here to be more particularly denominated *Petrosa*.—

The *ossa Petrosa* are the smallest proper bones of the cranium: their upper part is semi-circular, and their lower is of a firm structure. They are situated in the lateral and lower parts of the head; bounded at top by the squamous future, which joins them to the parietalia; and behind by the lambdoides, which join them to the occipital, and connects them to os sphenoides. Each has two sinusses, before and behind the sphenoides: the exterior lined with a cartilage, receiving the process of the lower jaw; the interior receives the lower-part of the sinus lateralis of the dura mater.

Each again has four processes; three external, and one internal; of the external, the first is called *zygomaticus* or *os jugale*; the second *mastoides* or *mammillaris*; the third *styloides*, each whereof see under its proper article.

The internal process is properly called the *os petrosum*: this is pretty long and large, containing the whole meatus auditorius and cavity of the tympanum.

PETTELIA, PETTEIA, in the ancient musick, a Greek term, to which we have no corresponding one in our language.

The melopeia, i. e. the art of arranging sounds in succession so as to make melody, is divided into three parts, which the Greeks call *leptis*, *mixtis*, and *chrestis*; the Latins *sumptio*, *mixtio*, and *usus*; and the Italians *prelo*, *melolameuto*, and *uso*.—The last of these is also called by the Greeks, *πέρηλα*, *Petteia*, and by the Italians *pettia*.

Pettia, or *Pettia*, then is the art of making a just discernment of all the manners of ranging, or combining sounds among themselves, so as they may produce their effect, i. e. may express the several passions intended to be raised: thus, *a. gr.* it shews what sounds are to be used, and what not, how often any of them are to be repeated, which to begin, and with which to end, whether with a grave sound to rise, or an acute one to fall, &c.

It is the *Pettia* that constitutes the manners of the musick; it being this that chuses out this or that passion, this or that motion of the soul to be awakened, and whether it be proper to excite it on this or that occasion.—The *Pettia* therefore is in musick much what the manners are in poetry.

We do not see whence the denomination should have been taken by the Greeks, unless from *πέρηλα* their game of chess; the musical *Pettia* being a sort of combination and arrangement of sounds, as chess is of peices called *πέρηλα*, calculi, or chessmen.

PETTY bag, an office in chancery, the three clerks whereof record the return of all inquisitions out of every shire, and make all patents of customers, gaugers, comptrollers, &c.

PETTY fagger *, a little, flicking, solicitor, or jobber in law disputes, without either skill or conscience.

* The word is formed from the French, *petit*, little; and the Saxon, *fagere*, suiter, or woe.

PETTY, or PETIT larceny, in law, small theft; or the stealing of things under the value of twelve-pence.

The punishment anciently was sometimes the loss of an ear; sometimes cudgelling: after Edward III. it was for a long time whipping, but it is now transportation.

PETTY orders. See the article ORDERS.

PETTY pates, among confectioners, a sort of small pies, made of a rich crust, and filled with sweet meats.

PETTY singles, among falconers, are the toes of a hawk.

PETTY tally, in the sea language, a competent allowance of victuals, according to the number of the ship's company.

PETTY, or PETIT treason, in law, the crime of a servant's killing his master, a wife's killing her husband, a child's killing his parent, or a clergyman's killing his prelate to whom he owes obedience.

The punishment of *petty treason* is, that the criminal shall be drawn on a sledge, or hurdle to the gallows, and there hanged.

The punishment of *petty treason* in a woman is the same with that of high-treason, viz. drawing and burning alive.

PETUM, *nicotiana*, or tabacco. See TOBACCO.

PEVERT. See the article PIVOT.

PEVETS, in a watch, the ends of the spindle of a wheel in a watch.—The holes into which they run, are called *pevet holes*. See WATCH.

PEWTER, a factitious metal, used in domestick utensils: its basis is tin, which is converted into *Pewter* by the mixture of six pounds of brass, and fifteen pounds of lead, to an hundred weight of tin. See METAL.

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Beside this composition which makes the common *Pewter*, there are others for other occasions, compounded of tin, mixed with regulus of antimony, bismuth, and copper, in several proportions.

Pewter has occasionally served for money. In the philosoph. transact. M. Putland informs us, that K. James II. turned all the *pewter* vessels, &c. of the protestants in Ireland he could seize, into money; half-crowns were somewhat bigger than half-pence, and other pieces in proportion.

He ordered it to be current in all payments: whence, our author observes, people absconded for fear of being paid their debts: he also mentions crown-pieces of this metal, with this legend on the rim, *malis tesseris fati*.

PHENOMENON *, *ΦΑΙΝΟΜΕΝΟΝ*, strictly an appearance in physics, an extraordinary appearance in the heavens, or on earth; either discovered by observation of the celestial bodies, or by physical experiments; and whose cause is not obvious.

* The word is formed from the Greek *φαίνω*, I appear.

Such are meteors, comets, uncommon appearances of stars, and planets, earthquakes, &c. such also are the effects of the magnet, phosphorus, &c.

The *Phenomena* of comets are inconsistent not only with the solidity of the heavens, supposed in the ptolemaic hypothesis, but equally with the plenitude of the heavens asserted by the cartesians.

That hypothesis is best which solves most *Phenomena*. Sir Is. Newton shews, that all the *Phenomena* of the heavenly bodies follow from the attraction of gravity, which intercedes those bodies; and almost all the *Phenomena* of the lesser bodies from the attraction and repulsion between their particles: so simple is nature.

Parallax of a PHENOMENON. See *PARALLAX*.

PHAGEDÆNA*, in chirurgery, &c. a deep, bloated ulcer, which eats and corrodes the neighbouring parts.

* The word is Greek, *φάγηλανα*, formed of *φαγω*, to eat.

PHAGEDÆNIC medicines, such as are used to eat off fungous, or proud flesh.

PHAGEDÆNIC ulcer. See *PHAGEDÆNA*, and *ULCER*.

The ephemerides of the academy of the *curiosi naturæ*, relate, that *phagedænic* ulcers have been frequently cured only with theeps dung.

PHAGEDÆNIC water, in chymistry, denotes a water made from quick-lime and sublimate; it is called from its efficacy in the cure of *phagedænic* ulcers.

To prepare this water, they put two pounds of fresh quick-lime in a large earthen pan, and pour upon it about ten pounds of rain-water; these they let stand together two days, stirring them frequently: at last leaving the lime to settle well, they pour off the water by inclination, filtrate it, and put it up in a glass bottle, adding to it an ounce of corrosive sublimate in powder; which, of white becomes yellow, and sinks to the bottom of the vessel. The water being settled, is fit for use, in the cleansing of wounds and ulcers, and to eat off superfluous flesh; and especially in gangrenes; in which case may be added to it a third or fourth part of spirit of wine.

PHALANX, *ΦΑΛΑΞ*, in antiquity, a huge, square, compact battalion, formed of infantry let close to one another, with their shields joined, and pikes turned cross-ways; inasmuch that it was almost impossible to break them.

It consisted of eight thousand men: Livy says, that this sort of battalion was invented by the Macedonians, and that it was peculiar to them; whence, among writers, it is sometimes called the *Macedonian Phalanx*.

St. Evremont observes, that the Macedonian *Phalanx* had the advantage in valour and strength over the Roman legion.

PHALANX, PHALANCES, is also applied by anatomists, to the three rows of small bones which form the fingers.

The uppermost *Phalanx* next the wrist is the longest and largest; the second is less, but longer and larger than the third *Phalanx*.

PHALÆCUS, or *PHALÆCIUS*, in poetry, a kind of verse, in use among the Greeks and Latins; consisting, like the saphic, of five feet, the first a spondee, the second a dactyl, and the three last trochees.

The *Phalæcus* is very proper for epigrams: Catullus excelled in it. Its original author is not known.

PHALICA, *ΦΑΛΑΙΚΑ*, in antiquity, feasts, or sacrifices celebrated at Athens, in honour of Bacchus.

The *Phalica* were instituted on the following occasion: one Pegasus, a citizen of Eleutheris, having carried home statues of Bacchus to Athens, drew on himself the laughter and contempt of the Athenians.—Soon after this, the people were seized with an epidemic disease; and upon consulting the oracle how to get free of it, were answered, that there was no way but to receive Bacchus in pomp; they did it, and thus instituted the *Phalica*; wherein, besides the statues and trophies of the god, they bore figures of the parts affected tied to thyrsi.

PHALLOPHORIA*, *ΦΑΛΛΟΦΟΡΙΑ*, in antiquity, a name given at Sicily to certain nimes, who ran about the streets smutted

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with black, and clothed in sheep skins, bearing baskets full of various herbs, as chervil, branca urfina, violet, ivy, &c.

* The word is formed from the Greek, *φαλλός*, a pole, at the end of which was fastened the figure of a human penis made of leather; and *φορέω*, I bear.

They danced in cadence and were crowned with ivy, in honour of Bacchus: carrying the phallus before them as the ensign of their office.

PHANATIC, *PHANATICUS*, a visionary; one who fancies, or thinks he sees spectres, spirits, apparitions, or other imaginary objects, even when awake; and takes them to be real.

Such are phrenetics, necromancers, hypochondriac persons; lycanthropi, &c. See *PHRENETIC*, *HYPOCHONDRIAC*, *LYCANTHROPY*, &c.

Hence the word is also applied to enthusiasts, pretenders to revelation, new lights, prophecies, &c.

PHANTASM, *ΦΑΝΤΑΣΜΑ*, *PHANTOM*, a species of an object perceived by an external sense, and thence retained in the phantasy.

PHANTASTIC, in musick.—*PHANTASTIC style*, is a free, easy manner of composition; proper for instruments. See *STYLE*.

PHANTASTICAL colours, is a denomination given by the peripatetics to those colours exhibited by the rainbow, or a prism; they erroneously supposing them not to be real colours, but only phantoms or deceptions of the sight.

But many experiments of the moderns, and particularly those of Sir Isaac Newton, demonstrate the contrary, and prove them as real as any other colours in nature.

PHANTASY, or *FANCY*, the *imagination*; the second of the powers, or faculties of the sensitive or rational soul; by which the species of objects received by the common sense, are retained, recalled, further examined, and either compounded, or divided.

Others define the *Phantasy* to be that internal sense or power, whereby the ideas of absent things are formed, and presented to the mind as if they were present.

The seat or organ of this sense is vulgarly supposed to be the middle part of the brain; and its objects, all the species communicated to it by the common sense, by the comparing of which it frames infinite others to itself.

In melancholic, and mad men this faculty is very strong, representing many extravagant and monstrous things; and framing its images as lively as those of sensation: whence naturally arise the visions and deceptions those persons are liable to.

In poets and painters the same faculty ought to be the predominant one; to enable them to feign, and pursue, and execute their fictions or fables with more strength, consistency, and beauty.

In men it is supposed to be subject to reason, but in brutes it has no superior: this being the *ratio brutorum*, or what we call reason in brutes.

The *Phantasy* is free from the ligature, or suspension of sleep; witness our dreams, &c.

Some philosophers use the word *Phantasy* in a more general signification, *viz.* for what we usually call *sensus communis*, the common sense.

PHARISEES*, a celebrated sect among the ancient Jews; so called, say some, because separated from the rest, by the austerity of their life, and by their professing a greater degree of holiness, and a more religious observation of the law.

* This is the import of the word *pharis*, in the Hebrew, or rather Chaldee tongue; whence is formed the Greek *Φαρισαῖος*, and the Latin *Phariseus*.—St. Jerom. and several of the Rabbins maintain this etymology; which is very agreeable to the state and character of the *Pharisees*; who were not only distinguished from the rest by their manner of life, but by their habit.

It is very difficult to fix the precise origin of the *Pharisees*. The jesuit Serrarius places their first rise about the time of Esdras; because it was then that the Jews first began to have interpreters of their traditions. Maldonat, on the other hand, will not have this sect to have arose among the Jews, till a little before the time of Christ. Others, perhaps with more probability, refer the origin of the *Pharisees* to the time of the Maccabees.

Be this as it will, *Pharisaism* is still the prevailing doctrine in the Jewish religion; that vast number of traditions in the Talmud, which bear so great a sway among the Jews, coming all from the *Pharisees*.

Josephus, who describes their dogmata, says, that they attributed all to destiny, and to God; so, however, as not to deprive man of his free agency; which Sixtus of Sienna thus explains: The *Pharisees* believed that all things were done by destiny, *i. e.* with God's foreknowledge, and in consequence of his immutable decree; the will of man still remaining free and unaffected: *sub, hoc est Dei præscientia & immobili decreto omnia geri manente tamen libero humanae libertatis assensu.*

They owned the immortality of the soul, and a future state; but they admitted at the same time a kind of metempsychosis, or transmigration of souls.

The *Pharisees* were great sticklers for the allegorical or mystical sense of the scriptures; whence most of the converts made to christianity among the Jews were of the number of the *Pharisees*.

In effect, the *Pharisees* were in every thing directly opposite to the *fadduces*.

PHARMACEUTICA, ΦΑΡΜΑΚΕΥΤΙΚΗ, that part of physick which directs the preparation, and application of medicines. See **PHARMACY**.

PHARMACOLOGY, a treatise of medicines, or of the art of preparing them, judging of them, &c.

PHARMACOPŒIA*, a dispensatory; or a treatise describing the preparations of the several kinds of medicines, with their uses, manner of application, &c.

* The word is formed from the Greek *φαρμακον*, remedy, and *ποιω*, *facere*, to make.

We have various *Pharmacopœias*; as those of Bauderon, Quercetan, Zwelfer, Charas, Bates, Salmon, Lemery, &c.—The latest, and most in esteem, are the Edinburgh and London dispensatories: but the most universal is Quincy's *Pharmacopœia*.

PHARMACOPOLA*, or *pharmacopœius*, an apothecary; or a person who prepares and sells medicines. See **APOTHECARY**.

* The word is seldom used but by way of ridicule. It is formed from the Greek *φαρμακον*, and *πολις*, *vendere*, to sell.

PHARMACUM, ΦΑΡΜΑΚΟΝ, a medicament, or medicine; whether of a salutary, or poisonous quality.

PHARMACY*, ΦΑΡΜΑΚΕΙΑ, that branch of medicine which teaches the choice, preparation, and mixture of medicines.

* The word is derived from the Greek *φαρμακον*, remedy.

Pharmacy is divided into galenical and chymical.

Galenical Pharmacy, called also simply *Pharmacy*, is that derived to us from the ancients; consisting in the knowledge, and management of the several parts of the *materia medica*, now in the hands of the apothecaries.

Chymical Pharmacy, called also *spagyric* and *hermetical*, is that introduced by Paracelsus, who calls it *ars distillatoria*; consisting in the resolving of mixed bodies, into their component parts, in order to separate the useful and ill, and collect and exalt the good.

One of the chief obstacles in the way of the improvement of physick, is the physicians neglecting of *Pharmacy*.—Simple, vulgar, familiar, easily prepared, and readily procured, Pliny well observes, were the only remedies intended by nature: when fraud was got into the world, and men began to live by their wits, shops were soon set up; and life offered every man to sale. So aight, innumerable compositions; and endless, inexplicable mixtures were cried up; The products of Arabia and India were crowded into a draught; and a plaister for a little ulcer fetched from the red sea. Whereas the proper remedies are those the poor every day meet with. — *Hist. Nat. lib. 24. c. 1.*

Characters in Pharmacy. See **CHARACTER**.

PHAROS, PHARE, a *light-house*; a pile raised near a port, where a fire is kept burning in the night to guide and direct vessels near at hand.

The *Pharos* of Alexandria, built in a small island at the mouth of the Nile, was anciently very famous, inasmuch as to communicate its name to all the rest—the Colossus of Rhodes also served as a *Pharos*.

Ozanam says, *Pharos* anciently signified a freight; as the *Pharos* or *Pharo* of Messina.

PHARSANG, or **PARASANG**. See **PARASANG**.

PHARYNX, ΦΑΡΥΞ, in anatomy, the upper opening of the oesophagus or gullet, situate at the bottom of the mouth; and called also the *fauces*.

The *Pharynx* is that part more particularly called the *gula*, or gullet; in which the action of deglutition commences; and where it is chiefly performed.

It is assisted by three pair of muscles, which principally compose the *Pharynx*. The first called the *stylopharyngeus* serves to draw up and dilate the *Pharynx*: the second the *ptyergo-pharyngeus* serves to constrict it: the third, which is called the *oesophagus*, serves to close it: See each under its proper article.

PHASES*, ΦΑΣΕΙΣ, in astronomy, the several appearances, or quantities of illumination of the moon, venus, mercury, and the other planets; or the several manners wherein they appear illuminated by the sun.

* The word is formed from the Greek, *φαίνω*, I appear, I shine upon.

The variety of *Phases* in the moon is very remarkable: sometimes she increases, sometimes wanes, sometimes is bent into horns, and again appears like a semicircle, at other times she is gibbous, and presently again resumes a full circular face.

For the theory of the *lunar Phases* see **MOON**.—As to the *Phases* of Venus, the naked eye does not discover any diversity in them; but the telescope does: Copernicus anciently prophesied, that after-ages would find that Venus underwent all the changes of the moon; which prophecy was first fulfilled by Galileo, who directing his telescope to Venus, observed her *Phases* to emulate those of the moon; being sometimes full, sometimes horned, and sometimes gibbous.

Mercury also does the same—all the difference between these, and those of the moon, is, that when these are full the sun is between them and us; whereas, when the moon is full, we are between her and the sun.

Saturn puzzled the astronomers a long time with his strange variety of *Phases*: Hevelius and others found him; 1. Monophrical. 2. Triphrical. 3. Spherico-anfated. 4. Elliptico-anfated. 5. Spherico-culpidated; but Huygens shews, that those monstrous *Phases* were principally owing to the imperfection of their telescopes. That great author, assisted by the best telescopes, noted three principal *Phases*, viz. Jan. 16, 1656, he was round, Octob. 13. brachiated, and Decemb. 17, 1657, anfated. See **SATURN**.

PHASES of comets. See the article **COMET**.

To determine the *Phases* of an eclipse for any given time.—Find the moon's place in her visible way for that moment: and thence, as a centre, with the interval of the moon's semi-diameter, describe a circle. Find in like manner the sun's place in the ecliptic, and thence, with the semi-diameter of the sun describe another circle: the intersection of the two circles shews the *Phases* of the eclipse, the quantity of obscuration, and the position of the cups or horns.

PHASMATA, in physiology, certain appearances arising from the various tinctures of the clouds by the rays of the heavenly luminaries, especially the sun and moon.

These are infinitely diversified by the different figures and situations of the clouds and the appulses of the rays of light, and together with the occasional flashings and shootings of different meteors, they have, no doubt, occasioned those prodigies of armies fighting in the air, &c. of which we have such frequent accounts in most sorts of writers*. V. Maccab. ii. 5. Melancth. meteor. 2. Snel. de comet. ann. 1618.

* Kircher, and his imitator Schottus, have erroneously endeavoured to explain the phenomenon from the reflection of terrestrial objects made on opaque and congealed clouds in the middle region of the air, which, according to them, have the effect of a mirror.—So that according to these authors, the armies pretended by several historians to have been seen in the skies, were no other than the reflection of the like armies placed on some part of the earth. Vid. *Hist. Acad. R. Scienc. an. 1726. p. 405, & seq.*

PHÉONS, in heraldry, the barbed heads of darts, arrows, or other weapons.

Phéons are represented as in *Tab. Herald. fig. 79*.—Sable, a fesse ermine between three *Phéons*, by the name of Egerton.

PHIAL*, **PHIALA**, a small thin glass bottle, popularly called a *vial*.

* The word is formed of the Greek *φιάλη*, which signifies the same. **PHIDITIA**, or **PHILITIA**, in antiquity, feasts celebrated with great frugality at Lacedæmon.

The *Phiditia* were held in the public places, and in the open air: rich and poor assisted at them alike, and on the same footing; their design being to keep up peace, friendship, and a good understanding, and equality among all the citizens great and small. Bernegger says, they who attended at this feast, brought each a bushel of flower, eight measures of wine, called *chorus*, and five minæ of cheese, and as much figs.

The *Philitia* of the Greeks were much the same with the *charistia* at Rome. See **CHARISTIA**.

PHILADELPHUS, ΦΙΛΑΔΕΛΦΟΣ, in antiquity, a title or surname, bore by several ancient kings; formed from the Greek *φίλος*, friend, lover, and *ἀδελφός*, brother; q. d. one who loves his brother, or brethren.

Ptolemy *Philadelphus* erected a library at Alexandria, and furnished it with 400,000, others say with 700,000 volumes, by the advice, and with the assistance of Demetrius Phalareus.

It was the same *Philadelphus*, that procured the Greek version of the books of Moses, called the *Septuagint*.

Father Chamillart has a medal of the queen of Comagene, which bears the title of *Philadelphæ*, without any other name.—M. Vaillant tells us, that Philip king of Syria had also the title *Philadelphus*.

PHILANTHROPY, ΦΙΛΑΝΘΡΩΠΙΑ, love of mankind, a general benevolence towards the species.

PHILAUTIA*, ΦΙΛΑΥΤΙΑ, in the schools, *self-love*; a vicious fondness and complaisance for a man's self.

* The word is formed from the Greek *φίλος*, *amicus*, and *αυτός*, *ipse*. **PHILIPPICKS**, ΦΙΛΙΠΠΙΚΑ, ΦΙΛΙΠΠΙΚΟΙ ΛΟΓΟΙ, in literature, a name given to the orations of Demosthenes against Philip king of Macedon.

The *Philippicks* are esteemed the master-pieces of that great orator: Longinus quotes abundance of instances of the sublime from them; and points out a thousand latent beauties therein. In effect, that pathetic wherein Demosthenes excelled, the frequent interrogations and apostrophe's wherewith he attacked the indolence of the Athenians, where could they be better employed? How much delicacy soever there be in the oration against Leptinus, the *Philippicks* have yet the advantage over it, were it only on account of the subject, which gives Demosthenes so fair a field to display his chief talent, we mean with Longinus, that of moving and astonishing.

Dionysius Halicarnassensis ranks the oration on the Halonese among the *Philippicks*, and places it the eighth in order; but though the authority of that great critic be of no small weight;

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yet, that force and majesty whereby Cicero characterises the *Philippics* of Demosthenes, seems to exclude the oration on the Halonese out of the number; and authorise the almost universal opinion of the learned, who reject it as spurious.

Libanius, Photius, and others, but above all, the languidness of the style, and the lowliness of the expressions which reign throughout the whole, father it on Hegesippus.

M. Tournell has given an excellent French translation of the *Philippics* of Demosthenes. It is an extraordinary thing to see so much spirit in a translation: so much of the strength and energy of Demosthenes, in a modern tongue; and that too so weak a one as the French.

PHILIPPICK is also applied to the fourteen orations of Cicero against Marc Anthony.—It was Cicero himself that gave them this title in his epistles to Brutus; and posterity have found it so just, that it has been perpetuated to our times.

Juvenal calls the second the *divine Philippick*, and witnesses it to be of great fame, *conspicuae divina philippica fama*. That orator's entitling his last and most valued orations after the *Philippicks* of Demosthenes, shews the high opinion he had of them.

Cicero's *Philippicks* cost him his life; Marc Anthony having been so irritated with them, that when he was arrived at the triumvirate, he procured Cicero's murder, cut off his head, and stuck it up in the very place whence the orator had delivered the *Philippicks*.

PHILIPPISTS, a sect or party among the Lutherans; the followers of Philip Melancthon.

That reformer having strenuously opposed the Ubiquists, who arose in his time; and the dispute growing still hotter after his death: the university of Wittenberg, who espoused Melancthon's opinion, were called by the Flacians, who attacked it, *Philippists*. See **UNIQUIST**.

PHILITIA. See the article **PHIDITIA**.

PHILIZERS, or **FILAZERS**. See **FILAZER**.

PHILO, a term originally Greek, formed of *φίλος*, *amicus*, friend, or lover; now used in composition in several words in our language, As,

PHILELEUTHERUS *, *φίλαελευθερος*, a lover of liberty.

* The word is formed of *φίλος*, and *ελευθερος*, *liber*, free.

PHILOLOGY *, *φιλολογια*, a science, or rather assemblage of several sciences, consisting of grammar, rhetoric, poetry, antiquities, history, and criticism.

* The word is formed from the Greek *φίλος*, and *λογος*, *q. d.* lover of discourse.

Philology is a kind of universal literature, conversant about all the sciences, their rise, progress, authors, &c.

Philology makes what the French call the *belles lettres*. In the universities it is also called *humanities*, or *humaniores litterae*. Anciently, *Philology* was only a part of grammar.

Eratosthenes, library keeper at Alexandria, was the first who bore the splendid title of *Philologus*, according to Suetonius; or that of *critick*, according to Clemens Alexandrinus. He lived under Ptolemy Philadelphus, and died in the 146th olympiad.

PHILOMATHES *, *φιλομαθης*, a lover of learning, or science. See **SCIENCE**, **KNOWLEDGE**, &c.

* The word is formed from the Greek *φίλος*, lover, and *μαθηταις*, *discipuli*, I learn.

PHILONIUM, in pharmacy, an opiate, or electuary, whereof there are two kinds, the Roman and the Persian.

The Roman, called also the great *Philonium*, took its name from the physician Philo who invented it. It consists of the seeds of henbane, pepper, opium, and other ingredients. It is used to promote sleep, and against colds, colicks, &c.

The Persian *Philonium* consists of several ingredients, among which are opium, terra sigillata, lapis hæmatitis, castor, and saffron. It is used to stop hæmorrhages, dysenteries, &c.

PHILOPATOR *, *φιλοπατορ*, in antiquity, a title, or surname, assumed by several of the kings of Egypt and Syria: importing, lover of one's father.

* The word is formed from the Greek *φίλος*, lover, and *πατηρ*, father.

Ptolemy *Philopator* succeeded Ptolemy Evergetes; and had for his successor Ptolemy Philometer.—The Syrians had their Seleucus *Philopator*, Antiochus *Philopator*, &c.

PHILOSOPHER, *φίλοσοφος*, a person well versed in philosophy; or who makes profession of, or applies himself to the study of nature and morality.

The sects of *Philosophers* are very numerous; and their dogmata or tenets very contradictory.

Helmont, and some of the chymists, denominate themselves *Philosophers by fire*.

The alchemists and adepts are frequently denominated the *Philosophers*, by way of eminence.

PHILOSOPHERS Lotion. See the article **LOTION**.

PHILOSOPHERS Stone, the greatest object of alchemy, is a long-sought-for preparation, which, when found, is to transmute or exalt impurer metals, as tin, lead, and copper, into gold and silver.

There are three ways whereby the alchemists have attempted to arrive at the making of gold: the first, by separation; for it is affirmed that every metal yet known, contains some quan-

tity of gold: only in most, the quantity is so little that it wont defray the expence of getting it out.

The second is by maturation; for the alchemists hold mercury to be the basis and matter of all metals; that quicksilver purged from all heterogeneous bodies would be much heavier, denser and simpler than the native quicksilver; and that by subtilizing, purifying and digesting it with much labour, and long operations, it may be converted into pure gold.

This method of maturation is only for mercury: the other metals it is ineffectual for, on two accounts: 1^o because their matter is not pure mercury, but has other heterogeneous bodies adhering to it: and 2^o by reason the digestion whereby mercury is turned into gold, would not succeed in other metals, in regard these had not been long enough in the mines.

Weight is the individual and inimitable character of gold, &c. Now mercury they say has ever some impurities in it; and those impurities are lighter than mercury. Could those be purged quite out, as it does not appear to them impossible but they might; mercury would be as heavy as gold; and what is as heavy as gold is gold, or at least might very easily be made gold.

The third method is, that of transmuting, or of turning of all metals readily into pure gold, by melting them in the fire, and casting a little quantity of a certain preparation into the fused matter; upon which the faeces immediately retire, are volatilized and burnt, and so carried off; and the rest of the mass is turned into pure gold.—That which works this change in the metals is called the *Philosopher's stone*. See **TRANSMUTATION**.

Whether this third method be possible or not is very hard to say? We have so many testimonies of it from persons, who on all other occasions speak truth, that it is somewhat hard to say they lye in this, even when they say that they have been masters of the secret. All required is, they say, to do that by art, which nature does in many years and ages. For that as lead and gold do but differ little in weight, therefore there is not much in lead beside mercury and gold. Now, if I had any body which would so agitate all the parts of lead, as to burn all that is not mercury therein; and had also some sulphur to fix the mercury; would not the mass remaining be converted into gold? there is nothing in nature so heavy as lead, gold and mercury only excepted. It is evident, therefore, there is something in lead that comes very near to gold. But in lead there is also some heterogeneous matter different both from mercury and gold. If now nineteen ounces of lead be dissolved by the fire, and eight ounces be thus destroyed, they argue that we shall have the rest good gold: the ratio of lead to gold being as eleven to nineteen. If then the *Philosopher's stone* can purify the mercurial matter in lead, so as that nothing shall remain but the pure mercurial body, and you can fix and coagulate this, by means of sulphur, out of nineteen ounces of lead, you will have eleven of gold. Or, if you reduce the lead from eighteen to fourteen, you will then have converted it into mercury; and if you further purify this mercury to the proper standard, you will have gold; provided you have but a sulphur to fix and coagulate it withal. Such is the foundation of the opinion of the *Philosopher's stone*; which the alchemists contend to be a most subtle, fixed, concentrated fire, which as soon as it melts with any metal, does, by a magnetic virtue, immediately unite itself to the mercurial body of the metal, volatilizes and cleanses off all that is impure therein, and leaves nothing but a mass of pure gold.

PHILOSOPHERS Tree, a chymical preparation, called also *arbor diana*, *diana's tree*. See **ARBOR DIANA**.

PHILOSOPHICAL, something that relates to *philosophy*. See **PHILOSOPHY** and **PHILOSOPHER**.

Thus we say a *philosophical thesis*, a *philosophical principle*, a *philosophical definition*, &c.

PHILOSOPHICAL Ether. See **ÆTHER**.

PHILOSOPHICAL Criticism. See **CRITICISM**.

PHILOSOPHICAL Egg, among the chymists, is a thin glass body, or bubble, of the shape of an egg; with a long neck or stem; used in digestions.

PHILOSOPHICAL Month, } See { **MENSTRUUM**, **MONTH**.
PHILOSOPHICAL Transmutations, } See { **TRANSACTIONS**.

PHILOSOPHIZING, the act of considering some object of our knowledge, examining its properties, and the phenomena it exhibits, and enquiring into their causes or effects, and the laws thereof; the whole conducted according to the nature and reason of things, and directed to the improvement of knowledge.

Rules of PHILOSOPHIZING, regulæ PHILOSOPHANDI, as established by sir Isaac Newton, are, 1. That no more causes of a natural effect be admitted than are true, and suffice to account for the phenomena thereof.

This agrees with the sentiments of most philosophers, who hold that nature does nothing in vain; and that it were vain to do that by many things which might be done by fewer.

2. Natural effects, therefore, of the same kind, proceed from the same causes. Thus, *r. gr.* the cause of respiration is one and the same in man and brute; the cause of the descent of a stone, the same in Europe as in America; the cause of light the same in culinary fire, and in the sun; and the cause of reflection the same in the planets as the earth.

3. Those qualities of bodies which are not capable of being heightened, and remitted, and which are found in all bodies where experiments can be made; must be looked on as universal qualities of all bodies.

Thus the extension of body is only perceived by our senses, nor is it perceived in all bodies; but since it is found in all that we have perception of, it may be affirmed of all. So we find that several bodies are hard; and argue that the hardness of the whole only arises from the hardness of the parts: whence we infer that the particles, not only of those bodies which are sensible, but of all others, are likewise hard. Lastly, if all the bodies about the earth gravitate towards the earth, and this according to the quantity of matter in each; and if the moon gravitates towards the earth, also, according to its quantity of matter; and the sea again gravitates towards the moon; and all the planets and comets gravitate towards each other: it may be affirmed universally, that all bodies in the creation gravitate towards each other.—This rule is the foundation of all natural *Philosophy*.

PHILOSOPHY, *φιλosophία*, the knowledge or study of nature and morality, founded on reason and experience.

Philosophy owes its name to the modesty of Pythagoras, who refused the titles, *σοφός*, *wise*, given to his predecessors, Thales, Pherecydes, &c. as too assuming; and contented himself with the simple appellation of *φιλοσοφός*, *quis*, *φιλο* της σοφίας, a friend, or lover of wisdom.

Chauvin rather derives the name from *φιλία*, desire or study, and *σοφία*, *q. d.* *studium sapientiae*; and says that Pythagoras conceiving that the application of the human mind, ought rather to be called *study* than *science*, set aside the appellation *wise*, and in lieu thereof took that of *philosopher*.—For having discoursed with great judgment and learning before Leontius king of the Philiassi, that prince asked him what art he professed; or in what points his wisdom chiefly lay? To which he answered, that he neither understood any art, nor was he *σοφός*, but *φιλοσοφός*. Which title St. Augustin observes, took so well with other authors, that whoever excelled in any thing relating to wisdom or knowledge, had afterwards no other appellation. Accordingly Socrates, Plato, &c. ever refrained from the swelling titles of *sophos*.

PHILOSOPHY is a term used in various significations among ancient and modern writers. In its laxer sense, it signifies the love of truth: thus, Plato frequently calls it *φιλαληθεια*.

In other places it signifies the knowledge of many things: thus Zeno calls *Philosophy*, *κατανοήσις*, comprehension, because comprehending all truth.—Agreeable to which, is Cicero's definition of philosopher, that he is one who studies to know the natures and causes of all things human and divine, and to attend to every good rule and method of life.

PHILOSOPHY, in a narrower sense, is frequently confined to some one Science, or branch of science: *v. gr.* to Logic, as we find it in Plato and Aristotle.—To Physics, or the knowledge of nature: in which sense it was chiefly used in the Ionic School. And to Ethics, or the rules of morality: thus it is Clemens of Alexandria relates, that among the Greeks there are philosophers who hold disputes about virtue.

Agreeable to this last application, Pythagoras defines *Philosophy* a meditation on death; by which, according to Plato and Clemens, is meant an abstraction or retirement from the body; which Apuleius thus explains: A philosopher is to study nothing so much as to set his soul at liberty from its correspondence with the body: Thus Cicero calls *Philosophy*, *ars vitæ*, and Seneca, *lex vitæ*: and thus Plutarch—constancy, fidelity, and a sound mind, are the real *Philosophy*; all the other parts of wisdom, tending any other way, are prettinesses and curiosities: and in this sense it was, that *Philosophy* chiefly flourished in the school of Socrates, afterwards called the *academic school*, and among the Stoics.

PHILOSOPHY again is frequently used by Pythagoras and Plato for Metaphysics, or the knowledge of God; which Plato calls the *true Philosophy*, others the *prima philosophia*; and in respect whereof, the Platonists call all other *Philosophy*, *nocturnal*, *νυκτερινή φιλοσοφία*.

Gale includes the several notions hitherto delivered, under this one general definition: *Philosophy* is the knowledge of things natural, moral, supernatural and notional, originally granted by God to our first parents, and transmitted to us for the honour of the Creator, and the good of the universe.

That definition of Epictetus is also pretty comprehensive: *Philosophy*, he says, consists in three things; the practice of precepts, the reason of precepts, and the proof of precepts.

Some have given the following appellations to the ancient *Philosophy*, under its several stages: *Philosophy*, say they, became *impious* under Diagoras; *vicious* under Epicurus; *hypocritical* under Zeno; *impudent* under Diogenes; *covetous* under Demochares; *volutuous* under Metrodorus; *fantastical* under Crates; *jealous* under Menippus; *licentious* under Pyrrho; and *quarrelsome* under Cicanthes.

The several dogmata maintained by the several philosophers, are infinite: Cicero makes no scruple to aver, that there is

nothing in the world, how absurd soever, but has been maintained by one philosopher or other.

From the first broachers of new opinions, and the first founders of schools, *Philosophy* is become divided into innumerable sects: some ancient, others modern: such are the Platonists, Peripatetics, Epicurians, Stoicks, Pyrrhonians and Academicks; and such are the Cartesian, Newtonian, &c. See the rise, doctrines, &c. of each sect, under its proper article, PLATONIST, PERIPATETIC, EPICUREAN, STOIC, PYRRHONIAN, ACADEMIC, CARTESIAN, NEWTONIAN, &c.

Philosophy may be divided into two branches, or it may be considered under two habitudes, *Theoretical* and *Practical*.

Theoretical, or *Speculative* *Philosophy*, is that employed in mere contemplation, and which terminates therein.—Such is Physics, which is a bare contemplation of nature, and natural things.

Theoretical *Philosophy*, again, is usually subdivided into three kinds, *viz.* Pneumatics; Physics, or Somatics; and Metaphysics, or Ontologia.

The first considers being, abstracted from all matter, its object are spirits, their natures, properties and effects.

The second considers matter and material things; its object are bodies, their properties, laws, &c.

The third extends to each indifferently; its object are either body or spirit.

In the order of our discovery, or arrival at the knowledge of them, Physics is first, then Metaphysics; the last arises from the two first considered together: after an acquaintance with God, ourselves, and natural bodies, we come to consider what is common to them all, or the attributes that agree to all; and thus form a sort of universal *Philosophy*, or doctrine *de ente* in general.

But in teaching, or laying down these several branches to others, we observe a contrary order; beginning with the most universal, and descending to the more particular. And hence we see why the Peripatetics call Metaphysics, and the Cartesians Pneumatics, the *prima philosophia*.

Others prefer the distribution of *Philosophy* into four parts, *viz.* 1. Pneumatics, which considers and treats of spirits. 2. Somatics, of bodies. The third compounded of both, Anthropology, which considers man, in whom both body and spirit are found. The 4. Ontology, which treats of what is common to all the other three.

Practical *Philosophy*, is that which lays down the rules of virtuous and happy life; and excites us to the practice thereof.

Practical *Philosophy* is properly Ethics alone, or the method of leading a virtuous and happy life.—Yet most authors divide it into two kinds, answerable to the two sorts of human actions to be directed thereby, *viz.* 1. Logic, which govern the operations of the understanding.

2. Ethics, properly so called, which direct those of the will.

Natural *Philosophy*, } See the articles { **NATURAL**
Moral *Philosophy*, } **MORAL**.

PHILOSOPHY is also frequently used for the particular doctrine, or system of opinions, broached by some considerable philosopher, and espoused and adhered to by his followers.

In this sense we say the

<i>Aristotelian</i>	} PHILOSOPHY. See	<i>PERIPATETIC.</i>
<i>Cartesian</i>		<i>CARTESIAN.</i>
<i>Epicurean</i>		<i>EPICUREAN.</i>
<i>Hermetical</i>		<i>HERMETICAL.</i>
<i>Newtonian</i>		<i>NEWTONIAN.</i>
<i>Platonic</i>		<i>PLATONIC.</i>
<i>Socratic</i>		<i>SOCRATIC.</i>

PHILOSOPHY is also used for a certain manner of philosophizing; or certain principles, upon which all the enquiries thereby made do turn.

In this sense we say,

<i>Corpuscular</i> or <i>Atomical</i> <i>Philosophy</i> .	} See	<i>CORPUSCULAR</i> , and
<i>Mechanical</i> <i>Philosophy</i> .		<i>ATOMICAL.</i>
<i>Experimental</i> <i>Philosophy</i> .		<i>MECHANICAL.</i>
		<i>EXPERIMENTAL.</i>

PHILOSOPHY, again, is considered with regard to the age, or the place wherein it was taught.

In this sense we say,

Scholastic or *School* *Philosophy*. See **SCHOLASTIC**.

New *Philosophy*, &c. See **MECHANICAL** *Philosophy*.

FILTER, *φιλτρε*, *FILTRUM*, in pharmacy, &c. a strainer, or filter. See **FILTER**.

FILTER *, *φιατόν*, is also used for a drug, or preparation, or charm, which it is pretended will excite love.

* The word is formed from the Greek, *φιλέω*, I love, of *φίλος*, lover.

Filters are distinguished into true and spurious: the spurious are spells or charms, supposed to have an effect beyond the ordinary laws of nature, by some magic virtue; such are those said to be given by old women, witches, &c.

The true *Filters* are supposed to work their effect by some natural and magnetical power.—There are many enthusiastic authors who

who believe the reality of these *Philters*; and alledge matter of fact in confirmation of their opinion: among the rest is Van-Helmont, who says, that upon holding a certain herb in his hand for some time, and taking afterwards a little dog by the foot with the same hand, the dog followed him wherever he went, and quite deserted his former master.

He adds that *Philters* only demand a conformation of mumia; and on this principle he accounts for the phenomena of love transplanted by the touch of an herb; for, says he, the heat communicated to the herb, not coming alone, but animated by the emanations of the natural spirits, determines the herb towards the man, and identifies it to him: having then received this ferment, it attracts the spirit of the other object magnetically, and gives it an amorous motion. But all this is mere cant; and all *Philters*, whatever facts may be alledged in their favour, are mere chimeras.

Naturalists alcribe an effect somewhat of kin to that of a *Philter* to cantharides taken inwardly; these, it is true, tend to excite love, or rather lust: but it is lust in the general, not determined to any particular object; and they do it no otherwise than by irritating the fibres of the nerves and muscles, by whose action the emissio feminis is effected.

PHILTRATION, or **FILTRATION**, the separation of the finer parts of a fluid, from the coarser; by passing it through a filter, viz. a linnen cloth, shammy skin, brown paper, or the like. See **FILTRATION**.

PHIMOSIS *, **ΦΙΜΩΣΙΣ**, in medicine, a disease of the penis, wherein the præputium is glued, or strongly constricted upon the glands; so as not to be capable of being drawn back, to uncover the glans.

* The word is Greek, and properly signifies a ligature with pack-thread, *απακας*, denoting packthread.

Sometimes a *Phimosis* conceals (shanks on, or about the glans; and sometimes it is so violent as to prevent the flowing out of the matter, whence it causes an inflammation or mortification of the part. When the prepuce is detained behind the glans, the case is called a *Paraphimosis*.

The cure of a paraphimosis in no wise differs from that of a *Phimosis*, except in the use of injections; and in both cases, if they still prove obstinate, the prepuce must be cut, in order to reduce it to its natural state or situation. See **PARAPHIMOSIS**.

PHIMOSIS is also used for a disease of the eyes, wherein the eyelids are so bound together by the mediation of some glutinous matter, that they are not to be opened.

PHLEBOTOMY *, **ΦΛΕΒΟΤΟΜΙΑ**, in medicine and chirurgery, *bleeding*; or the art, or operation of letting blood.

* The word is compounded of the Greek *φλεβ*, vein, and *τομή*, to cut.

Phlebotomy is a species of evacuation of the utmost importance in medicine; an idea of its effects, with the reason of its use, may be conceived from what follows.

It is evident the blood thrown out of the heart, while it strikes upon the antecedent blood, and drives it forwards, transfers to it part of its own motion, and it is therefore so much retarded in its own motion. Hence, if blood be drawn out of the basilar vein of the right arm; the succeeding blood, or that carried by the axillary artery, or right subclavian, will be less hindered in its motion, than it was before that vein was opened: for part of the blood being taken away by the opening of that vein, there remains behind a lesser quantity in the axillary vein, or less is contained between the farther extremity of the axillary artery and the heart, than was before: therefore the blood being let out by the vein, the remainder in the artery will be less impeded in its motion than before.

Hence the blood of that artery which communicates with the vein that is opened, will flow with a greater velocity after the aperture is made than before. Consequently, while the blood is flowing out of the vein in the arm, that thrown out of the heart into the aorta, will find less resistance in the ascending trunk, than in the descending; and will therefore flow faster in the ascending, than in the descending trunk: and thence too it will find less resistance in the right subclavian artery than in the left.

Lastly, it hence appears, that the blood being let out of a vein in the right arm, the remaining blood in the right axillary artery runs with a greater velocity into the artery of that arm that is contiguous to it, than through the thoracic artery, or the right scapular, which is likewise contiguous to it; because, when the blood is not supposed to be drawn out from any vein corresponding to the thoracic artery, or into which this discharges itself, there is proportionably a greater impediment to the motion of the blood in the thoracic artery, than in that of the arm. But because the velocity of the blood in the subclavian artery, or the right axillary, is greater than in the left; the velocity in the right thoracic will also be greater than in the left thoracic artery. Hence it is manifest, that the blood being let out of a vein in the right arm; the greatest velocity of the remaining blood will be in the artery of that arm, because it immediately empties its blood into the vein that is opened; and the next greatest velocity will be in the thoracic artery, or scapular of the same side, going out from the axillary artery. But the velocity of the blood will be far less in the brachial, axillary,

and thoracic artery on the left and opposite side; and least of all in the arteries arising from the descending trunk of the aorta.

On this view it may easily be gathered, what is to be done in the several circumstances of blood-letting: for instance, if we would prevent the increase of any humour from the blood stagnating in the left leg, or bring it about, that as little blood as possible should flow to that leg in any given space of time; first, blood is to be taken from the arm or leg of the right side: because this is truly making what is called a *revulsion*.

Again, if blood be drawn away on the same side, and from some vein that receives the blood from a branch of that trunk which transmits it to the swelled part; it will occasion a greater derivation of blood to that limb for a few moments: and this is all that can make any difference between the different parts from which the blood is drawn.

As to what relates to the whole habit; in all lentors and vici-dities, if there be a due strength and elasticity remaining in the solids, *Phlebotomy* will make the remaining blood circulate the faster, and become thinner and warmer; but in a plethora, from a debauch, or too large quantities of spirituous nourishment, or from a diminution of perspiration, where the blood yet retains its natural fluxility, *Phlebotomy* will make the remaining mass circulate slower, and become cooler.

In the former case, a diminution of the resistance in the blood-vessels, will increase the contractile powers of those vessels, and make them beat faster, and circulate their contents with greater velocity; but in the latter case a diminution of the quantity of a spirituous blood will lessen the quantity of spirit secreted in the brain, the consequence of which will be, that the heart and arteries will not contract so often nor so strongly as before, and therefore the blood will move slower, and become cooler. And on these things depend the whole doctrine of blood-letting.

PHLEGMA, **ΦΛΕΓΜΑ**, in chymistry, an aqueous and insipid fluid, supposed to be found in all natural bodies; coinciding with what the other philosophers call *water*.

Phlegm makes the fourth of the chymical elements, or elementary principles.

In the distillation of vinegar, as also of all minerals and inodorous vegetables, *Phlegm* comes out first; in that of wine left. This *Phlegm* is supposed to be the common vehicle and diluter of all solid bodies; and in proportion to its quantity in the mixture, are the other parts more languid and disabled in their attractions: yet, on the chymists system, *Phlegm* should be a principle of action; as being necessary to the dissolution of the salt in bodies, and without which the salt must remain inactive.

It is much to be questioned, whether this *Phlegm* can ever be procured without some mixture of other matters, that which has the least of them must come nearest to the nature of a principle; and on that account rain-water should afford it most.

Phlegm, Boerhaave observes, drawn by distillation from vegetables, does always carry with it somewhat of the smell of the vegetable, which it derives partly from the oil, and partly from the spirit residing therein. The same *Phlegm*, by frequently reiterated distillations, lays aside most of its smell, and approaches nearer to pure water, but it never becomes perfectly such. Add, that the purest distilled water, if exposed a few days to the sun, is much changed, and rendered turbid.

That *Phlegm* is not an elementary body, Mr. Boyle argues from its different powers and properties: the *Phlegm* of wine, and most liquors, have qualities that make them differ from mere water, and also from one another; the *Phlegm* of vitriol, that author observes, is an effectual remedy against burns, and a valuable nostrum for dissolving hard tumours; and that of vinegar will extract a saccharine sweetness out of lead, and even dissolve corals with long digestion; and that of sugar of lead, is said to dissolve even pearls.

In effect, the characters which serve to denominate a fluid, *Phlegm*, or water, among the chymists, are insipidity, and volatility; yet quicksilver has both these, which no body pretends to be *Phlegm*. Add, that it appears from several experiments, that water itself, by repeated distillations, may be converted into earth. Yet water, the same author observes, has a much fairer pretence to be an element, than any other of the *tria prima*.

Add, that as to the qualities which occasion that name to be given any visible substance, viz. its being fluid, insipid, and inodorous; we have never yet seen any of these separated substances, which the chymists call *Phlegm*, which were perfectly destitute both of taste and smell.

Common salt, and several other saline bodies distilled ever so dry, will each yield a large quantity of *Phlegm*; which can no other way be accounted for but from this, that among the various operations of the fire, on the matter of a concrete, several particles of that matter are reduced to a shape and size, requisite to compose such a liquor as the chymists call *Phlegm*, or water.

PHLEGM, in the animal economy, is one of the four humours, whereof the ancients supposed the mass of blood to consist.

Phlegm is the same that is otherwise called *pituita*. See **PITUITA**.

MAGOGUE *, ΦΑΕΙΜΑΓΟΡΟΣ, a medicine proper to purge *phlegm*, or *pituita*.

* The word is formed from the Greek, φλεγμα, *pituita*, and α, to drive, or draw.

Agaric, hernodactyls, turbit, and jalap, are reputed *Phlegmagogue*.

PHLEGMATIC, ΦΛΕΙΜΑΤΙΚΟΣ, a temperament, wherein *phlegm*, or *pituita*, is the prevailing humour.

Phlegmatic constitutions are subject to rheums, defluations, &c.

PHLEGMON *, ΦΕΓΜΟΝΗ, in medicine, a general name for all hot or inflamed tumours, formed in the fleshy or bloody parts of the body.

* The word is formed from the Greek, φλεγω, to burn, or inflame.

An inflammation, attended with a considerable swelling of the part, constitutes a *Phlegmon*.

If the blood be good, and laudable, and only peccant in quantity, it is called a *true Phlegmon*.

When corrupted and adulterated with bile, or pituita, it is called a *hazard Phlegmon*; in which case it participates of the erysipelas, cedema, or scirrhus.

The blood here extravasated produces a heat, redness, tension, rentency, pulsation, and great pain.—The bubo, carbuncle, furuncle, pustules, and other tubercles arising from the blood, are all reducible to the *Phlegmon*, &c.—The ophthalmia, parotides, squinancy, and even pleurisy and peripneumony, are species of the *Phlegmon*. See each under its proper article.

OPHTHALMIA, &c.

PHLOGOSIS, ΦΛΟΓΗΣΙΣ, in medicine, sometimes denotes a slight degree of the ophthalmia.

When the inflammation of the eye is light and gentle, it is called a *Phlogosis*; when very severe, a *chemosis*. See OPHTHALMIA.

PHLYACOGRAPHIA *, among the ancients, a merry and burlesque imitation of some grave and serious piece; particularly a tragedy transvested into a comedy.

* The word is formed from the Greek, φλυαζω, *nugari*, to trifle, or chatter, trifler, of φλυα, *nugor*.

The *Phlyacography* was the same thing with the *hilaroly*, or *bilaratragedy*.

There were several kinds of *Phlyacography*, which had their several names. See Salmastius on *Bohin*.

The parodies which have been made of some parts of the best poets, as the *Virgil travesty* of Scarron, and Cotton; the *Rival queens* of Cibber, from the *Rival queens* of Lee; and some pieces of opera's, the music whereof is applied to low and ridiculous words, come under the notion of *Phlyacographies*.

PHLYCTÆNÆ, ΦΛΥΚΤΑΙΝΑΙ, little white itching pimples or vesicles, arising on the skin, chiefly between the fingers, and about the wrist; and full of a limpid serum.

These sometimes degenerate into the itch, and sometimes into tetters. They are cured like other cutaneous eruptions.

PHLYCTÆNÆ also denote little ulcerous vesicles, arising sometimes on the adnata, and sometimes on the cornea, of the eye, like so many little bladders full of water; they are popularly called *blisters in the eyes*.

They appear like grains of millet; and when produced by a sharp corroding humour, occasion violent pain: the pustules on the adnata are red; those on the cornea are blackish, if near to the surface, but whiter if deeper. They are cured by excutients and dryers.

PHLYSTÆNA *, in medicine, a disease which produces bubo's or tumours, full of a ferous humour.

* The word is formed from the Greek, φλυα, φλυζω, *ebullio*, I boil, bubble, &c.

The *Phlystæna* is a violent disease.—The bubo's it occasions are sometimes large, livid, pale, black, or of any colour different from that of the natural flesh; and when pierced, the flesh frequently appears ulcerated under them.

They are usually occasioned by a hot sharp humour, and arise on all parts of the body; but they are most dangerous on the cornea of the eye.

PHŒNICIAN Character. See the article CHARACTER.

PHŒNICIUS *, ΦΟΙΝΙΤΙΟΣ, a medicine which produces redness, with blisters, on the places it is applied to.

* The word is formed from the Greek, φοινί, red.

Such are mustard seed, pepper, vitæriciones, &c.

Phœnigni are used to draw the humour to the part they are applied on, and to divert it from the part affected.

PHŒNIX, ΦΟΙΝΙΞ, in astronomy, a constellation of the southern hemisphere; unknown to the ancients, and invisible in our northern parts.

It took its name, and form, from that of a bird famous among the ancients; but generally looked upon by the moderns as fabulous.

The naturalists speak of this bird as single, or the only one of its kind: they describe it as of the size of an eagle; its head finely crested, with a beautiful plumage; its neck covered with feathers of a gold colour, and the rest of its body purple; only the tail white intermixed with carminion; and its eyes sparkling like flares.—They hold that it lives five or six

hundred years in the wilderness: that when thus advanced in age, it builds itself a funeral pile of sweet wood and aromatic gums; then it lights it with the wafting of its wings, and thus burns itself: and from its ashes arises a worm, which in time grows up to be another *Phœnix*.

Hence the Phœnicians gave the name *Phœnix* to the palm-tree, by reason, when burnt down to the very root, it naturally rises again fairer than ever.

PHŒNASCIA *, ΦΩΝΑΣΚΙΑ, the art of forming the human voice.

* The word is derived from the Greek, φωνη, voice.

In ancient Greece, there were combats, or contests, established for the voice, as well as other parts of the gymnastice.

These combats continued to be held in the time of Galen; and it was these that brought the *Phœnastibia* into vogue.

Hence the masters of this art, and those who taught the art of managing the voice were called *Phœnastici*, *φωναστικαι*, and under their tutorage were put all those desired to be orators, fingers, comedians, &c.

PHŒNICKS *, ΦΩΝΙΚΗ, the doctrine, or science of sounds; otherwise called *acousticks*.

* The word is derived from the Greek, φωνη, voice, or sound.

Phœnicks may be considered as an art, analogous to opticks; and may be divided, like that, into *direct*, *refracted* and *reflected*. These branches the bishop of Ferns, in allusion to the parts of opticks, denominates *Phœnicks*, *diaphanicks*, and *cataphanicks*.

Phœnicks is improveable both with regard to the object, the medium, and the organ.

As to the object, found, it may be improved both with regard to the begetting, and the propagating of sounds.

The first, in speaking, or pronouncing, in whistling, or singing, or hallowing, or luring, which are all distinct arts and all improveable.—The second by the position of the sonorous body.

With regard to the medium, *Phœnicks* may be improved by the thinness and quiescence thereof, and by the sonorous body being placed near a smooth wall, either plain or arched, especially cycloidally or elliptically: whence arises the theory of whispering places.

Add to these, that by placing the sonorous body near water, its sound is mollified; that by placing it on a plain, the sound is conveyed to a greater distance than on uneven ground, &c.

As to the organ which is the ear: it is helped by placing it near a wall, (especially at one end of an arch, the sound beginning at the other;) or near the surface of water, or that of the earth.

And also by instruments, as the stentorophonicon, or speaking-trumpet.

Also by an instrument to help weak ears, as spectacles do eyes; by an instrument to take in vastly remote sounds as telescopes do objects; by a microphone, or magnifying ear-instrument; and by a polyphone or multiplying ear-instrument.

Cataphanicks, or reflected hearing, may be improved by several kinds of artificial echoes; for, in general, any sound falling either directly or obliquely, on any dense body of a smooth surface, whether plain or arched, is beat back again, or reflected, i. e. it does echo more or less.

PHŒNICUM *centrum*. PHONOCAMPTICUM *centrum*. } See CENTRUM.

PHOSPHORICAL *column*. PHOSPHORUS *, ΦΩΣΦΟΡΟΣ, a matter which shines, or even burns, spontaneously, and without the application of any sensible fire.

* The word is formed from the Greek, φως, light, and φοω, I bear.

Phosphori are either *natural* or *artificial*.

Natural Phosphori are matters which become luminous at certain times, without the assistance of any art, or preparation.

Such are the glow-worms frequent in our colder countries; Lantern-flies, and other shining insects, in hot countries; rotten wood; the eyes, blood, scales, flesh, sweat, feathers, &c. of several animals; diamonds when rubbed after a certain manner; sugar and sulphur when pounded in a dark place; sea-water and some mineral-waters when briskly agitated; a cat's or horse's back, duly rubbed with the hand, &c. in the dark; nay, Dr. Croon tells us, that upon rubbing his own body briskly with a well warmed shirt, he has frequently made both to shine; and Dr. Sloane adds, that he knows a gentleman of Bristol and his son, both whose stockings will shine after much walking.

All *natural Phosphori* have this in common, that they do not shine always, and that they never give any heat.

But that which of all *natural Phosphori* has occasioned the most speculation, is the

Barometrical or mercurial Phosphorus.—M. Picard first observed that the mercury of his barometer, when shaken in a dark place, emitted light; with this circumstance, that in shaking the mercury

cury with rapidity, sometimes above and sometimes below its equilibrium with the air, the light was only seen when below it, where it appeared as if adhering to the upper surface. But this light is not found in the mercury of all barometers, which occasions a great difficulty.

M. Bernoulli, upon examining the circumstances of this phenomenon, invented a solution of the fame: he imagines that upon the mercury's descending, the vacuum in the tube increasing, there issues out of the mercury to fill up this excess of vacuity, a very fine subtle matter before dispersed throughout the pores of this mineral; and that at the same time there enters through the pores of the tube another fine matter: thus, the first matter emitted from the mercury, and collected over its surface, striking impetuously against that received from without, has the same effect with Des-Cartes's first element against the second: that is, it produces the motion of light.

But why, then, is not the phenomenon common to all barometers? to this he answers, that the motion of the subtle matter out of the mercury may be weakened, and prevented by any heterogeneous matter collected on its upper surface into a kind of pellicle: so that the light should never appear but when the mercury is perfectly pure.

This reasoning seems confirmed from the experiments of several barometers which he made according to this plan; but the royal academy of sciences, who repeated experiments with barometers made after the same manner, did not meet with the same success; the light being found in some, but not in others.

M. Homberg therefore conjectured, that the difference consisted in the different qualities of the quicksilver: in some, he observed, they used quick-lime to purify it; in others, steel-filings. The mercury then, rising in the distillation, and passing through the lime, might take away some parts thereof, capable by their extreme smallness, to lodge in its interstices. Hence, as quick-lime always retains some fiery particles, it is possible, in a place void of air, where they swim at liberty, they may produce this lustre.

Mr. Haukebee has several experiments on the mercurial *Phosphorus*—passing air forcibly through the body of quick-silver placed in an exhausted receiver, the parts were violently driven against the side of the receiver, and gave all around the appearance of fire; continuing thus till the receiver was half full again of air.

From other experiments he found, that though the appearance of light was not producible by agitating the mercury in the same manner in the common air; yet, that a very fine medium nearly approaching to a vacuum was not at all necessary.

And, lastly, from other experiments he found, that mercury enclosed in water, which communicated with the open air, by a violent shaking of the vessel wherein it was enclosed, emitted particles of light in great plenty, like little stars.

By including the vessel of mercury, &c. in a receiver, and exhausting the air, the phenomenon was changed: and upon shaking the vessel, instead of sparkles of light, the whole mass appeared one continued circle of light.

Artificial PHOSPHORI are such as owe their luminous quality to some art or preparation.

Of these there are three principal kinds: the first *burnings*, which consumes every combustible it touches; the other two have no sensible heat, and are called the *benonian* and *hermetic Phosphorus*.

The burning *PHOSPHORUS* may be made of urine, blood, hairs, and generally of any part of an animal that yields an oil by distillation.—The matter is most easily drawn from is human urine. It is of a yellowish colour, and of the consistence of hard wax, in the condition it is left by the distillation; and in this state is called *Phosphorus fulgurans*, from its coruscations; and *Phosphorus smaragdinus*, because its light is frequently green or blue, especially in places that are not very dark. It is also called *solid Phosphorus* from its consistence.

It dissolves in all kinds of distilled oils; and in that state is called the *liquid Phosphorus*.

It may be ground in all kinds of fat pomatums; in which case it makes a luminous unguent.

So that the *Phosphorus fulgurans*, *smaragdinus*, *solid* and *liquid Phosphorus*, and *luminous unguent*, are all the same Preparation under different circumstances.

It was invented by Mr. Kunkel, chymist of the elector of Saxony; and brought into France by M. Kraft, a physician of Dreiden, by whom it was communicated to Mr. Boyle.

In 1676, Mr. Elzbolt published a treatise expressly on it, at Berlin; and in 1680, Mr. Boyle published another in English under the title of *Noctilua*.

M. Homberg first made some of it at Paris in 1679, and communicated the method of preparation to the public.

Preparation of solid PHOSPHORUS or PHOSPHORUS of urine.—Evaporate a good quantity of urine of beer-drinkers to the consistence of honey. Cover it up in an earthen vessel, and let it three or four months in a cellar to ferment and putrify.—Mix two parts of sand, or powder of pot-threads, with one part of this urine, and put into a retort, fitted to a long-necked receiver, with two or three quarts of water in it.—Distill it in a naked fire, in a reverberatory furnace; at first gently; after two

hours, augment the fire gradually, till all the black fetid oil be drawn off.—Raise the fire to the highest degree; upon which white clouds will come into the receiver, and fix by little and little on one side, in form of a yellowish skin; and another part will precipitate to the bottom in powder.—Keep the fire thus violent for three hours till no more fumes arise.—Let all cool, and unloose the vessels; and throwing more water into the receiver, shake all well about, to loosen what sticks to the sides.—Pour the whole into a glass vessel to settle.

The volatile salt will now dissolve in the water, and the *Phosphorus* and oil will sink to the bottom; then pour off the water, and gathering the remaining matter together, put it into a glass-vessel with a little fresh water; and digest it in a sand-bath, stirring it from time to time with a wooden spatula.

By this means the *Phosphorus* will separate from the oil, and sink to the bottom: pour off the oil, and make up the *Phosphorus*, while hot, into sticks for use.

Boerhaave gives us other ways of preparing *Phosphorus*. Recent urine, he observes, digested three or four days in a tall glass, with a heat no greater than that of a healthy man, grows ruddy, fetid, and cadaverous: this digested urine being put to distil in a retort, yields a clear fetid liquor, then a yellow volatile salt, which evaporated to the consistence of a fapa, and mixed with four times its weight of dry sand, and the distillation continued in a covered retort; there successively comes over, by greater and greater degrees of fire, a fetid brown oil, bluish fumes, and finally a gross shining matter which sinks in water, and is the solid *Phosphorus*.

To make it more easily, and to the best advantage, it may be proper to take a sufficient quantity of human urine, afforded by a person not much given to drink wine, and exhale it away in an open vessel to a rob, or the consistence of honey; then let it to purify for half a year, and upon distillation it will afford a large proportion of salt; after which, if six times its own quantity of sand, or brick-dust be added to the remainder, and the distillation be continued, as in the case last mention'd, the *Phosphorus* will fall into the water.—Or it may commodiously be prepared, by suffering the rob of urine to digest for two years in an open vessel in the open air; during which time a slimy, faeculent, unctuous, earthy matter will fall to the bottom; which being frequently washed with pure water, wherein it will not dissolve, will leave a white matter behind it, neither of an alkaline, acid, saline, or terreftrial, nor scarce of an unctuous nature: and this is of itself a proper matter for the making of *Phosphorus* by distillation with sand.

Properties of solid PHOSPHORUS.—¹ With this *Phosphorus* one may write on paper, as with a pencil, and the letters will appear like flame in the dark; yet in the light nothing will appear but a dim smook.

² A little piece rubbed between two papers takes fire instantaneously—and if care be not taken in the management of it, there is danger of burning the fingers, the *Phosphorus* being exceedingly inflammable.

³ Its burning is very vehement, and penetrates deeper into the flesh than common fire; and it is very difficult to be extinguished.

M. Casini happening to press a piece in a cloth between his fingers, the cloth immediately took fire; he endeavoured to put it out with his foot, but his shoe caught the flame, and he was obliged to extinguish it with a brais ruler, which cast forth rays in the dark for two months after.

The solid *Phosphorus* never spoils, provided it be kept in a phial full of water: that in form of an unguent does not keep so well, and the liquid *Phosphorus* worst of all.

The liquid *Phosphorus* is best made by digesting in horse-dung, a little bit or some scrapings of the solid kind, for two days, in oil, or essence of cloves, oil of turpentine, or the like. After dissolution the oil will be so impregnated with it, that upon opening the bottle, the matter will appear on a flame.

Experiments with liquid PHOSPHORUS.—By washing the face, hands, or the like, with liquid *Phosphorus*, Dr. Stare tells us they will be made to shine very considerably in the dark, and the lustre thereof will be communicated to adjacent objects, yet without any offence to the skin.

As soon as a candle is brought in, the shining disappears, and no change is perceivable.

This *Phosphorus* emits frequent flashes like lightning, even when close stopped, especially in warm weather. Hence Mr. Boyle takes occasion to draw a parallel between lightning and *Phosphorus*.

Bonianian PHOSPHORUS.—The second kind of artificial *Phosphorus*, is a preparation of a stone called the *Bonianian stone*, from a city of that name in Italy, near which it is found.

The first who undertook to make this stone luminous, was a chymist of that city called *Vincenzo Casiarola*.—Poterus, Licetus, &c. have described the process, but mistakenly: M. Homberg, who made a journey to Italy expressly to learn the preparation, first communicated the same to Mr. Lemery, who published it in the seventh edition of his chymistry. See the article *BONIANIAN stone*.

This *Phosphorus* has not any sensible heat, and only becomes luminous after being exposed to the sun, or the day-light, in which state it resembles a burning coal, and preserves its light five or six minutes.

minutes in the dark, during which time the light gradually dwindles; and to recover the shining, it must be exposed afresh to the air.

The Hermetic Phosphorus or *Phosphorus Balduni*, which makes the third kind, is a preparation of English chalk, with aqua fortis or spirit of nitre, by the fire.

This makes a body considerably softer than the Bononian stone, but it has all the qualities thereof.—It has its name from its inventor Baldwin, a German chymist, called *Hermes* in the society of the *natura curiosorum*, whence its other name *Hermetia*.

New Phosphori.—Some of the late chymists have hit on other sorts of *Phosphori*.—Monsr. Homberg, in a process upon the fecal matter, happening to calcine it with allum, accidentally produced a new *Phosphorus*, in form of a powder, the least quantity of which taken out of a close vessel, and exposed to the air upon a piece of paper, in a moment's time would take fire, and set the paper a smoking, and presently burn it or any other combustible matter it came near.

This it would do, equally by night and day; and without rubbing or heating, or mixing it with any other thing to promote the inflammation; in which he observes, it differed from all the artificial *Phosphori* hitherto known. For that, *e. gr.* of urine, requires a small degree of warmth to enable it to shine, or to take fire; and the Bononian stone, and *Phosphorus Balduni*, only shine by means of the day-light.

In effect, M. Lemeiry the younger has at length discovered that there is scarce any animal or vegetable matter but will afford *Phosphorus*.—Thus he experienced in the seeds, farinae, leaves, flowers, woods, roots, and oils of divers plants; in honey and sugar, and in the blood and flesh of calves, sheep, flies, worms, the yolks of eggs, &c. also in the human skull, bones, fat, and nails; and the dung of all animals.

The principal thing added to all these matters to make *Phosphorus* of them, is allum, which is indispensably requisite; nor can any other salt how near a kin soever hereto, even though it yield the very same principles, be substituted in its place. As to the means, or the operation whereby it is to be made, calcination appears to be the essential part.

Rationale of the effects of Phosphorus. It may be observed that in most of the natural *Phosphori*, there is a brisk attrition or friction concerned; which we may suppose either to give the minute parts of the substance the proper motion and agitation necessary to convert them into fire, i. fire be so producible, (as Bacon, Boyle, Newton, and the generality of the English philosophers have supposed that it is) or else to expel and emit the particles of fire naturally contained in them.

In the faditious sorts, we may note, that a long process by fire is usually required, wherein the matter undergoes divers coccions, torrefactions, calcinations, distillations, &c. in the course whereof a considerable quantity of fire must necessarily be imbibed, and may possibly be retained therein.

In that *e. g.* prepared of the fecal matter, M. Homberg observes, that the aqueous part of the substance must necessarily have all been evaporated, with the greatest part of the oil and volatile salt; leaving pores or vacuities in the places they possessed; so that what remains, is a spongy plexus of earth and fixed salt, having nothing in its loculi, or cavities, but some of the matter of the fire which has been stopped and detained therein; much as in quick-lime.

This being supposed, we know that the fixed salt, which is here pretty copious, will readily absorb the moisture of the contiguous air; and that the sudden introduction of such moisture into the pores of the powder must produce a friction, which may excite a small degree of heat; and this joined with what fire was there already laid up, may make a heat sufficient to give fire to the small remains of oils too closely linked with the salt to have been carried off by the calcining fire: so that we have here every thing necessary to heat and light.

What confirms this doctrine is, that if the powder be kept in a vessel not sufficiently close; the air, insinuating by degrees, moistens and saturates it, but that so slowly, as not to produce friction enough to set it on fire; so that it is spoiled, and disabled from taking fire ever after: much as is the case in quick-lime, which, after it has lain some time in the air, ceases to grow hot even by the affusion of water.

The reason why quick-lime, which contains a great quantity of particles of fire, as well as our powder, does not conceive heat by the access of the air, or the ingress of its moisture into the pores thereof, but that water must be thrown thereon, is, that the quick-lime being more thoroughly calcined, retains too little fixed salt to imbibe the moisture readily and copiously enough to excite the necessary friction.

And the reason why quick-lime does not produce a flame, as the powder does, even when water is cast on it, is, that it did not retain enough of the oily matter to afford flame: for if oil were mixed with it, a flame would readily ensue. *Mem. de l'Acad. des. 1711.*

Phosphorus, in astronomy, is the morning star, or the planet Venus, when she goes before the sun.

The Latins call it *Luxur*; the French *etait de Berger*; the Greeks, *Phosphorus*, from *phos*, light, and *phoros*, I bear, or bring.

PHOTOSCIAERICA, a term which some authors use for the art of dialling.

The name is derived hence, that the art not only shews the hours by the shadow of a gnomon, whence it is called *scia-terial*, from *scia*, shadow; but sometimes also by means of the sun's light, as in ipso-dials, reflecting-dials, &c. from *phos*, lux, light.

PHOTINIANS, a sect of ancient hereticks, who denied the divinity of Jesus Christ.

They took their name from *Photinus* their chief, who was bishop of Sirmium, and a disciple of Marcellus.—He maintained, as Leo tells us in one of his sermons, that Jesus Christ was true man, but not true God, nor born before all ages; that he only began to be Christ when the Holy Ghost descended upon him; and that he was called *only son*, for no other reason but because the virgin had no other.—He was convicted of his error, and deposed by a synod held at Sirmium in 351.—His error was afterwards revived by Socinus.

PHRASE, *PHRASIS*, *ΦΡΑΣΙΣ*, in grammar, an elegant turn or manner of speech, peculiarly belonging to this or that occasion, this or that art, or this or that language.

Thus we say an Italian *Phrase*, an eastern *Phrase*, a poetical *Phrase*, or a rhetorical *Phrase*.

A few elegant *Phrases*, pertinently applied, are an ornament of discourse; but if they come too thick they have an ill effect, and make the style favour of affectation.

PHRASE is sometimes also used for a short sentence, or small set or circuit of words constructed together.

In this sense father Buffier divides *Phrases* into *compleat* and *incompleat*.

PHRASES are *compleat* where there is a noun and a verb, each in its proper function; i. e. where the noun expresses a subject, and the verb the thing affirmed of it.

Incompleat Phrases, are those where the noun and the verb together only do the office of a noun; as consisting of several words without affirming any thing, and which might be expressed in a single word.

Thus, *that which is true*, is an *incompleat Phrase*, which might be expressed in one word, *truth*: as, that which is true satisfies the mind; i. e. truth satisfies the mind.

PHRASEOLOGY, *PHRASEOLOGIA*, *ΦΡΑΣΕΟΛΟΓΙΑ*, a collection of the *Phrases*, or elegant expressions, in any language. See *PHRASE*.

PHRENES, *ΦΡΕΝΕΣ*, in anatomy, the diaphragm.

It was thus called by the ancients, from *φρον*, mind; they imagining this the seat of the rational soul. Hence

PHRENESIS, *PHRENXY*, or distraction. See *PHRENITIS*, and *PARAPHRENESIS*.

PHRENETIC nerves, called also *diaphragmatic* and *stomachic nerves*, are nervous branches derived from the cervical nerves, which joining in a trunk, run through the mediastinum undivided, till arriving near the diaphragm, they again divide, and send off divers branches, some into the muscular, others into the tendinous part thereof.

PHRENIC vessels, an appellation given to a vein, and some arteries of the human body; from their passing through the diaphragm. See *DIAPHRAGM*.

The *phrenic artery* arises out of the descending aorta, and distributes itself into the diaphragm and pectus duri. See *Tab. Anat. (Angiol.) fig. 1. n. 40.* See also *ARTERY*, *AORTA*, &c.

The *phrenic veins* are two veins which the descending cava receives immediately after its piercing the diaphragm.—See *Tab. Anat. (Angiol.) fig. 6. litt. g. g.*

*PHRENITIS**, *PHRENESIS*, or *PHRENXY*, in medicine, a constant and vehement delirium, or distraction; accompanied with an acute fever, raving, waking, &c.

* It has its name *φρενιτις*, from *φρον*, *menti*, the understanding; or as some will have it, from *φρον*, the diaphragm, in regard the ancients supposed it to have its seat in that part.

It differs from the *mania*, and *melancholy*, in that these are without fevers.

Physicians generally make the *Phrenitis* to consist in an inflammation of the meninges of the brain; and distinguish it from the *paraphrenitis*, which they suppose to be an inflammation of the diaphragm.

Willis will have them the same disease, and both to consist in an inflammation of the animal spirits. He only distinguishes them as the inflammation arises from the cerebrum alone, or from the cerebrum and cerebellum together; and concludes, that they both arise in a fever, from the boiling blood's throwing its adult recrements into the brain.

Boerhaave makes the *Phrenitis* either *true*, wherein the cerebrum, or meninges, or both, are inflamed; or *symptomatic*, where the matter of a fever is translated into the cerebrum.

The true one either kills on the third, fourth, fifth, or seventh day; or it changes into a mania, lethargy, comus, &c. tremors, gnashing of the teeth, and gummy blood disfilling from the nose in this case, are prognostics of death.

The disease is most frequently the effect of inflammatory or malignant fevers; though it sometimes arises from a suppression of the natural evacuations, as the menfes, &c.

The cure is the same as of an apoplexy; but where the evacuations

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are concerned, they must first be rectified.

PHRENSY. See the article **PHRENTIS**.

PHRYGIAN mode, in music. See **MODE**.

PHRYGIANS, PHRYGES, or PHRYGASTES, as S. Epiphanius calls them, in the church history, were ancient heretics, a branch of the montanists; so called from *Phrygia*, a country where they abounded.

They esteemed Montanus their prophet; and looked on Maximilla and Priscilla as great prophetesses.

This spirit of prophecy, or rather enthusiasm, was their distinguishing character. In the buifness of the trinity they were orthodox.

PHTHIRIASIS *, **ΦΘΕΙΡΙΑΣΙΣ**, in medicine, the morbus pedicularis, or lousy disease, wherewith children, and even sometimes adults, are afflicted.

* The word is formed from the Greek, *φθισ*, louse.

Its cause is in the seeds or ova of that vermin laid in the cuticle, which here happening to prove a proper nidus, cherishes and fosters the seed so as to hatch it.

The linnen cloths used by goldsmiths to wipe their vessels with after gilding, are excellent against the *Phthiriasis* by reason of the mercury they contain: they are to be applied by rubbing the child's head.

PHTHIRIASIS, **ΦΘΕΙΡΙΑΣΙΣ**, in its general sense, denotes any kind of consumption of the body, in what part soever it be seated, or from what cause soever it arise.

Thus we have a nervous *Phthiris*, and renal *Phthiris*, dorsal *Phthiris*, pulmonary *Phthiris*, &c.

PHTHIRIASIS, in its proper sense, is restrained to a pulmonary consumption, or a consumption arising from an ulcer, or other disorder of the lungs, accompanied with a slow hectic fever, which wastes, extenuates, and consumes the muscular flesh. Sydenham observes, that the hectic *Phthiris* usually has its origin in the winter's cold; from a sharp humour trickling down upon the lungs, where, like a catarrh, it irritates them so as to raise a cough.

This by degrees brings on other symptoms; as a spitting, first of a viscid pituita, then a heavy fetid pus, then of pure blood, and sometimes of the very substance of the lungs rotted by a long ulceration: with night-sweats, falling off of the hair, and finally a colliquative flux, which is soon followed by death.—The same author adds, that the *Phthiris* kills two thirds of those who die of chronic diseases.

In the last stage of the *Phthiris*, the nose appears sharp, the eyes hollow; the temples fallen, the ears cold and contracted, the skin about the forehead hard and dry, and the complexion greenish, or livid, &c. This appearance is called the *facies hipocratica*.

Among the causes of this disease may be reckoned intemperance, as it brings on a plethora or cacochymia, and also peripneumonies, asthma's, pleurifies, &c. Morton adds, that the *Phthiris* frequently arises from an ill conformation of the breast; which is either natural, as when the breast is too narrow, the neck too long, &c. or accidental, where there happens a curvity or distortion of the breast;—among the symptoms he reckons a nausea, or reaching, with a heat in the palms of the hands, and redness in the cheeks, all after eating.

For the cure—Sydenham orders the defunction on the lungs, in the first stage, to be abated by blood-letting, &c. and pectorals to be used, accommodated to the various states of the diseases, viz. Infrascants, attenuants to alligate the hectic, &c. with emulsions, asses-milk, &c. and balsamics to cure the ulcer. But the chief assistance in this disease is to be expected from riding constantly on horse-back: he says the patient need not confine himself to any laws of diet, &c. This alone, he adds, if used in time, is almost as sure a cure for a *Phthiris*, as the cortex is for an intermitting fever. See **EXERCISE**.

Dr. Baynard recommends butter-milk as an admirable succedaneum to asses-milk.—Silvius says, he knows of no medicine, either internal or external, so good against fresh ulcers of the lungs, as balsam of sulphur; especially when prepared with oil of anise.

Etmuller observes, that the cough of *phthisical* people is at first only stomacal; but that at length it becomes pulmonary. He adds, that vomitories are good in a beginning *Phthiris*, and that purgatives by all means are to be avoided; and commands the use of medicines made of tobacco; not only as they promote expectoration, but as they are vulnerary. It is a common observation, that in those countries where they burn turf, people are rarely affected with the *Phthiris*; which Willis ascribes to the sulphur abounding therein, and recommends tincture of sulphur as the best remedy he knows of in any cough without a fever; adding, that a suffumigation, or smother, of sulphur and arsenic has also frequently proved a cure in the most desperate *Phthiris*.

Bonetus holds the *Phthiris* to be contagious; and that there are frequently instances of its being communicated by cloaths, linen, beds, &c.

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Pitcairn recommends mercurius dulcis, in the beginning of * *Phthiris*. And Barbrette and Colbatch affirm, that, contrary to the opinion of most authors, they have frequently used acids with great success in the *Phthiris*. See **Supplement, Article PHTHIRIASIS**.

PHYGETHLON *, **ΦΥΓΕΘΛΩΝ**, in medicine, is defined by Celsus, a hard flat tumour, somewhat resembling a puffle; occasioning an intense pain, and sometimes a fever.

* The word is derived from the Greek, *φυγε*, I breed, or engender.

The *Phygethlon* only differs from the *phyma*, in that it does not rise so high; it ripens very slowly, and produces but little pus. The Latins call it *panis*, or *panus*, and sometimes *panicula*.—Goraeus defines the *Phygethlon*, a phlegmon, arising on the glandulous parts, especially about the neck, armpits, and inguen; in which last place it is called a *bubo*.

The *Phygethlon* has the same causes, and the same symptoms with the common *bubo*. It frequently arises after fevers, and pains of the belly, and is cured like other inflammatory tumours.

PHYLACTERY, **ΦΥΛΑΚΤΗΡΙΟΝ**, in church-history, a slip of parchment, wherein was wrote some text of holy scripture, particularly of the decalogue; which the more devout people among the Jews wore on the forehead, the breast, or the neck, as a mark of their religion. See **FRONTAL**.

PHYLACTERY, in the general, was a name given by the ancients to all kinds of charms, spells, or characters, which they wore about them, as amulets, to preserve them from dangers or diseases.

The primitive christians also gave the name *Phylacteries* to the cases wherein they inclosed the relics of their dead.

PHYMA, **ΦΥΜΑ**, in medicine, a roundish pointed tumour, arising on the glandular parts, especially under the lower jaw.

The *Phyma* is smaller and smoother, less red and painful, than the *Phygethlon*. See **PHYGETHLON**.

It is easily cured in children, but more difficultly in adults, but in those it is more rare. It is remedied by assisting nature in the work of maturation, as, by a suppurating cataplastm, &c. —It is supposed to have its rise from pituitous blood; and is most common in young children, where it frequently also arises from too tight bandages.

Goraeus observes, that some make *Phyma* a general name for all tumours, or aposthumes, that mature and suppurate readily, of what kind soever, or in whatsoever glandulous part they arise.

PHYSIC *, or **PHYSICK**, **ΦΥΣΙΚΗ**, the art of healing; properly called *medicine*.

* The word is formed from the Greek, *φύσις*, nature; in regard medicine consists principally in the observation of nature.

For the rise, progress, division, &c. of *Physic*, see **MEDICINE**.

Hermetical PHYSIC. } See the articles } **HERMETICAL**.

Bachelor of PHYSIC. } } **BACHELOR**.

PHYSICAL, **ΦΥΣΙΚΟΣ**, something belonging to, or really existing in, nature.

In this sense we say a *physical* point, in opposition to a mathematical one, which last only exists in the imagination.

Or a *physical* substance, or body, in opposition to spirit, or metaphysical substance, &c.

PHYSICAL, or sensible horizon. See **HORIZON**.

PHYSICAL agent.

PHYSICAL cause.

PHYSICAL certitude.

PHYSICAL concrete.

PHYSICAL continuity.

PHYSICAL evidence.

PHYSICAL fate.

PHYSICAL good.

PHYSICAL necessity.

PHYSICAL part.

PHYSICAL perfection.

PHYSICAL possible.

PHYSICAL predetermination.

PHYSICAL promotion.

PHYSICAL qualities.

PHYSICAL quantity.

PHYSICIAN, a person who professes medicine, or the art of healing.

The ancients distinguished their *Physicians* into various classes, or sects:—As,

Rational PHYSICIANS; those who proceeded in a certain regular method, founded upon reason; deducing consequences therefrom, to particular cases.

Methodical PHYSICIANS. See the article **METHODICAL**.

Dogmatical PHYSICIANS, those who laid down principles, and reasoned from those principles, and from experience.

Empirical PHYSICIANS, those who kept wholly to experience, and excluded all use of reason in medicine.—Such were Serapion, Appollonius, Glaucus, &c.

Clinical PHYSICIANS were those who visited their patients in bed to examine their cases.

They were thus called in opposition to the *empirics*, who sold their medicines in the streets, &c.

The ancients had also their *astrological Physicians*, *botanical Physicians* anatomical *Physicians*, *chirurgical Physicians*, *pharmaceutical Physicians*, &c. besides *gymnastical Physicians*, *iatriaptes*, or those who applied external unctions, and frictions, &c.—*Cosmetic Physicians* for the complexion; *ophthalmic Physicians* for the eyes; and *venerary Physicians* for wounds, &c.

Among the moderns, the name *Physician* includes almost all these several kinds.—Regular *Physicians* are contra-distinguished from *empirical Physicians*, who prescribe at random; having only some one or two remedies which serve in all diseases.

Galenic PHYSICIANS are those who prescribe gentle, natural, and ordinary medicines.

Spagyric or chymical PHYSICIANS are those who prescribe violent medicines drawn from minerals, &c. by fire, and by means of chymistry.

College of PHYSICIANS. See the article COLLEGE.

PHYSICKS *, *PHYSICA*, *φυσικη*, sometimes also called *physiology*, and *natural philosophy*; is the doctrine of natural bodies, their phenomena, causes, and effects, with the various affections, motions, operations, &c. thereof.

* The word is derived from the Greek, *φύσις*, nature.

Mr. Locke would likewise have God, angels, and spirits, come under *Physicks*, but these are more usually referred to metaphysics.

The origin of *Physicks* is referred by the Greeks to the barbarians, *viz.* the brachmans, magi, and the Hebrew and Egyptian priests.

From these it was derived to the Greek sages or *sophi*, particularly to Thales, who is said to have first professed the study of nature in Greece.

Hence it descended into the pythagoric, platonic, and peripatetic schools; whence it was propagated into Italy, and thence through the rest of Europe: though the druids, bards, &c. had a sort of systems of *Physicks* of their own.

Physicks may be divided, with regard to the manner wherein it has been handled, and the persons by whom, into

Symbolical PHYSICS, or such as was couched in symbols: such was that of the old Egyptians, Pythagoreans and Platonists, who delivered the properties of natural bodies under arithmetical and geometrical characters, and hieroglyphics.

Peripatetical, or that of the Aristotelians, who explained the nature of things by matter, form, and privation, elementary and occult qualities, sympathies, antipathies, attractions, &c.

Experimental, which enquires into the reasons and natures of things from experiments; such as those in chymistry, hydrostatics, pneumatics, optics, &c.

This has been much cultivated since the time of my lord Bacon; and continues to be so, with good success.

The experiments of the academists of Cimento, of the royal society, of the royal academy, and those of private persons, particularly Mr. Boyle, Sir I. Newton, Mr. Hawesbee, &c. have been of infinite service in *Physics*; and it is to these, in great measure, that the advantage of the modern philosophy above the ancient is due.

And finally, **Mechanical or Corpuscular**, which explains the appearances of nature from that matter, motion, structure, and figure of bodies, and their parts; all according to the settled laws of nature and mechanics.

PHYSIOGNOMICS, a term used by some physicians and naturalists, for such signs as are taken from the countenance to judge of the state, disposition, &c. of the body and mind.

PHYSIOGNOMY *, *φυσιογνωμία*, the art of knowing the humour, temperament, or disposition of a person, from observation of the lines of his face, and the characters of its members or features.

* The word is formed from the Greek, *φύσις*, nature, and *γνωσκω*, I know.

Baptista Porta and Robert Fludd are the top modern authors on *Physiognomy*.—The ancient ones are the sophist Adamantius, and Aristotle; the *Physiognomy* of which last we have translated into Latin by de Lacuna.

There seems to be something in *Physiognomy*; and it may perhaps bear a much purer philosophy than what these authors were acquainted withal. This, at least, we dare say, that of all the fanciful arts of the ancients, disused among the moderns, there is none has so much foundation in nature as this.

There is an apparent correspondence between the face and the mind; the features and lineaments of the one are directed by the motions and affections of the other: there is even a peculiar arrangement of the members of the face, and a peculiar disposition of the countenance, to each particular affection; and perhaps to each particular idea of the mind.

In effect, the language of the face, *Physiognomy*, is as copious, nay, perhaps, as distinct and intelligible, as that of the tongue, speech.—Thanks to bounteous nature, she has not confined us to one only method of conversing with each other, and of learning each other's thoughts; we have several: we do not wholly depend on the tongue, which may happen to be bound; and the ear, which may be deaf; but in those cases we have another resource, the countenance and the eye, which afford us this further advantage, that by comparing the reports of the tongue (a member exceedingly liable to deceive) with those of the face, the prevarications of the former may be detected.

The foundation of *Physiognomy* is this; the different objects that present themselves to the senses, nay, the different ideas that arise on the mind, do each make some impression on the spirits: and each an impression correspondent or adequate to its cause: therefore each makes a different impression.

If it be asked how such an impression should be effected? It is easy to answer that it follows from the œconomy of the creator, who has fixed such a relation between the several parts of the creation; to the end that we may be apprized of the approach or recess of things useful or hurtful to us.

If this be not philosophical enough, take the manner in the Cartesian language, thus: the animal spirits moved in the organ by an object, continue their motion to the brain; whence that motion is propagated to this or that particular part of the body, as is most suitable to the design of nature; having first made a proper alteration in the face, by means of its nerves, especially the pathetici and oculorum motorii.

The face, here, does the office of a dial-plate; and the wheels and springs within-side the machine adjusting its muscles, shew what is next to be expected from the striking part.—

Not that the motion of the spirits is continued all the way by the impression of the object; the impression probably terminates in the medulla of the brain, the common fund of spirits: the rest Dr. Gwither imagines may be effected much after the same manner as the air is conveyed into the pipes of an organ, which being uncovered, the air rushes in, and when the keys are let go, is stopped again.

Now, if by repeated acts, or the frequent entertaining of a favourite passion, or vice, which natural temperament has hurried, or custom dragged one to; the face is often put in that posture which attends such acts; the animal spirits will make such patent passages through the nerves (in which the essence of a habit consists) that the face is sometimes unalterably set in that posture (as the Indian religious are by a long continued sitting in strange postures in their pagods) or at least it falls insensibly and mechanically into that posture, unless some present object distort it therefrom, or some dissimulation hide it.

This reasoning is confirmed by observation: thus we see great drinkers, with eyes generally set towards the nose; the adduct muscles being oft employed to put them in that posture, in order to view their loved liquor in the glass, in the time of drinking; whence those muscles are also denominated *bibitory muscles*.

Thus also lascivious persons are remarkable for the *oculorum mobilis petulantia*, as Petronius calls it.—Hence also we may account for the quakers expecting face, waiting the spirit; the melancholy face of most sectaries; the studious face of men of great application of mind, &c.

Were our observation a little more strict and delicate, we might doubtless not only distinguish habits and tempers, but even professions.—In effect, does there need much penetration to distinguish the fierce look of the veteran soldier, the contentious look of the practised pleader, the solemn look of the minister of state, or many others of the like kind.

PHYSIOLOGY *, *φυσιολογία*, the doctrine of nature, or natural bodies; called also *physics*, and *natural philosophy*.

* The word is formed of *φύσις*, nature, and *λογία*, discourse, or reason.

PHYSIOLOGY properly denotes only an internal reasoning, or discoursing, which stops or terminates in the speculation, or abstract contemplation of its object, *viz.* natural appearances, their causes, &c. and does not direct or prescribe rules for the making of natural things, *e. gr.* stones, plants, &c.

In which view, chymistry does not properly belong to *Physiology*, but is a kind of counter-part thereto, as in many cases imitating or mimicking nature, rather than considering and explaining her.

PHYSIOLOGY is more particularly used for a branch of medicine, which considers nature with regard to the cure of diseases; particularly the human body, its parts, structure, health, life, functions, œconomy, &c.

Physiology, in this sense, amounts to much the same with what we otherwise call the doctrine of the *animal œconomy*.

PHYTOLOGY *, *φυτολογία*, a discourse upon plants; or a description of their forms, kinds, properties, &c.

* The Word is compounded of the Greek, *φύλον*, plant, and *λογία*, discourse, or *λέω*, I describe, or rehearse.

P I C

PIA *mater*, in anatomy, called *alio mater tenuis*, and *meninx tenuis*, a fine coat, or membrane, immediately investing the brain.—*Tab. Anat. (Osteol.) fig. 4. lit. a, a, a.*

PIACHE, **PIAZZA**, a covered arched walk, or portico. See **PORTICO** and **PIAZZA**.

PIASTER, a Spanish money, more ordinarily called a *piece of eight*. See **PIECE** of eight.

PIAZZA, in building, popularly called *Piache*, an Italian name for a portico, or covered walk, supported by arches.

The word literally signifies a broad open place, or square; whence it also became applied to the walks, or portico's around them.

PICA, in medicine, *malacia*, or a depravation of appetite, which makes the patient absurdly covet things unfit for food, or incapable of nourishing, as coals, ashes, plaister, salt, lime, chalk, vinegar, pepper, &c.

The *Pica* is frequent in girls, and in women with child; men are more rarely affected with it.—The disorder is seldom original; but is usually an effect of an hypochondriacal infirmity in men; and of a chlorosis, stoppage of the menses, or their eruption about the second month of pregnancy, in women: sometimes it seems to be hereditary in children, from some cause affecting the mother.

The disease is usually supposed to have its rise from a vitious ferment of the stomach; to which may be added also some disorders of the imagination, occasioned by ill examples and ridiculous prejudices.

In the *Philosophical Transactions*, Dr. Fairfax gives us an instance of a woman in Stow-market, who was invited by her *Pica* to suck the wind out of bellows; which as often as she could she took into her body with open mouth, forcing it in by blowing with both hands, the bellows being inverted.—He adds, he knew another in the same circumstances, whom nothing would satisfy but crackling cinders under her feet.

Something like this has also been supposed to be sometimes found in brutes.—The last mentioned author mentions a greyhound bitch, who five or six days before casting her whelps, longed for another bitch's whelps, and eat them all up, and would have eat the bitch herself. Thus it is that fows are sometimes known to eat up whole litters of pigs.—The usual remedies in the *Pica*, are bleeding, purging, vomiting, and chalybeats.

PICA, in printing. See **PRINTING LETTER**.

PICARDS, a religious sect, who arose in Bohemia, in the XVth century; so called from their author one Picard. He drew after him a great number of men and women, pretending he would restore them to the primitive state of innocence wherein Adam was created; and accordingly himself assumed the title of the new Adam.

Under this pretence he taught his followers to abandon themselves to all impurity; making them believe that therein consisted the liberty of the fons of God; and that all those not of their sect were in bondage.

He first began in Germany and the Low Countries; persuading many people to go naked, and giving them the name of Adamites.—After this, seizing an island in the river Lausne, a few leagues from Thabor, the head quarters of Zisca, he fixed himself and his followers therein; appointed his women to be common, but allowed none to enjoy them without his permission. So that when any man desired a woman, he carried her to Picard, who gave him leave in these words, *go, increase, multiply, and fill the earth.*

At length, Zisca, the great general of the Hussites, so famous for his victories over the emperor Sigismund, struck with their abominations, marched against them; and making himself master of their island, put them all to death except two, whom he spared to inform himself of their doctrine.

PICATUM *vinum*. See the article **VINUM**.

PICKAGE, or **PICCAGE**, **PICCAGIUM**, an ancient custom or duty, paid at fairs and markets, for breaking the ground, and pitching up stalls, or standings.

This profit of *Pickage* was usually given or granted in charters for holding a fair or market.

PICKERING, and **PICKEROONING**. See the article **PICK-QUEERING**.

PICKET, **PICQUET**, or **PIQUET**, in fortification; a stake sharp at one end, and usually shod with iron; used in laying out the ground, to mark the several measures and angles thereof.

There are also larger *Pickets*, drove into the earth to hold together fascines or faggots, in any work cast up in haste.

PICKETS are also stakes drove into the ground by the tents of the horse, in a camp, to tie their horses to; and before the tents of the foot, where they rest their muskets or pikes about them in a ring.

When a horseman hath committed any considerable offence, he is often sentenced to stand on the *Picket*; which is to have one hand drawn up as high as it can be stretched, and thus to stand on the point of a *Picket* or stake, only with his opposite foot; so that he can neither stand nor hang well, nor ease himself by changing feet.

PICKETS are also flakes with notches towards the top, to which

P I C

are fastened the cordages of tents.—Thus, to plant the *Pickets*, is to encamp.

PICKET in gaming. See the article **PIQUET**.

PICKLE, a brine, or liquor, ordinarily composed of salt, vinegar, &c. sometimes with the addition of spices, wherein meats, fruits, and other things are preserved and seasoned.

PICKLE is also used substantively for a fruit, root, leaf, or other vegetable matter, prepared in *Pickle*, to be used by way of sauce, &c. See **SALLET**, &c.

They *pickle* artichokes, mushrooms, ashen-keys, barberries, asparagus, beans, &c.—Broom-buds, capers, and olives, are pickled with oil and vinegar.

PICKLED *fish*. See the article **FISH**.

PICKQUEERING, **PICKERING**, or **PICKEROONING**, a little flying war, or skirmish, which the soldiers make when detached from their bodies, for pillage, or before a main battle begins.

PIQUET, or **PICKET**, a celebrated game at cards, much in use throughout the polite world.

It is played between two persons, with only thirty two cards; all the dukes, threes, fours, fives, and sixes, being set aside. In reckoning at this game, every card goes for the number it bears, as a ten for ten; only all court-cards go for ten, and the ace for eleven: and the usual game is one hundred up.—In playing, the ace wins the king, the king the queen, and so down. Twelve cards are dealt around, usually by two of two; which done, the remainder are laid in the middle: if one of the gamesters finds he has not a court-card in his hand, he is to declare he has *carte blanche*, and tell how many cards he will lay out, and desire the other to discard, that he may shew his game, and satisfy his antagonist that the *carte blanche* is real; for which he reckons ten.

Each person *discards*, i. e. lays aside a certain number of his cards, and takes in a like number from the stock.—The first, of the eight cards, may take three, four or five; the dealer, all the remainder if he pleases.

After discarding, the eldest hand examines what suit he has most cards of; and reckoning how many points he has in that suit; if the other have not so many in that or any other suit he tells one for every ten of that suit.—He who thus reckons most is said to win the point.

The point being over, each examines what *sequences* he has of the same suit, viz. how many tierces, or sequences of three, quarts or fours, quintes or fives, sixiemes or six's, &c. For a tierce they reckon three points, for a quart four, for a quinte fifteen, and for a sixieme sixteen, &c. And the several sequences are distinguished in dignity by the cards they begin from: thus; ace, king, and queen, are called *tierce major*; king, queen, and knave, *tierce a la king*; knave, ten, and nine, *tierce a la knave*, &c. and the best tierce, quart, or quinte, i. e. that which takes its descent from the best card, prevails; so as to make all the others in that hand good, and destroy all those in the other hand.—In like manner a quart in one hand sets aside a tierce in the other.

The sequences over, they proceed to examine how many aces, kings, queens, knaves, and tens, each holds; reckoning for every three of any sort, three: but here too, as in sequences, he that with the same number of threes, has one that is higher than any the other has, e. gr. three aces, has all his others made good hereby, and his adversary's are all set aside.—But four of any sort, which is called a *quatorze*, always set aside three.

All the game in hand being thus reckoned, the eldest proceeds to play; reckoning one for every card he plays above a nine; and the other follows him in the suit: and the highest card of the suit wins the trick.—Note, unless a trick be won with a card above a nine, (except the last trick) nothing is reckoned for it; though the trick serves afterwards towards winning the cards: and that he who plays last does not reckon for his cards unless he wins the trick.

The cards being played out, he that has most tricks reckons ten for winning the cards.—If they have tricks alike, neither reckons anything.—The deal being finished, and each having marked up his game, they proceed to deal again as before, cutting afresh each time for the deal.

If both parties be within a few points of being up, the *carte blanche* is the first thing that reckons; then the point; then the sequences; then the quatorzes or threes; then the tenth cards.

He that can reckon thirty in hand, by *carte blanche*, points, quintes, &c. without playing before the other has reckoned any thing, reckons ninety for them;—and this is called a *repique*.

If he reckons above thirty, he reckons so many above ninety: If he can make up thirty, part in hand, and part play before the other has told any thing, he reckons for them sixty.—And this is called a *pique*. Whence the name of the game.

He that wins all the tricks, instead of ten, which is his right for winning the cards, reckons forty,—and this is called a *capot*.

PICRA—*Hiera Picra*. See the article **HIERA**.

PICTA *Toga*. See the article **TOGA**.

PICTS *Wall*, in antiquity, a famed piece of Roman work, begun by the emperor Adrian, on the northern bounds of England, to prevent the incursions of the Picts and Scots.

PIE

At first it was made only of turf, strengthened with palliades: till the emperor severus, coming in person into Britain, built it with solid stone, reaching eight miles in length, from the firth to the German sea, or from Carlisle to Newcastle; with watch-towers garriioned at the distance of a mile from each other. It was ruined several times by the Picts, and often repaired by the Romans.-- At last Ætius, a Roman general, rebuilt it of brick; and the Picts ruining it in the year following, it was no longer regarded, but as a boundary between the two nations. The wall was eight foot thick, and twelve high from the ground; it run on the northside of the rivers Tyne and Irthing, up and down several hills: the tract or remains of it are to be seen to this day in many places both in Cumberland and Northumberland.

PICTURE, PICTURA, a piece of painting: or a subject, represented in colours, on canvas, wood, or the like; and inclosed in a frame.

PIECE, in commerce, signifies sometimes a whole; and sometimes only a part of the whole.

In the first sense we say, a *Piece* of cloth, of velvet, &c. meaning a certain quantity of yards, regulated by custom; being yet entire, and not cut.

In the other signification, we say, a *Piece* of tapestry, meaning a distinct member wrought a-part, which with several others make one hanging.

A *Piece* of wine, of cyder, &c. is a cask full of those liquors.

Chimney <i>PIECE</i> .	} See the articles	CHIMNEY.
Detached <i>PIECE</i> .		DETACHED.
Master- <i>PIECE</i> .		MASTER.
Esqul <i>PIECE</i> .		EASEL.

PIECE, in matters of money, signifies sometimes, the same thing with *species*: as, when we say, this *Piece* is too light, &c.

Sometimes by adding the value of the pieces, it is used to express such as have no other particular name: as, a *Piece* of eight rials, a *Piece* of twenty five sols, &c.

In England, the *Piece* absolutely, is sometimes used for twenty-shillings sterling; and sometimes for a Guinea.

By 6 G. II. c. 25. *Broad-pieces* of five and twenty or three and twenty shillings value, or any halves or quarters thereof, are called in.--And all persons are forbid to receive or utter them in payment by tale.

PIECE of eight, or pistre, is a silver money, first struck in Spain, afterwards in other countries; and now current in most parts of the world.

It has its name *Piece of eight, or rial of eight*, because equal to eight silver rials.

Its value is nearly on the same foot with the late French crown; viz. four shillings and six pence sterling.-- In 1687, the proportion of the simple rial to the pistre was changed; and in lieu of eight rials they gave ten.-- At present the reduction is on the ancient standard.

There are two kinds of pistres or Spanish crowns; the one struck at Potosi, the other at Mexico: these latter are a little matter heavier than the former, but in return they are not quite so fine.

The *Piece of eight* has its diminutions, viz. the demi-pistre, or *Piece of four rials*; the quarter, or *Piece of two*; the half quarter, and the sixteenth.-- The exchange between Spain and England is made in *Pieces of eight*.

PIECE, is also a kind of Money of account, or rather a manner of accounting used among the negroes on the coast of Angola in Africa.

The price of slaves, and other commodities, here negotiated, as also the duties paid the petty kings, are estimated on both sides in pieces. Thus, those barbarians requiring ten *Pieces* for a slave; the Europeans in like manner value the money or merchandize, to be given in exchange, in *Pieces*.

E. gr. a barrel of powder of ten pounds, is one *Piece*; a *Piece* of blue salempouris goes for four *Pieces*; ten brass buttons are reckoned for one *Piece*.

PIECE, in heraldry, denotes an ordinary, or charge. See **ORDINARY**, and **CHARGE**.

The honourable *Pieces* of the field, are the chief, fess, bend, pale, bar, cross, saltire, chevron; and in general all those which may take up one third of the field, when alone, and in what manner soever it be.

PIECES, in the military art, include all sorts of great guns and mortars.

These are also called *Pieces of ordnance*, or *artillery*.

Field *PIECES* are a smaller sort, carrying balls of ten or twelve pounds.

Battery *PIECES* are the larger sort of guns used at sieges for making of breaches.--Such are the twenty four pounders, and the culvein; the one carrying twenty four, and the other eighteen pound of ball.

Pointing a <i>PIECE</i> .	} See the articles	POISON.
Elevation of a <i>PIECE</i> .		ELEVATION.
Quadrating a <i>PIECE</i> .		QUADRATING.

PIEDOUCE *, in architecture, a little stand, or pedestal, either oblong or square, enriched without mouldings; serving to support a bust, or other little figure.

PIE

* The word is French, formed from the Italian, *peda*, in, foot. **PIEDROIT**, in architecture, a *peer*; or a square kind of pillar, part whereof is hid within a wall.

The only thing wherein it differs from a *pilaster* is, that the latter has a regular base and capital, which the other wants. See **PILASTER**.

PIEDROIT is also used for a part of the solid wall annexed to a door or window; comprehending the door-post, chambranic, tableau, leaf, &c.

PIE-POUDER-Court, an ancient court mentioned in many of our statutes, to be held in fairs; for the rendering of justice to buyers and sellers; and the redress of grievances arising therein.

It had its name either because most ordinarily held in *foirmer*, and that the suiters heret were chiefly country clowns; with dusty feet, called by the French, *pieds poudreux*; or from the expedition intended in the hearing of causes proper thereto, ere the dust went off the plaintiff and defendant's feet.

The Saxons called it *ceapung-gemot*, i. e. court of merchandise; or a court for the decision of disputes relating to buying and selling.--Doctor and student observe, that it is only held during the continuance of the fairs, &c.

PIER. See the article **PEER**.

PIERCED, PERCE, in heraldry, is when an ordinary is perforated or struck through, shewing, as it were, a hole in it.

This *Piercing* is to be expressed in blazon, as to its shape: thus if a cross have a square hole, or perforation in the center, it is blazoned, *square pierced*, which is more proper than *quarter pierced*, as Leigh expresses it; and accordingly the French call it, *perce en quarte*.--When the hole, or perforation, is round, it must be expressed *round pierced*; which Gibbon in Latin calls *perforata*, because all holes made with pierces or augers, are round.--If the hole in the center be in the shape of a lozenge, it is expressed *pierced lozenge ways*.

All piercings must be of the colour of the field, because piercing implies the shewing of what is under the ordinary, or bearing.

--And when such figures appear on the center of a cross, &c. of another colour, the cross is not to be supposed *pierced*, but that the figure on it is a charge, and must be accordingly blazoned.

PIERCING, among farriers.--To pierce a horse's shoe lean, is to pierce it too near the edge of the iron.--To pierce is fat, is to pierce it further in.

PIES, in our ancient law-books.--*Freres PIES*, were a sort of monks, so called because they wore black and white garments, like magpies; the name, we suppose, with those since called *Carmelites*: who, for a like reason, were anciently called by the French *Freres Barres*.

They are mentioned by Walsingham, p. 124. In *quodam veteri cuncteio*, quod fuerat quondam scriptum, quos *figuras pies veteres appellabant*.

PIESTRUM, PIESTPON, an instrument wherewithal to beat in pieces the bones of the head, sometimes necessary in drawing a child out of the womb: called also *embryotomus*.

PIETANTIA, or PITTANCE, a portion of victuals distributed to the members of a college, or other community, upon some great festivals.

PIETANTIARIUS. See the article **PITIANCIARIUS**.

PIETISTS, a religious sect lately sprung up among the protestants of Germany, seeming to be a kind of mean between the quakers of England, and the quietists of the Romish church.

Their author was Spenerus, from whom they learnt to despise all ecclesiastical polity, all school theology, and all forms and ceremonies; and to give themselves up to contemplation, and the mystick theology.

The *Pietists* are esteemed Adiahorists, or Indifferentists, i. e. in the German way of talking, they receive and allow of all sects among protestants, particularly the calvinists; contrary to the practice of other Lutherans.--Hence a Lutheran of Dantzick defines *Pietism*, an assemblage of the hypotheses, or systems, of Anabaptists, Schwencfeldians, Weigelians, Rathmannians, Labadists, and Quakers, who, under pretence of a new reformation, and in hopes of better times, set aside the Augsburg confession.

The same author charges the *Pietists* not only with schism, but with heresy; in that they believe with the Donatists, that the effect of the sacraments depends on the piety and virtue of the minister; that creatures are emanations from the subsistence of God; that a state of grace is a real possession of the divine attributes, and a true deification; that one may be united to God, though he deny the divinity of Jesus Christ; that all error is innocent, provided the person will be but sincere; that the preventing grace is natural, and that the will begins the work of salvation; that one may have faith without any supernatural assistance; that all love of the creature is original sin: that a christian may avoid all sin; and that one may enjoy the kingdom of God in this world.

These things we find charged on the *Pietists*, in a book intitled, *Manipulus objectionum Antipietisticarum*.--Indeed, this

looks

looks too much like polemical exaggeration; at least it is certainly so with regard to a good part of them.

In effect there are *Pietists* of several kinds: some run into gross illusions, and carry their errors to the overturning a great part of the christian doctrine: others are only visionaries; and others very honest and good people, who disgusted with the coldness and formality of other churches, and charmed with the frequent piety of the *Pietists*, are attached to their party, without giving into the groffest of their errors.

PIETY—*Mounts of PIETY*. See the article MOUNT.

PIG of lead, the eighth part of a fother, amounting to about 250 lb. weight.

PIGER *Henrich*, slothful Harry, a fantastical name for a slow diffilling chymical furnace; called also an *athanor*. See ATHANOR.

PIGMENTS, PIGMENTA, preparations used by painters, dyers, &c. to impart colours to bodies, or to imitate particular colours.

When glass is stained or coloured, as in painting on glass, or for counterfeiting gems, or precious stones; the *Pigment* is always of a metalline, or a mineral nature.

PIGMY, or PYGMY. See the article PYGMY.

PIGNE. See the article PINEA.

PIKE *, an offensive weapon, consisting of a shaft of wood, twelve or fourteen foot long; headed with a flat pointed steel, called the *spear*.

* The name *Pike* is said to be derived from a bird, called by the French *pie*, by us wood pecker, whose bill is said to be so sharp as to pierce wood like an auger.—Du Cange derives it from the base Latin *pica*, or *picca*, which Turnebus supposes to have been so called, *quasi pica*, because resembling a kind of ear of corn: Octavio Ferrari derives it *a picala*.—M. Fauchet says it was the *Pike* that gave name to the *Picards*, and to *Picardy*, which he will have to be modern, and to have been framed on occasion of that people's renewing the use of the *Pike*, the etymology whereof he fetches from the French *piquer*, to prick: but others will have the names *picard* to have been given that people by reason of their readiness to pick quarrels, called in French *piqueurs*.

The *Pike* was a long time in use in the infantry, to enable them to sustain the attack of the cavalry; but it is now taken from them, and the bayonet, which fixes on at the end of the carbine, is substituted in its place.

Yet the *Pike* still continues the weapon of foot-officers, who fight *Pike* in hand, salute with the *Pike*, &c.

Pliny lays the Lacedæmonians were the inventors of the *Pike*.—The Macedonian Phalanx was evidently a battalion of *pikemen*.

PIKE, in commerce.—To treat at the *Pike*, or *Pike's end*, *à la pique*, denotes a kind of commerce which the Europeans hold with certain savage nations, wherein they are to keep on their guard, and, as it were, sword in hand.—Thus it is we treat with the savages of Canada, &c. and with some negro nations on the coast of Africa.

Treating at the Pike also denotes a kind of prohibited traffic which the English, French and Dutch maintain in several parts of the Spanish West-Indies, near the colonies which those nations have in the Caribbee islands.

Perhaps it should rather be called *treating at Pike*, i. e. with the vessel at anchor; in regard this commerce, which is prohibited on pain of death, is only practised in roads where vessels lie at anchor, waiting for the Spanish merchants, who sometimes by stealth, though more frequently with the connivance of the governors, &c. come to exchange their gold, pieces of eight, cochineal, &c. for the European merchandizes. Others will have it treating at the *Pike*, i. e. at a *Pike's length*, or distance; by reason of the distance strangers are obliged to keep at.

PIKE fishing. } See the articles { FISHING.
Huxing of PIKE. } HUXING.

PILA or PILE, among our ancient writers, denotes the armside of a piece of money.

The denomination arose hence, that anciently this side bore an impression of a church built on piles.

Fleta, lib. 1. cap. 39: He who brings an appeal of robbery or theft against another, must shew the certain quantity, quality, price, weight, number, measure, or the valorem & *pilum*; where *pilum* signifies *figura monetæ*.

PILA *, PEER, in building, a mass of masons work in manner of a pillar, usually hexagonal.

* The word comes from the Latin, *pila*, used in the same sense by Vitruvius; and this probably from *pilulus*, *cogo*, *coarcto*.

Such are those serving as fulcra, to separate and support the arches of a stone-bridge, or the beams of a wooden-bridge.

The *Peers* of a stone-bridge are not to be less than one sixth part of the arch, nor more than a fourth.

Evelyn observes, that *Piles* and their quadras, as we see them in ancient altars and monuments, were used for inscriptions; but the shorter and more massily served for arches and buttresses to solid work.—They were sometimes made semicircular: but the ancients preferred those pointed at right angles, as best able to resist the current.

PILASTER, in architecture, a square column, sometimes insu-

lated, but more frequently let within a wall, and only projecting with a fourth or fifth part of its thickness.

The *Pilaster* is different in different orders; it borrows the name of each order, and has the same proportions, and the same capitals, members, and ornaments, with the columns themselves.

Pilasters are made usually without either swelling or diminution, as broad at top as at the bottom; though some of the modern architects, as M. Mansard, &c. diminish them at top, and even make them swell in the middle, like columns: particularly when placed behind columns.

Pilaster., M. Perrault observes, like columns, become of different kinds, according to the different manner wherein they are applied to the wall.—Some are wholly detached, called by Vitruvius *parastatæ*; others have three faces clear out of the wall: and others two: and others only one; these are all called by Vitruvius, *antæ*.

Insulate *Pilasters* are but rarely found in the antique.—The chief use they made of *Pilasters* was at the extremities of portico's, to give the greater strength to the corners.

There are four principal things to be regarded in *Pilasters*, viz. their projecture out of the wall, the diminution, the disposition of the entablature when it happens to be common to them and to a column, and their flutings and capitals.

1^o Then, the projecture of *Pilasters* which have only one face out of the wall, is to be one eighth of their breadth; at most not above one sixth. When they receive imposts against their sides, their projecture may be a quarter of their diameter.

2^o *Pilasters* are but seldom diminished, when they have only one face out of the wall.—Indeed where they stand in the same line with columns, and the entablature is continued over both, without any break, the *Pilasters* are to have the same diminution with the columns; that is to say, on the face respecting the column; the sides being left without any diminution.

3^o *Pilasters* are sometimes fluted, though the columns they accompany be not so; and, on the other hand, the columns are sometimes fluted, when the *Pilasters* that accompany them are not.

The flutings of *Pilasters* are always odd in number; except in half *Pilasters*, meeting at inward angles; where four flutings are made for three, &c.

4^o The proportions of the capitals of *Pilasters* are the same as to height with those of columns, but they differ in width; the leaves of the former being much wider; because *Pilasters*, tho' of equal extent, have only the same number of leaves for their girt, viz. eight.—Their usual disposition is to have two in each face in the lower row, and in the upper row one in the middle, and two halves in the angles, in the turns whereof they meet.—Add to this, that the rim of the vase or tambour is not frait as the lower part is, but a little circular and prominent in the middle.

In *Pilasters* that support arches, the proportions, Palladio shews, must be regulated by the light they lie in; and at angles, by the weight they are to sustain. For which reason, says Sir Henry Wotton, a rustic superficies best becomes them.

PILASTER-brick. See the article BRICK.

PILCHARD-fishing. See Pilchard FISHING.

PILE, in antiquity, a pyramid built of wood, whereon were laid the bodies of the deceased, to be burnt.

PILE is also used in building, for a great stake rammed into the earth for a foundation to build upon in marshy ground. See FOUNDATION.

Amsterdam and some other cities are wholly built upon *Piles*. The stoppage of Dagenham-breach is effected by dove-tail *Piles*, i. e. by *Piles* mortised into one another, by a dove-tail joint.

PILE is also used among architects, for a mass, or body, of building.

PILE, PILA, in coinage, denotes a kind of punchion, which, in the old way of coining with the hammer, contain'd the arms, cross, or other figure and inscription, to be struck for the reverse of the species.

Accordingly, we still call the arms side of a piece of money the *Pile*, and the head the *cross*; because in the ancient monies, a cross usually took the place of the head in ours. Hence also the game of *cross* and *Pile*.

Some will have it called *Pile*, *Pila*, because on this side, in our ancient coins, there was an impression of a church built on *Piles*. Scaliger, with more probability, derives it from the old French word, *Pile*, a ship. Vide prima Scaligarana, in voc. *Nummus Raticus*, p. 115.—In some ancient writings *Pila* is used to signify the particular figure or impression of money.—Thus *Fleta*; he who brings an appeal of robbery, or theft, against another, must shew the certain quantity, quality, price, weight, number, measures, value, and *Pile*.

PILE, in heraldry, is an ordinary, in form of a point inverted, or a stake sharpened; contracting from the chief, and terminating in a point towards the bottom of the field, somewhat in manner of a wedge.—See *Tab. Herald. fig. 80*.

It is formed probably in imitation of the Roman pilum, which was a tapering dart about five feet long, and sharpened at the point with steel.

PIL

The *Pile* is born inverted, engrafted, &c. like other ordinaries, and issues indifferently from any point of the verge of the elbow. — He beareth a *Pile gule*, by the name of Chandois.

PILLS, in medicine, a disease, by physicians, called *hemorrhoids*. See **HÆMORRHOIDS**.

PILETTUS *, in our ancient forest laws, an arrow which had a round knob a little above the head, to hinder it from going far into the mark.

* From the Latin *pila*, which signifies any round thing like a ball. *Et quod forejarii sui non portabant sagittas barbatus sed pilettos.* Charta Rogeri de Quincy.

PILGRIM *, one who travels through foreign countries to visit holy places, and to pay his devotion to the reliques of dead saints.

* The word is formed from the Flemish, *pelgrim*, or Italian *pelegrino*, which signifies the same; and these originally from the Latin *peregrinus*, a stranger, or traveller.

The humour of going on pilgrimage anciently prevailed exceedingly; particularly about the time of the croisades.

Several of the principal orders of knighthood were established in favour of *Pilgrims* going to the Holy Land, to secure them from the violences and insults of the Saracens and Arabs, &c. Such were the order of the knights Templars, the knights Hospitallers, knights of Malta, &c.

PILLAGE, among builders, is sometimes used for a square pillar, standing behind a column to bear up the arches; having a round base and capital as a pillar has.

PILLAR, in architecture, a kind of irregular column, round and insulate; but deviating from the proportions of a just column.

Pillars are always either too massive or too slender for a regular architecture. In effect, *Pillars* are not restrained to any rules: their parts and proportions are arbitrary. Such e. gr. are the *Pillars* which support Gothic vaults and other buildings, &c.

A square *Pillar* is a massive work, called also a *peer* or *piedroit*, serving to support arches, &c.

Butting Pillar is a buttment or body of masonry, raised to prop or sustain the thrust of a vault, arch, or other work. See **BUTTRESS**.

PILLAR, in the manage, signifies the centre of the volta, ring, or manage-ground, round which a horse turns; whether there be a wooden *Pillar* placed therein, or not.

There are also *Pillars* in manages on the circumference, or side; placed at certain distances, by two and two. — To distinguish these from that of the center, they are called the *two Pillars*. When these latter are spoken of, it is usual to say, *work the horse between the two Pillars*. — When the former, it is called *working round the Pillar*.

The use of the *Pillar* in the center, is for regulating the extent of the ground, that the manage upon the volts may be performed with method, and justness, and that they may work in a square by rule and measure upon the four lines of the volts; and also to break unruly high mettled horses, without endangering the rider.

The *two Pillars* are placed at the distance of two or three paces one from the other. — The horse is put between these, to teach him to rise before, and jerk out behind; and put himself upon raised airs, &c. either by the aids, or chastisement.

Ropes of two Pillars. See the article **ROPE**.

PILLE of Fouldrey, or **PILE** of Fouldrey, in the county of Lancaster, a defence built on a creek of the sea called *Pille*, by the idiom of the county, for a *pile*, or fort built for the safe-guard, or protection of any place.

This *Pile* was erected there by the Abbot of Fournesse, in the first year of Edward III. Camd. Brit. Rem. — *Delinus Henrico comiti Northum. insulam, castrium, pelam & domum de Man, &c.* Rot. Pat. 1 Hen. IV.

PILLORY was anciently a post erected in a cross road, by the lord, as a mark of his leignory, with his arms on it, and sometimes with a collar to tie criminals to.

PILLORY, at present, is a wooden machine, whereon certain criminals, as perjurers, &c. are fastened, and exposed to the public derision.

In the laws of Canutus it is called *heafsheang*. — Sir Henry Spelman says, it is *supplicii machina ad ludibrium, magis quam punitionem*. It was peculiarly intended for the punishment of bakers who should be caught faulty in the weight, or fineness of their bread. — In old charters it is called *callistrigium*.

The *Pillory* in Paris is in the middle of a round tower, with openings on every side. — It is moveable on an axis, or arbor; round which the executioner gives the criminal the number of turns appointed in court; stopping him at each opening to shew him to the people. — It was intended for several kinds of criminals, particularly for fraudulent bankrupts; and all those who made a cession, or surrender of their effects to their creditors, were obliged to take some turns round the *Pillory* on foot, with a green cap on.

PILL, **PILLULA**, in pharmacy, a form of medicine, taken dry; resembling a little ball; invented in favour of such as cannot well take ill tasted medicinal draughts; as also to keep in readiness for occasional use without decaying.

PIN

Pills are of various kinds, anodyne, somniferous, laxative; aperitive, hystric, antinephritic, &c. but they are principally cathartic.

The basis of cathartic *Pills* is usually aloes; with which are mixed agaric, turbith, hermodactyls, fenna, rhubarb, colocynthis, &c.

Pills are usually wrapped up in leaf-gold, wafer paper, or the like, to prevent their ill taste being perceived.

Perpetual PILLS, or **PILLULÆ perpetuæ**, are regulus of antimony made up in pills; thus called, because being swallowed and voided fifty times, they will purge every time with undiminished force.

The *aleopbangine* or *aromatic PILLS* of Mesue, made of aloes, scammony, troches of alhandal, and saffron, are by some called *polychrestæ*, as being supposed to collect the humours from all parts, to enable nature to cast them out more easily.

Beech PILLS, are a sort of *Pills* good against coughs, so called from the Greek, *βέχ*, cough. — They are also called *hypoglotides*, because left like lozenges to dissolve under the tongue.

PILLULÆ Diarrhodon. See the article **DIARRHODON**.

PILOT *, a person retained on board a ship to conduct it into a road, or harbour; or over bars, or sands; or through serpentine, and intricate channels, or the like.

* Menage derives the word *Pilot* from *prolita*, q. d. he who governs the prow, or head. Others fetch it from the old French *pile*, ship.

Pilots are no constant and standing officers on board our vessels: but are mostly called in occasionally on coasts and shoars unknown to the master. — And having done their parts in piloting the vessel, they return to shoar where they reside.

Among the French, *Pilot* is also used for the steersman; or an officer on board a ship, who always watches her course, and directs it.

There are among the French two kinds of *Pilots*: the one a *coasting Pilot*, well acquainted with the coasts, ports, roads, bars, sands, &c. and who commands in fight thereof.

The other an officer, who makes observations and takes altitudes out at sea, uses the quadrant, and fore-staff, and also watches the compass.

The *Pilot* is always the second person in the ship; whether it be a man of war, or a merchant-man. — In the former the captain is the first, the *Pilot* the second. In a merchant-ship, the master is the first, the *Pilot* after him.

This *Pilot* is also the steersman, who stands at the helm, and manages the rudder.

PILLY Barry. See the article **BARRY Pily**.

PIMENTO, **PIMENTA**, *all-spice*; a kind of aromatic fruit, called also *guinea-pepper*.

PIN, in commerce, a little necessary implement, chiefly used by the women, in adjusting their dresses.

The form and application of this little moveable need no description; but its consumption, and the number of hands it employs, are too considerable to be passed by unnoted.

Pins are now altogether made of brass wire blanché: formerly they likewise made them of iron-wire, which being blanché like the others, passed for brass: but the ill effects of those *Pins* has quite discarded their use. — The French however could not be driven off from them without several arrears of parliament. By a sentence of the lieutenant de police, July 1695, the seizure of some millions of those *Pins* was confirmed, and the *Pins* condemned to be burnt by the common executioner.

The *Pins* most esteemed in commerce are those of England; those of Bourdeaux are next, then those made at Rugle, Nangle, and some places in Normandy.

The perfection of *Pins* consists in the stiffness of the wire, and its blanching, in the heads being well-turn'd, and the points filed.

The London pointing and blanching are in most repute; because after forming the points on the stone, our pin-makers smooth them again on a polisher; and in blanching use fine tin well calcined, and sometimes silver leaves prepared by the gold-beaters; whereas in other parts they use a mixture of tin, lead, and quick-silver, which not only blanches worse than the former, but is also dangerous, by reason of the ill quality of that mixture, which renders a puncture with a *Pin* thus blanché very difficult to cure.

The consumption of *Pins*, and the number of artificers employed in the manufacture thereof are incredible. In Paris alone there were anciently above 1000 people employed in it, at present there are none; yet there is every year sold above 50,000 crowns worth of the *Pin-wire*, to the pin-makers of the neighbouring places, all brought thither from Stockholm. In the little Town of Rugle in Normandy, there are computed at least 500 workmen employed in the *Pin*-manufacture; the whole town being peopled therewith.

Notwithstanding that there is scarce any commodity cheaper than *Pins*, there is none that passes through more hands before they come to be sold. — They reckon twenty-five workmen successively employed in each *Pin*, between the drawing of the brass-wire, and the flicking of the *Pin* in the paper.

PIN

Pins are distinguished by numero's: the smaller called from N^o 3, 4, 5; thence to the 14th; whence they are only accounted by two to two, viz. N^o 16, 18, and 20, which is the largest size.

Besides the white *Pins* there are also black ones made for mourning, from N^o 4, to N^o 10. — These are usually of iron-wire. Lastly, there are *Pins* with double heads, of several numero's; used by the ladies to fix the buckles of their hair for the night, without danger of being disturbed by their pricking, &c.

One of the articles of the statutes of the ancient pin-makers of Paris, was, that no master should open more than one shop for the sale of his wares, except on new-year's-day, and the eve thereof; this we mention in an age of luxury and profusion, to recollect the agreeable simplicity of our fore-fathers, who contented themselves with giving *Pins* for new-years gifts.

Hence the custom of still giving the name *Pins*, or *Pin-money*, to certain presents which accompany the most considerable bargains; in which it is usual to give something towards the *Pin* of the wife, or children, or the person with whom the bargain is struck.

Hook Pins. *See the articles* { **HOOK.**
Protracting Pin. } **PROTRACTING.**

Ad PINNAS bibere, a method of drinking anciently used among the Danes in England. — The custom was to fix a *Pin* in the side of the wooden cup or wassal-bowl; which *Pin*, each guest was to drink bare, upon penalty of forfeiting.

PIN-and-Web, a horny induration of the membranes of the eye not much unlike a cataract.

The *Pin* and web is the same with what we otherwise call *pannus*, *unguis*, *pterygium*, &c. *See* **PANNUS**, **PTERYGIUM**, &c.

PIN-wheel, of a clock, the same with the striking wheel. *See* **WHEEL** and **CLOCK**.

PINCHING, in gardening, a sort of pruning; performed by nipping or breaking off the branches, or sprigs of a plant, or tree, between the nails of two fingers.

Most gardeners hold, that *pinching* contributes to the abundance of the fruit, as well as of the branches; and they say, that young shoots, thus lopped, are less apt to grow black and die, than when cut with a pruning knife.

The season for *pinching* is chiefly in April or May, sometimes it is also practised in June and July. — The fruits it is practised on are chiefly melons, cucumbers, &c. Quintiny also prescribes it for fruit-trees.

It is chiefly to be practised on the large branches towards the top of the plant, or tree, which are useless, and yet consume a great quantity of good sap. It must rarely be employed on the large branches below; which ought always to be preserved for the winter's pruning, that they may yield others, the following year, fit to fill the empty places. — Nor must the operation of *pinching* be performed on the tender shoots; because having only just sap enough for themselves, when they come to put forth more branches in the place where they are *pinched*, the small stock of sap allotted them being divided, will starve them. — The operation is to be performed, within two or three eyes of the branch they grow out of.

The effect of *pinching* is, that instead of one useless, and perhaps hurtful wood-branch, a vigorous tree will put forth two or three at the eyes remaining; and the sap being thus divided, the branches will be less, and fit for both wood and fruit.

PINCHING, in the mane, is when the horse standing, the rider holds him fast with the bridle-hand, and applies the spurs just to the hairs of his sides, without pricking him.

Pinching is accounted an aid, spurring a chastisement or correction.

PINDARIC, in poetry, an ode formed in imitation of the manner of Pindar.

The *Pindaric* manner is distinguished by the boldness and height of the flights, the suddenness and surprisingness of the transitions, and the seeming irregularity, wildness, and enthusiasm of the whole.

Pindar, whence the manner takes its name, was of Thebes: he flourished about four hundred and seventy-eight years before Christ; and was cotemporary with *Æschylus*: what we have remaining of his is a book of odes, all in praise of the victors at the Olympian, Pithian, Nemean, and Isthmian games; whence the first is entitled the *Olympians*, the second the *Pythians*, the third the *Nemeans*, and the fourth the *Isthmians*.

Pindar is full of force and fire, his thoughts are sententious, his style impetuous, his fallies daring, and frequently running as it were at random; he affects a beautiful disorder, which yet is said to be the effect of the greatest art.

The supposed irregularity of his numbers has made several of his imitators imagine themselves *pindaric* poets, by the mere wildness, and irregularity of their verses. — None of our writers seem to have succeeded in the *pindaric* character, better than Cowley.

In a *pindaric* ode, the plan of the whole ought to be drawn first, and the places marked out where the elegant fallies and wanderings may best be, and how the returns may be justly made to the subject.

PIN

PINEA, or **FIGNE**, in commerce, a term used in Peru and Chili, for a kind of light, porous mass, or lumps formed of a mixture of mercury and silver dust from the mines.

The ore, or mineral of silver, being dug out of the veins of the mine, is first broke, then ground in mills for the purpose, driven by water with iron pestles, each of two hundred pound weight. — The mineral thus pulverized, is next sifted, then worked up with water into a paste, which when half dry, is cut into pieces called *cuerpos*, a foot long, weighing each about two thousand five hundred pounds.

Each *cuerpo* is again kneaded up with sea-salt, which dissolving incorporates with it. — They then add mercury, from ten to twenty pounds for each *cuerpo*, kneading the paste afresh until the mercury be incorporated therewith. This office being exceedingly dangerous, by reason of the noxious qualities of the mercury, is always made the lot of the poor Indians.

This amalgamation is continued for eight or nine days; and some add, lime, lead, or tin ore, &c. to forward it; and in some mines they are obliged to use fire. — To try whether or no the mixture and amalgamation be sufficient, they wash a piece in water, and if the mercury be white, it is a proof that it has had its effect; if black, it must be further worked.

When enough, it is sent to the lavatories, which are large basins that empty successively into one another. — The paste, &c. being laid in the uppermost of these, the earth is then washed from it into the rest by a rivulet turned upon it; an Indian all the while stirring it up with his feet, and two other Indians doing the like in the other basins.

When the water runs quite clear out of the basins, they find the mercury and silver at bottom, incorporated. — This matter they call *Pella*, and of this they form the *Pineas*, by expressing as much of the mercury as they can; first by putting it in woollen bags, and pressing and beating it strongly; then by stamping it in a kind of wooden mould of an octagonal form, at bottom whereof is a brass plate pierced full of little holes.

The matter being taken out of the mould, is laid on a trivet, under which is a large vessel full of water; and the whole being covered with an earthen head, a fire is made around it.

The mercury still remaining in the mass, is thus reduced into fumes, and at length condensing, it is precipitated into the water, leaving behind it a mass of silver grains of different figures, which only joining or touching at the extremes, render the matter very porous and light.

This then, is the *Pinea* or *Pigne* which the workmen endeavour to sell secretly to the vessels trading to the South-sea; and from which those who have ventured to engage in so dangerous a commerce, have made such vast gains. — Indeed the traders herein must be very careful, for the Spanish miners are errant knaves, and to make the *Pignes* weigh the more, they make a practice of filling the middle with sand or iron.

PINEAL, **PINEALIS**, in anatomy, a name which Des Cartes gives to a small gland in the third ventricle of the brain; from its resemblance to a pine-apple.

This gland he makes the sensorium, or seat of the reasonable soul. Other authors call it *conoides* and *conarium*. *See* **CORNU**.

PINGUEDO, (in anatomy) the Latin term for *fat*. *See* **FAT**. — Some restrain *Pinguedo* only to that humid soft kind of fat found in animals next under the skin.

PINION, in mechanicks, an arbor, or spindle, in the body whereof are several notches, into which catch the teeth of a wheel that serves to turn it round.

Or a *Pinion* is a lesser wheel, which plays in the teeth of a larger. *See* **WHEEL**.

In a watch, &c. the notches of a *Pinion* (which are commonly 4, 5, 6, 8, &c.) are called *leaves*, and not teeth, as in other wheels.

Pinion of report, is that *Pinion* in a watch which is commonly fixed on the arbor of the great wheel, and which in old watches used to have but four leaves; it drives the dial-wheel, and carries about the hand.

The quotient, or number of turns to be laid upon the *Pinion*, of report, is found by this proportion: as the beats in one turn of the great wheel, are to the beats in an hour; so are the hours of the face of the clock. (viz. 12, or 24) to the quotient of the hour-wheel, or dial-wheel divided by the *Pinion* of report, that is, by the number of turns which the *Pinion* of report hath in one turn of the dial-wheel: which in numbers is 26928 : 20196 :: 12 : 9.

Or rather thus: as the hours of the watches going, are to the numbers of the turns of the fuly; so are the hours of the face, to the quotient of the *Pinion* of report. — If the hours be 12, then 16 : 12 :: 12 : 9. But if 24, the proportion is 16 : 12 :: 24 : 18.

This rule may serve to lay the *Pinion* of report on any other wheel, thus: as the beats in one turn of any wheel, are to the beats in an hour; so are the hours of the face, or dial-plate of the watch, to the quotient of the dial-wheel, divided by the *Pinion* of report, fixed on the spindle of the aforesaid Wheel.

Flying

PIP

Flying PINION. See the article *FLYING*.

PINK, a Vessel used at sea, masted and rigged like other ships; only that she is built with a round stern; the bends and ribs compassing fo, as that her sides bulge out very much. This disposition renders the *Pinks* difficult to be boarded; and also enables them to carry greater burdens than others.—Whence they are often used for store-ships and hospital-ships in the fleet.

PINNA, or **PENNA**, a Latin word signifying a feather. See *FEATHER*.

It is also used figuratively in divers arts, to express things which bear some resemblance, in form, to feathers; as the fins of fishes, &c.

PINNA auris, in anatomy. See *EAR*.

PINNA nafi, is the same as *ala nafi*. See *NOSE*.

PINNACE, a small vessel, with a square stern, having sails and oars, and carrying three masts; chiefly used as a scout for intelligence, and for landing of men.

One of the boats belonging to a great man of war, serving to carry the officers to and from the shoar, is also called the *Pinnace*.

PINNACLE *, in architecture, the top, or roof, of a house, terminating in a point.

* The word comes from the Latin *pinna*, or *pinnaulum*.

This kind of roof among the ancients was appropriated to temples; their ordinary roofs were all flat, or made in the platform-way.

It was from the *Pinnacle*, that the form of the pediment took its rise.

PINNATA folia, in botany, are such leaves of plants, as are formed of several other small leaves set on the two sides of a middle rib, as those of the ash-tree, of vetches, and the like.

PINNING, in building, the fastening of tyles together, with pins of heart of oak; for the covering of a house, &c.

PINT *, **PINTA**, a vessel, or measure used in estimating the quantity of liquids, and even sometimes of dry things.

* Budaeus derives the word *Pint* from the Greek *πινδα*: others from the German *Pint*, a little measure of wine; Nicod from the Greek *πινος*, to drink.

The English *Pint* is twofold; the one for wine-measure, the other for beer and ale-measure.

The wine *Pint* contains a full pound, avoir du pois, of common running water; two *Pints* make a quart, two quarts a pottle, two pottles a gallon, &c.

The Paris *Pint* is estimated at one sixth of the ancient congius; and contains two pounds of common water; it is divided into chopines, which some call septiers: the septier into two demi-septiers, the demi-septier into two poissons, each poisson containing six cubic inches.—Two *Pints* make a quart, quartreau, which some call a pot: the *Pint* of St. Denis is almost double that of Paris.

PINTLE, among gunners, an iron which serves to keep the cannon from recoiling.

PINTLES, in a ship, are hooks by which the rudder hangs to the stern-post.

PIONEER *, in war, a labourer employed in an army, to smooth the roads, pass the artillery a-long, and to dig lines and trenches, mines, and other works.

* Menage derives the word from the Latin *pedestones*, a diminutive of *pedes*: Bochart deduces it from the *Peones*, a People of Asia, whose principal employment was to dig the earth in mines, &c.

PIP, or **PEP**, **PEPIA**, a disease among poultry; consisting of a white, thin skin, or film, that grows under the tip of the tongue, and hinders their feeding.

It usually arises from want of water, or from the drinking puddle-water, or eating filthy meat.—It is cured by pulling off the film with the fingers, and rubbing the tongue with salt.—Hawks are particularly liable to this disease; especially from feeding on stinking flesh.

PIPE, in building, &c. a canal or conduit for the conveyance of water, and other liquids.

Pipes for water, water-engines, &c. are usually of lead, iron, earth, or wood.—Those which are of timber are commonly either oak, or alder.

Those of iron are cast in the forges; their usual length is about two foot and a half; several of these are commonly fastened together, by means of four screws at each end, with leather, or old hat between them to stop the water.

Those of earth are made by the potters.—These are fitted into one another, one end being always made wider than the other.—

To join them the closer, and prevent their leaking, they are covered with pitch and tow.—Their length is usually about the same with that of the iron *Pipes*.

The wooden *Pipes* are bored with large iron augers of different sizes, succeeding one another from less to larger; the first pointed, the rest formed spoon-wise, increasing in diameter from one inch to six.—They are fitted into the extremities of each other, and are sold by the foot.

PIS

Leadon *Pipes* are of two kinds; the one folded, the other not folded: for the construction of each kind whereof, see *PLUMBERY*.

For the *PIPES* of organs. See the article *ORGAN*.

Bag PIPE. See the article *BAG-PIPE*.

PIPE is also a popular machine used in the smoaking of tobacco; consisting of a long slender tube, made of earth or clay; having at one end a little vase, or furnace, called the *bowl*, for the reception of the tobacco: the fumes whereof are drawn by the mouth through the other end.

Pipes are made of various fashions, long, short, plain, worked, white, varnished, unvarnished, and of various colours, &c.—The Turks use *Pipes* three or four foot long, made of rushes, or of wood bored; at the end whereof they fix a kind of nut, of baked earth, which serves as a bowl, and which they take off after smoaking.

PIPE *, also denotes a vessel, or measure for wine, and things measured by wine-measure.

* The word is formed from the barbarous Latin *pipa*, a vessel, cask, &c.

The *Pipe*, or butt, contains two hogheads, four barrels, or one hundred and twenty six gallons; and is computed to weigh about nine hundred, two quarters, and seventeen pounds.

The *Pipe* is little used in France, except in Anjou and Poitou, where it consists of two boisseaux, equal to a muid and half of Paris; the muid consisting of thirty six septiers, and the septier of eight pints.

PIPE, **PIPA**, in law, is a roll in the exchequer, called also the *great roll*.

PIPE Office, is an office wherein a Person called the *clerk of the Pipe*, makes out leases of crown-lands, by warrant from the lord-treasurer, or commissioners of the treasury, or chancellor of the exchequer.

Clerk of the Pipe makes up all accounts of sheriffs, &c. and gives the accompanys their quietus est. To this Office are brought all accompts which pass the remembrancer's office and remain there; that if any stated debt be due from any person, the same may be drawn down into the great roll of the pipe; upon which the comptroller issues out a writ, called the *summons of the pipe*, for recovery thereof. And, if there be no goods or chattels, the clerk then draws down the debts to the lord treasurer's remembrancer, to write estreats against their lands.

All tallies which vouch the payment of any sum contained in such accompts, are examined, and allowed by the chief *secundary of the Pipe*.

Besides the chief clerk, in this office are eight attorneys, or sworn clerks, and a comptroller.

PICQUET. See the articles *PICKET* and *PICQUET*.

PIRATE, or **PYRATE**, *PIRATA*, *rover*; a person, or vessel, that robs on the high seas, or makes descents on the coasts, &c. without the permission, or authority of any prince, or state.

When *Pirates* are caught, they are usually hanged up without remission, or any formal trial; sometimes in the next port; sometimes on board the vessel that takes them.

In different parts they are differently denominated; as in the West-Indies, *buccaniers*, *free-booters*, &c.—In the Mediterranean, *corsairs*, &c.

Alexander reproaching a *Pirate* with his condition; was answered, if I am a *Pirate*, it is because I have only a single vessel; had I a fleet, I should be a mighty conqueror.

PIRATE was also anciently used for the person to whose care the mole, or peer, of a haven, which in Latin was called *pera*, was intrusted.

PIRATE was sometimes too, according to Spelman, used for a sea-captain, or soldier. After, in the life of king Alfred, tells us, *justit navis longas fabricari, impioque piratis in illis vias maris custodiendas commisit*.

PIROUETTE *, or **PYROUETTE**, in the manage, a turn or circumvolution which a horse makes, without changing his ground.

* The word is French, and literally signifies a whirlingig.

Pirouettes are either of one tread or *pisfe*, or of two.—The first is an entire short turn which the horse makes upon one tread, and almost in one time; in such manner as that his head comes to the place where his tail was, without putting out his haunches.—In the *Pirouette of two treads or pisfes*, he takes a small compass of ground, almost his length, and marks both with the fore-part and the hind.

PISCARY, **PISCARIA**, in our ancient statutes, the liberty of fishing in another man's waters.

PISCES, in astronomy, the twelfth sign, or constellation of the zodiac.

The stars in *Pisces*, in Ptolemy's catalogue, are 38. In Tycho's 33. In the Britannic catalogue 109.—The longitudes, latitudes, magnitudes, &c. whereof are as follow.

Names

P I S

Names and situation of the stars.

Sign.	Longit.	Latitude.	Magn.
♈ 11 06 22	7 22 49	B 7	
12 06 15	6 51 40	B 6	
12 04 48	6 01 09	B 6	
In the mouth of the south. fish	14 15 56	9 03 19	B 4
	14 41 18	7 01 31	B 6
5			
South. of 2 in the hind part of the head	17 03 44	7 16 43	B 4
North. in the hind part of the head	18 42 17	8 52 36	B 5 6
Preced. of two in the belly	18 34 33	4 26 26	B 5
A small one contiguous to it	18 35 20	4 16 40	B 6 7
Preced. in the back.	20 52 27	9 01 58	B 5
10			
	17 56 47	1 22 54	B 6
	18 16 05	2 04 20	B 6
	18 48 28	1 46 36	B 6
	19 13 58	1 24 53	B 6
	20 34 43	3 37 54	B 6
15			
Subseq. in the back	21 05 46	4 15 34	B 6
Subseq. of two in the belly	23 18 38	7 12 12	B 5
	22 16 36	3 25 07	B 5
	26 00 11	11 07 22	B 7
	23 56 55	4 32 43	B 5 6
20			
1st of those preced. the square under the fourth. fish)	21 48 21	1 19 43	A 6 7
	23 41 07	2 01 47	B 6
	24 59 44	3 28 57	B 6
Second.	22 47 44	2 11 39	A 6 7
	27 22 53	6 58 13	B 6
25			
Preced. of north. in the square	23 57 34	3 07 49	A 5
In the tail of the fourth. fish	28 14 55	6 22 15	B 5
Subseq. of the north. in the square	24 53 04	2 57 45	A 5
Preced. of the fourth. in the square	23 42 36	5 42 33	A 5
	29 49 12	7 57 50	B 6
30			
That which follows over the tail	29 38 45	7 31 43	B 5 6
Subseq. the south. of those in the square under Pisces)	24 36 38	5 46 55	A 5 4
	2 26 23	9 12 37	B 6
	2 37 16	6 36 03	B 6
	2 45 08	5 54 26	B 6
35			
	5 04 06	11 05 36	B 6
	3 11 38	6 24 02	B 7
	6 18 45	13 12 04	B 6
	6 46 18	12 55 03	B 6
In the line next the tail of Pisces	3 39 16	5 27 36	B 6
40			
	6 09 48	10 09 08	B 6
	7 01 13	10 41 48	B 6
	2 16 10	0 44 49	A 6
	4 36 55	4 30 42	B 6
	9 57 40	15 06 45	B 6
45			
	9 16 43	13 37 31	B 6
	8 43 31	12 16 56	B 7
	9 08 47	11 39 13	B 7
Second from the tail in the line	5 49 42	3 10 38	B 6
	11 18 50	15 23 53	B 6
50			
	8 50 00	00 10 00	B 7
	10 08 47	10 21 41	B 7
	13 25 40	15 43 24	B 7
	12 26 42	9 38 42	B 6
	11 08 49	5 22 25	B 7
	14 16 36	13 19 58	B 7
55			
	9 12 22	1 31 48	B 7
	14 57 38	14 30 43	B 7
	9 37 31	1 57 28	B 7
Preced. of the bright stars in the line	9 49 17	2 09 44	B 4
	13 34 02	10 44 49	B 6
60			
Preced. of three in the head of the north. fish)	18 17 46	20 30 43	B 6
	15 43 29	12 17 13	B 6
Middle of those in the head	19 23 22	19 29 38	B 6
1st of 3 in the head of the north. fish	20 33 53	20 57 08	B 6
Preced. of 2 against the eye of the north. fish)	22 53 41	23 03 47	B 5
65			
Middle of the bright stars in the fourth. line)	13 12 11	1 04 07	B 4
	10 23 36	7 23 22	B 6
	12 46 09	1 10 40	A 6
Preced. of 2 in the fin of the back.	19 06 00	13 21 08	B 5
	15 43 21	5 31 13	B 6
70			
Subseq. against the eye of the north. fish)	23 46 30	23 06 23	B 5
	12 41 48	1 55 32	A 6
	24 04 18	22 47 51	B 6
Middle in the fin of the back	19 18 25	12 28 46	B 6

P I S

Names and situation of the stars.

Sign.	Longit.	Latitude.	Magn.
♈ 12 06 37	4 49 08	A 7	
75			
Upper, in the fold of south. line	13 37 12	1 30 24	A 5
1st of three in the fin of the tail	19 17 47	11 18 09	B 6
North. of two against the mouth of north fish)	24 27 32	21 59 06	B 6
South. of the same	23 58 26	20 42 19	B 5
	12 52 27	4 40 45	A 7
80			
That follow. the fin of the back	20 11 43	12 25 29	B 5
	13 21 16	4 50 30	A 7
South. of two in the belly	22 08 31	15 29 02	B 5
1st of three bright ones in the fourth. line)	15 32 13	0 13 25	A 4
85			
	18 53 15	7 39 27	B 7
South. of 2 in the fold of fourth. line	15 32 53	0 51 50	A 6 7
North. in the belly	15 00 04	4 17 13	A 6
Another following it	24 27 10	17 26 56	B 5
	25 25 21	18 39 53	B 6
	21 40 54	8 20 43	B 7
90			
Preced. of the contiguous in the bend- ing of the line)	22 45 12	9 22 03	B 5
Subseq. of the same	22 52 27	9 23 58	B 5
	17 56 00	3 34 52	A 7
	18 56 45	1 57 39	A 6 7
	23 14 23	8 17 49	B 6 7
95			
3d of those in north. line before the knot)	18 46 40	3 04 25	A 5
North. of three in the north. line	22 29 20	5 21 07	B 4 3
	23 11 35	4 20 47	B 6
Middle of those in the north. line	22 35 18	1 52 05	B 5 4
	24 41 39	5 51 46	B 8
100			
	23 50 06	3 40 32	B 7
2d of those in south. line before the knot)	24 42 55	5 38 07	B 6 7
	21 10 37	4 43 12	A 5
	26 47 42	9 01 34	B 6 7
	27 14 27	8 36 20	B 8
105			
That next the knot in the north. line	23 24 40	1 38 58	A 5
1st before the knot in south. line	23 11 18	7 55 45	A 5
	24 42 05	8 35 05	A 6 7
In the knot of the two lines	19 25 02	9 05 10	A 3
PISCINA *, in antiquity, a large basin, in an open publick- place, or square; where the Roman youth learnt to swim; and which was surrounded with a high wall, to prevent the casting of filth into it.			
* The word is formed from the Latin <i>piscis</i> , fish; because men here imitated fishes in swimming; and because fishes were actually kept in some of these places.			
PISCINA was also used for the square basin in the middle of a bath.			
PISCINA <i>probatia</i> , was a pool, or reservoir of water, near the court of Solomon's temple; so called from the Greek <i>πρόβατος</i> , sheep, because here they washed the cattle which were destined for sacrifice.			
By this <i>Piscina</i> it was that our Saviour wrought the miraculous cure of the paralytic.—Daviel observes, there are still remaining five arches of the portico, and part of the basin of this <i>Piscina</i> .			
PISCINA, or <i>lavatory</i> , among the Turks, is a large basin placed in the middle of the court of a mosque, or under the portico's that encompass it.			
Its form is usually a long square; it is built of stone or marble, furnished with a great number of cocks; wherein the Mussulmans wash themselves before they offer their prayers; as being persuaded that ablution effaces sin.			
PISCIS <i>australis</i> . See the article AUSTRALIS.			
PISCIS <i>volans</i> , in astronomy, is a small constellation of the southern hemisphere, unknown to the ancients, and invisible to us in these northern regions.			
PISSASPALTUM *, or PISSASPALTUS, ΠΙΣΣΑΣΠΑΛΤΟΣ, in natural history, denotes a native, solid bitumen; found in the Ceraunian mountains of Apollonia: of an intermediate nature between pitch and asphaltum.			
* The word is compounded of <i>πισσα</i> , pitch, and <i>ασφαλτος</i> , bitumen.			
PISSASPALTUM is also a name given to a factitious substance compounded of pitch, and asphaltus or the true bitumen judaicum.			
The coarseness of this, the black colour, and the fetidness of the smell, distinguish it from the true asphaltum.			
PISSASPALTUM is also used by some writers to denote the Jewish pitch, or simple asphaltum.			
PISSELÆUM, ΠΙΣΣΕΛΑΙΟΝ, <i>oleum PIGINUM</i> , or oil of pitch, a medicament compounded of oil and pitch.			
PISSELÆUM <i>indicum</i> , among modern writers denotes a bituminous substance brought from the West-Indies, popularly called Barbadoes tar.			

PIS

It has a strong smell unlike the common tar, and is not very pleasant to sight or taste. It is accounted a good balsamick, and where the stomach can dispense with it, will do great service in many disorders of the breast, which has also been experienced of common tar.

PISTACHIA *, or **PISTACH nut**, a fruit brought from several parts of Asia, chiefly from Aleppo and Persia.—When wrapt in all its coats, it is of the size of a green almond; but when stript of all but its shell, it resembles a small nut. The kernel is red without, and green within, its taste is very agreeable.

* The word is formed from the Latin, *pishtium*, of the Greek, *πισταχίου* whence, according to Menage, the city Pistacium took its name.

The tree that produces it is a kind of turpentine-tree: the nuts are to be choien new, heavy, and full; as to those that are broken, such as have kept their colours best are to be preferred; for as to the size it is a fancy.

Pistachias are aperitive, and proper to give vigour, and are used in emulsions, &c. in phthical, and nephritical cafes. They also enter several ragouts, and are comfited, made into conferves, &c. There is likewise a kind of false *Pistachia*, brought from the Caribbee islands, which some confound with the real ones, though very different, both with regard to the plants that produce them, and their quality. The spurious *Pistachia* plant does not rise above a foot high. Nor does the fruit grow on the branches, but is found in pods.—The pod sometimes only contains a single nut, which resembles an olive; but usually several; and in that case they are inequal. The substance is white, compact and heavy.

This fruit is rarely eat raw, because of the ill effects it produces; it is usually roasted or comfited; is used in ragouts, and to make ratafia's.

PISTE *, in the manage, the track or tread, which a horse makes upon the ground he goes over.

* The word is French, and literally signifies a track.

The *Piste* of a horse may be either *single* or *double*.

If the rider make him go, but an ordinary gallop, in a circle, or rather square, he will make but a *single Piste*: if he either make him gallop with his haunches in, or go terra à terra, he will make two *Pistes*, one with the fore-part, another with the hind.—And the same if the rider make him passage, or go side ways, either in a straight line, or upon a circle.

PISTIL, **PISTILLUM**, in botany, a little upright part in the middle of the calyx, or the leaves of flowers; called also by some the *style*.

The *Pistil* is an essential part of a flower; and the principal female organ of generation; it being in this that the seeds or young plants are lodged.

It arises from the pedicle of the flower, or the centre of the calyx, and at length becomes the young fruit, which is sometimes hid in the calyx, and sometimes stands quite out.

The figure of the *Pistil* is very different in different flowers: sometimes it is a little stalk, which enlarges at the two ends like a pestle; sometimes it is a mere stamen or thread. Sometimes it is round, sometimes square, triangular, oval, &c.

Almost all *Pistils* are furnished at top, either with fine hairs, which make a kind of velveting; or with little filaments disposed in plumes; or else they are beset with little vesicles full of a glutinous juice.

Some flowers have several *Pistils*; or rather the *Pistils* terminate in several branches, or horns, which have their rise from as many young fruits, or as many different capsules, containing seeds.

All these *Pistils*, whatever form they be in, have certain apertures at their tops, or certain clefts continued the whole length, to the base or embryo of the fruit.—This is very visible in the lilly, daffodil, and melon, either by cleaving the *Pistils* lengthwise, or cutting them transversely.—If after cutting the *Pistil* of the lilly, you immerse one extremity in water, and suck through the other end, the water will rise through it as through a pipe.

By opening the *Pistils* in their different states of growth, it appears evidently, that it is these which form the young fruits, and contain within them the embryo's of the seeds; whether those seeds be diffused through the whole length of the *Pistil*; or whether they be all inclosed in its base; and that they are always open at top, and perforated, either more or less sensibly, to the bottom: though this cavity is frequently effaced as the young fruit grows; and sometimes a part of the *Pistil*, which Malpighi calls the *style*, or bodkin, dries and falls off.

The *Pistil*, we have observed, is the female organ of generation; its base does the office of the uterus, or womb, in women; and its length that of the vagina.

It is encompassed with the stamina, the apices whereof are full of a fine dust, called *sarina fecundans*; which bursting its vesicular, or apices, when mature, is shed on the upper part of the *Pistil*, and thence is conveyed by the cavity thereof to the base or uterus; where being fed with a fine juice, secreted by the petala, it grows, expands, and thus forms the embryo of a new plant, &c.—For a more distinct account of the office of the *Pistil* in the generation plants, see **PLAN**.

PIT

PISTOL, a little fire-arm, bore at the fiddle-bow, at the giddle, or in the pocket.

The *Pistol* is said to have taken its name from *Pistoya*, a city in Italy; where, as Fauchet tells us, it was first made.—Borel derives the word from *pistula*, pipe; the barrel of this piece bearing some resemblance to a flute.

PISTOL, *Dublon*, in commerce, a gold coin struck in Spain, and several parts of Italy, Switzerland, &c.

It has its augmentations, and diminutions; which are *quadruple Pistols*, *double Pistols*, and *half Pistols*.

The *Pistols* are about the same weight, fineness, and value, with the French louis d'or, viz. it is equal to about sixteen shillings and six-pence sterling.

In Spain the *Pistols* is accounted equal to four pieces of eight, or thirty two rials, or a thousand and eighty eight maravedis; or a thousand three hundred and sixty maravedis of billon: the old money current at Seville and Cadiz, in Andalusia, &c. being 25 per cent. better than the money they now reckon by at Madrid, Bilbao, &c. which augmentation was made by Charles II. in 1668. to prevent the exportation of money out of the kingdom.

Most of the exchanges in Italy are made on the foot of the *Pistole*.

PISTON, a part or member in several machines, particularly pumps, air-pumps, syringes, &c. called also the *embolus*, and popularly the *lucker*.

The *Piston* of a pump is a short cylinder of metal, fixed exactly to the cavity of the barrel or body; and which being worked up and down alternately therein, raises the water; and when raised, presses it again, so as to make it force up a valve wherewith it is furnished, and so escape through the nose of the pump. See **PUMP**.

The *Pistons* of air-pumps, syringes, &c. See described under **AIR-PUMP**, and **SYRINGE**.

PIT and *gallows*, in our ancients customs. See **FURCA** and **Fossa**.

Coal Pit. } See the articles { *Coal pit*.

Cock Pit. } { *Cock pit*.

Pit saw. See the article **Saw**.

Pit of a theatre, all that space between the amphitheatre, or galleries, and the theatre or stage; called by the ancients *orchestra*, and by the French *parterre*.

This being the most commodious part, it was here the Roman senate was placed. It has its name *Pit*, in Latin *arena*, from its being sunk below the level of the stage.

PITANCIARIUS, **PIETANCIARIUS**, or **PIETANTIARIUS**, an officer in the ancient monasteries, whose business it was to provide and distribute the pittances of herbs and meat, amongst the monks. See **PITTANCE**.

PITCH, **Pix**, a tenacious kind of juice or gum, drawn from fatty woods, chiefly from pines and firs; and used in shipping, in medicine, and in various other arts.

Pitch is properly a juice of the bark of the *pine*, or *pitch-tree*: and is conceived to be no other than the oil thereof inspissated and tuned black, farther than in the balsom.

The method of drawing, or procuring it, is by cleaving the tree into little billets, which they lay in a furnace having two apertures, through one of which the fire is put, and through the other the *Pitch* is gathered; which oozing from the wood runs along the bottom of the furnace into basons or receptacles placed for the purpose.—The smoak which is here very thick, gives it the black colour we find it withal.—Some will have our common *Pitch* to be only the last running, and tar to be the first.

Wheeler gives us another manner of drawing *Pitch*, used in the Levant.—A pit is dug in the ground two ells in diameter at top, but contracting as it goes deeper: this they fill with branches of pine, cloven into shivers.—The top of the pit is then covered over with fire, which burning down to the bottom, the *Pitch* distils and runs out at a hole made therein.

Pitch acquires different names according to its different preparations, colours and qualities. As it distils from the wood it is called *barras*, but afterwards it assumes a double name; the finest and clearest being called *galipot*, and the coarser, *marbled barras*.

Of the *galipot* is made what they call *white Pitch*, or *burgundy Pitch*, which is nothing but the *galipot* melted with oil of turpentine; though some will have it a native *Pitch*, distilling from a refinous tree growing in the mountains of Franche Comte.

Of the same *galipot* is likewise prepared what we call *resin*; by boiling *Burgundy Pitch* to a certain consistence, and making it up in cakes.

The black *Pitch*, which is what we properly call *Pitch*, some say, is the liquid *galipot* burnt and reduced into the form and consistence we see it in, by mixing tar with it while hot.

The best is that brought from Sweden and Norway.—Its goodness consists in its being of a glossy black colour, dry, and brittle.

Naval PITCH, **Pix navalis**, is that drawn from old pines, ranged and

and burnt like charcoal.—This, with a mixture of tow or beaten cables, serves for the pitching of vessels.

Naval Pitch is also a denomination given to that scraped from off the sides of old vessels; and which is supposed to have acquired an astringent virtue, by means of the salt water.—It serves to make plaisters; though it is certain the apothecaries usually substitute the common *black Pitch* in its stead.

Greek Pitch, or *Spanish Pitch*, is that boiled in water till it has lost its natural smell: upon which it becomes dry and friable.

The ancients called it *Colophony*, from Colophon a city in Greece, whence great quantities were brought.

Oil of Pitch, *oleum PICINUM*, is an oil procured from pitch, by separating the aqueous matter that swims at top of the melted pitch.—This, for the great virtues attributed to it, is also called *ballum of Pitch*.

Pitch, in building, denotes the angle or gable end. See **GABLE**. If the length of each rafter be $\frac{1}{2}$ of the breadth of the building, the roof is said to be *true Pitch*.

If the rafters be longer, it is said to be a *high or sharp pitched* roof; if shorter, which seldom happens, it is said to be a *low or flat pitched* roof. See **ROOF**.

Pitch is also a sea term.—When a ship falls with her head too much into the sea, or beats against it so as to endanger her top-masts, they say, she will *pitch her masts by the board*.

PITCHING-pence, a duty, commonly of one penny, paid for pitching or setting down every sack of corn, or pack of merchandise, in a fair or market.

PITCHT—*shoulder PITCHT*. See **SHOULDER pitch**.

PITH, the inward central part of a tree, or plant; answering to the medulla, or marrow, of an animal.

Some will have the circulation of the sap to be effected by means of the *Pith*; others by the bark; and others by the wood.

PITHIA, and **PITHIAN**. See the articles **PYTHIA** and **PYTHIAN**.

PITT. See the article **PIT**.

PITTACIUM, *πυττακιον*, in chirurgery, a name which some authors give to a piece of cloth spread with a salve, to be laid on a part affected.

PITTANCE, *PIETANTIA*, the commons, or allowance of meat, be it fish, flesh, or the like, stately eaten at meals, besides bread.

The word is not much used except among religious, and those who live in college, or community.—Du Cange derives it from *pietantia*, used in the lower Latin for a monachal portion given to two monks in the same dish, consisting of something better than pulse.

Hence we sometimes also find it denote a meal, or commons better than ordinary; such as is allowed in communities on feast days.

Others derive the word a *pietate*; and others, with Salmastius, from *pittacia*, a mors, or portion allowed the soldiers, mentioned in several laws of the Theodosian code. It is added, that the word *pittacia* properly signified a title, or written label, added at top of the vessel, to shew what was within-side, or for whom it was intended.

PITUITA, one of the four humours found in the bodies of animals, on which their temperament is commonly supposed to depend.

The *Pituita*, called also *phlegm*, is properly the most viscid and glutinous part of the blood, separated in the largest glands, where the contortions of the arteries are greatest, and give the greatest retardation to the blood's velocity; as in the glands about the mouth and head.

The clafs of phlegmagogues, as manna, &c. are supposed particularly to purge *Pituita*.

Physicians give several epithets to the *Pituita*, according to its conditions or qualities, as *saline*, *vitreous*, *gyfous*, *acid*, &c.

Pituita is supposed to be the prevailing humour in cold, heavy flow people, inclined to ferineous and staid; as the bile is in those inclined to war, &c.

The *Pituita* discharged at the nostrils, is separated in the membrane that lines the cavities of the nose, cheeks, &c.

Its use is to keep that membrane soft, and defend it from injuries of extraneous bodies, especially those of the air; which passes this way in inspiration when the mouth is shut.

PITUITARY gland, is a gland in the brain, somewhat difficult to be seen without removing it out of its place.—See *Tab. Anat. (Angeiol.) fig. 1. lit. b.*

It is of the size of a very large pea, and is placed in the sella of the os sphenoides, under the infundibulum, wherewith it communicates; receiving from it a lymph, or juice, which the infundibulum derives from the plexus choroides and pineal gland; and from this lymph does the gland itself take its name.

It also filtrates a juice itself, separating from the blood a white liquor very subtle, and apparently very spirituous.

M. Littré observes a sinus, or reservoir of blood, which touches

this gland; and which is open to it in the place of contact, so that the gland lies partly in the blood.—Thil., that author takes to do the office of a balneum marie, in keeping the gland of the degree of warmth necessary for the discharge of its functions.

This gland is found in all quadrupeds, fishes, and fowls, as well as in men.—M. Littré gives an instance of a tedious disease, and at length death, arising solely from an obstruction and inflammation of the *pituitary* gland.

PIVOT, or **PEVOT**, a foot, or shoe of iron, or other metal, usually conical, or terminating in a point; whereby a body intended to turn round, bears on another fixed at rest, and performs its circumvolutions.

The *Pivot* usually bears or turns round in a sole or piece of iron or brass, hollowed to receive it.

Large gates, &c. usually turn on *Pivots*.—The ancients tell us, they had theatres in Rome that held eighty thousand people; which yet turned on a single *Pivot*.

PLACARD, or **PLACART**, **PLACAERT**, a foreign term, frequent in gazettes, signifying a leaf, or sheet of paper stretched and applied upon a wall or post.—Edicts, regulations, &c. are to be made publick in *Placards*.

The word *Placard* is also used for a libel, or lampoon.—At Rome, *Placards* against the pope are frequently fixed in the night-time, to the statue of Palquin. See **PASQUINADE**.

PLACARD, in architecture, denotes the decoration of the door of an apartment, consisting of a chambranle, crowned with its frieze or gorge, and a cornice sometimes supported by consoles. See **DOOR**.

PLACARD, in our customs, denotes a licence whereby a Person is permitted to shoot in a gun, or to take otherwise unlawful game.

PLACE, *locus*, in philosophy, that part of immoveable space which any body possesses.

Aristotle and his followers divide *Place* into *external* and *internal*.

Internal PLACE is that space or room which the body contains.

External PLACE is that which includes or contains the body; which is also called by Aristotle, the first or concave and immoveable surface of the ambient body.

It is controverted in the schools, whether *internal Place* be a real entity, or only an imaginary being; i. e. whether it be any thing intrinsically, or only an aptitude and capacity of receiving bodies.

Some maintain it a positive being, incorporeal, eternal, independent, and infinite: and assert it even to constitute the immensity of the godhead.

The Cartesians, on the contrary, hold *internal Place* abstractedly considered, to be no other than the very extension of the bodies contained therein; and therefore in no wise different from the bodies themselves.

The schoolmen likewise dispute, whether *external Place* be moveable or immoveable? Its immobility is argued from this consideration, that what moves must necessarily leave its *Place*, which it cannot do if it go along with the moveable. Others charge an absurdity on this opinion of Aristotle, viz. that hence it follows, that a body really at rest is continually shifting *Place*; a tower, for instance, on a plain, or a rock in the middle of the sea, in regard the one and the other are continually inclosed with new air or new water, must be said to be in motion, or to change *Place*.

To solve this difficulty, and ward off the absurdity which follows from Aristotle's laying down *external Place* as immoveable, infinite expedients have been had recourse to.—The Scotists contend for *Place*, being only immoveable, by equivalence.—Thus, when the wind blows, the air which invested the surface of the tower does indeed recede, but then other similar and equivalent air takes place.—The Thomists chuse to deduce the immobility of *external Place*, from its keeping the same distance from the center, and the cardinal points of the world; and the Nominalists, from a correspondence with certain virtual parts of the divine immensity.

The Cartesians deny *external Place* to be either a surrounding surface, or a body surrounded, or a mean term between the two, and conceive it to be the situation of a body among adjacent bodies considered as at rest.—Thus the tower shall be deemed to remain in the same *Place*, though the ambient air be changed, since it retains the same situation, with regard to the neighbouring hills, trees, and other parts of the earth.

Sir Isaac Newton better and more intelligibly distinguishes *Place* into absolute and relative.

Absolute and primary PLACE is that part of infinite and immoveable space which a body possesses.

Relative or secondary PLACE is the space it possesses considered with regard to other adjacent objects.

Dr. Clarke adds another kind of *relative Place*, which he calls *relatively common Place*, and defines it that part of any moveable or measurable space which a body possesses; which *Place* moves together with the body.

PLACE, Mr. Locke observes, is sometimes likewise taken for the position

portion of infinite space possessed by the material world, though this he adds, were more properly called extension.

The proper idea of *Place*, according to him, is the relative position of any thing, with regard to its distance from certain fixed points; whence we say, a thing has or has not changed *Place*, when its distance is, or is not altered with respect to those bodies.—

For the vision of *Place*. See *VISION*, and *VISIBLE*.

Place, in optics, or *optical Place*, is the point to which the eye refers an object. See *OPTIC*.

Thus the points D and E (*Tab. Optics*, fig. 68.) to which two spectators in d and e refer the object C, are called *optic Places*.

Here, if a right line joining the *optic Places* D and E, be parallel to a right line passing through the eyes of the spectators d, e; the distance of the *optic Places* D, E will be to the distance of the spectators d and e, as the distance of one of the *optic Places* from the *Place* of the object E C, to the distance of the other spectator from the same object d C.

Optic Place of a star, is a point in the surface of the mundane sphere as C or B, (*Tab. Astronomy*, fig. 27.) wherein a spectator in E, or T, sees the centre of the star S. See *STAR* and *PLANET*.

This is divided into *true* and *apparent*.

True or real optic Place, is that point of the surface of the sphere B, wherein a spectator, placed in the centre of the earth sees the centre of the star or phenomenon.—Or it is a point among the fixed stars, determined by a line drawn from the centre of the earth through that of the star, and terminated in B among the stars.

Apparent or visible optic Place, is that point of the surface of the sphere, wherein a spectator, placed on the surface of the earth in E, sees the centre of the star S.—Or a point C found by a line passing from the spectator's eye through the star, and terminated in the sphere of the stars.

The distance between the two *optic Places* makes what we call the *Parallax*.

Place of the sun, a star, or planet, simply, denotes the sign and degree of the zodiac, which the luminary is in.

Or, it is that degree of the ecliptic, reckoning from the beginning of Aries, which the planet's or star's circle of longitude cuts: and therefore it coincides with the longitude of the sun, planet, or star.

As the sine of the sun's greatest declination $23^{\circ} 30'$: to the sine of any present declination given or observed, *v. gr.* $23^{\circ} 15'$: to 10 is radius, 10: To the line of his longitude $81^{\circ} 52'$; which if the declination were north, would give $20^{\circ} 52'$ of Gemini, if south, $20^{\circ} 52'$ of Capricorn, for the sun's place.

Astronomical Place. See the article *ASTRONOMICAL*.

Moon's Place is that point of her orbit wherein she is found at any time.

This by reason of the great inequalities in the lunar motions, which render a number of equations and reductions necessary before the just point be found, is of various kinds; *viz.* her *fictitious Place*, which is the moon's *Place* once equated; her *Place nearly true*, which is her *Place* twice equated; and the moon's *true Place*, which is her *Place* thrice equated.

Eccentric Place of a planet in its orbit, is the *Place* or point of its orbit, wherein a planet would appear if seen from the sun. Thus suppose N E O R, (*Tab. Astron.* fig. 25.) the ecliptic, N P O Q the planet's orbit, the sun in S, the earth in T, and the planet in P: the right line S P expresses the *eccentric Place* in the orbit.

Heliocentric Place of a planet, or its place reduced to the ecliptic, or the *eccentric place* in the ecliptic, is that point of the ecliptic to which a planet, viewed from the sun, is referred.

This coincides with the longitude of a planet viewed from the sun.

Thus the right-line R S indicates the *heliocentric place*, or place reduced to the ecliptic.

Geocentric Place, is that point of the ecliptic, to which a planet viewed from the earth is referred.

Thus N E O R, representing the ecliptic, &c. T R will represent the *geocentric Place*.

Computation of a Planet's Place. See the article *PLANET*.

Place of radiation, in optics, is the interval, or space in a medium or transparent body, through which any visible object radiates.

Place, in geometry, is a line used in the solution of problems; more usually called by the Latin name, *locus*.

See the doctrine of geometrical *Places* under the article *LOCUS*, see also *GEOMETRICAL* and *PLAIN*.

Place, in war, is a general name for all kinds of fortresses, where a party may defend themselves.

In which sense it may be defined to be a *Place* so disposed, as that the parts which encompass it, defend and flank one another.

Strong or fortified Place, is a *Place* flanked and covered with bastions.

Regular Place, is that whose angles, sides, bastions, and other parts are equal; and this is usually denominated from the number of its angles: as, a pentagon, a hexagon, &c. See *PENTAGON*, *HEXAGON*, &c. see also *REGULAR*.—Palma nova, built by the Venetians, is a dodecagon.

Irregular Place, is that whose sides and angles are unequal. See *IRREGULAR*.

Place of arms, in fortification, is a strong city, or town, pitched upon for the chief magazine of an army.—See *Tab. Fortif.* fig. 21. *lit. gg.* &c.

Place of arms, in a city or garrison, is a large open spot of ground, usually near the centre of the place, where the grand guard is commonly kept, and the garrison holds its rendezvous at reviews, and in cases of alarm, to receive orders from the governor.

Place of arms, of an attack, in a siege, is a spacious place covered from the enemy by a parapet or epaulment, where the soldiers are posted ready to sustain those at work in the trenches, against the soldiers of the garrison.

Place of arms particular, in a garrison, is a place near every bastion, where the soldiers, sent from the grand place to the quarters assigned them, relieve those that are either upon the guard, or in fight.

Place of arms without, is a place allowed to the covert-way, for the planting of cannon, to oblige those who advance in their approaches to retire.

Place of arms, in a camp, is a large space at the head of the camp, for the army to be ranged in and drawn up in battalia. There is also a *Place* for each particular body to assemble in. See *CAMP*.

Place of arms, of a troop, or company, is the spot of ground on which the troop, or company, draws up.

Face of a PLACE.	} See the articles	FACE.
Fire of the PLACE.		FIRE.
Tenaille of the PLACE.		TENAILLE.
View of a PLACE.		VIEW.

Place, among logicians, and orators, denotes the seat or source of an argument; or that from which it is taken. See *ARGUMENT*.

There are two sorts of *Places*, *viz.* *inartificial* and *artificial*.—The first is the *Place* of testimony, authority, &c. The second, that of reason: as when we argue from universals, *e. gr.* from genus, and species; or from causes, as the end, efficient, matter, form, &c.

Common Place. See the article *COMMON PLACE*.

Place of units, tens, &c. See *UNIT*, and *NUMERATION*.

Hygical PLACES in astrology.	} See the articles	HYLEGAL.
Whispering PLACE.		WHISPERING.
Additions of PLACE.		ADDITION.

Unity of PLACE. See the article *UNITY*.

PLACENTA, in anatomy, a softish roundish mass, found in the womb of a pregnant woman; wherein the ancients supposed, the blood was purified and prepared for the nourishment of the foetus.—See *Tab. Anat.* (Splanchn) fig. 16. *lit. aa.* Hence they also called it *hepar uterinum*, the liver of the womb, as if it did the office of a liver in preparing the blood.

It is called by the moderns *Placenta*, *q. d.* womb-cake, because in form of a cake.

The *Placenta* is supposed by some to be only a mass of coagulated blood; for in the pressing, or washing it, it dissolves; and its real use to be, to serve as a pillow for the umbilical vessels to rest on.

Its figure is not unlike that of a plate without brims; it is usually three quarters of a foot over, and sometimes a foot. It is round, and generally concave and convex. The convex side adheres to the uterus, and is uneven, having divers protuberances and pits, by which it makes impressions upon, and receives others from, the uterus.—Its place in the uterus, whatever some pretend, is not certain.

In women, unless in case of twins, &c. there is but one *Placenta*, however, the number generally answers the number of the foetus.—In some brutes, especially oxen or sheep, they are very numerous, sometimes near an hundred, even for one foetus; but finally, and only resembling large conglomerate glands. From the external or concave side, which likewise has its protuberances, though covered with a smooth membrane, issue the umbilical vessels, which are in great plenty distributed through the whole substance of it.

Some even imagine this part to be no more than a plexus of the veins and arteries, by whose extremities opening into the sides of the hypogastric vessels, the circulation is performed between the mother and the foetus; for that side of the *Placenta* which adheres to the womb, appears to be nothing but the extremities of an infinite number of small threads, which, in labour, dropping out of the pores in the sides of the hypogastric blood-vessels, into which they had insinuated themselves, is the occasion of the flowing of the lochia, till the uterus collapses, or the pores, by the natural elasticity of the vessels, contract by degrees.

It is a great dispute among the anatomists of the royal academy of Paris, whether the *Placenta* have any external coat, whereby it is connected to the womb?—M. Mery maintains it has none, and that nothing hinders the blood of the mother from passing out of the womb into the *Placenta*, and thence to the foetus : In which opinion he is seconded by M. Rohault. Mess. Vieussens and Winflow maintain the contrary. In a subsequent memoir, M. Rohault endeavours to shew, that the *Placenta* is no particular part, but only a portion of the chorion condensed or thickened. See CHORION.

PLACITA, PLAS, a term frequent in our laws, and customs. Originally, *Placita* signified certain publick assemblies, of all degrees of men, wherein the king presided, and where the great affairs of the kingdom were consulted upon.

These assemblies were called *Placita generalia*; because *generalitas universorum majorum tam clericorum quam laicorum ibidem conveniebat*.—And hence the decrees, ordinances, sentences, &c. of this assembly were also called *Placita*.

Sim. Dunelmensis tells us, they were held in the open fields; for, says he, *nullam oportet regem in litteris assignare curiam, quia ubi res judicat in aperto, ibi est curia sua*.

Some will have these *Placita generalia*, and *curie regis*, of ancient times, to be much the same with what we now call a *Parliament*.

The lords courts came hence also to be called *Placita generalia*, though often *curie generales*; because all their tenants and vassals were obliged to appear in them.

We also meet with *Placitum nominatum*; for the day appointed a criminal to appear in, and make his defence. Leg. Hen. I. —And *Placitum fratrum*, i. e. when the day is lapsed.

My lord Coke derives the word *placitum* à *placendo*, *quia bene placitare super omnia placet*: Indeed, this seems a very fanciful etymon; and others have more reason in deriving the word from the German *platz*, or the Latin *plateis*, fields, or streets, where these assemblies were originally held.

PLACITARE *, in the old law-books, signifies to plead causes. See **PLEADING**.

* *Mos placitandi, ante conquestum, fuit coram aldermanno, & proceribus, & eorum hundredariis, sc. baronibus, majoribus, melioribus, senioribus, & urbanis*. Milt. in Bibl. Cott. sub Tit. Vuellius.

Hence *Placitator*, a pleader.—Ralph Flambard is recorded to have been *totius regni placitator*, in William the second's time.

PLACITUM, in law, a sentence of the court; or an opinion, ordinance, or decree.

Custos PLACITORUM Coronæ. See the article **CUSTOS**.

PLAFOND, or **PLATFOND**, in architecture, the ceiling of a room, whether it be flat or arched; lined with laths and plaster, and sometimes also enriched with paintings, &c.—See *Tab. Archit. fig. 10*. See also **CEILING**.

PLAFOND is also more particularly used for the bottom of the proecture of the larmier of the cornice; called also the *soffit*. See **SOFFIT**.

PLAGIARY, in philology, *author-theft*; or the practice of purloining other peoples works, and putting them off for a man's own.

Among the Romans, *Plagiarius* was properly a person who bought, sold, or retained a freeman for a slave; so called, because the Flavian law condemned such a person *ad plagas*, to be whipped.

Thomasis has an *expres treatise de Plagio literario*; wherein he lays down the laws and measures of the right which authors have to one anothers writings.—Dictionary-writers, at least such as meddle with arts and sciences, seem in this case exempted from the common laws of *meum and tuum*; they do not pretend to set up on their own bottom, nor to treat you at their own cost.

Their works are supposed, in great measure, compositions of other people's; and whatever they take from others they do it avowedly, and in the open sun. In effect, their quality gives them a title to every thing that may be for their purpose, where-ever they find it; and if they rob, they do not do it any otherwise, than as the bee does, for the public service. Their occupation is not pillaging, but collecting contributions; and if you ask them their authority, they will produce you the practice of their predecessors of all ages and nations.

PLAGUE, PESTILENCE, PESTIS, a very acute, destructive, malignant, and contagious disease; usually proving mortal.

The *Plague* is commonly defined by a malignant fever; but Diemerbroeck thinks the two ought to be distinguished; the fever not being the essence, but only a symptom, or effect of the *Plague*.

The *Plague* is reckoned by Dr. Lister, and many others, as an exotic disease, never bred or propagated in England, but always imported from abroad, and particularly from the Levant, the coasts of Asia the lesser, Egypt, &c. where it is familiar. Sydenham observes, that it rarely infects England oftener than once in forty years; but through the mercy of God, it is now greatly beyond that period since we have been visited.

The origin and cause of the *Plague* has been a celebrated subject.

ject of controversy among physicians.—The disorder is generally supposed to be communicated by the air, but how, and in what manner the air becomes thus deadly, is the question. Some will have infected the cause of *Plagues*, as they are of blights; these, they say, being brought in swarms from other parts by the winds, are taken into the lungs in respiration, mix with the blood and juices, and attack and corrode the viscera. Mr. Boyle, on the other hand, attributes *Plagues* principally to the effluvia or exhalations breathed into the atmosphere, from noxious minerals.

The air, in effect, is depraved in far more places than improved, by being impregnated with subterraneous exspirations.—Indeed among the minerals known to us, there are many more noxious than wholesome ones; and the power of the former to do mischief, is more efficacious than of the latter to do good, as we may guess by the small benefit men receive in point of health, by the effluvia of any mineral or other known fossil, in comparison of the great and sudden damage often done by the exspirations of orpiment, sandarack, and white arsenic.

Amongst the various sorts of particles wherewith the atmosphere is replete, some may be so small and solid, or so conveniently shaped, as to enter many of the numerous orifices of the minute glandules of the skin, or at other pores thereof. Thus, though neither paper nor bladder be pervious to the elastic parts of the air; yet may either of them be easily penetrated by other corpuscles of the atmosphere; and Mr. Boyle, says he, has prepared a dry body, which being inclosed in either, would, without wetting or discolouring, or any ways sensibly altering them, pass in a trice through the pores thereof, in such plenty, as to exert a manifest operation on bodies placed at some distance beyond them.

This is also confirmed from the sudden check almost every summer given to the *Plague* at Grand Cairo; for since morbid causes operate more effectually than curative ones, it seems more than probable, that exhalations ascending from under ground, may produce pestilential fevers, and the *Plague* itself; since the corpuscles which impregnate the Egyptian air upon the swelling of the Nile, put a speedy stop not only to the contagion, but to the malignity of the *Plague*, assisted even by the summer's heat, which there is excessive.

It is possible there may be noxious minerals in a country, that are not often able to produce pestilencies; they may be in strata, or beds, so deep, that even a small earthquake shall not affect them, though a more violent shock may.

And hence we may account for the *Plague's* raging in some parts of Africa once in thirty, or once in a hundred years; since there may be periodical paroxysms, or grand and vehement commotions in the subterranean parts, tho' not yet observed in them.

It is probable, peculiar kinds of venomous exhalations may sometimes be emitted, especially after earthquakes; and thus occasion mortal diseases in animals of one kind, and not of another; and in this or that place, and not elsewhere.—Fernelius gives us an account of a *Plague*, or murrain, in 1514, which invaded no creatures but cats. Dionysius Halicarnassensis mentions a *Plague*, which attacked none but malds; and that which raged in the time of Gentilis killed scarce any women, and very few but lusty men. Boterus mentions another *Plague*, which assaulted none but the younger sort; and we have instances of the same kind of a later standing. Cardan speaks of a *Plague* at Basil, with which the Switzers, and not the Italians, Germans, or French were infected; and Joh. Utenhoveus takes notice of a cruel *Plague* at Copenhagen, which, though it raged among the Danes, spared the Germans, Dutch, and English, who went with all freedom, and without the least danger, to the houses of the infected.

The *Plague*, according to Sydenham, usually begins with a chilliness and shivering, like the access of an intermitting fever; then comes on a nausea, with vehement vomitings, an intense pain about the region of the heart, as if pinched in a pincers; and a burning fever, which continually preys on the patient, till either death, or the eruption of some bubo, parotis, or other tumor, in the inguina or axillæ, or behind the ears, relieve him, and discharge the matter of the disease. Sometimes, indeed, it attacks without any fever; purple spots appearing all at once, the certain signs of present death; but this rarely happens except at the beginning of some terrible *Plague*. It has also been known to make its first appearance in tumors, without any fever, or other violent symptom.

Heaviness, pain in the stomach, head, and back, cardialgy, broken sleep, anxiety, alteration in the look, difficulty of breathing, hiccough, lyncope, delirium, convulsive twitchings, diarrhoea, eyes sunk or inflamed, tongue black and dry, vehement drought, foetid breath, carbuncles, spots livid, purple, green, &c. are also symptoms usually attending this disease.

A great deal depends on the circumstances of the tumors, or *plague-sores*; as they appear, and increase, the fever abates; and as they sink or diminish, it renews again. When they happen about the time of the crisis, and suppurate kindly, they are good prognosticks of a happy recovery.

In acute diseases, says Hippocrates, prognosticks are ever fallacious. However, in the terrible plague at Nimeguen, Diemer-

brook, who attended the sick through the whole progress thereof, relates that those taken ill about new and full moon rarely escaped; that faintings, swoonings, and palpitations of the heart, were usually deadly signs; an intermitting pulse always mortal; drowfulness, sneezings, tremulous motions, dotings, fore throat, &c. were ill omens: pleurifies always mortal; costiveness a good sign; a diarrhoea almost constantly fatal; and that bloody stools or urines always presaged ill.

As to the cure, physicians are much divided.—It is generally attempted with alexipharmics and cardiacs, with the assistance either of sudorifics, or phlebotomy, or both.—Many eminent physicians both ancient and modern, highly commend blood-letting; Sydenham particularly says, that if used copiously, and in time, it never yet did harm; but that sudorifics often prove pernicious: Diemerbroek, on the contrary, with other very experienced writers, protest against phlebotomy, as very dangerous, and often deadly; the chief hopes they built in diaphoretics and sudorifics; emetics and purgatives are by most absolutely forbid: and yet Dr. Sayer used the former with good success, in the beginning of the disease in the Plague at London, Ann. 1640. See ALEXIPHARMIC, &c.

The juice of lemons is commended as of singular efficacy in the Plague, and pestilential fevers: Piso relates that it is the principal remedy of the Indians, and protests he never knew any thing come up to it. Dr. Harris observes, that the same remedy is what the Turks have principally recourse to.—Camphor is also much extolled: this, Ettmuller assures us, was the basis of Hæmulus's antipestiferous oil, who had a statue erected to him when dead, in the city of Verona, for the service he had done thereby.—It was prepared from equal quantities of camphor, citron peel, and amber.—The viperine salt, and rob of elder-berries, are also greatly commended. For preservatives against the Plague, they are usually summed up in that popular dithich:

*Hæc tria libijam salubri atque pestem,
Mox, longe, tarde, cede, recede, redi.*

Cauteries, and especially issues, and setons in the inguina, are found of great service in preserving from infection. A piece of myrrh held in the mouth in contagious places, is also commended. But Diemerbroek assures us, that there is nothing better in this intention, than smoking tobacco; but he adds, that it is only to such as have not made the practice familiar to them. The other preservatives used by that author, were the rad. helonii, cardamoms, white-wine vinegar, and chearfulness; and when he found his spirits low, as if the disease were taking possession, a cup of generous wine, sometimes even to a degree of ebriety.

PLAGUE-water, *aqua epidemica*, is one of the compound waters of the shops, distilled from mint, rosemary, angelica roots, &c.

PLAIN, *PLANUS*, an epithet applied to various things, generally importing them to be smooth, even, level, or superficial, or simple, or obvious, or the like.

In these senses the words stand opposed to rough, solid, laboured, enriched, &c.

It is a maxim in heraldry, that the *plainer* the coat, the nearer to antiquity.—*Plain* coats are such as are least encumbered with figures, or charges, and which have nothing in them but what is natural.

PLAIN figure, in geometry, is an uniform surface, from every point of whose perimeter, right lines may be drawn to every other point in the same.

PLAIN angle is an angle contained under two lines or surfaces.

It is so called in contradistinction to a *solid* angle.

PLAIN triangle, is a triangle included under three right lines, or surfaces; in opposition to a *spherical*, and a *mixt* triangle. See **TRIANGLE**.

PLAIN trigonometry is the doctrine of plain triangles, their measures, proportions, &c.

PLAIN glass, or *mirror*, in optics, is a glass or mirror whose surface is flat, or even.—See the phenomena, and laws of *plain* mirrors, under the article **MIRROR**.

Plain mirrors amount to what we popularly call *looking-glasses*; see the manner of grinding, polishing, and preparing them, under the article **LOOKING GLASS**.

PLAIN tyle. See the article **TYLE**.

PLAIN scale, is a thin ruler, whereon are graduated the lines of chords, sines, tangents, secants, leagues, rhumbs, &c. of ready use in most parts of the mathematics, chiefly in navigation. See **LINE**, &c.

See its description and use under the article **SCALE**.

PLAIN chant, in music. See the article **CHANT**.

PLAIN descendant. See the article **DESCANT**.

PLAIN chart, in navigation, is a sea-chart, wherein the meridians and parallels are represented by parallel straight lines; and where, of consequence, the degrees of longitude are the same in all the parallels of latitude.

See the properties, construction, &c. of this chart under the article **CHART**.

PLAIN sailing, in navigation, is the art of working the several cases and varieties in a ship's motion, on a plain chart. See **PLAIN CHART**.

Plain sailing is founded on the supposition of the earth being a plane, or flat; which though notoriously false, yet places being laid down accordingly, and a long voyage broke into many short ones; the voyage may be tolerably performed by it, near the same meridian.

In *plain sailing* it is supposed, that by the rhumb-line, meridian, and parallel of latitude, there always will be formed a right-angled triangle; and that so posited, as that the perpendicular side may represent part of the meridian, or north and south line, containing the difference of latitude: the base of the triangle represents the departure; and the hypotenuse the distance sailed.—The angle at the vertex is the course, and the angle at the base the complement of the course; any two of which, with the right-angle being given, the triangle may be protracted, and the other three parts found.

For the doctrine of *plain sailing*, see **SAILING**.

PLAIN table, in geometry, &c. an instrument used in the surveying of land; whereby the draught, or plan, is taken on the spot, without any future protraction, or plotting. See **SURVEYING**.

The *plain table*, represented *Tab. Surveying*, fig. 31. n. 1. consists of a parallelogram of wood, about fifteen inches long, and twelve broad; round this goes a boxen jointed frame, by means whereof a sheet of paper is fastened tight to the table, so as lines may be conveniently drawn upon it.

On each side the frame, which may be put on either side upwards, towards the inward edge, are scales of inches subdivided, for the ready drawing of parallel lines.—Beside which, on one side are projected the 360 degrees of a circle, from a brass centre in the middle of the table, (each degree halved) with two numbers to every tenth degree, the one expressing the degree, the other its complement to 360, to save subtraction: on the other side are projected the 180 degrees of a semi-circle, from a brass centre in the middle of the table's length, and at $\frac{1}{2}$ of its breadth; each degree halved, and every tenth noted with two numbers, *viz.* the degree and its complement to 180°.

To one side of the Table is fitted a compass, for placing the instrument by; and the whole is fixed by a socket, upon a three legged staff for a stand, on which it is turned round, or fastened by a screw, as occasion requires.—Lastly, to the table belongs an index, which is a ruler at least sixteen inches long, and two broad; usually graduated with scales, &c. and having two sights perpendicularly placed on its extremities.

Use of the PLAIN table.—To take an angle by the *Plain table*: or to find the distance of two places accessible from the same third.

Suppose DA, DB, (*Tab. Surveying*, fig. 32. n. 2.) the sides of the angle required; or AB the distance required. Place the instrument horizontally, as near the angle as possible; and assume a point in the paper on the table, *v. gr.* c. To this point apply the edge of the index, turning it about this and that way, till through the sights you see the point B, and in this situation of the ruler, draw by its edge the line c e indefinitely. After the same manner turn about the index on the same point, till through the sights you see the point A; and draw the right line c d indefinitely.—Thus have you the quantity of the angle laid down.

Measure the lines DA, DB, with a chain; and from a scale, set off the measures thus found, on the respective lines; which suppose to reach from c to b, and from c to a.—Thus will c b and c a be proportional to DB and DA.

Transfer the distance a b to the same scale, and find its length; the length thus found, will be the length, or distance, of A B required.

^{2^o} To find the distance of two places, one whereof is inaccessible, by the plain table.—Suppose the distance required A B; (*fig. 33.*) and A the accessible point.

^{1^o} Place the *plain table* in C; look through the sights till you see A and B; and draw a c and c b. Measure the distance from your station to A; and set it off from the scale, upon c a. ^{2^o} Remove the table to A, where place it so, as that the point a representing A, and the index laid along the line a c, you see backwards, the former station C. (Note, in this fixing the instrument, lies the use of the compass; for the needle will hang over the same degree of the card in the first and the second case; so that some fit the instrument by the needle alone; others only use it to shorten the trouble, by bringing the instrument nearly to its due position by means thereof; and then fixing for good by the back sight.) ^{3^o} The instrument fixed, turn the sights to B; and draw the line a b. ^{4^o} On the scale, measure the interval a b; which will be the distance of A B required.

^{3^o} To find the distance of two inaccessible places by the plain table.—Suppose the distance of A B (*Tab. Surveying*, fig. 34.) required.

^{1^o} Choosing two stations in C and D; in the first C, place the *plain table*; and through the sights look to D, B, and A: drawing by the edge of the index, the lines c d, c b, c a.—^{2^o} Measure the distance of the stations C D; and set this off, from a scale,

scale, on c d.—³ Removing the table from C, fix it in D; so as the point d hanging over the place D, and the index lying along the line c d, through the sights you see the former station C. The instrument thus fixed, direct the sights to A and B, and draw the right lines d a and d b. Lastly, find the distance of a b, on the scale; and this will be the distance of A B required. After the same manner, may the distance of any number of places be found from two stations; and thus may a field, part of a country, &c. be surveyed.

⁴ To take the plot of a field from one station, whence all the angles may be seen; with the plain table.—Place the instrument in the station, assume a point in the paper, to represent the same, v. gr. C. (fig. 21.) laying the edge of the index to this point; direct it to the several angles of the field, A B C D E F, &c. and draw indefinite lines by its edge, towards every angle, viz. C a, C b, C c, &c. measure the distance of each angle from the station, viz. C A, C B, C C, C D, &c. and from a scale set these off from C on their corresponding lines; the extremities hereof will give points, which being connected by lines will represent the field.

⁵ To take the plot of a field, wood, or the like, by going round the same, with the plain table.—Place the instrument horizontally at the first angle, v. gr. A. The needle on the meridian of the card; assuming a point on the paper, to represent it, to that point lay the index, directing it through the sights you see a mark in the angle B. And draw an indefinite line along it; measure the distance of A and B, and from a scale set it off on the line thus drawn; the extremity of this distance will represent the point B. Remove the instrument to B, where set it so as that the needle hang over the meridian of the card; and so as the index lying along the line last drawn, you see the former station A through the sights: here fasten it, lay the index to the point B, and turn it, till through the sights you see the next angle C; in this situation draw a line as before, measure the distance B C, and set it off from a scale on the line.—Remove the instrument to C, where, fixing it by the needle, and the back sight, as before, turn the index on the point C, till you see the next angle D; draw the line, measure, and set off the distance C D as before, and remove the plain table to E; where fix it, as before, look to the next angle F, draw the line, measure, and set off the distance, &c.

In this manner having compassed the whole field, you will have its whole perimeter plotted on the table; which may be now cast up, and its contents found, as in the article of SURVEYING. *Manner of shifting paper on the plain table.*—When in large parcels of ground, the plot is found to exceed the dimensions of the plain table, and to run off from the paper; the sheet must be taken off the table, and a fresh one put on: the way of managing which shifting, is as follows:—Suppose H, K, M, Z, (fig. 35.) the limits of the plain table; so that having laid down the field from A to B, thence to C and D; you want room, the line D E running off the paper: draw as much of the line D E as the paper will well hold, viz. D O. And by means of the divisions on the edge of the frame, draw the line P Q through O, parallel to the edge of the table H M; and through the point of intersection O, draw O N parallel to M Z. This done, take off the frame, remove the sheet, and clap a fresh one (fig. 36.) in its stead; drawing on it a line R S near the other edge parallel thereto. Then lay the first sheet on the table, so that the line P Q lie exactly on the line R S, to the best advantage, as at O. Lastly, draw as much of the line O D, on the fresh sheet, as the table will hold; and from O continue the remainder of the line D, to E. From E proceed with the work as before to F, G, and A.

Use of the plain table, as a theodolite, semi-circle, or circumferentor.—The great inconvenience of the plain table is, that its paper renders its use impracticable in moist weather. Even the dew of the morning and evening is found to swell the paper considerably, and of consequence to distort the work.—To avoid this inconvenience, and render the instrument useful in all weathers; by leaving off the paper, and setting up a pin in the centre, it becomes a theodolite, a semi-circle, or a circumferentor, and is applicable like them.

The plain table stripped of its paper, becomes either a theodolite, or a semi-circle, as that side of the frame, which has the projection of the degrees of a circle, or a semi-circle, is turned upwards. If it be to serve for a theodolite; the index, which as a plain table turns on any point as a centre, is constantly to turn about the brass centre hole in the middle of the table. If it be for a semi-circle, it must turn on the other brass centre hole, in both cases it is done by means of a pin raised in the holes. When the plain table is to serve as a circumferentor, screw the compass to the index, and both of them to the head of the staff, with a brass screw-pin fitted for the purpose; so as the staff and table standing fixed, the index, sights, &c. may be turned about, and vice versa.

To take an angle by the plain table, considered as a theodolite.—Suppose the quantity of the angle E K G (fig. 20.) required. Place the instrument at K, the theodolite side of the frame upwards,

laying the index on the diameter. Turn the whole instrument about, the index remaining on the diameter, till through the sights you spy E. Screw the instrument fast there, and turn the index on its centre, till through the sights you spy G.

The degree here cut on the frame by the index, is the quantity of the angle fought; which may be laid down on paper by the rules of common protraction.

Thus you may proceed to do every thing with the plain table, as with the common theodolite.

To take an angle with a plain table, considered as a semi-circle.—Proceed in the same manner with the instrument considered as a semi-circle, as when considered as a theodolite; only laying the semi-circular side upwards, and turning the index on the other centre hole in the middle of the length, and at about $\frac{1}{2}$ of the breadth of the table.

To take an angle with the plain table, considered as a circumferentor.—Suppose the former angle E K G required. Place the instrument at K, the flower-de-luce towards you. Direct the sights to E, and observe the degree cut by the fourth end of the needle which suppose 296. Turn the instrument about, the flower-de-luce still towards you, and direct the sight to G, noting the degree cut by the other end of the needle, which suppose 182. Subtract the less from the greater, the remainder 114° is the quantity of the angle fought. If the remainder chance to be more than 180° then it must be again subtracted from 360. This second remainder will be the angle required; which may be protracted, &c. as under the article PROTRACTOR.

Thus you may proceed to do every thing with the plain table, as with the common circumferentor.

PLAIN number is a number that may be produced by the multiplication of two numbers into one another.—Thus 20 is a plain number, produced by the multiplication of 5 into 4.

PLAIN place, in geometry, *locus PLANUS*, or *locus ad PLANUM*, is a term which the ancient geometers used for a geometrical locus, when it was a right line, or a circle—in opposition to a solid place, which was an ellipsis, parabola, or hyperbola.

These plain loci the moderns distinguish into *loci ad rectam*, and *loci ad circumulum*. See *LOCUS*.

PLAIN problem, in mathematics, is such an one, as cannot be solved geometrically, but by the intersection either of a right line and a circle; or of the circumferences of two circles.

Such is the problem following.—Given, the greatest sides, and the sum of the other two sides, of a right-angled triangle; to find the triangle.—Such also is this, to describe a trapezium that shall make a given area of four given lines.

Such problems can only have two solutions, in regard a right line can only cut a circle, or one circle cut another in two points.

PLAIN, in heraldry, is sometimes used for the point of the shield, when couped square; a part remaining under the square, of a different colour, or metal from the field.

This has been sometimes used as a mark of bastardy, and called *champaigne*: for when the legitimate descendants of bastards have taken away the bar, fillet, or traverse bore by their fathers, they are to cut the point of the shield with a different colour called *Plain*.

PLAIN, used substantively, in perspective, mechanics, astronomy, &c. See *PLANE*.

Oblique PLAINS. See the article *OBLIQUE*.

PLAIN, *PLAINTE*, in law, the propounding or exhibiting any action, real or personal, in writing.

Hence, the party making this *Plain*, is called plaintiff.

PLAINTE, in the ancient customs of France, was a request, or petition, presented to the king, against the judges of the provinces, and afterwards against bailiffs and seneschals; for denying justice, or for rendering judgment contrary to the laws of the realm.

For in those days there was no appeal from their decisions; but they all pronounced in the dernier resort; so that the *Plainte* was not directed against the party, but against the judge; who was cited to see his own sentence declared null.

This was a kind of supplement to the way of appeals, which was then shut up. These *Plaines*, in the capitulars of Charlemagne, are called *blasphemies*.

PLAIN, in law, he that sues, or complains, in an assize, or in an action personal; as, in an action of debt, trespass, deceit, detinue, and the like.

Plaintiff stands opposed to *defendant*.

PLASTER, in building. See the articles *PLASTER*, *MORTAR*, &c.

Casting in PLASTER. See the article *CASTING*.

PLASTER, in medicine. See the article *EMPLASTER*.

PLASTERED walls. See the article *WALL*.

PLAN, a representation of something, drawn on a plane.

Such are maps, charts, and ichnographies.

PLAN, in architecture, is particularly used for a draught of a building; such as it appears, or is intended to appear, on the ground; shewing the extent, division, and distribution

bution of its area into apartments, rooms, passages, &c. The *Plan* is the first device or sketch the architect makes; it is also called the *ground-plot*, *plat-form*, and *ichnography* of the building.

Geometrical PLAN, is that wherein the solid and vacant parts are represented in their natural proportion.

Raised PLAN, is that where the elevation, or upright is shewn, upon the geometrical plan, so as to hide the distribution. See **ELEVATION**.

Perspective PLAN, is that conducted and exhibited by degradations, or diminutions, according to the rules of perspective.

To render *Plans* intelligible, it is usual to distinguish the masses with a black wash. The projections on the ground are drawn in full lines, and those supposed over them in dotted lines. The augmentations or alterations to be made are distinguished by a colour different from what is already built; and the tints of each *Plan* are made lighter as the stories are raised.

In large buildings it is usual to have three several *Plans* for the first three stories.

PLANCHIER, or **PLANCERE**, in architecture, the under part of the corona, or drip; making the superiour part of the cornice, between two cymatiums.

PLANE, **PLANUM**, in geometry, denotes a *plain* figure; or a surface, lying evenly between its bounding lines.

Wolfius defines *Plane*, a surface from every point of whose perimeter a right line may be drawn to every other point in the same.

As the right line is the shortest extent from one point to another; so is a *Plane* the shortest extension between one line and another.

Parallel PLANES. See the article **PARALLEL**.

PLANES are frequently used in astronomy, &c. for imaginary surfaces, supposed to cut, and pass through solid bodies; and on this foundation it is that the whole doctrine of conic sections, and of the sphere, turn.

When a *Plane* cuts a cone parallel to one of its sides, it makes a parabola; when it cuts the cone parallel to its base, it makes a circle.

The sphere is wholly explained by *Planes*, imagined to cut the celestial luminaries, and to fill the areas or circumferences of their orbits.

Astronomers shew, that the *Plane* of the moon's orbit is inclined to the *Plane* of the earth's orbit, or the ecliptic, by an angle of about 5 deg. and passes through the centre of the earth.

The intersection of this *Plane* with that of the ecliptic, has a proper motion of 3' 11" each day, from east to west; so that the nodes answer successively to all the degrees of the ecliptic, and make a revolution round the earth in about nineteen years.

The *Planes* of the orbits of the other planets, like that of the ecliptic, pass through the centre of the sun.—The *Plane* of the orbit of Saturn, is inclined to the ecliptic by 20° 33' 30", and cuts it, at present, in the 22^d degree of Cancer and Capricorn.

The centre of the earth then, being in the *Plane* of the moon's orbit, the circular section of that plane in the moon's disk, is represented to us in form of a right line passing through the centre of the moon.—This line is inclined to the *Plane* of the ecliptic by 5° when the moon is in her nodes: but this inclination diminishes as that planet recedes from the nodes; and at three degrees distance, the section of the moon's orbit in its disk, becomes parallel to the *Plane* of the ecliptic. The same appearances attend the primary planets, with regard to the sun.

But the case is very different in the planets as seen from one another, especially from the earth.—The *Planes* of their orbits only pass through the centre of the earth when they are in their nodes, in every other situation, the *Plane* is raised above the orbit of the planet, either to the north or the south. And the circular section of the *Plane* of the orbit on its disk, or in the orbit of one of its satellites, does not appear a right line, but an elliptic, broader or narrower as the earth is more or less elevated above the *Plane* of the orbit of the planet.

PLANE, in mechanics.—A *horizontal PLANE*, is a *Plane* level or parallel to the horizon.

The determining how far any given *Plane*, &c. deviates from an horizontal one, makes the whole business of levelling.

Inclined PLANE, in mechanics, is a plane which makes an oblique angle with an horizontal *Plane*.

The doctrine of the motion of bodies on *inclined Planes* makes a very considerable article in mechanics*; the substance whereof is as follows:

* A machine has been contrived for measuring the acceleration of a ball down an inclined plane, and comparing it with that found in bodies falling at liberty. See its description in *Mém. de l'Acad. roy. des Sciences*. 1699. p. 343.

Laws of descent of bodies on inclined PLANES.—I. If a body be placed on an *inclined Plane*, its relative gravity will be to its absolute gravity, as the length of the *Plane*, *e. gr.* AC (Tab. *Mechan.* fig. 58.) to its height AB.

Hence, 1° since the ball D only gravitates on the *inclined Plane*, with its relative gravity; the weight L, applied in a direction

parallel to the length of the *Plane*, will retain or suspend it, provided its weight be to that of the ball, as the altitude of the *Plane* BA is to its length AC.

2° If the length of the *Plane* CA be taken for the whole sine; AB will be the sine of the angle of inclination ACB.—The absolute gravity of the body, therefore, is to its respective gravity applied on the *inclined Plane*, and therefore, also the weight D to the weight L acting according to the direction DA which sustains it; as the whole sine is to the sine of the angle of inclination.

3° Hence the respective gravities of the same body on different *inclined Planes*, are to each other as the sines of the angle of inclination.

4° The greater therefore the respective gravity is, the greater is the angle of inclination.

5° As, therefore, in a vertical *Plane*, where the inclination is greatest, *viz.* perpendicular, the respective gravity degenerates into absolute; so in an horizontal *Plane*, where there is no inclination, the respective gravity vanishes.

II. To find the sine of the angle of inclination of a *Plane*, on which a given power will be able to sustain a given weight.—Say, as the given weight, is to the given power, so is the whole sine to the sine of the angle of inclination of the *Plane*. Thus, suppose, a weight of 1000 be to be sustained by a power of 50, the angle of inclination will be found 2° 52'.

III. If the weight L descend according to the perpendicular direction AB, and raise up the weight D in a direction parallel to the *inclined Plane*; the height of the ascent of D will be to that of the descent of L, as the sine of the angle of inclination C, to the whole sine.

Hence 1° the height of the descent CD of the weight L, is to the height of ascent DH of the weight D, reciprocally as the weight D to the equivalent weight L.

2° Since then CD.L=D.H.D, and the actions of the equiponderating bodies D and L are equal; the moments of the weights D and L are in a ratio compounded of their masses, and the altitudes through which they ascend or descend in a *Plane*, either inclined or perpendicular.

3° The powers that raise weights through altitudes reciprocally proportional to them, are equal.—This Des Cartes assumes as a principle whereby to demonstrate the powers of machines.

Hence we see why a loaded waggon is drawn with more difficulty up an inclined than on an horizontal *Plane*; as being pressed with a part of the weight which is to the whole weight in a ratio of the altitude of the plane, to its length.

IV. Weights E and F, fig. 53. n. 2. equiponderating upon *inclined Planes* AC and CB of the same height CD, are to each other as the lengths of the *Planes* AC and CB.

S. Stevinus gives a very pretty demonstration of this theorem, which, for its easiness and ingenuity, we shall here add.—Put a chain, whose parts do all exactly weigh in proportion to their length, over a triangle, GIH: (fig. 59.) it is evident the parts GK and KH do balance each other. If then IH did not balance GI, the preponderating part would prevail; and there would arise a perpetual motion of the chain about GIH: but this being absurd, it follows, that the parts of the chain IH and GI; and consequently all other bodies which are as the lengths of the *Planes* IH and IG, will balance each other.

V. A heavy body descends on an *inclined Plane*, with a motion uniformly accelerated.

Hence, 1° The spaces of descent are in a duplicate ratio of the times, and likewise of the velocities; and therefore in equal times they increase according to the unequal numbers, 1, 3, 5, 7, 9, &c.

2° The space passed over by a heavy body descending on an *inclined Plane*, is subduplicate of that which it would pass over in the same time, with the velocity it has acquired at the end of its fall.

3° Heavy bodies, therefore, descend by the same laws on *inclined Planes*, as in perpendicular *Planes*. Hence it was, that Galileo, to find the laws of perpendicular descent, made his experiments on *inclined Planes*, in regard of the motions being slower in the latter than the former; as in the following theorem.

VI. The velocity of a heavy body descending on an *inclined Plane*, at the end of any given time; is to the velocity which it would acquire in falling perpendicularly, in the same time, as the height of the *inclined Plane* is to its length.

VII. The space passed over by a heavy body on an *inclined Plane* AD, (fig. 60.) is to the space AB, it would pass over in the same time in a perpendicular *Plane*: as its velocity on the *inclined Plane* is to its velocity in the perpendicular descent, at the end of any given time.

Hence, 1° The space passed over on the *inclined Plane*, is to the space it would descend in the same time in the perpendicular *Plane*, as the altitude of the *Plane* AB to its length AC; and therefore as the sine of the angle of inclination B, to the whole sine.

2° If, then, from the right angle B, a perpendicular be let fall to AC; AC:AB::AB:AD. So that in the same time wherein the body would fall perpendicularly from A to B; in an *inclined Plane* it will descend from A to D.

3° The space, therefore, of perpendicular descent being given

in the altitude of the *Plane A B*; by letting fall a perpendicular from *B* to *AC*, as we have the space *A E* to be passed over in the same time on the *inclined Plane*.

4° In like manner, the space *A D*, passed over on the *inclined Plane*, being given, we have the space *AB*, through which it would descend perpendicularly in the same time, by raising a perpendicular meeting the side of the *Plane* in *B*.

5° Hence in the semi-circle *CDEF* *fig. 61.* the body will descend through all the *Planes AD, AE, AF, AC*, in the same time; viz. in that time wherein it would fall through the diameter *AB*, supposing that perpendicular to the horizontal *Plane LM*. VIII. The space *AD*, *fig. 60.* passed over an *inclined Plane AC*, being given, to determine the space which would be passed over in any other *inclined Plane* in the same time.

From the point *D* erect a perpendicular *DB*, meeting the altitude *AB* in *B*; then will *AB* be the space, through which the body would fall perpendicularly in that time. Wherefore if from *B* a perpendicular *BE* be let fall to the *Plane AF*; *AE* will be the space in the *inclined Plane* which the body will pass over, in the same time wherein it falls perpendicularly from *A* to *B*; and consequently *AD* will be the space in the other *inclined Plane AC*, which it passes through in the same time.

Hence, since *AB* is to *AD*, as the whole sine to the sine of the angle of inclination *C*; and *AB* is to *AE* as the whole sine to the sine of the angle of inclination *F*; the spaces *AD* and *AE*, which the body will pass over in the same time on different *inclined Planes*, are as the sines of the angles of inclination, *C* and *F*, and reciprocally as the respective gravities on the same *Planes*. And consequently, they are also reciprocally as the lengths of *Planes* equally high, *AC* and *AF*.—Whence the problem may be resolved various ways by calculation.

IX. The velocities acquired in the same time on different *inclined Planes*, are as the spaces passed over in the same time. Hence also, they are as the sines of the angles of inclination *C* and *F*; reciprocally as the respective gravities on the same *Planes*; and reciprocally as the lengths of equally high *Planes AC* and *AF*. X. A body descending on an *inclined Plane AC*, when it arrives at the horizontal line *CB*, has acquired the same velocity which it would have acquired in a perpendicular descent *A B*, to the same horizontal line *CB*.

Hence, if a heavy body descending through different *inclined Planes A C, A G, A F*, has acquired the same velocity when it arrives at the same horizontal line *CF*.

Hence also a body continuing its descent through several contiguous *inclined Planes*, acquires the same velocity which it would acquire in descending perpendicularly to the same horizontal *Plane*.

XI. The time of descent along an *inclined Plane AC*, is to the time of perpendicular descent through *AB*, as the length of the *Plane AC*, to its altitude *AB*: but the times of descent through different *inclined Planes* equally high *AC* and *AG*, are as the lengths of the *Planes*.

XII. If the diameter of a circle *AB* (*fig. 61.*) be parallel to the horizontal line *LM*; a body will descend from any point of the periphery *D E*, or *C* to *B*, along an *inclined Plane DC*, *EB*, and *CB*, in the same time wherein it will descend through the diameter *AB*. Hence,

XIII. The descents of bodies through a semicyloid *DEF*, (*fig. 62.*) and through any arch thereof *DG*, are always isochronal, or performed in the same time; on which principle is built the doctrine of pendulums vibrating in a cycloid.

Laws of ascent of bodies on inclined PLANES.—I. If a body ascend in a medium void of resistance, in any direction, whether perpendicular, or along an *inclined Plane*; its motion will be uniformly retarded.

Hence, if a body ascending either perpendicularly or obliquely, in such a medium, passes over a space which is subduple of that it would pass over in the same time on a horizontal *Plane*, with an uniform celerity equal to that it has at the beginning of its motion.

2° Such spaces, therefore, performed in equal times, decrease in a retrograde order, as the uneven numbers 7, 5, 3, 1: and therefore the ascent is so much impeded; and consequently, when the impressed force is exhausted, the body will descend again by the force of gravity.

3° They are therefore, inversely, as the spaces described in the same times by a body descending through the same altitude.

For, suppose the time divided into four parts; in the first moment, the body *A* descends through the space 1, and *B* ascends through 7; in the second, *A* descends through 3, *B* ascends through 5; &c.

4° Hence a body rising with an impressed force, ascends to that altitude, from which it must fall to acquire that velocity in falling wherewith it ascended.

5° Hence, by falling it acquires a force to rise again to the height from whence it fell.

II. The time wherein a body ascends to a given altitude, being given; to determine the space passed over each moment. Suppose the same body to descend from the same altitude in the same time; and find the spaces passed over each moment.

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These, taken inversely, are the same with the spaces of ascent required.

Suppose, *v. gr.* a body projected perpendicularly, to ascend through a space of 240 feet in four seconds; and the spaces of ascent performed in the several times required; if now, the body had descended, the descent in the first minute had been 15 feet, in the second 45, in the third 75, in the fourth 105, &c. The descent therefore will be in the first moment 105, in the second 75, &c.

III. If a body descend either perpendicularly through *AD*, (*fig. 62.*) or in any other surface *F E D*, and with the velocity it has there acquired, again ascend along another surface *DC*; at points equally high, *v. gr.* at *G H*, and *Q*, it will have the same force, and the same velocity.

Hence, if a body descend along any surface, *F E D*, and again ascend along another similar and equal surface *D G C*; it is the same as if it passed over the several parts of the same line twice.

Whence, the times of ascent and descent through equal spaces are equal.

On this principle is founded the construction and use of pendulums.

PLANE of gravity, or gravitation, is a plane supposed to pass through the centre of gravity of the body, and in the direction of its tendency; that is, perpendicular to the horizon.

PLANE of reflection in catoptrics, is a plane which passes through the point of reflection; and is perpendicular to the plane of the glass, or reflecting body.

PLANE of refraction, is a plane drawn through the incident and refracted ray.

Perspective PLANE, is a plain pellucid surface, ordinarily perpendicular to the horizon, and placed between the spectator's eye and the object he views; through which the optic rays, emitted from the several points of the object, are supposed to pass to the eye, and in their passage to leave marks that represent them on the said plane.

Such is the *Plane H I*; (*Tab. Perspect. fig. 1.*) some call it the *table*, or *picture*, because the draught, or perspective of the object, is supposed to be thereon; others, the *section*, from its cutting the visual rays; and others, the *glass*, from its supposed transparency.

Geometrical PLANE, in perspective, is a plane parallel to the horizon, whereon the object to be delineated is supposed to be placed.

Such is the *Plane L M*. (*Tab. Perspect. fig. 1.*)—This *Plane* is usually at right angles with the *perspective Plane*.

Horizontal PLANE, in perspective, is a plane passing through the spectator's eye, parallel to the horizon, cutting the perspective plane when that is perpendicular to the geometrical one, at right angles.

Vertical PLANE, in perspective, a plane passing through the spectator's eye, perpendicular to the geometrical plane; and usually parallel to the perspective plane.

Objective PLANE, in perspective, is any plane situate in the horizontal plane, whose representation in perspective is required.

PLANE of the horopter, in optics, is a plane that passes through the horopter, *AB*, (*Tab. Optics, fig. 67.*) and is perpendicular to a plane passing through the two optic axes *I C* and *C H*. See *HOROPTER*.

PLANE of the Projection, in the stereographic projection of the sphere, is the same with the *perspective Plane*, which see.

PLANE of a dial, or dial-PLANE, the surface whereon a dial is drawn. See *DIAL*.

We have *horizontal, vertical, inclining, declining, reclining, de-inclining, direct, &c. dial-planes*. See *DECLINER, RECLINER, DIRECT, &c.*

Dedination of a PLANE. See the article *DECLINATION*.

PLANE glass, mirror, figure, number, problem, &c. See *PLAIN glass, mirror, number, figure, problem, &c.*

PLANE, in joinery, &c. denotes an edged instrument, used to pare or shave woods smooth, even, &c.

It consists of a piece of wood very smooth at the bottom, serving as a stock, or shaft; in the middle whereof is an aperture, through which passes a steel edge, or chisel, obliquely placed, and very sharp, which takes off the inequalities of the wood it is slid along.

The *Plane* acquires various names according to its various forms, sizes, and uses; as, the —*Fore-plane*, which is very long, and is that commonly first used; the edge of its iron is not ground straight, but rises with a convex arch in the middle, to bear being set the ranker; its use being to take off the greater irregularities of the stuff, and to prepare it for the *smoothing plane*.

Smoothing plane, is short and small, its iron fine; it takes off the great irregularities left by the *fore-plane*, and prepares the wood for the *jointer*.

Jointer is the longest of all; its edge very fine, not standing out above a hair's breadth; it comes after the *smoothing-plane*, and is chiefly intended to shoot the edge of a board perfectly straight for jointing smooth tables, &c.

Strike block is like the *jointer*, but shorter; its use is to shoot short joints, &c.

Rabbit-plane is used to cut the upper edge of a board, strait or square, down into the stuff, so as the edge of another, cut after the same manner, may join in with it on the square: it is also used to strike fascia's in mouldings. Its iron is full as broad as its stock, that the angle may cut strait; and it delivers its shavings at the sides, not, like the others, at the top.

The *Plow*, a narrow rabbit-plane, with the addition of two flaves, whereon are shoulders, and on the shoulders a fence.—Its use is to plow a narrow square grove on the edge of a board, &c.

Moulding-planes; of these there are various kinds, accommodated to the various forms and profiles of the mouldings.

Such are the *round-plane*, the *hollow*, the *O G*, the *Snipe's-bill*, &c. which are all of several sizes, from half an inch to an inch and half.

To use the *moulding-planes* on soft wood, as deal, pear-tree, &c. they set the iron to an angle of 45° with the base or sole of the *Plane*. On hard wood, *e.g.* ebony, box, &c. they set to an angle of 80° ; sometimes quite upright. To work on hard wood, the edge or bafil is ground to an angle of 18° or 20° ; on soft wood to an angle of about 12° . For the more acute the bafil, the smoother the iron cuts; but the more obtuse, the stronger. A method has lately been brought into use, of forming mouldings in marble with the *Plane*.

PLANE, among fowlers.—To **PLANE**, is to fly or hover, as a kite or other bird does, without moving its wings.

PLANET, **PLANETA***, in astronomy, a celestial body, revolving round the sun as a centre, and continually changing its position with respect to the other stars.

* Whence its name $\phi\lambda\alpha\eta\eta\epsilon\varsigma$, wanderer; in opposition to a *star* which remains fixed.

The *Planets* are usually distinguished into *primary* and *secondary*. **Primary PLANETS**, called also simply and by way of eminence, *Planets*, are those which move round the sun as their proper centre.—Such are Saturn, Jupiter, Mars, the Earth, Venus, and Mercury.

Secondary PLANETS are such as move round some *primary Planet*, as their respective centre, in the same manner as the *primary Planets* do round the sun.—Such are the Moon moving round our earth; and those others moving round Saturn and Jupiter, properly called their *Satellites*. See the doctrine of *secondary Planets*, under the article **SATELLITES**, and **SECONDARY**.

The *primary Planets* are in number six, which are again distinguished into the *superiour* and *inferiour*.

Superiour PLANETS are those further off the sun than our earth is, —Such are Mars, Jupiter, and Saturn.

Inferiour PLANETS are those nearer the sun than our earth is, and situate between the earth and sun.—Such are Venus and Mercury.—See the order, position, &c. of the *Planets*, in *Tab. Astron. fig. 44*.

The *Planets* are represented by the same characters as the chemists use to represent their metals by, on account of some supposed analogy between those celestial and subterraneous bodies.

Saturn is represented by the character ♄.—This *Planet*, by reason of its great distance, appears to the eye with a feeble light.—It performs its revolutions round the sun in about thirty years.

Jupiter, marked ♃, is a bright refulgent star, finishing its course round the sun in about twelve years.

Mars, characterised ♂, is a ruddy fiery coloured *Planet*, finishing its course in about two years.

Venus, ♀, is the brightest of all the *Planets*, constantly attending the sun, and never distant from him above 47 degrees.

It finishes its course in about seven months.

When it goes before the sun, it is called *phosphorus* and *lucifer*; and when it follows him *hesperus*. See **PHOSPHORUS**, &c.

Mercury, ☿, a little bright *Planet*, the sun's constant companion, from whose side it never departs above 28° , and by that means is usually hid in his splendor.—It performs its course in about three months.

To which we now add, Tellus, the earth, marked ⊕, or ♁, performing its course about the sun, between Mars and Venus, in the space of a year.

From these definitions, a person may easily distinguish all the *Planets*.—For if after sun-let he sees a *Planet* nearer the east than the west, he may conclude it is neither Mercury nor Venus; and may determine whether it is Saturn, Jupiter, or Mars, by the colour and light: by which also he may distinguish between Mercury and Venus.

Nature of the PLANETS.—From the several phases and appearances of the *Planets*, they are found to be all perfectly like the moon; which we have shewn to be perfectly like our earth; whence it follows, that the *Planets* are also dark, opaque, spherical, &c. bodies, like our earth.

This may be shewn almost to be a demonstration.—1^o Venus observed with a telescope, is rarely found full, but with variable phases like those of the moon; her illuminated part still turned

towards the sun, *viz.* towards the east when she is the morning-star, and towards the west when the evening-star.—And the like phases are observed in Mercury and Mars.

2^o Gallendus first, and after him others, have observed Mercury on the face of the sun, a cross which he appeared to pass like a black round spot. See **TRANSIT**.—Horrox in 1639, also observed Venus in the sun; where she made the same appearance.

3^o De la Hire, in 1700, with a telescope of sixteen foot, discovered mountains in Venus, larger than those of the moon.

4^o Cassini observed two spots in Venus; four in Mars, likewise observed by Campani; and several, at several times, in Jupiter: and from his observations of these spots, he found that they had a rotation round their axes: He even determined the velocity of that rotation, or the period wherein it was effected.

v. gr. That of Jupiter, 9 hours 56'. That of Mars 24 hours 40'. And that of Venus, 24 hours. And since the Sun, Moon, Jupiter, Mars, Venus, and the earth, are found to revolve on their axes, *i. e.* to have a diurnal rotation: no doubt Mercury and Saturn have the same; though the great nearness of the former to the sun, and the great distance of the latter, prevent any spots from being observed on them, whence that rotation might be demonstrated.

5^o In Jupiter are observed two swaths, or belts, different from the rest of his disk, and moveable; they are sometimes found in one part, sometimes in another; and are sometimes broader, sometimes narrower.

6^o In 1609, were first observed the little stars, or moons, moving about Jupiter, by Sim. Marius; and in 1610 the same were observed by Galileo: These are now frequently observed to disappear in a clear sky, when Jupiter happens to be diametrically interposed between them and the sun.—Whence it appears they are void of light, at such time when the sun's rays, intercepted by Jupiter, cannot be propagated to them in right lines; and hence also that, like the moon, they are opaque bodies, illuminated by the sun; and hence again, since Jupiter does not illuminate his satellites when placed behind him, he himself, in that part turned from the sun, may be argued to be void of light.

7^o When Jupiter's moons are diametrically interposed between Jupiter and the sun, there is seen a round spot on Jupiter's disk, which is sometimes larger than the satellite itself.—Whence it appears, that the satellites are opaque bodies, illuminated by the sun, that they project a shadow from the sun; and that the round spots seen in Jupiter, are the shadows of the satellites.

Whence also, the interfection of that shadow being found to be a circle, the shadow must be conical; and therefore the figure of the satellites, at least as to sense, is spherical.

8^o The earth being between Jupiter and the sun; if, at the same time, any of the satellites happen to be between Jupiter and the sun, it is lost in Jupiter's light; though sometimes appearing like a black spot.—This phenomenon has been frequently observed by Cassini and Maraldi, who have likewise noted very considerable alterations in the apparent magnitudes of the satellites; for which no reason could be given from the distance of Jupiter, the sun, or the earth: *v. gr.* That the fourth, which is usually seen the smallest, is sometimes the largest; and the third, which is usually the largest, appears sometimes the smallest.—Hence, as the satellites are illuminated by the sun, even then when emerged in Jupiter's light, yet do appear obscure, there must be some alteration in their atmospheres, to prevent the sun's rays being equally reflected from every part of their surface; which must likewise be the cause why their shadow is sometimes larger than themselves.

Now, to sum up the evidence.—1^o Since in Venus, Mercury, and Mars, only that part of the disk illuminated by the sun, is found to shine; and, again, Venus and Mercury, when between the earth and the sun, appear like dark spots or maculae, on the sun's disk; it is evident, that Mars, Jupiter, and Mercury, are opaque bodies, illuminated with the borrowed light of the sun. And the same appears of Jupiter, from its being void of light in that part to which the shadow of the satellites reaches, as well as in that part turned from the sun; and that his satellites are opaque, and reflect the sun's light, is also abundantly shewn. Wherefore, since Saturn, with his ring and satellites, do only yield a faint light, fainter considerably than that of the fixed stars; though these be vastly more remote; and than that of the rest of the *Planets*: it is past doubt, that he too, with his attendants, are opaque bodies.

2^o Since the sun's light is not transmitted through Mercury and Venus, when placed against him; it is plain they are dense opaque bodies; which is likewise evident of Jupiter, from his hiding the satellites in his shadow; and therefore, by analogy, the same may be concluded of Saturn.

3^o From the variable spots in Venus, Mars, and Jupiter, it is evident those *Planets* have a changeable atmosphere; which changeable atmosphere may, by a like argument, be inferred of the satellites of Jupiter; and therefore, by similitude the same may be concluded of the other *Planets*.

4^o In like manner, from the mountains observed in Venus, the same may be supposed in the other *Planets*.

5° Since then Saturn, Jupiter, both their satellites, Mars, Venus, and Mercury, are opaque bodies, shining with the sun's borrowed light, and are furnished with mountains, and encompassed with a changeable atmosphere; they have, of consequence, waters, seas, &c. as well as dry land, and they are bodies like the moon, and therefore like the earth. Q. E. D. And hence nothing hinders but that the *Planets* may also be concluded to be inhabited—Huygens, in his *Cosmotheoros*, argues very plausibly for the existence of planetary inhabitants, from the similitude of the *Planets* with our earth; those, like this, being opaque, dense, uneven, round, heavy, illuminated and warmed by the sun, having night and day, summer and winter, &c. Wolfius deduces something relating hereto from arguments of another kind—Thus *e. gr.* It is scarce to be doubted, that the inhabitants of Jupiter are much larger than those of the earth; and in effect of the giant kind. For it is shewn in optics, that the pupil of the eye dilates in a strong light, and contracts in a weak one; wherefore, since in Jupiter the sun's meridian light is much feebler than on the earth, by reason of Jupiter's greater distance from the sun; the pupil will need to be much more dilatable in the inhabitants of Jupiter, than in those of the earth. But the pupil is observed to have a constant proportion to the ball of the eye; and the eye to the rest of the body; so that in animals, the larger the pupil the larger the eye, and the larger the body.

To ascertain the size of these jovial inhabitants, it may be observed that the distance of Jupiter from the sun, is to the earth's distance from the same, as 26 to 5; the intensity of the sun's light in Jupiter is to its intensity on the earth, in a duplicate ratio of 5 to 26; but it is found by experience, that the pupil dilates in a ratio greater than that wherein the intensity of light decreases; otherwise, a body at a great distance might be seen as clearly as a nearer: the diameter, therefore, of the pupil in its greatest dilation, in Jupiter, is to its diameter in the like state in the earth, in a ratio greater than that of 5 to 26.—If then we put it, as 10 to 26, or as 5 to 13: since the ordinary stature of the inhabitants of the earth is computed at 5 English feet, 4 inches and $\frac{1}{2}$; (which Wolfius tells us was his own height) the ordinary stature of Jupiter's inhabitants will be found 14 feet $\frac{1}{2}$, which is very nearly the size of the giant Og, mentioned by Moses, whose iron bed was 9 cubits long, and its breadth 4.

Motion of the PLANETS.—That the *Planets* do all revolve round the sun as their centre, and not round the earth, is evident from a thousand phenomena.—1° The orbit wherein Venus, *e. gr.* moves, does certainly encompass the sun, and therefore in describing that orbit, the *Planet* must turn round the sun.

That her orbit includes the sun, appears hence, that she is sometimes above the sun, sometimes below it, sometimes beyond it, and sometimes on this side; all which are evident from the circumstances of her phases.

That she does not move round the earth is no less apparent from her being ever observed in the same quarter with the sun, never receding from him above 45°.—She never therefore comes to be in opposition to the sun; no, not to be in a quartile aspect, or to have a quarter of the heavens between them; both which, like the earth, she must frequently have, did she attend and move round the earth.

2° That Mercury revolves round the sun appears in like manner from his phases, which resemble those of Venus and the moon; and from its neighbourhood to the sun, from whom Mercury never recedes so far as Venus does.

3° That the orbit of Mars includes the sun, is evident from that *Planet*'s being found both in conjunction and opposition with the sun; and in both cases shining with a full face.—Indeed, from the same circumstances it appears, that the orbit of Mars encompasses the earth; but then, it follows, likewise, from Mars's diameter appearing seven times as big when in opposition, as when in conjunction, that he is seven times nearer the earth, in the former than the latter position. The earth therefore is far from being the centre of Mars's motion; but Mars is ever nearly at the same distance from the sun.—Again, Mars viewed from the earth moves very irregularly; is sometimes seen to proceed slower, sometimes faster; sometimes he stands still, and sometimes he goes backward: (the reasons whereof, see under the article *OPTIC inequality*.) but viewed from the sun, he will ever appear to move with the same constant uniform tenor; whence it is evident, he respects the sun, not the earth, as the centre of his motion.

4° The same appearances whence Mars is shewn to revolve round the sun as a centre, are likewise observed in Jupiter and Saturn; whence the same conclusion may be made of them. Lastly, that the earth revolves round the sun, as a centre, is evident from her place, which we have observed to be between the orbits of Mars and Venus; and from the phenomena of the superior *Planets* viewed therefrom.—If the earth stood still we should never see those *Planets* either stationary or retrograde; the earth therefore moves, but it is still found between the orbits of Mars and Venus which encompass the sun; therefore the earth also encompasses the sun.

To this astronomical demonstration, may be added a physical demonstration, of the earth's motion from Sir Isaac Newton.—It appears from abundant observation, that either the earth turns round the sun, or the sun round the earth, so as to describe equal areas in equal times: but he demonstrates, that bodies revolving about one another according to such law, do of necessity gravitate towards each other. Whence, if the sun gravitate to the earth, action and re-action being full equal, the earth will likewise gravitate toward the sun. But he proves, further, that two bodies gravitating towards each other, without directly approaching one another in right lines, must both of them turn round the common centre of gravity of both.—The sun and earth, therefore, do both revolve round one common centre.—But the earth being but a point in comparison of the sun, the common centre of gravity of the two, will be within the sun's body, and not far from its centre.—The earth, therefore, revolves round a point, within the body of the sun, and therefore round the sun.

The orbits of the *Planets* are all ellipses; one of whose foci is in the sun.—This Kepler first found from Tycho's observations; before him all astronomers took the planetary orbits for eccentric circles.

The planes of these orbits do all intersect in the sun; nor are their extremities far apart.—In effect, they are but little inclined to one another; and the greatest angle any of them makes with the plane of the earth's orbit, *i. e.* of the ecliptic, is that of Mercury, which lies at an angle of 6° 52'; that of Venus is 3° 23'; that of Mars 1° 52'; that of Jupiter 1° 20'; and that of Saturn 2° 30'.

The line wherein the plane of each orbit cuts that of the earth, is called the *line of the nodes*; and the two points wherein the orbits themselves touch that plane, the *nodes*.

The distance between the centre of the sun, and the centre of each orbit, is called the *eccentricity* of the *Planet*.

And the angle at which each plane cuts that of the ecliptic, is called the *inclination* of the plane.

To account for the motion of the *Planets* about the sun; there needs nothing but to suppose an uniform projectile motion, in straight lines, at first given them; and a power of attraction or gravitation, such as we observe in all the great bodies in our system.—For a body A, (*Tab. Astron. fig. 60. n. 2.*) proceeding uniformly along the line AB; will, by the intervention of the attracting body C, be every moment diverted out of its rectilinear, and bent into a curvilinear path, according to the laws of central forces.

If, then, the projectile motion be perpendicular to a line, CA, drawn from the attracting body C; and its velocity be so proportioned to the force of attraction of A, as that the centripetal and centrifugal forces are equal, *i. e.* that the conatus to fall to the central body C, in a right line, AC; and that to proceed in the direction of the tangent, AB, balance each other: the body will revolve in a circular orbit, $\alpha, \beta, \gamma, \delta$, &c.

It is not improbable, that at the beginning, this was the state of things; and that the velocities impressed on the several *Planets* were so combined with their respective masses and distances from the sun at which they were to roll; as that their momenta should counter-balance the sun's attractive force, and be precisely counter-balanced thereby: whence the primitive orbits must have been perfect circles, from which they do not even now deviate very far; the eccentricity of the earth's orbit being only $\frac{1}{8336}$ of its semi-diameter.

If the *Planet*'s projectile motion be not perfectly adjusted to the sun's attraction; the orbit described will be an ellipse.—If it be too swift, the orbit will be greater than a circle, and the nearer focus coincide with the central body; if too slow, the orbit will be less than a circle, and the further focus coincide with the central body.

Indeed the form of the planetary orbits does not only depend on the adjustment of the first projectile velocity with the sun's attraction, but also on the direction wherein that motion was originally impressed.—If that direction were according to the tangent AB, as above supposed, and the central forces exactly balanced, the orbit would be circular; but if that direction were oblique, in any manner, whether ascending to or descending from the sun, the orbit of the *Planet*, notwithstanding any adjustment of its velocity to the attraction, would be an ellipse.

The motion of the *Planets* in their elliptic orbits are not equal, by reason the sun is not in their centre but their focus.—Hence they move, sometimes faster and sometimes slower, as they are nearer or farther from the sun; but yet these irregularities are all certain, and follow according to an immutable law.

Thus, suppose the ellipse BEP, &c. (*Tab. Astron. fig. 61. n. 2.*) the orbit of a *Planet*; and the focus S, the sun's place: AP the axis of the ellipse, is called the *line of the apses*; the point A the *higher apsis* or *aphelion*; P the *lower apsis* or *perihelion*; SC the eccentricity; and ES the mean distance of the *Planet* from the sun.

Now the *motion* of the *Planet* in its perihelion, is swiftest; and in its aphelion, slowest; at E the *motion* as well as the distance is mean, *i. e.* it is such as would describe the whole orbit in the same time it is really described in.

The law whereby the *motion* is regulated in every point of the orbit, is, that a line, or radius, drawn from the centre of the sun to the centre of the *Planet*, and thus carried along, with an angular *motion*, does always describe an elliptic area proportional to the time.—Suppose, *e. gr.* the *Planet* in A, and thence in a certain time to proceed to B; the space or area the radius SA describes, is the triangle ASB: when, at length, the *Planet* arrives at P, if from the centre of the sun S there be drawn SD, in such manner as that the elliptic area PSD is equal to that ASB; the *Planet* will here move through the arch PD, in the same time wherein it moved through the arch AB; which arches are unequal, and nearly in a reciprocal proportion to their distance from the sun. For from the equalities of the areas it follows, that the arch PD must exceed AB as much as SA exceeds SP.

This law was first demonstrated by Kepler, from observation; and is since accounted for by Sir I. Newton from physical principles: And to this all astronomers, now, subscribe, as of all others that which best solves the planetary phenomena.

Computation of a PLANET'S motion and place.—As to the periods and velocities of the *Planets*, or the times wherein they perform their courses; they are found to have a wonderful harmony with their distances from the sun, and with one another. The nearer each *Planet* is to the sun, the quicker still being its motion; and its period the shorter.—The great law they here all immutably observe is, that the squares of their periodical times are as the cubes of their distances from the centres of their orbits.

The knowledge of this law we also owe to the sagacity of Kepler, who found it to obtain in all the primary *Planets*; as astronomers have since found it also to do in the secondary ones.

Kepler deduced this law, merely from observation, and comparison of the several distances of the *Planets* with their periods: the glory of investigating it from physical principles, is due to Sir Isaac Newton, who has demonstrated that, in the present state of things, such a law was inevitable.

A *Planet's* motion or distance from its apogee, is called the *mean anomaly* of the *Planet*; and is measured by the arch, or area it describes in the time.—When the *Planet* arrives at the middle of its orbit, or the point G, the distance or time is called the *true anomaly*.—When the *Planet's* motion is reckoned from the first point of Aries, it is called its *motion in longitude*, which is either mean, *viz.* such as the *Planet* would have were it to move uniformly in a circle; or true, which is that wherein the *Planet* actually describes its orbit, and measured by the arch of the elliptic it describes.

Hence may the *Planet's* place in its orbit for any given time after it has left the aphelion, be found.—For suppose the area of the ellipse to be divided by the line SG, that the whole elliptic area may have the same proportion to the area ASG as the whole periodical time wherein the *Planet* describes its orbit, has to the time given: in this case G will be the *Planet's* place in its orbit. See PLACE.

The phenomena of the inferior PLANETS, are their conjunctions, elongations, stations, retrogradations, phases, and eclipses. See CONJUNCTION, ELONGATION, STATION, RETROGRADATION, &c. under their respective articles.

Phenomena of the superior PLANETS, are the same with those of the inferior; with an additional one, *viz.* opposition.

The particular phenomena, circumstances, &c. of each PLANET, see under the name of the respective *Planet*, &c. JUPITER, MARS, &c.

The general proportions, diameters, surfaces, solidities, distances, gravities, degrees of light, &c. of the several *Planets*; see under the articles SOLAR SYSTEM, and DIAMETER.

Configuration of the PLANETS. } See } CONFIGURATION.
Theories of the PLANETS. } See } THEORY.

PLANETARY, something that relates to the *Planets*. See PLANET.

In this sense we say, planetary worlds, planetary inhabitants, &c. Huygens and Fontenelle bring several probable arguments for the reality of planetary worlds, and animals, plants, men, &c.—The former in his ΚΟΣΜΟΘΕΟΡΟΣ, *viz.* de terris celestibus; the latter in his dialogues, *sur la pluralité des mondes*.

PLANETARY system, is the system or assemblage of the planets, primary and secondary, moving in their respective orbits, round their common centre, the sun.

PLANETARY hours in chronology. See HOUR.

PLANETARY days.—Among the ancients, the week was shared among the seven planets; each planet having its day. This we learn from Dion Cassius and Plutarch, *Sympos.* l. 4. q. 7. Herodotus adds, that it was the Egyptians who first discovered what God, that is, what planet presides over each day, for that among this people the planets were directors. And hence it is, that in most European languages, the days of the week are still denominated from the planets; Sunday, Monday, &c.

PLANETARY years, the periods of time wherein the several planets make their revolutions round the sun, or earth.

As from the proper revolution of the sun, the solar year takes its original; so from the proper revolutions of the rest of the planets about the earth, so many sorts of years do arise, *viz.* the saturnian year, which is defined by 29 Egyptian years, 174 hours 58 minutes, equivalent in a round number to 30 solar years.—The jovial year, containing 317 days, 14 hours, 59 minutes.—The martial year, containing 321 days, 23 hours, 31 minutes.—For Venus and Mercury, as their years, when judged of with regard to the earth, are almost equal to the solar year; they are more usually estimated from the sun, the true centre of their motions: in which case, the former is equal to 224 days 16 hours 40 minutes, the latter to 87 days 23 hours 14 minutes.

PLANETARY dials, those whereon the planetary hours are inscribed.

PLANETARY squares, the squares of the seven numbers from 3 to 9 disposed magically.

Corn. Agrippa, in his famous book of magic, has given the construction of the seven planetary squares: M. Poignard, canon of Brussels, in his treatise of sublime squares, gives new, easy, and general methods for making the seven planetary squares, and all others to infinity, by numbers in all sort of progressions.

PLANIFOLIOUS flowers. See the article FLOWER.

PLANIMETRY, PLANIMETRIA, that part of geometry which considers lines and plain figures; without any consideration of heights or depths.

Planimetry is particularly restrained to the mensuration of planes or surfaces; in opposition to *stereometry*, or the mensuration of solids. See MEASURING.

Planimetry, or the art of measuring the surfaces and planes of things, is performed with the squares of long measures, as square feet, square inches, square yards, square perches, &c. that is, by squares whose sides are an inch, a foot, a yard, a perch, &c. so that the area or centre of any surface is laid to be found when we know how many such square inches, feet, yards, &c. it contains.

PLANISPHERE, a projection of the sphere, and the several circles thereof, on a plane: as, upon paper, or the like. In this sense, maps of the heavens and the earth, wherein are exhibited the meridians, and other circles of the sphere, are called *Planispheres*.

PLANISPHERE is sometimes also considered as an astronomical instrument, used in observing the motions of the heavenly bodies; consisting of a projection of the celestial sphere upon a plane, representing the stars, constellations, &c. in their proper situations, distances, &c.—Such is the *astrolabe*, which is a common name for all such projections.

In all *Planispheres*, the eye is supposed to be a point viewing all the circles of the sphere, and referring them to a plane whereon the sphere is as it were flattened.—This plane is called the *plane of the projection*.

A perspective plane is only a plane of projection placed between the eye and the object, so as to contain all the points which the several rays drawn from the object to the eye impress thereon. But in *Planispheres* or astrolabes, the plane of the projection is placed beyond the object; which is the sphere.—The plane of the projection is always some of the circles of the sphere.

Among the infinite number of *Planispheres* which the different planes of projection, and the different positions of the eye, would furnish; there are two or three that have been preferred to the rest.—Such are that of Ptolemy, where the plane of projection is parallel to the equator.—That of Gemma Frisius, where the plane of projection is the colure, or solstitial meridian, and the eye of the pole the meridian.—That of John de Royas, a Spaniard, whose plane of projection is a meridian, and the eye placed in the axis of that meridian, at an infinite distance. This last is called the *Analemma*.

The common defect of all these projections is, that they distort and alter the figures of the constellations, so as it is not easy to compare them with the heavens; and that the degrees in some places are so small, that they afford no room for operation.

All these faults M. de la Hire has provided against in a new projection, or *Planisphere*; where it is proposed the eye shall be so placed, as that the divisions of the circles projected shall be sensibly equal in every part of the instrument.—The plane of his projection is that of a meridian.

NAUTICAL *Planisphere*. See the article NAUTICAL.

PLANO-convex-glass, or lens, is that, one of whose surfaces is concave, and the other plain.

The concavity is here supposed to be spherical, unless the contrary be expressed.—For the properties, grinding, &c. of plano-convex lenses, see LENS, GRINDING, &c.

PLANO-concave-glass, or lens, is that, one of whose surfaces is convex, and the other plain. See CONVEXITY.

The convexity is supposed to be spherical, unless the contrary be expressed. For the properties, grinding, &c. of plano-concave lenses, see LENS, &c.

PLANT,

PLANT, PLANTA, an organical body, consisting of a root, and other parts, and producing usually leaves, a stem, branches and flowers.

A *Plant* may be defined, in Boerhaave's manner, to be an organical body composed of vessels and juices; to which body belongs a root, or a part whereby it adheres to some other body, and particularly the earth, from which it derives the matter of its life and growth.

A *Plant* is distinguished from a fossil by its being organical, and consisting of vessels and juices; and from an animal, by its adhering to another body, and deriving its nourishment therefrom.

Plant is a general name, under which are comprized all vegetable bodies, as trees, shrubs, and herbs.

From the observations of Malpighi, Dr. Grew, M. Reneaume, Bradley, and others, there appears a great similitude between the mechanism of *Plants*, and that of animals; the parts of the former bear a constant analogy to those of the latter; and the vegetable and animal œconomy appear both formed on the same model.—To give an idea hereof, it will be necessary to describe the parts whereof *Plants* consist.

The parts of *Plants* are,—1. The root, a spongy body, whose pores are disposed to admit certain humid particles prepared in the ground: On the size of the vessels and pores of the root, the quality of the root is found much to depend.—Boerhaave considers the root as composed of a number of absorbent vessels, analogous to the lacteals in animals. And M. Reneaume takes it to do the office of all the parts in the abdomen which minister to nutrition; as the stomach, intestines, &c.

2. The woody matter, which consists of capillary tubes, running parallel from the root throughout the stalk.—The apertures of these tubules are ordinarily too minute to come under the cognizance of the eye, unless in a piece of charcoal, cane, or the like. These tubes Mr. Bradley calls arterial vessels; it being through these that the sap rises from the root.

3. Besides these, there are other larger vessels disposed on the outside of the arterial vessels between the wood and the inner bark, and leading down to the covering of the root.—These the same author calls the venal vessels, and supposes them to contain the liquid sap found in *Plants* in the spring, &c.

4. The bark, which is of a spongy texture, and by many little strings passing between the arteries, communicates with the pith.

5. The pith, or pecten, which consists of little transparent globules, chained together somewhat like the bubbles that compose the froth of liquor.

Add, that the trunk and branches of a tree bear a resemblance to the exterior members or limbs of an animal, which it may subsist without, though their rotting and mortification frequently occasion a total destruction thereof.—Accordingly, we find the like effects from wounding or lopping of a tree, as that of a limb, viz. an extravasation, callus, &c.

Œconomy or use of the parts of PLANTS.—The root having imbibed the saline and aqueous juices of the earth, and filled itself therewith for the nourishment of the tree; those are put in motion by heat, i. e. are made to evaporate into steam, which from the root enters the mouths of the arterial vessels, and mounts to the top with a force answerable to the heat that puts it in motion.—By this means it gradually opens the minute vascules rolled up in the buds, and expands them into leaves. Now, as all vapours, upon feeling the cold, naturally condense; so this, when arrived at the extreme parts of the arteries, i. e. the buds of the tree, meeting the cold air, condenses into a liquor, in which form it returns by its own weight, through the venal vessels, to the root; leaving behind it such parts of its juice, as the texture of the bark will receive, and requires for its sustenance.

Thus does the juice continue to circulate; till the winter's cold congealing it into the consistency of a gum, it stagnates in the vessels; in which state it remains till the fresh warmth of the succeeding spring puts it in motion again: upon which the *Plant* renews its former vigour, and pushes forth branches, leaves, &c.

This short view of the vegetable œconomy will bear some further illustration; there being several curious points here couched, and, as it were, folded up in *femine*.—The principle, then, whereby the root, after imbibing its food, determines it to mount upwards, contrary to its natural gravity, is somewhat obscure: Some will have it effected by means of the pressure of the atmosphere, in the same manner as water is raised in pumps: But this is precarious, as being founded on a supposition, that the absorbent tubules are void of air; besides, that the atmosphere could not raise the juice above 32 feet high, whereas there are trees much higher than that.—Others have recourse to the principle of attraction, and suppose the power that raises the sap in vegetables to be the same with that whereby water ascends in capillary tubes, or in heaps of sand, ashes, or the like; but neither will this alone suffice to raise water to the tops of trees.

One would suspect therefore that the first reception of the food, and its propagation through the body, were effected by different

means; which is confirmed by the analogy of animals. The motion of the nutritious juices of *Plants* is produced much like that of the blood in animals, by the action of the air; in effect, there is something equivalent to respiration exercised throughout the whole *Plant*.

The discovery of this we owe to the admirable Malpighi; who first observed, that vegetables consist of two series or orders of vessels.—1. Those above-mentioned, which receive and convey the alimental juices; answering to the arteries, lacteals, veins, &c. of animals.—2. Tracheæ, or air-vessels, which are long hollow pipes, in and from which air is continually received and expelled, i. e. inspired and expired; within which tracheæ, the same author shews, all the former series's of vessels are contained.

Hence it follows, that the heat of the year, nay, of a day, of a single hour, or minute, must have an effect on the air included in these tracheæ, i. e. it must rarefy it, and consequently dilate the tracheæ; whence also must arise a perpetual spring, or source of action, to promote the circulation in *Plants*.

For, by the expansion of the tracheæ, the vessels containing the juices, are pressed; and by that means the juice contained is continually propelled, and so accelerated; by which same propulsion, the juice is continually comminuted, and rendered more and more subtle, and so is enabled to enter vessels still finer and finer; the thickest part of it being at the same time excited and deposited into the lateral cells or loculi of the bark, to defend the *Plant* from cold, and other external injuries.

The juice having thus gone its stage, from the root to the remote branches, and even to the flower; and having in every part of its progress deposited something both for aliment and defence; what is redundant passes out into the bark, the vessels whereof are inoculated with those wherein the sap mounted; and through these it redescends to the root, and thence to the earth again.—And thus is a circulation effected.

Thus is every vegetable acted on by heat during the day-time, especially while the sun's force is considerable; and the sap-vessels are thus squeezed and pressed, and the sap propelled, and raised, and at length evacuated, and the vessels exhausted; and in the night again, the same tracheæ being contracted by the cold of the air, the other vessels are eased and relaxed, and so are disposed to receive fresh food for the next day's digestion and excretion.—And thus *Plants* may be said to eat and drink in the night time.

The vessels or containing parts of *Plants*, consist of mere earth, bound or cemented together by oil, as a gluten; which being exhausted by fire, air, age, or the like, the *Plant* moulders, or returns again into its earth, or dust.—Thus, in vegetables burnt by the intensest fire, the matter of the vessels is left intire, and indissoluble by its utmost force; and, consequently, it is neither water, nor air, nor salt, nor sulphur, but earth alone.

The juice or sap of a *Plant* is a humour furnished by the earth, and changed in the *Plant*; consisting of some fossil parts, other parts derived from the air and rain; and others from putrified animals, plants, &c. consequently, in vegetables are contained all kind of salts, oil, water, earth; and probably all kinds of metals too: in fact, the ashes of vegetables always yield somewhat which the loadstone attracts.

This juice enters the *Plant* in form of a fine and subtle water, which the nearer it is to the root, the more it retains of its proper nature; and the further from the root, the more action it has sustained, and the nearer it approaches to the nature of the vegetable.

Consequently, when the juice enters the root, the bark whereof is furnished with excretory vessels fitted to discharge the excrementitious part; it is earthy, watry, poor, acid, and scarce oleaginous at all.

In the trunk and branches it is further prepared; though it still continues acid, as we see by the tapping or perforating of a tree in the month of February, when it distils a watry juice apparently acid.

The juice being hence carried to the germs, or buds; is more concocted; and here having unfolded the leaves, these come to serve as lungs for the circulation and further preparation of the juice.—For those tender leaves being exposed to the alternate action of heat and cold, moist nights, and hot scorching days, are alternately expanded and contracted; and the more so, on account of their reticular texture.

By such means the juice is still further altered and digested; as it is further yet in the petala, or leaves of the flowers, which transmit the juice, now brought to a further subtilty, to the stamina.—These communicate it to the farina, or dust in the apices; where having undergone a farther maturation, it is shed into the pistil; and here having acquired its last perfection, it gives rise to a new fruit or *Plant*.

The generation of *PLANTS* does also bear a close analogy to that of some animals; particularly such as want local motion; as mussels, and other immoveable shell-fish, which are hermaphrodites, and contain both the male and female organs of generation.

The flower of the *Plant*, for all its finery, is found to be the pudendum, or principal organ of generation; but the use of so

mechanism, and so many parts has till of late been but little known.—We shall instance in a tulip.

Its flower consists of six petals, or leaves; from the bottom whereof, at the middle, arises a kind of tube called the *pistil*; and around this are disposed several pretty fine threads called *stamina*, arising likewise from the bottom of the flower, and terminating in little bunches at top called *apices*, replete with a fine dust called *farina*.—For the further explanation of the parts of generation, see *PISTIL*, *STAMEN*, *FARINA*, &c.

This is the general structure of the flowers of *Plants*, though diversified in infinite ways, and to such degree, that some have no fertile pistil, others no stamina; others have stamina without any fertile apices; and what exceeds all the rest, some *Plants* seem to have no flowers.—But, allowing the structure now represented to be, as in effect it is, the most common; and that those parts which seem wanting are usually only less apparent; the generation of *Plants*, in general, may be well accounted for.

The fruit is usually at the basis of the pistil, so that when the pistil falls, with the rest of the flower, the fruit appears in its stead.—Indeed frequently the pistil is the fruit itself; but still they have both the same situation in the centre of the flower, whose leaves disposed around the little embryo, only seem destined to prepare a fine juice in their little vessels, for its support, during the little time that they last, and it requires it: though Mr. Bradley takes their chief use to be to defend the pistil, &c. The apices of the stamina are little capulae, or bags full of a farina or dust, which, upon the capulae growing ripe, and bursting, falls out.

M. Tournefort took this dust to be only an excrement of the food of the fruit, and the stamina to be no more than a kind of excretory ducts, which filtrated this useless matter, and thus discharged the embryo *Plant* of it. But M. Morland, M. Geoffroy, and others, find nobler uses for this dust.—According to their system, it is this dust that falling on the pistil fecundates the grain or fruit inclosed therein; and hence they call it the *farina fecundans*.—Thus the farina should be the male part of the *Plant*, and the pistil the female.

Mr. Bradley, at the bottom of the pistil of the lily, describes a vessel which he calls the *uterus*, or womb, wherein are three ovaries filled with little eggs, or rudiments of seeds, like those found in the ovaria of animals; and these, he adds, always decay and come to nothing, unless impregnated by the farina of the same *Plant*, or some other of the same kind.—The stamina, he says, serve for the conveyance of the male seed of the *Plant*, to be perfected in the apices; which, when ripe, bursting forth in little particles like dust, some of them fall into the orifice of the pistil, and are either conveyed thence into the uterus, to fecundify the female ova, or are lodged in the pistil, where, by their magnetic virtue, they draw the nourishment from the other parts of the *Plant* into the embryo's of the fruit, making them swell, grow, &c.

The disposition of the pistil, and the apices about it, is always such, as that the farina may fall on its orifice. It is usually placed lower than the apices; and when we observe it to be grown higher, we may conjecture the fruit has begun to form itself, and has no further occasion for the male dust. Add to this, that as soon as the work of generation is over, the male parts, together with the leaves, fall off, and the tube leading to the uterus begins to shrink. Nor must it be omitted, that the top of the pistil is always either covered with a sort of velvet tunicle, or it emits a gummy liquor, the better to catch the dust of the apices.—In flowers that turn down, as the acanthus, cyclamen, and the imperial crown, the pistil is much longer than the stamina; that the dust may fall from their apices in sufficient quantity on the pistil.

This system favours much of that admirable uniformity found in the works of nature; and carries with it all the seeming characteristics of truth; but it is experience alone must determine for it.—Accordingly M. Geoffroy tells us, that in all the observations he had ever made, the *Plant* was rendered barren, and the fruits became abortive, by cutting off the pistils before the dust could impregnate them: which is since confirmed by many other experiments of Mr. Bradley and others.

In many kinds of *Plants*, as the willow, oak, pine, cypress, mulberry-tree, &c. the flowers are sterile, and separate from the fruit. But these flowers, M. Geoffroy observes, have their stamina and apices, whose farina may easily impregnate the fruits, which are not far off.

Indeed there is some difficulty in reconciling this system to a species of *Plants* which bear flowers without fruits, and another species of the same kind and name which bear fruits without flowers; hence distinguished into male and female; of which kind are the palm-tree, poplar, hemp, hops, &c.—For how should the farina of the male, here, come to impregnate the seed of the female.

M. Tournefort conjectures, that in this case the fine filaments, tomentum, or down, always found on the fruits of these *Plants*, may serve instead of flowers, and do the office of impregnation.—But M. Geoffroy rather takes it, that the wind, doing the office of a vehicle, brings the farina of the males to the females. In this opinion he is confirmed by a story in Jovianus Pontanus; who relates, That in his time there were two palm-trees, the one male, cultivated at Brindisi, the other female, in the wood of Otranto, 15 leagues apart; that this latter was several

years without bearing any fruit; till at length rising above the other trees of the forest, so as it might see (says the poet) the male palm-tree at Brindisi, it then began to bear fruit in abundance. Here, M. Geoffroy makes no doubt, but that the tree then only began to bear fruit, because in a condition to catch on its branches the farina of the male, brought thither by the wind.

For the manner wherein the farina fecundifies, M. Geoffroy advances two opinions.—1. That the farina being always found of a sulphurous composition, and full of subtle penetrating parts, (as appears from its sprightly odour) falling on the pistils of the flowers, there resolves, and the subtillest of its parts penetrating the substance of the pistil and the young fruit, excite a fermentation sufficient to open and unfold the young *Plant*, inclosed in the embryo of the seed.—In this hypothesis the seed is supposed to contain the *Plant* in miniature, and only to want a proper juice to unfold its parts, and make them grow.

The 2d opinion is, that the farina of the flower is the first germ or bud of the new *Plant*, and needs nothing to unfold it, and enable it to grow, but the juice it finds prepared in the embryo's of the seed.

These two theories of vegetable generation, the reader will observe, bear a strict analogy to those two of animal generation; viz. either that the young animal is in the semen masculinum, and only needs the juice of the matrix to cherish and bring forth; or that the animal is contained in the female ovum, and needs only the male seed to excite a fermentation, &c.

M. Geoffroy rather takes the proper seed to be in the farina; inasmuch as the best microscopes do not discover the least appearance of any bud in the little embryo's of the grains, when examined before the apices have shed their dust.—In leguminous *Plants*, if the leaves and stamina be removed, and the pistil, or that part which becomes the pod, be viewed with the microscope, ere yet the flower be opened; the little green transparent vesiculae, which are to become the grains, will appear in their natural order; but still shewing nothing else but the mere coat or skin of the grain. If the observation be continued for several days successively, in other flowers, as they advance, the vesiculae will be found to swell, by degrees to become replete with a limpid liquor; wherein, when the farina comes to be shed, and the leaves of the flower to fall, we observe a little greenish speck, or globule, floating about at large.

—At first there is not any appearance of organization in this little body; but in time, as it grows, we begin to distinguish two little leaves like two horns. The liquor diminishes insensibly, as the little body grows, till at length the grain becomes quite opaque; when, upon opening it, we find its cavity filled with a young *Plant* in miniature; consisting of a little germ of *plumula*, a little root, and the lobes of the bean or pea, &c.

The manner wherein this germ of the apex enters the vesicula of the seed, is not very difficult to determine.—For, besides that the cavity of the pistil reaches from the top to the embryo's of the grains, those grains or vesiculae, have a little aperture corresponding to the extremity of the cavity of the pistil, so that the small dust, or farina, may easily fall through the aperture into the mouth of the vesicula, which is the embryo of the grain.—This cavity, or cicatrula, is much the same in most grains, and it is easily observed in pease, beans, &c. without the microscope. The root of the little germ is just against this aperture, and it is through this it passes out when the little grain comes to germinate.

The process of nature in the generation of vegetables, and the apparatus she has contrived for that purpose, are so curious, and withal so little and so lately known among us, that we shall illustrate them further with figures; taking the melon for our example, in regard the parts of generation are here very distinct. By the way it must be observed, that though the melon contains both sexes, yet the disposition of the organs differs, here, from the general one above rehearsed in the instance of the tulip: In effect, on the melon *Plant* are two distinct flowers, or blossoms, the one doing the male office, the other the female; which we shall therefore call the *male* and *female* flower.

In *Tab. Nat. Hist. fig. 13.* is represented the male flower or blossom of the pumpkin, a plant of the melon kind, the leaves being stripped from off the circle FF.—ABE represent the head, placed in the centre of the flower, and formed of the circumvolutions of the apices B, and sustained by four columns GCGG.—The part B of the head represents the circumvolutions of the apices while yet shut; and the part E represents them open, and covered with the farina, which they before contained, but which is diffused on the outside when the *Plant* arrives at maturity. Each apex forms a kind of canal separated by a partition into two. A grain of the farina is represented by D. H represents the pedicle that sustains the flower, and which in the male flower produces nothing.

Fig. 15. represents the female flower, or blossom of the pumpkin, or that which bears the fruit.—The leaves are stripped off the circle FF, as before, the better to shew the other parts. The knot of the flower, or the embryo of the fruit, is represented by A. The pistil is represented by BB; and is only a continuation of the embryo of the fruit A. The top of the pistil spreads in BB into several oblong bodies, each separable into two lobes. These bodies are very rough, furnished with hairs and little vesicles proper to catch the dust of the male flower, and to conduct them to the mouths of the canals, which communicate as

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far as the cells of the grains contained in the young fruit. Upon cutting the pistil transversely in its smallest part, we find as many canals as there are divisions in its head; which canals correspond to as many little cells, each including two orders of grains, or seeds, ranged in a spongy placenta.

This doctrine of generation affords us a hint how to alter, improve, &c. the taste, form, and quality of fruits, &c. viz. by impregnating the flower of one, with the farina of another of the same class.

To this accidental coupling and intermixing it is, that the numberless varieties of new fruits, flowers, &c. produced every year by our gardeners, with many other phenomena in the vegetable kingdom, are to be ascribed.

The affection of perpendicularity observed in the stalks or stems of *Plants*, as well as in their branches and roots, makes a fine speculation.—It is a phenomenon never attended to till very lately. The cause is very subtle, and has employed the wits of several of the present set of philosophers, particularly of Astruc, de la Hire, Dodart, and Parent: See their several systems under the article PERPENDICULARITY.

Nor is that constant parallelism observed in the tufts of trees, to the soil or ground they grow upon, a circumstance to be overlooked. See PARALLELISM.

For the fecundity of *PLANTS*, &c. See FECUNDITY.

PLANTS may be divided, with regard to the manner of their generating, into

Male, or such as bear no fruit or seed, and have only the male organ of generation, viz. the farina.—Of this kind are the *Male* palm-tree, willow, poplar, hemp, nettle, and hop-plant. *Female*, or such as bear fruit, and have the female organ, viz. the pistil, or uterus, but want the farina.—Such are the *female* palm, willow, poplar, &c.

Hermaprodites, or such as have both male and female parts, or both the farina, and pistil.

These are again subdivided into (1.) those, in whose flower both sexes are united; as the lily, gilliflower, tulip, and much the greater part of the vegetable species; whose pistil is surrounded by the stamina. And (2.) those whose male and female parts are distinct, and at a distance from each other; such is the rose, whose uterus is beneath the petals; the melon, and all of the cucumber kind, which have their male and female flowers apart; and all fruit, nut, and mast bearing trees, as the apple, plum, gooseberry; and the walnut, hazel, philbert, oak, beech, pine, cypress, cedar, juniper, mulberry, plantain, &c. which have catkins.

Plants may be again distinguished, with regard to their food, and the element they live in, into

Terrestrial, which are those that live only on land, as oaks, beech, flax, &c.

Aquatic, which live only in water; either in rivers, as the water-lily, water-plantain, &c. or in the sea, as the fucus, coral, coralline, &c.

Amphibious, which live indifferently either in land or water; as the willow, alder, &c.

Plants are again distributed, with regard to their destined age or period, into

Annual, which are those whose root is formed and dies in the same year; such are all the leguminous *Plants*, wheat, rye, &c.

Biennials, or *triennials*, which only produce flowers and seeds, the second or even third year after their being raised, and then die, such are fennel, mint, &c.

Perennial, which are those that do not die after they have once borne seed; of these some are ever-greens, as the asarabacca, yew, &c. others lose their leaves one part of the year, as ragwort, colts-foot, &c.

Plants again are distinguished, with regard to their magnitude, &c. into

Trees, arbores; as the oak, pine, fir, elm, lycamore, &c.

Shrubs, frutices, as the holly, box, ivy, juniper, &c. and *Herbs*, as mint, sage, sorrel, thyme, &c.

With regard to certain remarkable qualities, into inert and *Sensitive**, such as give some tokens of sense.

* On which account they were called by the ancients *aschynomous* plants (from *ασχνομος*, to be bald) and by the moderns, *living* or *mimic* plants.

But these divisions are rather popular, than just and philosophical.

The Botanists give us more accurate and minute arrangements, or distributions, of the vegetable kingdom, into classes, genera, species, &c. with regard to their nature, characters, &c.—But it is a point they are not well agreed upon from what consideration the division into genera is best taken; some, as Guier, Columna, Tournefort, &c. chusing only the flower and fruit; and others taking in the roots, leaves, stems, &c. See farther under the article GENUS.

Our ingenious Mr. Ray distributes plants into 25 genera, or classes, under the following denominations.

1. *Imperfect* *PLANTS*, which are such as appear to want the flower and seed.—Such are, corals, sponges, fungus, truffies, and mosses.
2. *PLANTS* producing an imperfect flower, and whose seed is too small to be discerned by the naked eye; such are fern, polypody, &c.

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3. Those whose flowers want petals; --- such are hops, hemp, nettles, and docks.

4. Those with a compound flower, and which emit a milky juice when cut or broke; as lettuce, dandelion, succory, &c.

5. Those with a compound flower of a discous form, and whose seed is alated, or as it were winged with down; as colts-foot, flea-bane, &c.

6. *Herba cymosa*, or those whose flower is composed of several long fistulous flowers gathered into a round head, and covered with a scaly coat; as the thistle, great burdock, blue-bottle, &c.

7. *Corymbiferous* *PLANTS* with a discous flower, but no down to the seeds; as the daisy, yarrow, corn-marygold, &c.

8. *PLANTS* with a perfect flower, and only one seed to each flower, as valerian, agrimony, burnet, &c.

9. *Umbelliferous* *PLANTS*, with a flower of five petals, and two seeds to each flower. This being a large genus, is subdivided into seven orders, viz. those with a flat broad feed, as wild garden parship: with a longish and larger feed, swelling in the middle, as cow-weed, and wild chervil: with a shorter feed, as angelica: with a tuberous root, as the earth-nut: with a small striated feed, as caraways, fatifrage, and burnet: with a rough hairy feed, as parilly, and wild carrot: and with entire leaves, as anicle and thorough-wax.

10. *Stellate* *PLANTS*, whose leaves go round the stalks, at certain intervals, in form of stars; as clivers, madder, &c.

11. *Rango-laved* *PLANTS*, which have their leaves placed alternately, or in no certain order along the stalks; as hounds-tongue, mouse ear, &c.

12. *Verticillate* *PLANTS*, whose leaves grow by pairs, on their stalks, one leaf right against another, the flower being monopetalous; and usually in form of a helmet; as thyme, mint, pennyroyal, vervain, &c.

13. *Polypermus*, or those with many naked seeds, at least five, succeeding their flower; as crows-foot, marsh-mallows, cinquefoil, strawberries, &c.

14. *Bacciferous* *PLANTS*, or such as bear berries; as briony, honeysuckle, Solomon's-seal, lily of the valley, nightshade, asparagus, &c.

15. *Multisiliquous*, or *corniculate* *PLANTS*, which after each flower produce several long slender siliques, or cases wherein their seed is contained; as orpine, navel-wort, bears-foot, columbines, &c.

16. *Vasculiferous* *PLANTS* with a monopetalous flower, and which after each flower, have a vessel beside the calyx, containing the seed, as henbane, bindweed, rampions, fox-glove, eye-bright, &c.

17. Those with an uniform tetrapetalous flower, bearing their seeds in oblong siliquous cases; as stock-gillyflower, mustard, radish, &c.

18. *Vasculiferous* *PLANTS* with a seeming tetrapetalous flower, but of an anomalous or uncertain kind, and in reality only monopetalous, falling off altogether in one; as speedwell, fluellin, plantain, yellow and wild poppy, &c.

19. *Vasculiferous* *PLANTS* with a pentapetalous five-leaved flower; as maiden pinks, campions, chickweed, St. John's wort, flax, primrose, wood-forrel, &c.

20. *Leguminous* *PLANTS*, or such as bear pulse; with a papilionaceous flower, consisting of four parts joined at the edges; as peas, beans, vetches, tares, lentils, liquorice, trefoil, &c.

21. *PLANTS* with a true bulbous root; as garlic, daffodils, hyacinth, fathion, &c.

22. Those whose roots approach nearly to the bulbous form; as flower-de-luce, cuckoo-pint, &c.

23. *Culmiferous* *PLANTS*, with a grassy leaf, and an imperfect flower, having a smooth, hollow jointed stalk with a long sharp pointed leaf at each joint, and the seeds contained in a chaffy husk; as wheat, barley, rye, oats, reeds, and most kinds of grass.

24. *PLANTS* with a grassy leaf, but not culmiferous, with an imperfect or staminate flower; as rushes, cats-tail, &c.

25. *PLANTS*, whose characters are uncertain; chiefly water-plants, as the water-lily, milk-wort, mouse-tail, &c.

For the fancied transmutation of one species of *PLANTS* into another, see TRANSMUTATION, DEGENERATION, &c.

The properties and virtues of *Plants* have been observed by some naturalists to bear an analogy to their forms.—In the Philosophical Transactions, we have a discourse of Mr. James Pettiver, to shew, that *Plants* of the same or like figure, have the same or like virtues and uses.—Thus the umbelliferous tribe, he observes, have all a carminative taste and smell, are powerful expellers of wind, and therefore good in all flatulent disorders.—The galeate or verticillate kind are a degree warmer, and more powerful than the last; and therefore may be reputed aromatic, being proper for nervous disorders.—The tetrapetalous kind are hot like the two former, but exert their power in a different way, viz. by a diuretic volatile salt, which makes them of use in chronical diseases, obstructions, cacochymias, &c.

PLANTA, in anatomy, the lowest part, or sole of the foot of man; comprehended between the tarsus and the toes. See FOOT.

PLANTAGENET, in history, an addition or surname, borne by many of our ancient kings.

The term *Plantagenet* has given infinite perplexity to the critics and antiquaries, who could never settle its origin and etymology.

—It

—It is allowed that it first belonged to the house of Anjou, and was brought to the throne of England by Henry II. where his male posterity preferred it till the time of Henry VII. a space of above 400 Years.

It is disputed who it was that first bore the name. Most of our English authors conclude, that our Henry II. inherited it from his father Geoffrey V. earl of Anjou, son of Fulk V. king of Jerusalem, who died in 1144.—This Geoffrey they will have the first of the name; and our Henry II. the issue of Geoffrey by Maud, only daughter of Henry I. the second.

Yet Menage will not allow Geoffrey to have borne the name; and adds, that in effect the old annalist of Anjou, J. Bourdigne, never calls him so.—The first Menage adds, to whom he gives the appellation, is Geoffrey third son of this Geoffrey V.

Yet must the name be much more ancient than either of these princes, if what Skinner says of its origin and etymology be true.—That author tells us, that the house of Anjou derived the name from a prince thereof, who having killed his brother to enjoy his principality, took to repentance, and made a voyage to the Holy Land to expiate his crime; disciplining himself every night with a rod made of the plant *genêt*, *genista*, broom; whence he became nick-named *Planta-genêt*.

Now it is certain that our Geoffrey made the tour of Jerusalem; but then he did not kill his brother, nor did he go thither out of penance, but to assist king Amauris his brother.—Who then should this prince of the house of Anjou be? Was it Fulk IV. ? It is true he dispossessed his elder brother Geoffrey, and clapt him in prison, but he did not kill him; nay, Bourdigne observes, he was even released out of the same by his son Geoffrey V. already mentioned.

Further, this Fulk did make a journey to Jerusalem, and that too, partly out of a penitential view; we are assured by Bourdigne, he did it out of apprehension of the judgments of God, and eternal damnation, for the great effusion of christian blood in the many mortal battles he had been in.—The annalist also adds, that he made a second voyage; but it was to return God thanks for his mercies, &c. To which we may add, that Fulk was never called *Planta-genêt*; to that what Skinner advances appears to be a fable.

There is another common opinion, which appears no better founded; and it is this, that the name *Plantagenet* was common to all the princes of the house of Anjou, after Geoffrey V. whereas, in fact, the name was only given to a few; and that, as it should seem, to distinguish them from the rest. Thus Bourdigne never applies it to any but the third son of Geoffrey V. and distinguishes him by this appellation from the other princes of the same family.—Tho' it is certain that it was likewise given to the elder brother, Henry of England, as before observed.

PLANTARIS, in anatomy, a muscle which has a fleshy beginning from the back part of the external protuberance of the thigh-bone, and descending a little way between the gemelli and soleus, becomes a long and slender tendon, which proceeds by the inside of the great tendon over the os calcis to the bottom of the foot, and expands itself under the sole, upon the *musculus perforatus*, to which it adheres closely, as the palmaris does in the hand. See *Tab. Anat. (Myol.) fig. 1. n. 68*. Some reckon this among the extensors of the foot. See **EXTENSOR**.

PLANTATION, in the islands and continent of America, a spot of ground which some planter, or person arrived in a new colony, pitches out to cultivate and till for his own use.

PLANTING, in agriculture and gardening, the setting of a tree, or plant, taken up from its former place in a new hole or pit proportionable to its bulk; throwing rich earth over its root, and filling up the hole to the level of the other ground.

PLANTING in a back. See **ORCHARD**.

PLANTING of forest-trees. See **NURSERY and TREE**.

PLANTING of young and trees.—After two years growth in the nursery, stone-fruit, being first inoculated or grafted, are ready for removal; which is best done in October or November.

To prepare the soil for its new guests, a hole is dug two foot deep; or, if the soil be not very good, the pit is made shallower, and earth raised above it.—With the soil dug up, they frequently mix either a rich soil from elsewhere, or manure, so as the mixed be at least as rich as the soil out of which the tree came.

The hole being half filled up with this compost, it is trodden down, to afford a firm rest to the root; all the extremities whereof are cut off, and the tree fitted to the wall by cutting off such branches as grow directly either towards or from-wards the wall, and leaving only the side-branches, which are to be nailed to it.

This done, the tree is set in its hole, as far from the wall as is consistent with the head's spreading thereon, that the root may have the more room backwards; and the hole is then filled up with the compost.

If the soil be poor, it is proper to manure round the tree; and in the end of February, to cover it with fern or straw.—It will also be necessary to prune and nail the tree to the wall, at least twice or thrice every year.

Inverted PLANTING, is a method of planting, wherein the ordinary position of the plant, or shoot, is inverted; the branches

being set in the earth, and the roots reared into the air.

Agriculture mentions this monstrous way of *Planting*, which he assures us succeeds very well in moist, or all sorts of fruit-trees, timber-trees, &c. both foreign and domestic.

Bradly affirms to have seen a lime-tree in Holland growing with its first roots in the air, which had shot out branches in great plenty, at the same time that its first branches were turned into roots, and fed the tree.

The industrious Mr. Faichild has practised the same with us, and gives us the following directions for the performance thereof.

Choose a young tree of one shoot, of alder, elm, willow, or any other tree that takes root readily by laying. Bend the shoot gently down till the extreme part be in the earth, and so let it remain till it has taken good root.—This done, dig about the first root, and gently take it up out of the ground, and tuck it till the stem be nearly upright; in which state stake it up.

Then prune the roots, now erected in the air, from the bruises and wounds they received in being dug up; and anoint the pruned parts with a composition of four parts of bees wax, two of resin, and two of turpentine, melted together and applied pretty warm.—Then prune off all the buds or shoots upon the stem, and dress the wounds with the same composition, to prevent any collateral shootings; and leave the rest to nature.

PLANTING, in architecture, denotes the laying the first courses of stone on the foundation, according to the measures, with all the exactness possible.

PLASM, **PLASMA**, is sometimes used for a mould, wherein any metal, or such-like running matter, which will afterwards harden, is cast, to receive its figure.

PLASTER, or **PLASTER**, in building, a composition of lime, sometimes with hair, sometimes with sand, &c. to patch, or cover the nudities of a building.

PLASTER of Paris, is a stifle stone, serving many purposes in building; and used likewise in sculpture, to mould and make statues, bas-reliefs, and other decorations in architecture. It is dug out of quarries, in several parts of the neighbourhood of Paris; whence its name.—The finest is that of Montmartre. *Plaster of Paris*, among our workmen, is of two kinds; *viz* *crude*, or in the stone; and *burnt*, or beaten.

The *crude* is the native *Plaster*, as it comes out of the quarry; in which state it is used as shards in the foundations of buildings. The *burnt Plaster* is a preparation of the former, by calcining it like lime in kiln or furnace, and then beating it into powder, and diluting and working it. In this state it is used as mortar or cement in buildings.

This, when well sifted and reduced into an impalpable powder, is used also to make figures and other works of sculpture; and is besides of some use in taking out spots of grease, &c. in stuffs and silks.

In the *Plaster* quarries is also found a kind of false talc, or plated scilicet, wherewith they counterfeit all kinds of marble. See **Supplement, article GYPSUM**.

PLASTIC, *πλαστικός*, imports as much as *formative*, or a thing endued with a faculty of forming, or fashioning a mass of matter after the likeness of a living being.

* The word comes from the Greek, *πλασσις*, or *πλασσω*, *plassein*, I fashion, form, &c.

Some of the ancient Epicureans, and perhaps the Peripatetics too, imagined a *plastic* virtue to reside in the earth, or at least to have anciently resided therein; and that it was by means hereof, and without any extraordinary intervention of a Creator, that it first put forth plants, &c.

Nay, some of them, whether seriously or not, we do not undertake to determine, taught, that animals, and even man, were the effect of this *plastic* power.

PLASTIC, *πλαστικός*, the **PLASTIC art**; a branch of sculpture, being the art of forming figures of men, birds, beasts, fishes, plants, &c. in plaster, clay, stone, or the like. See **SCULPTURE**.

The workmen concerned herein are also called *plastar*, *πλασται*. *Plastic* differs from carving, in that here the figures are made by addition of what wants; but in carving always by subtraction of what is superfluous.

The *plastic art* is now chiefly used among us in fret-work ceilings; but the Italians apply it also to the mantlings of chimneys with great figures.

PLAT, a popular term among mariners, &c. for a sea-chart.

PLATA, **PLATE**, in commerce, a Spanish term, signifying silver; as vellon, which they pronounce vellon, signifies copper.

These two terms are not only used to express the species of those metals struck in Spain, but also to distinguish between several of their monies of account.—Thus they lay a ducat of *Plata*, and a ducat of vellon; a rial of *Plata*, and a rial of vellon; which denominations augment and diminish the value by almost one half; 34 maravedis of *Plata* being equal to 63 of vellon; and the piece of eight being only 272 maravedis of *Plata*, but 510 of vellon. See **DUCAT**, **PIECE of eight**, **RIAL**, and **MARAVEDIS**.

PLATE, in commerce, denotes gold or silver wrought into vessels for domestic uses.

PLATE, in heraldry, is a round, flat piece of silver, without any impression; but, as it were, formed ready to receive it.

The term is used only by English heralds.—In other nations they are known by the name of *bezants argent*.

PLAT-BAND, in gardening, a border, or bed of flowers, along a wall, or the side of a parterre; frequently edged with box, &c.

PLAT-BAND, in architecture, is any flat square moulding, whose height much exceeds its projection. — See *Tab. Archit. fig. 28. lit. n.*

Such are the faces or fasciæ of an Architrave, and the *Plat-band* of the modillions of a cornice.

The *Plat-band* is signified in Vitruvius, and others, by the words *fascia*, *tania*, and *coria*. See *FASCIA*.

PLAT-BAND of a door or window, is used for the lintel, where that is made square, or not much arched.

These *Plat-bands* are usually crossed with bars of iron, when they have a great bearing: But it is much better to ease them by arches of discharge built over them.

PLAT-BANDS of flutings, the lifts or fillets between the flutings of columns.

PLAT-FORM, in war, an elevation of earth, on which cannon is placed to fire on the enemy.

Such are the mounts on the middle of the curtains.—On the rampart there is always a *Plat-form*, where the cannon are mounted.

It is made by the heaping up of earth on the rampart; or by an arrangement of madders, rising insensibly for the cannon to roll on; either in a casemate, or on an attack in the outworks.

PLAT-FORM, in architecture, is a row of beams, which support the timber-work of a roof, and lie on the top of the wall, where the entablature ought to be raised.

PLAT-FORM is also used for a kind of terrace, or broad smooth open walk on the top of a building, from whence we may take a fair prospect of the adjacent country.

Hence an edifice is said to be covered with a *Plat-form*, when it is flat at top, or has no ridge.

Most of the oriental buildings are thus covered, as were all those of the ancients.—Cæsar was the first among the Romans who procured leave to build his house with a ridge or pinnacle.

PLAT-FORM, or *orlop*, in a man of war, is a place on the lower deck, abast the main-mast, between it and the cock-pit, and round about the main capstan; where provision is made for the wounded men, in time of service. See *Tab. Ship. fig. 2. lit. 7.*

PLATONIC, something that relates to Plato, his school, philosophy, opinions, or the like.

PLATONIC bodies, are the same with what we otherwise call *regular bodies*. See *REGULAR BODIES*.

PLATONIC love, denotes a pure, spiritual affection, subsisting between the different sexes, abstracted from all carnal appetites, and regarding no other object but the mind, and its beauties; or it is even a sincere disinterested friendship, subsisting between persons of the same sex, abstracted from any selfish views, and regarding no other object but the person.

The term took its rise from the philosopher Plato, a strenuous advocate for each kind.

The world has a long time laugh'd at Plato's notions of love and friendship.—In effect, they appear arrant chimera's contrary to the intentions of nature, and inconsistent with the great law of self-preservation; which love and friendship are both ultimately resolvable into.

PLATONIC year, or the *great year*, is a period of time determined by the revolution of the equinoxes; or the space wherein the stars and constellations return to their former places, in respect of the equinoxes.

The *Platonic year*, according to Tycho Brahe, is 25816; according to Ricciolus 25920; and according to Cassini 24800 years.

This period, which is more than five times the age of the world, once accomplished, it was an opinion among the ancients, that the world was to begin anew, and the same series of things to turn over again.

PLATONISM, the doctrine and sentiments of Plato and his followers, with regard to philosophy, &c.

The founder of this system of philosophy, Plato, the son of Aristo, was an Athenian; born about the year of the world 3645; who, after having spent his youth in exercises of the body, painting and poetry, became a disciple of Socrates.—After his master's death, he applied himself to Cratylus and Hermogenes; till being a master of the Greek philosophy, he travelled into Italy, where he learnt also that of the Pythagoreans. Thence he proceeded into Egypt; where, in several years residence, he became fully acquainted with the secrets of the Egyptian priests.

At his return to Athens, he began to retail the stock of learning he had collected, among his countrymen; philosophizing daily in the Academy, a delicious villa in the neighbourhood of that city.—And hence his disciples were called *Academics*.

In physics, he chiefly followed Heraclitus; in ethics and politics, Socrates; and in metaphysics, Pythagoras.

After his death, two of the principal of his disciples, Aristotle and Xenocrates, continuing his office, and teaching, the one in the Academy, the other in the Lyceum; form'd two sects, under different names, though in other respects the same; the one retaining the denomination of *Academics*; see *ACADEMIC*.

The other assuming that of *Peripateticus*; see *PERIPATETIC*.

In after-times, about the first ages of the christian church, the followers of Plato quitted the titles of *Academists*, and took that of *Platonists*.

It is supposed to have been at Alexandria in Egypt that they first assumed their new title, after having restored the ancient Academy, and re-established Plato's sentiments; which in process of time had many of them been laid aside.

Porphyrus, Plotin, Iamblichus, Proclus, and Plutarch, are those who acquired the greatest reputation among the Greek Platonists: And among the Latins, Apuleius and Chalcidius.—Among the Hebrews, Philo Judeus.—The modern Platonists own Plotin the founder, at least the reformer of their sect.

The *Platonic philosophy* appears very consistent with the Mosaic; and a great party of the primitive fathers follow the opinions of that philosopher, as being favourable to Christianity.—Justin is of opinion, that Plato could not learn many things which he has said in his works, from mere natural reason; but thinks he might have learnt them from the books of Moses, which he might have read when in Egypt.

Hence Numenius, the Pythagorean, expressly calls Plato the *Attic Moses*; and upbraids him with plagiarism, in that he stole his doctrine about the world and God, from the books of Moses.

Theodoret says expressly, that he has nothing good and commendable about the Deity, and his worship, but what he stole from the Hebrew theology; and Clemens Alexandrinus calls him the *Hebrew philosopher*.

Gale is very particular in his proof of the point, that Plato borrowed his philosophy from the scriptures, either immediately, or by means of tradition; and, beside the authority of the ancient writers, he brings some arguments from the thing itself.—As, *a. gr.* Plato's confession that the Greeks borrowed their knowledge of the one infinite God, from an ancient people, better and nearer to God than they; by which people, our author makes no doubt, he meant the Jews: From his account of the state of innocence, as, that man was born of the earth, that he was naked, that he enjoyed a truly happy state, that he conversed with brutes, &c.—In effect, from an examen of all the parts of Plato's philosophy, physical, metaphysical, and ethical; this author finds, in every one, evident characters of its sacred original.

As to the manner of the creation, Plato teaches that the world was made according to a certain exemplar, or idea, in the divine Architect's mind. And all things in the universe, in like manner, he shews, do depend on the efficacy of eternal ideas.

This ideal world is thus explain'd by Didymus: "Plato supposes certain patterns or exemplars of all sensible things, which he calls ideas; and as there may be various impressions taken off from the same seal, so he says are there a vast number of natures existing from each idea." This idea he supposes to be an eternal essence, and to occasion the several beings in nature to be such as itself is: And that most beautiful and perfect idea, which comprehends all the rest, he maintains to be the world.

Further, Plato teaches that the universe is an intelligent animal, consisting of a body and a soul.

The first matter whereof this body was formed, he observes, was a rude indigested heap, or chaos: Now, adds he, the creation was a mixed production; and the world is the result of a combination of necessity and understanding, *i. e.* of matter, which he calls necessity, and the divine wisdom.

The principles, or elements, which Plato lays down, are fire, air, water, and earth.

He supposes two heavens; the *empyrean*, which he takes to be of a fiery nature, and to be inhabited by angels, &c. and the *starry heaven*, which he teaches is not adamantine or solid, but liquid and spirable.

His physics, or doctrine *de corpore*, is chiefly laid down in his *Timæus*; where he argues on the properties of body, in a geometrical manner; which Aristotle takes occasion to reprehend in him.—His doctrine *de mente* is delivered in his tenth book of *laws*, and his *Parmenides*.

St. Augustin commends the *Platonic philosophy*; and even says, that the *Platonists* were not far from Christianity: He adds, that the generality of the new *Platonists* of his time embraced the faith.

Justin Martyr professes, that Plato's doctrine was of the utmost advantage to him, in helping him to believe the mysteries of the Christian faith.—To which it may be added, that it was in good measure by Plato's help, that Origen confuted Celsus. Indeed the late author of *Platonisme dévoilé* carries things to an extravagant length, when he contends, that the dogmata of our religion are only the opinions of Plato; that the fathers give us nothing of the mysteries thereof, but what they learnt from him; and that Christianity is only *Platonism* veiled, or covered over. To which opinion, however, M. le Clerc seems also a little inclined.

PLATONISTS. See *PLATONISM*; and *ACADEMICS*.

PLATTOON *, or *PLOTTOON*, in war, a small square body of 40 or 50 men, drawn out of a battalion of foot, and placed

* The word is formed, by corruption, of the French *peloton*, a bottom, or clue of thread.

between the squadrons of horse, to sustain them; or in ambuscades, freights, and desfiles, where there is not room for whole battalions or regiments.

Platoons are also used, when they form the hollow square to strengthen the angles.

The grenadiers are generally posted in *Platoons*.

PLATT'S, on board a ship, are flat ropes made of rope yarn, and woven one in another.

Their use is to save the cable from galling in the haul; or to wind about the flukes of the anchors, to save the pendant of the fore-sheet from galling against them.

PLAYYSMA, *Myoides*. V. **MUSCLE**.

PLAY, *Lusus*. See **GAME**, and **GAMING**.

PLAY, in poetry, &c. See **DRAMA**, **TRAGEDY**, **COMEDY**, &c.

PLAY-HOUSE. See **THEATRE**, **AMPHITHEATRE**, &c.

PLEA, **PLACITUM**, in law, that which either party alledgeth for himself in court, in a cause then depending to be tried.

Pleas are either of the crown, or common *Pleas*.

Pleas of the crown, are all suits in the king's name, for offences committed against his crown and dignity, or against his crown and peace.—Such are treasons, felonies, misprisions of either, and mayhem.

Edward I. enfeoffed Walter de Burgo in the land of Ulster in Ireland, &c. excepting the *Pleas* of the crown, *viz.* rape, willful firing, and treasure-trove. *Cam. tit. Ireland.*

Common Pleas, are those agitated between common persons; though, by the division above laid down, they should comprise all others except those there enumerated, notwithstanding that the king be a party.

Pleas may farther be divided into as many branches as *action*; inasmuch as they are in reality the same thing.

There is also *foreign Plea*, whereby matter is alledged in any court, that ought to be tried by another.—As if one lay bartyard to another in a court baron.

Pleas of the sword.—Ranulph earl of Chester, 2 Hen. III. granted to his barons of Cheshire, an ample charter of liberties, *exceptis placitis ad gladium meum pertinentibus*.

The reason of the exception was, that William the Conqueror gave the earldom of Chester to his half-brother Hugh, commonly called Lupus, ancestor of this Ranulph, *Tenere ita libere ad gladium, sicut ipse rex tenuit Angliam ad coronam*.

Accordingly, in all indictments for felony, murder, &c. in the county Palatine, the form was, *Contra pacem domini comitis, gladium & dignitatem suam; or contra dignitatem gladii Cestrie*.

—Such were the *Pleas* for the dignity of the earl of Chester.

Court of common Pleas, called also **common bench**. See **COMMON Pleas**.

PLEADING, **PLACITATIO**, a discourse spoken at the bar, in defence of the cause of a party.

From the time of the conquest, all *Pleading* was performed in French, till the time of Edward III. when it was appointed that the *Pleas* should be *pleaded* in English, but that they should be entered or recorded in Latin.

At Athens, and even in France and England, it was prohibited to have any formed or prepared *Pleading*, or to amuse the court with long artificial harangues; only, in important matters, it was the settled custom to begin the *Pleadings* with a passage in holy scripture.

It is but of late years that eloquence was admitted to the bar; and it may be said, there is scarce any nation in Europe, where it is less practised or encouraged than among us.—The elocution of the bar, like that of the pulpit, despises the rules of rhetoric.

PLEADINGS, in a stricter sense, are all the allegations of the parties to a suit, made after the count, or declaration, till issue is joined.

In this sense the *Pleadings* express what is contained in the bar, replication, and rejoinder; and not what is in the declaration itself.—Hence defaults in the matter of declaration, are not comprized within the *mispleading*, or insufficient *Pleading*, which only extends to that committed in the bar, replication, or rejoinder.

PLEASURE, the effect of a sensation or perception, agreeable to the mind, or of the gratification of some appetite.

Pleasures may be distinguished into two kinds.—The first, those which anticipate, or go before the reason; such are all agreeable sensations.—These are popularly called *Pleasures of sense*, or of the body.

The second are those which do not precede or anticipate either the senses or reason. These we call *Pleasures of the mind*.

—Such is the joy arising from a clear perception of some future good, or the confused sensation of a present one.

For an instance of each:—A man frequently finds *Pleasure* in eating a fruit he was before unacquainted withal: This is *anticipating Pleasure*, which he feels ere he knows the fruit to be good. On the other hand, a hungry hunter expects, or perhaps actually finds, victuals; where the joy he conceives, is a *Pleasure* that follows from the knowledge of his present or future good.

Pleasure and *Pain* seem to be no other than engines in nature's hand; whereby we are directed to consult our own preservation, and avoid our ruin.—To things that may contribute to

the one, as food, venery, &c. she has annexed *Pleasure*; and to those that may conduce to the other, as hunger, diseases, &c. pain: She durst not leave it to our discretion, whether we would preserve and propagate the species or not; but, as it were, constrains us to both: Were there no *Pleasure* in eating, nor pain in hunger, what numbers would be starved through negligence, forgetfulness, or slothfulness? What is it induces people to the office of generation but *Pleasure*? Without this the world had scarce subsisted to this time.

Among the multiplicity of things to be done, and to be avoided, for the preservation of animal life, &c. how should we have distinguished between the one and the other, but for the sensation of *Pleasure* and pain? These are not only spurs, to urge us on, but also guides, to direct us whither we are to go. Wherever nature has fixed a *Pleasure*, we may take it for granted, the there enjoins a duty; and something is to be there done, either for the individual, or for the species.

Hence it is that our *Pleasures* vary at different stages of life; the *Pleasures*, *e. gr.* of a child, a youth, a grown man, an old man, &c. all tending to those particular things required by nature in that particular state of life, either for the preservation, simply, or jointly for that and propagation, &c.

Hence, from the different constitutions of the body, at different ages, it were very easy to account for all the particular tastes and *Pleasures* thereof: Not by deducing the *Pleasures* mechanically from the disposition of the organs in that state; but by considering what is necessary for the perfection and well-being of the individual in that state, and what it is to contribute to that of the species.—In a child, *e. gr.* mere preservation in the present state is not enough; it must likewise grow: to bring this to pass, nature has made the returns of hunger, &c. more frequent, as well as more acute; and the *Pleasures* of feeding more exquisite. And that the excess of aliment in proportion to the bulk of the body may be dispensed withal, she has made one of the great *Pleasures* of the state to consist in a series of sportive exercises, by means whereof the parts of the body come to be opened and expanded, and arrive at maturity. This done, the *Pleasures* that conducted thereto disappear; and others suited to the new state, succeed.

For the *Pleasures* of beauty, music, &c. See **BEAUTY**, **MUSIC**, &c.

PLEBANUS was anciently the title of a rural dean. See **RURAL dean**.

The denomination arose hence, that these deanries were then affixed to the *Plebania*, or chief mother-church within such a district, which at first was usually ten parishes.

PLEBANUS seems also to have been used for a parish-priest of such a large mother-church, as was exempt from the jurisdiction of the ordinary, so that he had the authority of a rural dean committed to him by the archbishop, to whom the church was immediately subject.

PLEBEIAN, **PLEBEIUS**, a person of the rank of the populace, or common people.

The term is chiefly used in speaking of the ancient Romans, who were divided into *senators*, *knights*, and *Plebeians* or *commons*.

PLEBISCITUM, among the Romans, a law enacted by the common people, at the request of the tribune, or some other plebeian magistrate, without the intervention of the senate.

PLEBISCITUM is more particularly applied to the law which the people made, when, upon some misunderstanding with the senate, they retired to the Aventine mount.

PLEDGE, **PLEGIUS**, in common law, a surety, or gage, either real or personal, which the plaintiff or defendant is to find for his prosecuting the suit.

The word is sometimes also used for *frank Pledge*, which see.

To **PLEDGE**, in drinking, denotes to warrant, or be surety to one, that he shall receive no harm while he is taking his draught.

The phrase is referred by our antiquaries to the practice of the Danes, heretofore in England, who frequently used to stab, or cut the throats of the natives, while they were drinking.

PLEDGERY, or **PLEGGERY**, suretiship, or an undertaking or answering for another.

The appellant shall require the constable and marshal, to deliver his pleggs, and to discharge them of their *Pleggery*; and the constable and marshal shall ask leave of the king to acquit his *Pleggs*, after that the appellant is come into the lists to do his devoir. *Orig. Jur. ex Vet. Cod. MS. in Bibl. Selden.*

PLEDGET, in chirurgery, a kind of flat tent, made, not to enter a wound, but to be laid upon it, to imbibe the superfluous humours, and keep it clean and dry.

PLEGIUS acquietandis, a writ that lies for a surety, against him for whom he is surety, in case he pay not the money at the day. *Fitz. Nat. Brev.*

PLEIADES, *Θιαδες*, in astronomy, an assemblage of seven stars, in the neck of the constellation *Taurus*.

They are thus called from the Greek *πλεω*, *navigare*, to sail; as being terrible to mariners, by reason of the rains and storms that frequently rise with them.

PLE

The Latins call them *Vergilæ*, from *Vir*, spring; because of their rising about the vernal equinox.

The largest is of the third magnitude, and is called *Lucida Pleiadum*. See their several longitudes, latitudes, magnitudes, &c. under the article **TAURUS**.

POETICAL PLEIADES, is a name which the Greeks gave to seven celebrated poets, flourishing under the reign of Ptolemy Philadelphus.

In imitation of the Greeks, Ronfard formed a *Pleiades* of French poets under the reign of Henry II.—It consisted of Daurat, Ronfard, du Bellay, Belleau, Baif, T'yard, and Jodelle. On the same model, some of their authors are projecting a new *Pleiades* of the Latin poets of the present time; but they are not yet agreed about the names of those that are to compose it; much less on him who shall be the *Lucida Pleiadum*.—M. Baillet has named F. Rapin, F. Commire, F. de la Rue, M. de Santeuil, M. Menage, M. du Perier, and M. Petit.

PLENARTY, in law, a term used in ecclesiastical matters, to denote that a benefice is full, or possessed of an incumbent. In which sense it stands opposed to *vacancy*. See **VACANCY**. Infinitution, by six months, is a good *Plenary* against a common person, but not against the king, without Induction. See **INSTITUTION** and **INDUCTION**.

PLENARY *, something complete, or full.—Thus we say, the pope grants *plenary indulgences*, i. e. full and intire remissions of the penalties due to all sins.

* The word is formed of the Latin *plenarius*, of *plenus*, full.

PLENILUNUM *, in astronomy, that phasis or state of the moon, popularly called the *full moon*.

* The word is a compound of the Latin *plenus*, and *luna*.

PLENIPOTENTIARY *, a person who has full power, and commission to do any thing.

* The word is compounded of *plenus*, full, and *potentia*, power.

The word is chiefly understood of the ministers or ambassadors sent from princes or states to treat of peace, marriages, and other important matters.

The first thing done in conferences of peace, is, to examine the powers of the *Plenipotentiaries*.

PLENITUDE, **PLENITUDO**, the quality of a thing that is full, or that fills another.

In phycic, it is chiefly used for a redundancy of blood and humours.

Physicians reckon two kinds of plenitude.—The one called *ad vires*, when the abundance of the blood oppresses the patient's strength.

The other *ad vasa*, when it fills the vessels too much; swelling them to a degree of bursting.

PLENUM, in physics, a term used to signify that state of things, wherein every part of space, or extension, is supposed to be full of matter.

It is used in opposition to a *vacuum*, which is a space supposed devoid of all matter.

The Cartesians adhere firmly to the doctrine of an absolute *Plenum*.—They do on this principle, that the essence of matter consists in extension; from whence, indeed, the consequence is very easy, that where-ever there is space or extension, there is also matter.

But this principle we have shewn to be false; and therefore the consequence drawn from it falls to the ground. See **MATTER**.

But that there is a real vacuum in the nature of things, is likewise demonstrated by arguments *a posteriori*, under the article **VACUUM**.

PLEONASM *, **PLEONASMUS**, in rhetoric, a figure of speech, whereby we make use of words seemingly needless or superfluous, in order to express a thought with the greater force and energy.

* The word is formed from the Greek *πλεονασμος*, *q. d. super-abundancy*.

Such is, *I saw it with my own eyes*; or, *he heard it with his own ears*, &c.

The *Pleonasm* is called by the Latins, *redundantia*. *Pleonasm*, by grammarians, is usually defined a fault in discourse, wherein we say more than needs.

M. Vaugelas will not allow the phrase, *I saw it with my own eyes*, to be a *Pleonasm*; inasmuch as there are no superfluous words in it; none but what are necessary to give a stronger assurance of the thing affirmed.—It is sufficient that one of the phrases say somewhat more than the other, to avoid the imputation of a *Pleonasm*.

In effect, though we give the name *Pleonasm* to any thing that is not necessary, or that enters the discourse independently of the sense or construction; yet there are frequently words which in that view would be pertinent, yet are used to good purpose to give a greater force, or grace to discourse.

He spoke with his mouth, is a *Pleonasm* in English; it is none in Latin: Virgil says, *sic ore locutus*. Some French authors deny *unir ensemble*, to unite together, to be a *Pleonasm*.

PLEROTICS *, *πληρωτικα*, in medicine, a kind of remedies, otherwise called *incarnatives*, and *sarcotics*. See **INCARNATIVE** and **SARCOTIC**.

* The word is formed from the Greek *πληρωω*, *I fill*.

PLE

PLETHORA, *πληθωρα*, in medicine, such an abundance of any good and laudable humour, as proves hurtful to the animal functions.

Plethora is chiefly understood of the blood, though sometimes of the other humours.

The *Plethora* is the consequence of a good chylickation, sanguification, &c. attended with a too sparing discharge by perspiration, &c.

It is usually described either as *ad vires*, or *ad vasa*.

The *Plethora* is chiefly produced in a body whose organs of digestion are strong, blood-vessels lax, diet full of good juice, temperament sanguine, mind at ease and indolent, of a middle age, and in a moist air.—It renders heat and motion uneasy; it stretches the great vessels, and compresses the smaller. And hence stiffness, and heaviness, and on the least occasion ruptures in the vessels, suffocations, &c.

Dr. Freind makes the catamenia, or menses, the mere result of a *Plethora*, and will have them only an evacuation for relief against the quantity of the blood, which he supposes to be natural to women, from the humidity of their temperature, the smallness of their vessels, &c. Hence arises a Coacervation in the blood-vessels, of a superfluity of aliment remaining over and above what is excreted by the common ways.

PLEVIN, **PLEVINA**, in law, a warrant or assurance; the same with pledge. See **PLEDGE**, **REPLEVIN**, &c.

PLEURA *, *πλευρα*, in anatomy, a membrane which lines the inside of the cavity of the breast, and incloses all the parts contained therein, being of the same figure and extent as the thorax itself, and of the same substance with the peritonæum.

* The word is derived from the Greek *πλευρα*, which primarily signifies *side*. The Latins call it *saccus*.

It is very fine and thin, yet manifestly double; thickest about the back; where it is fastened to the ligaments of the vertebrae.—In the middle of the thorax it is doubled, which duplicature forms what we call the *mediastinum*, which divides the thorax longitudinally into two parts.

The use of the *Pleura* is to defend the inside of the thorax, and to render it smooth, that the lungs may not be hurt in their motion.

PLEURISY, **PLEURESIS**, **PLEURITIS**, *πλευριτις*, in medicine, a violent pain in the side, attended with an acute fever, a cough, and a difficulty of breathing.

The *Pleurisy* arises from an inflammation of some part of the pleura, to which is frequently joined that of the exterior and superficial part of the lungs.

It usually arises upon cooling too hastily after violent heat; as by drinking cold water, lying open to the air, &c.

This inflammation seizes any part of the integuments of the thorax, *viz.* either the pleura or mediastinum; and therefore the pricking pain may be felt in any part of the thorax; but the place it most ordinarily infects is the side; sometimes the right, sometimes the left, sometimes higher, sometimes lower. This makes what we call the *pleuritis vera*, or *true* or *internal Pleurisy*; in opposition to the *notha*, or *spurious*, or *external Pleurisy*, which is a pain in the side, without any fever, and frequently without any cough; and is supposed to arise from a sharp serosity lodged in the pleura, or higher among the intercostal muscles.

The great remedy in the true *Pleurisy* is copious and repeated bleeding. In adults, Sydenham observes, it is seldom cured with less than the loss of forty ounces of blood.—By omitting phlebotomy the patient is frequently suffocated.

The *Pleurisy* sometimes succeeds another fever; occasioned by a precipitation of the febrile matter upon the pleura.

When it rises to an imposthume, it is called an *empyema*. When it happens in the mediastinum, or diaphragma, it is called *paraphrenitis*.

Etmuller recommends sudorifics in the *Pleurisy*; and observes, that much more regard is to be had to the sputum that attends the cough, than to the urine.—Baglivi notes, that *Pleurisies* are frequently occult; and gives this method of discovering them.—Make the patient lie on his right or left side, and bid him breathe strongly and cough: If he feel any pain or heaviness after it, he is certainly *pleuritic*.—The same author adds, that a hard pulse is a certain attendant of the *Pleurisy*.

Riverius gives us instances of some notable cures performed herein by cupping and scarification. See **Supplement**, article **PLEURITIS**.

PLEXUS, in anatomy, a name common to several parts in the body, consisting of bundles of little vessels interwoven in form of net-work.

The nerves, in their progress form several *Plexus*'s, especially the par vagum, or eighth pair, the intercostals, and the fifth. The par vagum, at its intersection with the intercostal nerve, forms the *Plexus gangliiformis superior* and inferior. A branch of this nerve joining near the heart, with others from the intercostals, form the *Plexus cordiacus superior*. A little further it sends off several branches, which reuniting, form the *Plexus pneumodicus*. In each trunk of the intercostal, before it arrives at the thorax, are two *Plexus gangliiformes*, called *Plexus artiales*.—When arrived in the thorax, it receives

ceives three or four twigs from the vertebral nerves, together with which it constitutes the *Plexus intercostalis*; whence descending into the abdomen, it forms that famous piece of network, called on the right side *Plexus hepaticus*, and on the left *Plexus splenicus*.—From the hepatic *Plexus* arise a number of branches, proceeding some to the liver, others to the pancreas, others to the capula of glisson, and other larger ones to the right kidney.—The splenic *Plexus* sends out branches to the left part of the ventricle and pancreas, the spleen, the left atrial capula and left kidney.—Lastly, several branches both from the hepatic and splenic *Plexus*, passing along the mesenteric arteries, especially the upper, to which they serve as a kind of cover, form the mesenteric *Plexus*, which bears some resemblance to a fan, from the circumference whereof proceed several little branches or threads in manner of rays, continued thence to the intestines; though still accompanying the arteries.

PLEXUS choroides is a wonderful texture of small arteries and veins, and, as some say, lymphatics, in the brain, on each side of the thalami nervorum opticorum, and just over the pineal gland.

It is sometimes also called *Plexus reticularis*, from its net-like structure.

PLICA, in medicine, a disease of the hair, almost peculiar to Poland, and hence denominated *Polonica*; though there are instances of it in Hungary, Alsatia, Switzerland, &c.

The *Plica* is a fever, malignant, and dangerous disease, wherein the hair of the head is matted and glued together beyond all possibility of being extricated; and is attended with a grievous disorder of all the limbs of the body; and before the hair become complicated, a violent pain; a sweat usually attending it. An unreasonable cutting off the hair in this case is dangerous; nor is there any proper and adequate remedy for the disease yet discovered. See *Supplement article PLICA POLONICA*.

PLIGHT, in our old law-books, a term which signifies the estate, with the quality of the land; though sometimes it extends also to the rent-charge, and the possibility of a dower. *Coke's Inst. fol. 221.*

PLINTH*, in architecture, a flat square member, in form of a brick; sometimes also called the slipper.—See *Tab. Archit. fig. 26. lit. n. fig. 24. lit. u. fig. 49. lit. k.*

* The words come from the Greek πλινθος, brick.

The *Plinth* is used as the foot, or foundation of columns: being that flat square table, under the mouldings of the base and pedestal, at the bottom of the whole order; seeming to have been originally intended to keep the bottom of the primitive wooden pillars from rotting.

The *Plinth* is also called the *orle* or *oria*. See **ORLO**.

Vitruvius also calls the Tuscan abacus, *Plinth*, from its resembling a square brick.

PLINTH of a statue, &c. is a base or stand, either flat, round, or square, serving to support a statue, &c.

PLINTH of a wall, is a term for two or three rows of bricks advancing out from the wall: or in the general, for any flat high moulding, serving in a front wall to mark the floors; or to sustain the eaves of a wall, and the larder of a chimney. See **WALL**, &c.

PLOCE, in rhetoric, a figure whereby a word is repeated, by way of emphasis; in such manner as not only to express the subject, but the quality thereof; as, Cruelty! yes, cruelty beyond all example. His wife's a wife indeed.

PLOK-PENIN, a term used in the public sales at Amsterdam, for a little sum given by the last bidder.

The *Plok-penin* is a kind of earnest, whereby it is signified, that the commodity is adjudged to him.

The *Plok-penin* differs according to the quality of the commodity, and the price of the lot.—Sometimes it is arbitrary, and depends on the pleasure of the buyer; and sometimes it is regulated by the ordinances of the burgo-masters.

For instance, the *Plok-penins* of French wines are fixed at two florins; those of Frontignac at 20 sols; those of Rhenish at two florins; those of vinegar at 20 sols, and those of brandy at 30. There are also merchandizes where there are no *Plok-penins*, and others where it is double what we have mentioned.

PLOT, or **PLOTT**, in gardening. See the article, **GRASS plot**, &c.

PLOT, in dramatic poetry, the fable of a tragedy or comedy; or the action represented therein. See **FABLE** and **ACTION**.

PLOT is more particularly used for the knot or intrigue, which makes the difficulty and embarrass of a piece.

The unravelling puts an end to the *Plot*.

PLOT, in surveying, the plan or draught, of any parcel of ground, *e. gr.* a field, farm, or manor, surveyed with an instrument, and laid down in the proper figure and dimensions. See **PLOTTING**.

PLOTTING, among surveyors, the art of describing or laying down on paper &c. the several angles and lines of a tract of ground surveyed by a theodolite, or the like instrument, and a chain.

In surveying with the plane-table, the *Plotting* is saved; the several angles and distances being laid down on the spot, as fast as they are taken.

But in working with the theodolite, semicircle, or circumferentor, the angles are taken in degrees; and the distances in chains

and links. So that there remains an after-operation, to reduce those numbers into lines: and so to form a draught, plan, or map. This operation is called *Plotting*.

Plotting, then, is performed by means of two instruments, the protractor and *Plotting-scale*.—By the first, the several angles observed in the field with a theodolite, or the like, and entered down in degrees in the field-book, are protracted on paper in their just quantity.

By the latter, the several distances measured with the chain, and entered down, in like manner in the field-book, are laid down in their just proportion.

Under the articles *Protractor* and *Plotting-scale*, are found, severally, the use of those respective instruments in the laying down of angles and distances: We shall here give their use conjointly, in the *plotting* of a field, surveyed either with the circumferentor, or theodolite.

Method of PLOTTING, from the circumferentor.—Suppose an inclosure, *e. gr.* ABCDEFGHK (*Tab. Survey, fig. 21.*) to have been surveyed: And the several angles, as taken by a circumferentor in going round the field, and the distances as measured by a chain, to be found entered in the field-book, as in the following table:

Deg.	Min.	Cha.	Link.	Deg.	Min.	Cha.	Link.
A	191	00	10 75	F	324	30	7 54
B	297	00	6 83	G	96	30	7 54
C	216	30	7 82	H	71	00	7 78
D	325	00	6 96	K	161	30	8 22
E	12	24	9 71				

1. On a paper of the proper dimensions, as LMNO, (*fig. 31.*) draw a number of parallel and equidistant lines, representing meridians, expressed in dotted lines.—Their use is, to direct the position of the protractor; the diameter whereof must always be laid either upon one of them, or parallel thereto; the semi-circular limb downwards for angles greater than 180°, and upwards for those less than 180°.

The paper being thus prepared, assume a point on some meridian, as A, whereon lay the centre of the protractor, and the diameter along the line.—Consult the field-book for the first angle, *i. e.* for the degree cut by the needle at A, which the table gives you 191°.

Now, since 191° is more than a semicircle or 180°, the semicircle of the protractor is to be laid downwards; where, keeping it to the point with the *protracting pin*, make a mark against 191; through which mark from A, draw an indefinite line AB.

The first angle thus protracted, again consult the book, for the length of the first line AB. This you find 10 chains, 75 links.—From a convenient place therefore, on the *plotting scale*, take the extent of 10 chains, 75 links between the compasses; and setting one point in A, mark where the other falls in the line AB, which suppose in B: draw therefore the full line AB, for the first side of the inclosure.

Proceed then to the second angle: and laying the centre of the protractor on the point B, with the diameter as before directed, make a mark, as *e.* against 297°, the degrees cut at B; and draw the indefinite line BC.—On this line, from the *plotting scales*, as before, set off the length of your second line, *viz.* 6 chains, 83 links; which extending from B to the point C, draw the line BC, for the second side.

Proceed now to the third angle or station: Lay then the centre of the protractor, as before, on the point C; make a mark, as *e.* against the number of degrees cut at C, *viz.* 216. draw the indefinite line CD, and thereon set off the third distance, *viz.* 7 chains, 82 links; which terminating, *e. gr.* at D, draw the full line CD, for the third side.

Proceed now to the fourth angle D; and laying the centre of the protractor, over the point D, against 325°, the degree cut by the needle, make a mark *e.*; draw the dry line DE, and thereon set off the distance 6 chains, 96 links; which terminating in E, draw DE for the fourth line: And proceed to the fifth angle, *viz.* E.

Here the degrees cut by the needle being 102° 24" (which is less than a semicircle) the centre of the protractor must be laid on the point E, and the diameter on the meridian, with the semi-circular limb turned upwards.—In this situation make a mark, as before, against the number of degrees, *viz.* 12° 24", cut by the needle at E; draw the dry line EF, on which let off the fifth distance, *viz.* 9 chains, 71 links; which extending from E to F, draw the full line EF, for the fifth side of the inclosure.

After the same manner proceed orderly to the angles F, G, H, and K; then placing the protractor, making marks against the respective degrees, drawing indefinite dry lines, and setting off the respective distances, as above, you will have the *Plot* of the whole inclosure, ABC, &c.

Such is the general method of *Plotting* from this instrument; but it must be observed, that in this process, the stationary lines, *i. e.* the lines wherein the circumferentor is placed to take the angles, and wherein the chain is run to measure the distances, are, properly, the lines here *plotted*.—When therefore, in surveying, the stationary lines are at any distance from the fence or boundaries of the field, &c. off-sets are taken, *i. e.* the distance of the fence from the stationary line is measured at each station; and even at intermediate places, if there prove any considerable bends in the fence.

PLO

In *plotting*, therefore, the stationary lines being laid down, as above; the off-sets must be laid down from them, *i. e.* perpendiculars of the proper lengths must be let fall at the proper places from the stationary lines. The extremes of which perpendiculars, being connected by lines, give the *Plot* desired.

If instead of going round the field, the angles and distances have been all taken from one station; the process of *plotting* is obvious, from the example above: All here required, being to protract, after the manner already described, the several angles and distances, taken from the same stationary point in the field; from the same point or centre on the paper.—The extremities of the lines thus determined, being then connected by lines, will give the *Plot* required.

If the field have been surveyed from two stations; the stationary line to be first *plotted*, as above, then the angles and distances taken from each, to be laid down from each respectively.

The method of PLOTTING, where the angles are taken by the theodolite, i. e. by back-sight and fore-sight, (as it is called) is somewhat different.—To prepare the angles for *plotting*, the quantity of each must first be found, by subtracting the degrees of the fore-sight and back-sight from each other: The remainder is then the angle to be protracted.

The use of parallel lines is here excluded, and instead of laying the protractor constantly on, or parallel to meridians; its direction is varied at every angle.—The practice is thus:

Suppose the former inclosure to have been surveyed with the theodolite, after the manner of back-sight and fore-sight; and suppose the quantity of each angle to be found by subtraction. An indefinite line is drawn at random, as A K *fig. 31*; and on this the measured distance, *e. gr.* 8 chains, 22 links, is set off, as in the former example: If now the quantity of the angle A have been found 140°, the diameter of the protractor is to be laid on the line A K, with the centre over A; and against the number of degrees, *viz.* 140, a mark made, an indeterminate dry line drawn through it, and the distance of the line A B laid down from the scale thereupon.

Thus we gain the point B; upon which laying the centre of the protractor, the diameter along the line A B, the angle B is protracted, by making a mark against its number of degrees, drawing a dry line, and setting off the distance B C, as before. Then proceed to C, laying the diameter of the protractor on B C, the centre on C protracts the angle C, and draw the line C D: Thus proceeding orderly to all the angles and sides, you will have the *Plot* of the whole inclosure A B C, &c. as before.

Plotting scale, a mathematical instrument usually of wood, sometimes of brass, or other matter; and either a foot, or half a foot long.

It is denominated from its use in *plotting* of grounds, &c. See *PLOTTING*.

On one side of the instrument (represented *Tab. Survey, fig. 32.*) are seven several scales, or lines, divided into equal parts.—The first division of the first scale is subdivided into ten equal parts, to which is prefixed the number 10, signifying that 10 of those subdivisions make an inch; or that the divisions of that scale are decimals of inches.

The first division of the second scale is likewise subdivided into 10, to which is prefixed the number 16, denoting that 16 of those subdivisions make an inch.—The first division of the third scale is subdivided in like manner into 10, to which is prefixed the number 20.—To that of the fourth scale is prefixed the number 24; to that of the fifth 32; that of the sixth 44; and that of the seventh 48; denoting the number of subdivisions equal to an inch, in each, respectively.

The two last scales are broken off before the end, to give room for two lines of chords marked by the letters *c c*.

On the back-side of the instrument is a diagonal scale, the first of whose divisions, which is an inch long, if the scale be a foot, and half an inch, if half a foot, is subdivided, diagonally, into 100 equal parts; and at the other end of the scale is another diagonal subdivision, of half the length of the former, into the same number of parts, *viz.* 100.

Next the scales, is a line divided into hundredth parts of a foot, numbered 10, 20, 30, &c. and a line of inches subdivided into tenth parts, marked 1, 2, 3, &c.

Use of the PLOTTING scale.—1. Any distance being measured with the chain, to lay it down on the paper.—Suppose the distance to be 6 chains, 50 links. Draw an indefinite line; set one foot of the compasses at figure 6 on the scale, *e. gr.* the scale of 20 in an inch, and extend the other to five of the subdivisions, for the 50 links: This distance being transferred to the line, will exhibit the 6 chains, 50 links, required.

If it be desired to have 6 chains, 50 links, take up more or less space, take them off from a greater or lesser scale, *i. e.* from a scale that has more or fewer divisions in an inch.

To find the chains and links contained in a right line, as that just drawn, according to any scale, e. gr. that of 20 in an inch.—Take the length of the line in the compasses, and applying it to the given scale, you will find it extend from the number 6 of the great divisions, to five of the small ones; hence the given line contains 6 chains, 50 links.

PLOUGH, or **Plow**, in agriculture, a popular machine for

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the breaking up of ground; consisting of a train or carriage, with two large irons, the one pointed, the other edged; serving to cut and open the land, and draw furrows therein. The parts of the **PLOUGH** are, the *plough-beam*, the *handle*, *tail*, *stilt*, *hals* or *flaves*, *neck* or *share-beam*, *earth-board*, *mould-board*, *brest-board*, *furrow-board*, *shield-board*, &c. the *sheath*, *share-iron*, *couler*, *plough-pin* and *collar-links*, *plough-pillow* and *bessler*, and sometimes *wheels*.

The structure and contrivance of the *Plough* is various for various kinds of grounds: A particular description of all would be endless.—The most usual are the

Double wheeled PLOUGH, used throughout Hertfordshire, &c.—

This is apparently one of the best and strongest, and of easiest draught of any; it suits all kinds of lands, except miry clays in winter; which are apt to clog the wheels, which are about 18 or 20 inches high, and the furrow-wheel sometimes larger than the other.

Lincolnshire PLOUGH is singular in its shape, and very good for marl or fenny lands, subject to weeds and sedges, but free from stones; by reason of its coulter, and the largeness of its share, which is often a foot broad, and very sharp.

Suffex single-wheeled PLOUGH is of a clumsy make, very wide in the breech; so that the draught of it must be very hard.—It is chiefly remarkable for its shape.

Caxton or trenching PLOUGH, invented to cut drains about Caxton in Cambridgeshire, in stiff miry clay grounds.—It is larger than ordinary, and has two coulters, one before the other; which bending inwards, cut each side of the trench.—The mould-board is three times the usual length, to cast the turf a great way off from the trench.

It cuts a trench a foot wide at bottom, a foot and half at top, and a foot deep, and is drawn with 20 horses.

Dray PLOUGH is the most common.—It is made without either wheel or foot; of an easy draught, and best in winter for miry clays, where the land is soft.

Spanish PLOUGH varies much in its make from our common *Ploughs*. It is a kind of semicircle pitched on one end, with the convex side turned to the plowman, and the concave side (a little inclined) to the horse. It is in a right line with the share. With this *Plough* and one horse the Spaniards plough two or three acres of their light ground in a day.

Colchester PLOUGH is a fine light-wheel *Plough*, with which two horses will cut up two acres of their light land in a day.—It is peculiar for its iron earth-board made rounding, by means of which it turns the turf better than any other *Plough* yet invented.

One-wheel PLOUGH may be used in almost any kind of ground; being lighter and nimbler than other wheel *Ploughs*.

Double PLOUGHS. In this, there is one *Plough* fixed to the side of another; so that by means of four horses and two men, a double furrow is plowed, the one by the side of the other. Add to these another kind of *double Plough*, whereby two furrows are ploughed at once, one under another, by which the earth is stirred up 12 or 14 inches depth, which is in many cases of great benefit. See *Supplement, article PLOUGH*.

PLOUGH, among book-binders, is a tool whereby they cut the leaves of books smooth. See *BOOK-BINDING*.

PLOUGH, or **Plow**, in navigation, an ancient mathematical instrument made of box, or pear-tree, and used to take the height of the sun or stars, in order to find the latitude.

It admits of the degrees to be very large, and has been much esteemed by many artists; though now generally disused among us.

PLOW-LAND, or *plough-land*, *carucata terra*, in our ancient customs, the same with *bida*, or, a hide of land.

In a more modern sense, as used in respect of repairing highways, a *Plough-land* is estimated at 50 s. per annum.

PLOW-ALMS, a duty anciently of a penny, paid to the church for every *Plough-land*, or hide of land.

De qualibet carucata juncia inter pascha et pentecosten unum denarium, qui dicitur plow-almes. Monast. Ang.

PLOUGH-MONDAY, the next monday after twelfth-day. The ploughmen, in the north-country, on this day, draw a *Plough* from door to door, and beg *Plough* money to drink.

PLOUGHING, or **Plowing**, one of the principal operations in agriculture, performed with the *Plough*.

Ploughing is principally either that of *lays*, or of *fallows*.

PLOUGHING of lays, is the first cutting up of grass-ground for corn; which is usually done in January, when the earth is wet, and the turf tough, so as to hold turning without breaking; in which the perfection of this kind of *ploughing* consists.

PLOUGHING of fallows, called also *fallowing*, is a preparing of land by *ploughing*, long before it be *ploughed* for seed.—This is a considerable benefit to all lands, few of which will bear above two or three crops successively without such respite. Hence landlords use to bind their tenants to do it once in three years. When this is done twice, it is called *twofallowing*; when thrice, *trifallowing*, &c.

The first is as soon as the husbandman has done sowing his corn; and this is to be very shallow, well turned, and clapped close together.—The second is in June, when they go to the full depth.—The third, about the beginning of August.—If it rise full of clods, they harrow it down; but then they soon strick-fize, or *plough* it up again into ridges.

In Staffordshire, beside the three summer fallowings, they usually give then land a winter fallowing. Pliny commends the *Negliging* of lands four times; and so does Virgil.

*Ille sages demum votis respondet avari
Agricolae, his quae solem, his frigora sensit.*

Georg. lib. 1.

This is an ancient piece of husbandry; Xenophon, Pindar, and Virgil recommend it: witness also those verses of Virgil.

*Aeternis idem tunc, cessare novellis,
Et signum patere situ durefieri campum.*

Georg. lib. 1.

PLUG, a large wooden peg, wherewith to stop the bottom of a cistern, cask, pipe, or the like.

PLUMAGE, the feathers, or covering of birds.—*For the mechanism whereof, see FEATHER.*

PLUMAGE, in falconry, is particularly understood of the feathers under a hawk's wing.

The falconers also give their hawks parcels of small feathers to make them cast; and these they call *Plumage*.

PLUMB, or **PLUM**, in matters of spicery. See **CURRANS** and **RAISINS**.

PLUMB-LINE, a term among artificers for a perpendicular line. See **PERPENDICULAR**.

It is thus called, because usually described by means of a plummet.

PLUMBAGO, in metallurgy, a metallinecrement, separated in the purification of gold or silver with lead, and sticking to the sides of the furnace.

This is otherwise called *molybdæna*; and has the same virtue with litharge.

PLUMBAGO seems also to have been used, among the ancients, for black lead, used in making pencils for designing, &c. See **BLACK LEAD**.

Pomet adds, that *Plumbago* was also the sea-lead, *plumbum marinum* of the ancients; who, he notes, took black lead for a production of the sea, not a mineral, as it really is; but this is scarce credible.

PLUMBERY*, the art of casting, preparing, and working lead; and of using it in buildings, &c.

* The word is formed of the Latin, *plumbum*, lead.

The lead used in *Plumbery* is furnished from the lead-works in large ingots, or blocks, called pigs of lead, ordinarily weighing about an hundred pounds a-piece.

As this metal melts very easily, it is easy to cast figures hereof of any kind, by running it into moulds of brass, clay, plaster, &c. But the chief article in *Plumbery*, is the sheets, and pipes of lead.—It is these which make the basis of the plumbers' work in building; the process of these, therefore, we shall give a description of.

Method of casting large sheets of lead.—The lead destined for this use is melted in a large caldron or furnace, usually built with free-stone and earth, fortified on the outside with a massive of shards and plaster. At the bottom hereof is a place sunk lower than the rest, wherein is disposed an iron pot, or pan, to receive what may remain of the metal after the sheet is run. The furnace is so raised above the area of the floor, as that the iron pot just rests thereon.

To use the furnace, they heat it with wood laid within it; that done, they throw in the lead, pell-mell with the burning coals, to melt.

Near the furnace is the table or mould, whereon the lead is to be cast.—This consists of large pieces of wood well jointed, and bound with bars of iron at the ends. Around it runs a frame, consisting of a ledge or border of wood two or three inches thick, and one or two high from the table, called the *sharps*. The ordinary width of the tables is from three to four foot; and their length from 18 to 20 foot.

This table is covered with fine sand, prepared by moistening it with a watering pot, then working it with a stick; and at last, to render it smooth and even, beating it flat with a mallet, and planing it with a slip of brass or wood.

Over the table is a strike or rake of wood, which bears and plays on the edges of the frame by means of a notch cut in either end thereof, and is so placed, as that between it and the sand is a space proportionable to the intended thickness of the sheet.—The use of this strike is to drive the matter, while yet liquid, to the extremity of the mould.

At top of the table is a triangular iron peel or shovel, bearing, before, on the edge of the table itself, and behind, on a trestle somewhat lower than the table.—Its use is in conveying the metal into the mould; and the design of its oblique disposition is, that it may by that means be able to retain the metal, and keep it from running off at the fore-side, where it has no ledge.—Some of these peels are big enough to hold fifteen or sixteen hundred weight of lead, and even more.

Things being thus disposed, with a large iron ladle they take out the melted lead, coals and all, out of the furnace; and with this, mixed as it is, they fill the iron peel.—When full, they take out the coals, and clear the lead with another iron spoon, pierced after the manner of a scummer.

This done, they hoist up the lower part of the peel by its handle; upon which the liquid matter running off, and spreading itself on the mould, the plumber conducts and drives it to the extremity of the table by means of the strike, which the

workman passes along the ledges, and thus renders the sheet of an equal thickness.

The sheets thus cast, there remains nothing but to edge them, i. e. to planish the edges on both sides, in order to render them smooth and strat.

Method of casting thin sheets of lead.—The table or mould here used is of a length or breadth at discretion, only ledged on one side.—Instead of sand they cover it with a piece of woollen stuff, nailed down at the two ends to keep it tight; and over this lay a very fine linnen cloth.—The feet of the table are uneven, so that it does not stand horizontal, but moderately inclined.

Great regard is in this process had to the lead while melting, that it have the just degree of heat, so as it may run well, yet not burn the linen.—This they judge of by a piece of paper; for if the paper take fire in the liquid lead, it is too hot; and if it be not shrunk and scorched a little, it is not hot enough.

Being then in its just degree, they have a strike, but different from that described in the former article; as serving both for peel and strike; both to contain, and to conduct the liquid lead.—It is, in effect, a wooden case without any bottom, only closed on three sides. It is pretty high behind, but the two sides, like two acute angles, still diminish to the tip, from the place where they are joined to the third or middle piece, where they are of the same height therewith, viz. 7 or 8 inches high.—The width of the middle makes that of the strike, which again makes that of the sheet to be cast.

The strike is placed at top of the table, which is before covered in that part, with a pasteboard that serves as a bottom to the case, and prevents the linen from being burnt while the liquid is pouring in. The strike is so disposed on the table, as that the highest part looks to the lower end of the table, and the two sloping sides to the higher end.

The strike is now filled with lead according to the quantity to be used; which done, two men, one at each side the table, let the strike descend down the table, or else draw it down with a velocity greater or less, as the sheet is to be more or less thick; the thickness of the sheet still depending on the promptitude wherewith the strike slides down the inclining mould.

The fine smooth sheets of lead thus made, are sometimes used between the joints of large stones in great buildings, &c.

Method of casting pipes, without folding.—To make these pipes, they have a kind of furnace, consisting of a large iron pot or caldron, supported on a pretty high iron stand. The caldron is encompassed with a massive of bricks and loam; only leaving a mouth or passage for the conveyance of wood underneath, and for lighting the fire; and another little aperture behind, to serve as a vent-hole.

In this furnace they melt the lead, after first heating it with a fire underneath: To forward the fusion, they also put in burning faggots along with the metal.—The metal is afterwards skimmed and laden off with the instruments mentioned above. Near the furnace is a bench, furnished at one end with a little mill, with arms or levers to turn it withal.—A strong girt, armed with an iron hook at one extremity, is fastened by the other to the axis of the mill, around which it turns when in motion. On this bench the moles of the pipes are placed horizontally, and the mill and the girt serve to draw out the iron core after the pipe is cast.

The moulds of these tubes are of brass, and consist of two pieces, which open and shut by means of hooks and hinges; their inward caliber, or diameter, is according to the size of the pipe to be made, and their length is usually two foot and a half. In the middle is placed a core, or round piece of brass or iron, somewhat longer than the mould, and of the thickness of the inner diameter of the pipe.—This core is passed through two copper rundles, one at each end of the mould, which they serve to close; and to these is joined a little copper tube about two inches long, and of the thickness the leaden pipe is intended to be of.—By means of these tubes the core is retained in the middle of the cavity of the mould.

The core being in the mould, with the rundles at its two ends, and the lead melted in the furnace, they take it up in a ladle, and pour it into the mould by a little aperture at one end, made in form of a funnel.

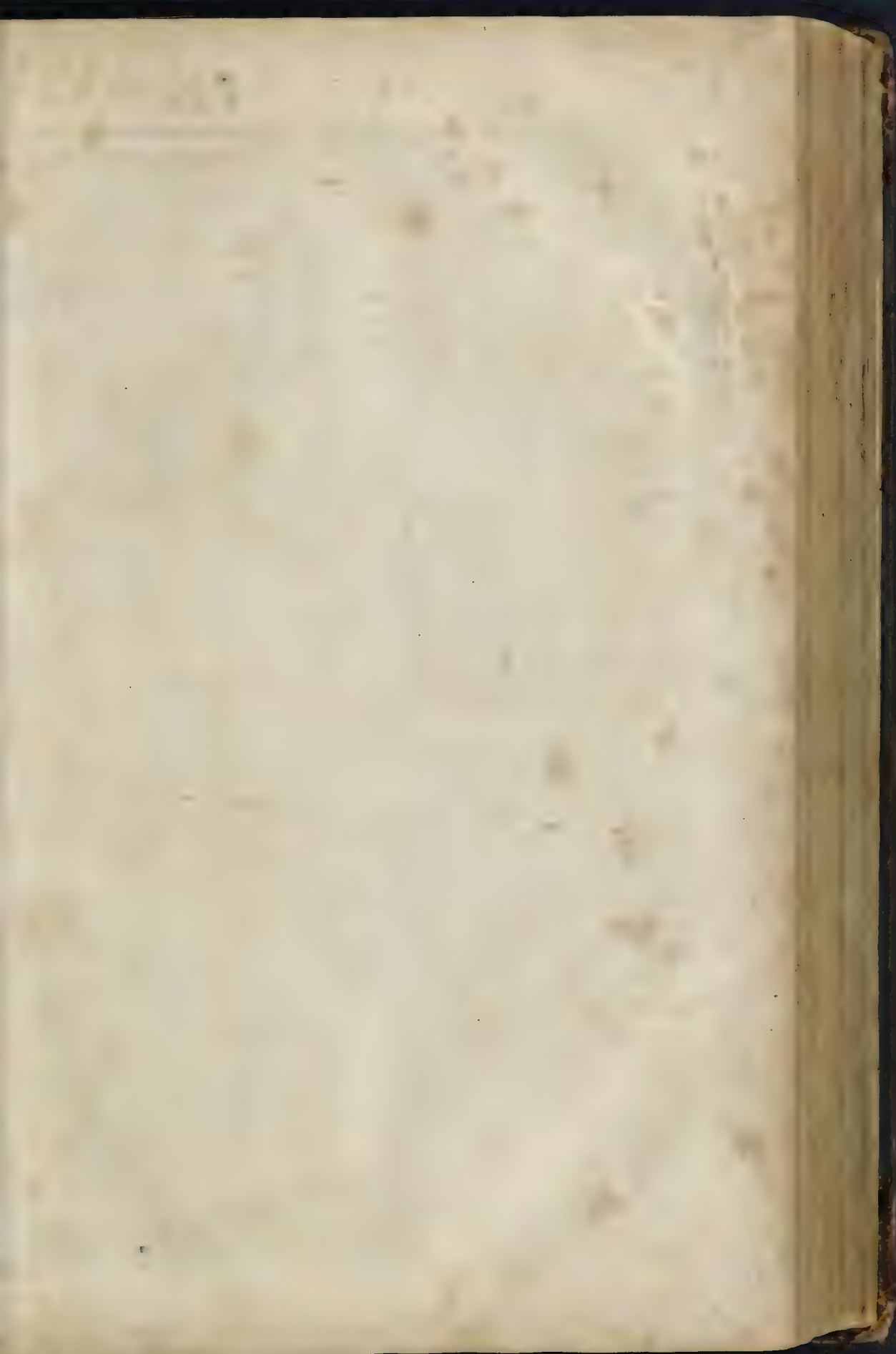
When the mould is full, and the metal cold, they pass the hook of the girt into a hole at the end of the core; and turning the mill with the hand, draw out the core.—They then open the mould and take out the pipe.

If they desire to have the pipe lengthened, they put one end thereof in the lower end of the mould, and pass the end of the core into it; then shut the mould again, and apply its rundle and tube as before, the pipe just cast serving for rundle, &c. at the other end.

Things thus replaced, they pour in fresh metal into the mould, thus repeating the operation, till they have got a pipe of the length required.

Pipes made of sheet lead soldered.—For these the Plumbers have wooden cylinders or rollers, of the length and thickness required; and on these they form their pipes, by wrapping the sheet around them; soldering up the edges all along in this manner.—After grating the lead well with a grater, they rub

relin



PNEUMATICKS.

Tab

Fig 1 Barometer



Fig 2 Barometer



Fig 3 Barometer

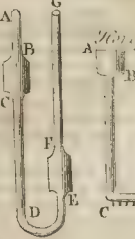


Fig 4 Torricellian Tube

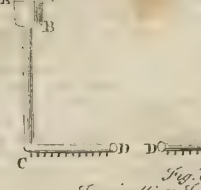


Fig 5 Diagonal Barometer

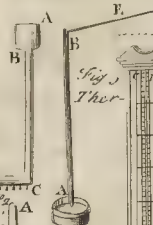


Fig 6 Barometer



Fig 7 Hygrometer

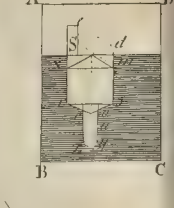


Fig 8 Thermometer

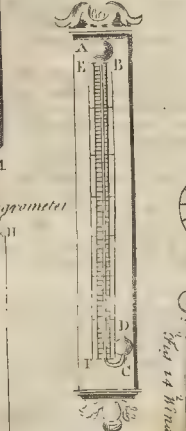


Fig 9 Thermometer



Fig 10 Hygrometer

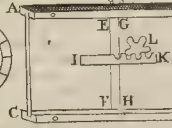


Fig 11 Manometer

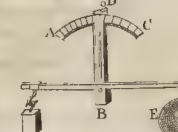


Fig 12 Hygrometer

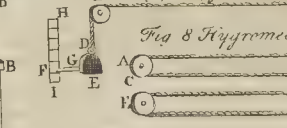


Fig 13 Hygrometer

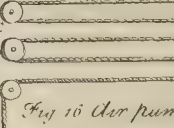


Fig 14 Air pump



Fig 15 Hygrometer



Fig 16 Wind gauge

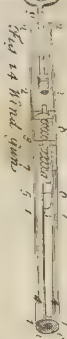


Fig 17 Anemometer



Fig 18 Anemometer

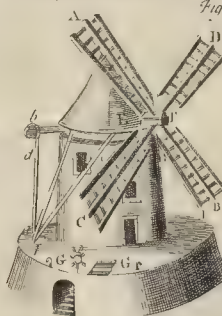


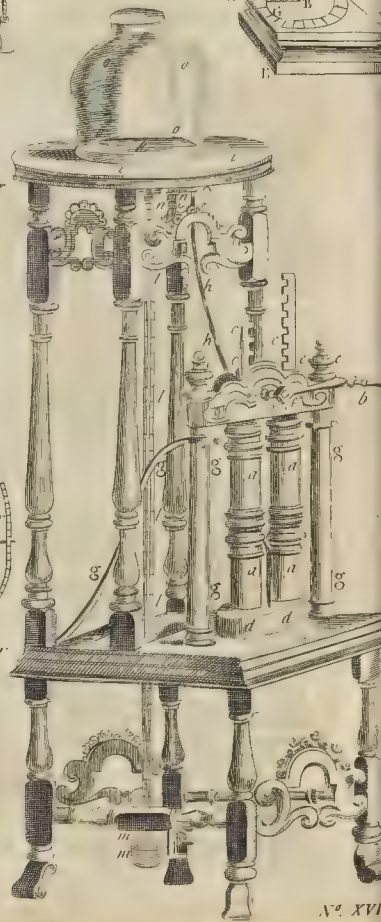
Fig 19 Hygrometer



Fig 20 Barometer



Fig 21 Barometer



refin over the part thus grated; they then pour on it some folder melted in a ladle, or else melt it with a hot foldering iron, inserting those parts where they would not have the folder catch, with chalk, or the foil of the hand.

The folder which the *Plumber* uses, is a mixture of two pounds of lead with one of tin. See *SOLDER*.

PLUMBUM. See the article *LEAD*.

PLUMBUM album. See *Burnt LEAD*.

PLUME-ALUM, alumen plumsium. See *ALUM*.

PLUME, a set or bunch of ostrich-feathers, pulled out of the tail and wings, and made up to serve for ornament in funerals, &c.

PLUME*, in falconry, is the general colour or mixture of the feathers of a hawk, which shows her constitution.

* The word is formed of the Latin *pluma*, feather.

When a hawk seizes her prey, and dismembers it of its feathers, she is said to *plume* it.

PLUME, or PLUMULE, in botany, a little member of the grain or seed of a plant; being that which in the growth of the plant becomes the stem, or trunk thereof. See *SEED* and *STEM*.

The *Plume* is inclosed in a cavity formed in the lobes on purpose for its reception.—It is almost of the same colour with the radicle, or little root, on the basis whereof it is sustained.

The *Plume* is the first part that appears out of the earth; as, in effect, it is the part that first appears out of the membrane or cover of the seed; there being a hole over-against it in the membrane, through which it makes its escape.

It is the appearance of the *Plume* without the cavity of the grain, that makes what we call the *bud* or *germ* of a plant.

The *Plume* is so called, because consisting of several pieces bound together in manner of a feather.—In corn, the *Plume* is that which, after the radicle is shot forth, shoots out towards the smaller end of the seed; whence some call it the *acrosperme*.

PLUMMET, PLUMB-RULE, or PLUMB-LINE, an instrument used by masons, carpenters, &c. to draw perpendiculars withal; in order to judge whether walls, &c. be upright, planes horizontal, and the like.

It is thus called from a piece of lead, *plumbum*, fastened to the end of a thread or cord, which usually constitutes this instrument.

Sometimes the string defends along a ruler of wood or metal raised perpendicularly on another: in which case it becomes a level.

At sea a *Plummet* is used by the pilot to sound the depth of the water.

PLURAL, PLURALIS, in grammar, a particular inflexion of nouns and verbs, whereby they come to express a plurality, or number, of things.

The Latins, English, &c. have only two numbers, *singular* and *plural*; the Greeks and Hebrews have three, *singular*, *dual* and *plural*.

In Latin, &c. both nouns and verbs have usually distinct terminations to their different numbers; in English, nouns substantives usually become *plural* by the addition of an *s* or *es* to the singular.

Nouns adjective are the same in both numbers; and in verbs, the number is distinguished by that of the pronouns.

PLURALITY, PLURALITAS, a discrete quantity, consisting of two, or a greater number.

A *Plurality of worlds* is a thing which Mr. Huygens has endeavoured to prove in his *Cosmtheoros*.—And the same is likewise contended for in a very pretty treatise of M. Fontenelle under that title.

See the chief argument for a *Plurality of worlds* under the articles *MOON*, *PLANET*, and *EARTH*.

The greatest absurdity in the pagan theology, is, the *Plurality of gods*.

PLURALITY of benefices or livings, is where the same clerk is possessed of two or more spiritual preferments, with cure of souls.

Plurality of benefices is a thing too much tolerated in the church, but never approved of.

It was the smallness of some benefices that first gave occasion to *Pluralities*; for an ecclesiastic not being able to subsist on a single one, was allowed to hold two; and at length the number increased without bounds.

The abuse was endeavoured to be remedied at the council of Lateran under Alexander III. and Innocent III. when the holding more than one benefice was expressly forbid by a canon; but the same canon granting the pope a power to dispense with it in favour of persons of distinguished merit, there were so many found a title to this merit, that the prohibition became useless.

We have also a regulation in regard to *Pluralities*, but it is often dispensed with. See *BENEFICE*.

In Germany the pope grants dispensations for possessing a *Plurality of benefices*, on pretence that the ecclesiastic princes there need large revenues to bear up against the protestant princes.

PLUS, in algebra, a term commonly used for *major*, or *majoris*, more.

Its character is +. See *CHARACTER*.

Thus $4 + 10 = 14$, is read, four, *plus*, or more, 10, is equal to 14.

PLUSH, in commerce, &c. a kind of stuff having a sort of velvet knap or flag on one side; composed regularly of a woof of a single woollen thread, and a double warp, the one wool, of two threads twisted, the other goats or camels hair; tho' there are also some *Plushes*, intirely of worsted, and others composed wholly of hair.

Plush is manufactured like velvet, on a loom with three treadles.

—Two of these separate and depress the woollen warp, and the third raises the hair-warp; upon which the workman throwing the shuttle, passes the woof between the woollen and hair-warp; and, afterwards, laying a brafs broach, or needle, under that of the hair, he cuts it thereon with a knife destined for that use, conducting the knife on the broach, which is made a little hollow, all its length; and thus gives the surface of the *Plush* an appearance of velvet.

Some ascribe the invention of *Plush* to the English; others say it was first made in Holland, and particularly at Harlem.—Be this as it will, it is certain, the French are the people who make the most of it; there being several very considerable *Plush* manufactures at Amiens, Abbeville, and Compeigne.

There are other kinds of *Plush*, all of silk; some of which have a pretty long knap on one side, and some on both.

PLUSH, among botanists, is a name given to the middle of roses, anemones, &c. called also *thrum*, or *thrummy heads*; by others *hairy heads*, *buttons*, *bolls*, *tuffs*, or *wort*. This is properly the stamina of the flower. See *STAMINA*.

PLUVIAL, PLUVIALE, anciently signified a hood, or cloak, which ecclesiastics, chiefly religious, wore in the country, to shelter themselves from the rain; by the Latins called *pluvialis lacerna*.

The word is now used in the Romish church, for a large hood wore by the chantor and sub-deacon, at mass and vespers, &c.—It covers the whole man, and is fixed before with two clasps.

PLUVIUS, in antiquity, an attribute of Jupiter; implying him the author of rain; *q. d.* he that sends rain.

Among the basio relievos of the *Antonine* column, in the place where the miracle of the thundering legion is represented, we see a flying man in the air, his arms spread out, and with a very long beard, which seems to dissolve into rain.—The learned take this to be a representation of Jupiter *Pluvius*.

PNEUMATICS, PNEUMATICE, called also *PNEUMATOLOGY* and *PNEUMATOSOPHY*, the doctrine and contemplation of spirits, and spiritual substances.

The word is formed of the Greek *πνευμα*, *spiritus*, breath; whence, from the different acceptations of that word either as an incorporeal substance, or as air, there arise two sorts of *Pneumatics*.

PNEUMATICS, in the schools, is frequently used for the doctrine of spirits: as God, angels, and the human soul. See *SPIRIT*.

In this sense *Pneumatics* coincide with what we otherwise call *metaphysics*.

PNEUMATICS is more commonly used among us, for the doctrine of the air; or the laws wherein that fluid is condensed, rarefied, gravitates, &c.

Some make *Pneumatics* a branch of mechanics; because it considers the air in motion, with the effects thereof.—It is certainly a sister of hydrostatics; the one considering air in the same manner that the other does water.

Wolfius, in lieu of *Pneumatics*, uses the word *aerometry*, *q. d.* the art of measuring the air.

The doctrine and laws of *Pneumatics* will be found under the articles *AIR*, *ATMOSPHERE*, *ELASTICITY*, *GRAVITY*, *COMPRESSION*, *CONDENSATION*, *RAREFACTION*, *EXPANSION*, &c.

PNEUMATIC engine, machina or anilia PNEUMATICA, denotes the air-pump. See *AIR-PUMP*.

PNEUMATOCELE*, *πνευματοcele*, in medicine, a flatulent or windy hernia; or a tumor of the membranes of the scrotum or navel, proceeding from pent up vapours, and attended with a tensive pain.

* The word is formed from the Greek *πνευμα*, wind, and *κελη*, tumor.

Sometimes one of the testes only is thus inflated, sometimes both, and sometimes likewise the scrotum.

This *hernia* is of all others the lightest, and least dangerous.—It is cured by dissections internally, and fomentations and cataplasms externally.

PNEUMATOMACHI, *πνευματομαχοι*, ancient heretics, so called, because they opposed the divinity of the Holy Spirit, placing him in the number of creatures.

PNEUMATOSIS, *πνευμασις*, a term which some authors use for the generation or formation of animal spirits in the brain.

PNEUMONICS*, *πνευμονικα*, medicines proper in diseases of the lungs, in which respiration is affected.

* The word is formed from the Greek, *πνευμων*, lungs, or *πνευμα*, *spiritus*, breath.

Of this number are sulphur, lung-wort, hyssop, ground-ivy, and colts-foot; they are used in phthisis, asthma's, peripneumonies, pleuritis, &c.

POCK. See the article *Pox*.

POCKET of wool, is half a sack. See SACK of wool.
POD, the shell or hulk of any pulse. See STRIQUA.
PODAGRA *, *podagra*, in medicine, the gout in the feet. See GOUT.

* It is thus called from the Greek, *pus*, foot, and *alga*, capture, seizure.

PODAGRA *dentium*, sometimes, though with impropriety enough, is used for the tooth-ach.

PODESTA, or POTESTA, a magistrate, or officer of justice and policy, in a free city.

The name is originally Italian, *Pedesta*; and is chiefly applied to certain magistrates of Venice and Genoa, whose function is to administer justice in those republics.

The *Podesta* in Venice corresponds to the prætor in ancient Rome, though appeals lie from his decisions, to the new auditors, or the new civil guaranty. See QUARANTIA.

PODEX, in anatomy, &c. the same with *anus*, or *fundament*. See ANUS.

PODOMETER, or PEDOMETER. See PEDOMETER.

POEM, *POEMA*, *ποιημα*, a composition in verse, of a due length and measure.

POEMS, *carmina*, are of various kinds; some denominated from the persons who first invented, or most used them; as the *Archilochian*, *Sapphic*, &c.—Others from their composition, as the *monocolon*, consisting of one kind of verse; *dicolon*, of two; and *tricolon*, of three kinds.—Others from their intensions or deficiency; as *brachycatalectic*, which in every verse wants two syllables; *catalectic*, which wants one; *acatalectic*, none; and *hypercatalectic*, which has a syllable too much, which, if cut off at the beginning of the next verse, the verse is said to be *hypermeter*. See ACATALECTIC, &c.—Others are denominated from the subject-matter; as the *apobaterion*, *epibaterion*, *epinicion*, *epithalamium*, *genethliac*, *propemptic*, *elegiac*, *satiric*, *epicidien*, *epitaph*, *threnos* or *lamentation*, *encomiastic*, *panegyric*, *loteric*, *lyric*, *pastoral*, &c.—Others from the manner of narration; as *exegetic*, which relates a thing under the author's own person, *dramatic*, and *epic*. See each under its proper head, EPIC, DRAMA, &c.—To these may be added, odes, eclogues, and idylliums.

To this head must also be referred several other poetical compositions of a less serious kind, which the idly-labouring vein of little poets has produced into the world, and which, tho' frequently admired by persons of a low taste, are justly ranked by Mr. Addison in the class of false wit.—Such are the acrostic, enigma, anagram, cento, chronogram, proteus, echo, &c.

POESY *, POESIS. See the article POETRY.

* The word is formed from the Greek, *ποιος*, of *ποιου*, *facio*, *fabrico*, *ingo*, I make, I frame, I invent.

Hence alchymy, or the art of making gold, was anciently called *Poesy*, *chrysopoesy*, &c.

POET, POETA, an author who composes poems, or discourses in verse.

Cicero relates it as a saying of Democritus and Plato, that there could be no good *Poet sine affatu furoris*, without a tincture of madness; and Aristotle calls *Poets* expressly, *maniacs*, *maniacs*, *madmen*.

M. Spanheim tells us, that the Arab authors are more poetically given than those of any other people; and adds, that there are more verses among the Arabians, than among all the other nations of the world put together.

The Greek word *ποιητης*, *Poet*, signifies *maker*, from *ποιου*, *facio*, I make; whence the *Poets* were anciently also called *fatists*.—The name they were properly denoted by among the Romans, was *uates*, which signifies also *prophet*.

By a law of the emperor Philip, inserted in the *code*, l. 10. t. 52. *Poets* are expressly excluded from the immunities granted the professors of all other sciences.

Homer, Virgil, Milton, and Tasso, are the chief, almost the only epic *Poets*.—Sophocles, Euripides, Shakspeare, Otway, Corneille, and Racine, are the best tragic *Poets*.—Aristophanes, Menander, Plautus, Terence, Fletcher, Johnson, Moliere, &c. the chief comic *Poets*.—Horace, Cowley, and Malherbe, excelled as lyric *Poets*. And Juvenal, Persius, Regnier, Boileau, Dryden, and Oldham, as satiric *Poets*.

POETICAL, *ποιητικος*, something that relates to poetry or poets. In this sense we say, a poetical genius, a poetical phrase, poetical licence, poetical fury, &c.

Most languages have their poetical words, which are never used on other occasions.—These prove of great advantage to the poets; who are hereby enabled to raise the style and diction into the poetical character, with the greater ease.

The French often lament the want of a set of such words in their language; for want whereof their poetry appears in a too familiar garb, not sufficiently distinguished from the common language. It is too reserved; not being allowed any boldness, or flights, but what might pass in prose. To this, in good measure, is attributed the little success their authors have met with in the epic way.

POETICAL justice is chiefly used in respect of the drama, to denote a distribution of rewards and punishments to the several persons, at the catastrophe or close of the piece, answerable to the several characters they have appeared in. See CHARACTER. Whatever difficulties and distresses the virtuous and innocent

may labour under, and how prosperously soever it may go with the wicked, in the course of the piece; the poet usually takes care to give each of them their due ere he parts with them.—But it is controverted whether this piece of justice be indispensable, and whether it may not be allowed to leave virtue oppressed, and vice flourishing.

POETICAL rising and setting. See RISING and SETTING.

The ancient poets, referring the rising, &c. of the stars to that of the sun, make three kinds of rising and setting, *viz.* *astronomical*, *acronical*, and *helical*. See each under its proper article, COSMICAL, &c.

POETICS, POETICE, *ποιητικα*, the doctrine of poetry, or the laws and rules of conducting pieces or compositions of poetry. Aristotle's *Poetics* is a work infinitely valued; and M. Dacier's comment thereon is one of his best pieces we have.—Horace, Vieta, Vossius, and Scaliger, have likewise published *Poetics* in Latin; the Duke of Buckingham in English; and Menardiere, Hedelin, and Despreaux, in French.

POETRY *, POESY, the art of composing poems, or pieces in verse.

* The word is formed from the Greek, *ποιημα*, of *ποιου*, *facio*, I make.

If a verse be considered as a mere series of just six feet following one after another in the same line: *Poetry* and *verification* will appear two very different things: But Boiliu, in his idea of verse, includes cadencies, peculiar constructions, arrangements and expressions unknown in common discourse; and above all, a certain noble, bold, elevated, and metaphorical turn and manner of diction.—These, he observes, are so essential to *Poetry*, that without them the most exact arrangement of long and short syllables, makes little else but a kind of measured prose; whereas these, in a discourse that has no poetical feet or measures, do yet give it the poetical character, and make it a kind of *unmeasured Poetry*.

The rules of *Poetry* and *verifying* are taught by art, and acquired by study; but this force and elevation of thought, which Horace calls *something divine*, and which alone makes the *Poetry* of any value, must be derived from nature; or, according to Aristotle, from some happy transports, to which that author gives the name of *madness*.—*Εἰς τὴν δὲ ποιητικὴν οὐκ ἔστιν ἄλλο ἢ τὸ πνεῦμα*.—But there must ever be conceived a just solid judgment at the head of this fury of the poet's imagination.

Hence the critic concludes, that the end of *Poetry* is to please; its *cause*, either the excellence of the poet's genius, or a poetical fury, and transport of the soul, manageable by the judgment; its *matter*, long and short syllables, and feet composed hereof, with words furnished by grammar; and its *form*, the arrangement of all these things in just and agreeable verse, expressing the thoughts and sentiments of the author after the manner already mentioned.

But after all, how narrow are these bounds, if we consider *Poetry* in the light wherein the works of Homer and Virgil have set it? What is here laid down pretends to no praise, which a mere translator may not rise to, and which the war of Catiline might not merit, if turned out of the prose of Sallust.—It is with reason, therefore, that we distinguish the *low* and *simple* from the *greater Poetry*; by giving the former the title of *verification*: and that we make *Poetry* and *verification* two distinct arts: In effect, there is not more difference between grammar and rhetoric, than between the art of making verses, and that of inventing poems.

The *greater Poetry*, then, consists principally in fiction, or the invention of fables; in the expressing of things by allegories and metaphors; and in the inventing of actions, under which the truths which the poet has to reach may be agreeably disguised.

In this view, scarce any poems retain the nature and essence of the grand *Poetry*, but the *epopœia*, *tragedy* and *comedy*; the rest, be they elegies, satires, song, or what they will, come under the name of *verification*.

The ancient eloquence it is observed, was full of mysteries and allegories.—The truth was by them usually disguised under those ingenious inventions called *μυθoi*, fables, *q. d.* words; as if there were as much difference between these fabulous discourses of the learned, and the common language, as between the speech peculiar to man, and the voice of brutes.

At first fables were chiefly used in treating of the divine nature, after the manner they then conceived of it: this occasioned the first poets to be called *divines*, and *Poetry* the *language of the gods*.—The divine attributes they separated into a number of persons; by reason the weakness of the human mind could not conceive so much power, and so much action, in a simplicity so strict and indivisible as that of God.

Nor could they speak of the operation of this almighty cause, without speaking likewise of its effect.—They therefore added physics to their theology, handling both after the same manner, without quitting their veils or allegories.

Now, man being the most considerable of all the works of the Deity, and there being nothing so proper for poets, or of such general use to mankind, as such a subject; they therefore added ethics to the former, and treated the doctrine of manners in the same way as they had done divinity and physiology.—And hence arose the *epopœia*, or epic poem.

The epic poets have done, with regard to morality, just the contrary of what the divine poets did for their theology.—As the too great diversity of divine actions and perfections, so little proportionate to our understanding, occasioned the latter to divide the single idea of the simple essence of God into several persons under different names; as Jupiter, Juno, Neptune, &c. So, on the contrary, the nature of moral philosophy, which never gives any rules for particular things, occasioned the epic poets to unite in one single idea, in the same person, and even in a single action, whatever of the like kind occurs in different persons, and different actions.

Thus, says Aristotle, *Poetry* teaches moral philosophy, not by reciting historically what Alcibiades has done or suffered; but by proposing what such a person, whom the poet calls by any name he pleases, would necessarily or probably have done or said on the like occasion.—It is in this manner that *Poetry* represents either the unhappy consequences of designs ill concerted, of wicked actions, &c. or the reward of good actions, and pleasure reaped from a design laid in virtue, and conducted by prudence.

Thus, according to our critic, the poetical actions and persons are all feigned, allegorical and universal; not historical and singular.—This is likewise the sentiment of Horace, who adds, that poets teach morality as well as philosophy; but the preference herein he gives to Homer.

This advantage of the poets over mere philosophers arises hence, that all *Poetry* is an imitation.—Now imitation is a thing extremely natural; and hence this manner of proposing things becomes better fitted to engage the auditors. Again, imitation is an instruction given by examples; and examples are the more proper to persuade, in regard they prove the thing possible.—In effect, imitation is so much the nature of *Poetry*, that Aristotle tells us, it is to this the art owes its rise.

But the poets, by becoming philosophers, did not cease to be divines; on the contrary, the morality they taught obliged them frequently to introduce the deity in their works; and the share so august a being had in the action, obliged the poet to make it grand, important, and conducted by the persons of kings and princes.

Add to this, that it likewise obliged the poet to think and speak after a manner elevated above the common pitch of men, and to use phrases equal, in some measure, to the divine persons he introduced; and to this purpose served the poetical, figurative language, and the majesty of heroic verse.

To convey their truths to the best advantage, and adapt them to the particular purposes they were intended for; poets found out various forms.—Hence the epopeia and drama.

Epic *Poetry* is more for the manners and habits, than the passions; these last life all at once, and their violence is but of a short duration; but the habitudes are cooler and more gentle, and life and fall more slowly.

The epic action, therefore, could not be restrained to a day or two, as that of the drama; a longer and a juster space was required for this, than for tragedy, which is only for the passions. And hence arose a still greater difference between tragedy and the epopeia.

For the tragic violence required a stronger and more lively representation than the epic; and accordingly it consists wholly in the action; the poet never speaking; as he does in the epopeia, where there are no actors.

The laws of epic and dramatic *POETRY*, see under EPIC, CHARACTER, INVOCATION, DRAMATIC, THEATRE, TRAGEDY, COMEDY, ACT, SCENE, CHARACTER and SENTIMENT. For the lower sorts of *POETRY*, see each under its proper article, ODE, SONG, EPIGRAM, ELEGY, SATYR, &c.

POINT *, is a term used in various arts.

* The word is derived from the Latin, *punctum*, which is formed from *pungere*, to prick.

POINT, in geometry, according to Euclid, is a quantity which has no parts, or which is indivisible.

Wolffius defines it, that which terminates itself on every side; or which has no terms or boundaries distinct from itself.

This is what we otherwise call the *mathematical Point*; and is only conceived by the imagination; yet is it in this that all magnitude begins and ends; the flux or motion of the point generating a line, that of a line a surface, &c.

Hence some define a *Point* to be the inception of magnitude. A line can only cut another line in a *Point*.—Any three *Points* being given out of a right line; a circle, or part of a circle, may be drawn that shall pass through them all.

To draw a parallel line, a perpendicular, a tangent, &c. to a given point, are popular problems in geometry. See PERPENDICULAR, PARALLEL, TANGENT, &c.

Proportion of mathematical *POINTS*.—It is a current maxim, that all infinities, whether infinitely great or infinitely small, are equal; yet is the maxim false in both cases.—Dr. Halley shews several infinite quantities, which are in a finite proportion to one another; and some infinitely greater than others. See INFINITE QUANTITY.—The like, the Hon. Mr. Roberts shews of infinitely small quantities, viz. of *theoretical Points*.

He demonstrates, for instance, that the points of contact between circles, and their tangents, are in a subduplicate proportion to the diameters of the circles. That the *Point* of contact between a sphere and a plane is infinitely greater than that between a circle and a tangent; and that the *Points* of contact in spheres of different magnitude are to one another as the diameters of the spheres.

POINT of contrary flexure, in the higher geometry, is a *Point* of a curve, wherein it is bent or inflected towards a part contrary to that it before tended towards: so, e. gr. as to turn its convexity towards its axis, or any other fixed *Point*, which before it, turned its concavity towards.

If the curve turn back again towards the *Point* whence it first set out, the *Point* of the flexure is particularly called the *Point* of regression, or retrogradation. See RETROGRADATION of curves.

Wolffius illustrates the use of the calculus differentialis in finding the *Point* of contrary flexion in various kinds of curves.

POINT, PUNCTUM, in physics, is the smallest or least sensible object of sight, marked with a pen, point of a compass, or the like.

This is what we popularly call a *physical Point*; which in reality has parts, though those parts are not here regarded.—Of such *Points* does all physical magnitude consist.

This *physical Point* coincides with what Mr. Locke calls the *Point* sensible, and which he defines to be the least particle of matter, or space, we can discern.—He adds, that to the sharpest eye this is seldom less than 30 seconds of a circle, whereof the eye is the centre.

POINT, in grammar, is a character used to mark the divisions of discourse.

The *Point* proper, is what we otherwise call a *full stop*, or period, and serves to denote the sense complete, and the period ended.

Two *Points* usually mark the middle of a period, and shew a construction complete, and the sense to be perfect; yet intimating something to come after it: this we call a *Colon*.

A *Point* with a comma, called a *semicolumn*, marks a sense less complete than the colon: though authors seem to use them indifferently: nor are grammarians agreed about their precise difference.

The comma, or virgula, marks a subdivision of a member of a period.

A *Point* of interrogation, ? marks something to be pronounced in a higher tone, as intimating a question asked.

A *Point* of admiration, ! marks a sudden surprize and wondering.

Our *Points* and accents were intirely unknown to the ancients. In the ancient Greek manuscripts, the whole discourse seems wrote with the same stroke of the pen; the words and letters being joined throughout.

In after-times, points were invented, and added at the top of the letters, to shew when the sense was finished: Hence the grammarians, coming to retouch the old manuscripts, thought fit to add the points and accents.—Salmasius affirms, that he has even observed, plainly, where they have been added, by the difference of hands.

POINTS, or vowel POINTS, in the Hebrew learning, are certain characters, which, in the writings of that language, serve to mark the vowels.

The antiquity of the *Points* in the Hebrew tongue makes the subject of a celebrated controversy among the learned; some maintaining their origin to be the same with that of the Hebrew language; and others asserting them to have been first introduced by Eldras, after the Babylonish captivity, when he compiled the canon, transcribed the books into the present Chaldean character, and restored the purity of the Hebrew text.

Others will have them invented by the doctors of the school of Tiberius, usually called the *Massoretas*, five or six hundred years after Christ.—The rabbin Elias Levita was the first who started this question in the last century; and maintained them to have been an invention of the *Massoretas*, for the ease of those who were to learn the Hebrew tongue.

This sentiment was espoused by Capella, to whom also adhered Luther, Calvin, Calaubon, Scaliger, &c. Buxtorf attacked Capella violently on this article, and gained a great number of divines on his side, who took the alarm, imagining it a grievous wound to the holy text, to allow the *vowel-points* to have been added by the *Massoretas*, and not to have been found in the ancient text; because, without these, it is very difficult to fix the certain reading thereof.—Yet in the Samaritan text there is no *Point* or vowel, nor in many of the most ancient Hebrew manuscripts.

POINT, in music, is a mark or note anciently used to distinguish the tones.

Hence we still call it simple *counter-point*, when a note of the bass answers precisely to that of the treble; and figurative *counter-point*, when a note is syncopated, and one of the parts makes several inflections of the voice or tone, while the other only makes one.

We still use a *Point* to raise the value of a note, and prolong its time by one half, *v. g.* a *Point* added to a semibreve makes it instead of two minims, equal to three.

POINT, in astronomy, is a term applied to certain parts or places marked in the heavens, and distinguished by proper epithets. The four grand *Points* or divisions of the horizon, *viz.* the *east, west, north, and south*, are called the *cardinal Points*. See *CARDINAL*; see also *EAST, WEST, &c.* each under its proper article.

The zenith and nadir are the *vertical Points*.

The *Points* wherein the orbits of the planets cut the plane of the ecliptic, are called the *nodes*.

The *Points* wherein the equator and ecliptic intersect, are called the *equinoctial Points*.—Particularly, that whence the sun ascends towards the north-pole, is called the *vernal Point*.—And that by which he descends to the south-pole, the *autumnal Point*.

The *Points* of the ecliptic, where the sun's ascent above the equator, and descent below it, terminate, are called the *solstitial Points*.—Particularly, the former of them the *eternal or summer Point*: the latter, the *brumal or winter Point*.

POINT, in navigation and geography.—*POINTS* of the horizon, or of the compass, are certain *Point*s formed by the intersections of the horizon with vertical circles.

The number of these *Points*, therefore, is really the same with that of the *Points* conceived in the horizon, *i. e.* infinite; tho' in practice we only distinguish 32 of them.

Some use *Point* for the intersection of a vertical circle with a circle parallel to the horizon; and even some, for the segment of a vertical intercepted between the meridian and horizon, or a circle parallel thereto.

The *Points* are shewn by right lines drawn from a *Point* assumed in a horizontal plane.

A *Point* of the compass is popularly taken for a 32d part of the whole; or for an arch of 11 degrees, 15 minutes: half of which, *viz.* 5° 37' 1/2, is called a *half Point*: and half of that, or 2° 48' 1/4, a *quarter Point*.

These *Points* of the compass are divided into cardinal and collateral.

Cardinal Points are the intersections of the horizon and meridian, called the *north and south Points*; and the intersections of the horizon with the prime vertical, called the *east and west*. These coincide with what the Latins call *cardines mundi*; and are a quadrant, or 90 degrees, distant from each other.

Collateral or intermediate Points, are those lying between the cardinal *Points*,—which are either *primary*, *viz.* those equidistant from the two cardinals, as north-east, south-west, &c. Or *secondary*, which are again, either of the *first order*, *viz.* such as are equidistant from a cardinal and the next primary, as north-north-east; or of the *second order*, *i. e.* equidistant between a cardinal or primary, and first secondary, as north-east by north.

The *primary collateral Points*, therefore, are 45° distant from the cardinals; the first secondaries 22° 30' from the cardinal and next primary collateral; and the secondaries of the *second order* 11° 15' from a cardinal, or first collateral, and a secondary.

POINT, among seamen, is also used for a cape, or head-land, jetting out into the sea.

They say, two *Points* of land are *one in another*, when they are so in a right line against each other, as that the innermost is hindered from being seen by the outermost.

POINT, in perspective, is a term used for various parts or places, with regard to the perspective plane. Such are, the

POINT of sight, or of the eye: this is a point F, on a plane, H I, (*tab. perspect. fig. 12.*) marked out by a right line O F, drawn from the eye, perpendicular to the plane.—This is also called the *principal Point*.

This *Point* is in the intersection of the horizontal and vertical planes. See *PLANE*.

Some authors call this the *principal Point*; and give the name *Point of sight*, or *vision*, to the point wherein the eye is actually placed, and where all the rays terminate, as O. See hereafter *POINT of view*.

POINT of distance is a *Point*, *v. gr.* P, or Q, in the horizontal line P Q, at the same distance from the principal *Point* F, as the eye O is from the same.

Third POINT is a *Point* taken at discretion in the line of distance, wherein all the diagonals drawn from the divisions of the geometrical plane, concur.

Objective POINT, a *Point* on a geometrical plane, whose representation is required on the perspective plane.

Accidental POINT. See the article *ACCIDENTAL*.

Visual POINT. See the article *VISUAL*.

POINT, in optics.—The *POINT of concurrence*, or *concurrence*, is that wherein converging rays meet, more usually called the *focus*.

POINT of dispersion, is that wherein the rays begin to diverge; usually called the *virtual focus*.

POINT of incidence, is a *Point* on the surface of a glass, or other body, wherein a ray falls.

POINT of view, with regard to building, painting, &c. is a *Point* at a certain distance from a building, or other object, wherein the eye has the most advantageous view or prospect of the same.

This *Point* is usually at a distance equal to the height of the building.—For an instance:—To consider with judgment the whole of the famous church of the invalids at Paris; we must not stand at above 340 foot distance from it, which is nearly its height. To be able to judge of the ordonnance of its facade or frontispiece, and the regularity of its order, the eye should only be as far off as the frontispiece is high, *viz.* 100 feet.

But to examine the correctness of its profiles, and the spirit of its ornaments, the eye should only be distant the height of the Doric order, which is about 40 feet; if it be nearer, the parts being too much shortened, will appear out of proportion.

A vague or indeterminate *Point* has a different effect from the *Point of view*; in that, in looking at a building from an indeterminate *Point*, the eye can only form an idea of the magnitude of its mass, by comparing it with other buildings adjacent to it.

POINT of reflexion, is a *Point* on the surface of a glass, or other body, whence a ray is reflected.

POINT of refraction, is a *Point* in the surface of a glass, or other refracting surface, wherein the refraction is effected.

Radiant POINT. See the article *RADIANT*.

POINTS, in heraldry, are divisions of the escutcheon into several squares, sometimes to the number of 9, sometimes to 15; some whereof are of one colour or metal, the others of another; called also *equipollent Points*.

There is also another, and that more frequent division of the escutcheon into *Points*, which have several names and values, according to their several places.

There are nine principal *Points* in an escutcheon, as marked in *tab. herald. fig. 38*.—A represents the *dexter chief Point*.—B the *middle chief Point*.—C the *sinister chief*.—D the *honour Point*.—E the *self Point*, called also the *centre*.—F the *nombril* or *navel Point*.—G the *dexter base*.—I the *sinister base*.—H the *precise middle base*.

Columbiere makes the *Points* and their situations symbolical.—As the several bearings in an escutcheon are so many types representing the commendable actions of the person they are given to; so the escutcheon itself represents the body of the man that performed them; and the *Points*, or parts, signified by these letters, the principal parts of his body.—Thus, A, B, C, represent the head, in which the three great faculties reside: D, the neck, where ornaments are chiefly borne: E, the heart &c. See *ESCUTCHEON*.

POINT is also the name of an ordinary, something like the pile, rising frequently from the bottom of the escutcheon to the top, very narrow, and only taking up two thirds of the *Point* of the escutcheon.

When the *Point* arises from the base, it is peculiarly called *Point-in-point*.

POINT inverted, is when it descends from the chief downwards; possessing two thirds of the chief, but diminishing as it approaches the point of the escutcheon, though without touching it.

POINT in bend, or *Point in bar*, is when the *Point* is placed transverse, in the situation of a bend or bar.

When it comes from the sides of the escutcheon, it is also called a *Point dexter or sinister*, according to its situation.

The *Point dexter* is commonly reputed an abatement due to a braggadocio.—*Point-champion-ten* due for killing a prisoner after quarter demanded.—*Point-in-point*, a diminution belonging to a coward.—*Point-plane*, an abatement belonging to a liar, &c. See *DIMINUTION*.

POINT is also used in heraldry for the lowest part of the escutcheon, which usually terminates in a *Point*.

POINT-champain. See the article *CHAMPAIN*.

In the French arms the fleur de lys's are two in chief, and one in *Point*.

POINT is also an iron or steel instrument, used with some variety in several arts.

Engravers, etchers, cutters in wood, stone-cutters, &c. use *Points* to trace their designs on the copper, wood, stone, &c.

Statuaries, &c. have likewise *Points* in manner of little chisels, used in the first forming or sketching out their work.

Turners work or fashion their common works between two *Points* fastened to the puppets.—Lapidaries also have iron *Points*, to the ends whereof are fastened pieces of diamonds, serving to pierce the precious stones withal.

POINT, in the manufactories, is a general term used for all kinds of laces wrought with the needle.

Such are *Point de Venise*, *Point de France*, *Point de Genoa*, &c. which are distinguished by the particular æconomy and arrangement of their *Points*.

POINT is sometimes also used for lace woven with bobbins, as *English Point*, *Point de Malines*, *Point de Heere*, &c.

POINT,

POINT, in architecture.—*Arches of the third POINT.*

Arches of the fourth POINT. See the article **ARCH**.

Gauge-POINT. See the article **GAUGE**.

POINT, in poetry, denotes a brisk lively turn, or conceit usually found or expected at the close of an epigram.

POINT-BLANK, in gunnery, denotes the shot of a gun, levelled horizontally, without either mounting or sinking the muzzle of the piece.

In shooting *Point-blank*, the shot or bullet is supposed to go directly forward, in a straight line, to the mark; and not to move in a curve, as bombs and highly elevated random shots do.

POINTED crowns. See the article **CROWN**.

POINTED roof. See the article **ROOF**.

A *cross* **POINTED**, among heralds, is that which has the extremities turned off into Points by frait lines. Columbiere calls it *signale*, q. d. *for bond*.

POINTING, PUNCTUATION, in grammar, the art of dividing a discourse, by points, into periods and members of periods, in order to facilitate the pronunciation and understanding thereof. See **PUNCTUATION**.

POINTING, among seamen, the marking on the chart in what point or place the vessel is.

All the difficulty in *Pointing* a chart arises from our ignorance of the longitude.—The pilot easily finds the latitude by taking the height of the pole; but for the longitude, there is no coming at it but by computation, which is always uncertain.

POINTING the cable, is a sea term, denoting the untwisting it at the end, and lessening the yarn, and then twisting it again, making all fast with a piece of marling, to keep it from ravelling out.

POINTING, in war, the levelling or directing a cannon, or mortar-piece, so as to play against any certain point. See **ORDNANCE**.

This is done by means of a quadrant with a plummet. See **gunners QUADRANT**.

POISE. See the articles **COUNTERPOISE**, **WATERPOISE**, &c.

POISON *, in medicine, a malignant quality in some animal, vegetable, or mineral body, which renders it hurtful, and even mortal, to those who take it even in a small quantity.

* The word is derived from the Latin, *potio*, draught; and was anciently used in an innocent sense. See **POTION**.

Some define *Poison* to be any thing taken inwardly, whose properties are contrary to those of food, or to what they should be in order to nutrition.

Poisons are of various kinds, and operate in various manners; some by dissolving the blood, others by coagulating it, and others by corroding and destroying the solid parts.

Some attack, equally, all the parts; some only a particular one.—Thus the *lepus marinus* is an enemy to the lungs, cantharides to the bladder, &c.

Some things again, which prove *Poison* to man, serve for food to other animals.—Thus, mandragora and henbane feed hogs, though they kill man; and thus that deadly *Poison* hemlock is wholesome for goats, bustards, and, as Galen says, for stallions too. The cassia plant, Sir Hans Sloane tells us, *poisons* unprepared; but prepared, is the common bread of the West Indies, particularly in Jamaica and the hotter parts; and is used to victual ships.

Nay, what is more, some *Poisons* are not only food, but even phlegm, to other animals.—In the *Philos. Transact.* we have an instance of a horse troubled with the farcy, which could not be cured by the most famed remedies, which yet cured himself in a short time, by feeding greedily on hemlock.—Fontanus also tells us of a woman who eat hemlock for some time to procure sleep, and with very good effect, though repeated doses of opium had no operation.

Dr. Tanc. Robinson, in a letter to Mr. Ray, gives an account of several poisonous plants, which, if truly corrected, or exactly dosed, he says, may prove the most powerful remedies known.—Thus the hellebores, incorporated with a sapo, or with alkali-salts alone, are successful in epilepsies, vertigos, palsies, lethargies, and mania's: dose from ʒj to ʒjss. The roots of cicuta, asarum, and napellus in agues and periodical pains: dose ʒj to ʒjss. The hyocyamus in hemorrhages, violent heats and inflammations: dose ʒj to ʒjss. The fœmen stramonii is a good anodyne, useful in vigilia's, rheumatism, hysterical cases, &c. dose ʒj to ʒjss. Elaterium, soldanella and gratiola, are also good in hydropic cases. Opium corrected loses its narcotic quality, and is safely given in great doses in convulsive cases, fluxes, catarrhs, &c.

Physicians distinguish three kinds of *Poisons*.

Animal Poisons, which are those drawn from animals; as, the

viper, the scorpion, *lepus marinus*, &c.

Vegetable Poisons, as aconite, cicuta, or hemlock, hellebore, napellus, &c.

Mineral Poisons, as arsenic, corrosive sublimate, ceruse, orpiment, realgar, &c.

The theory of the effects, operations, &c. of animal *poisons*, is very accurately and mechanically delivered by Dr. Mead, in his remarkable essay, the Uses of a viper, tarantula, and mad

dog. See his doctrine under the respective articles, **TARANTULA**, **VIPER**, and **HYDROPHOBIA**.

The operation of *vegetable Poisons*, see delivered under the article **OPIATES**.

As to *mineral Poisons*, they all bear so much analogy to that made of quick-silver in the common sublimation, that their operation will be easily conceived from what we have already laid down under the heads **MERCURY** and **SUBLIMATE**.

They are all more or less dangerous, as their salts receive a greater or less force from the metallic particles; and hence, as the most virulent may be mitigated by breaking the points of the saline crystals, so the most innocent minerals may become corrosive by combining them with salts, as is seen in the preparations of silver, antimony, iron, &c.

The general remedies against *Poisons* are known by the name of *antidotes*, *alexipharmics*, and *alexiterials*.

Counter Poison. See the article **COUNTER POISON**.

To *Poison a piece*, among gunners, is the same as to clog and nail it up. See **NAILING**.

POISONING, in law, the crime of administering poison to a person, whereby he dies.

This, by a law of Henry VIII. was made a sort of treason; and the punishment doomed for it was, to be put alive into a cauldron of water, and boiled to death.—At present it is only murder, or felony without benefit of clergy, if the party dies of the poison within a year and a day.

POISONOUS waters. See the article **WATER**.

POLAR, something that relates to the poles of the world. See **POLE** and **CIRCUMPOLAR**.

In this sense we say, *polar virtue*, *polar tendency*, &c. See **POLARITY**.

Polar circles, are two lesser circles of the sphere, parallel to the equator, at the distance of 23 deg. from each pole; serving to mark the beginning of the frigid zones.

The *polar circles* are particularly denominated from their respective neighbouring poles, the *arctic* and *antarctic*.

Polar dials are those whose planes are parallel to some great circle passing through the poles, or to some one of the hour-circles; so that the pole is neither elevated above, nor depressed below the plane.

Such dial, therefore, can have no centre, and consequently its style, sub-style, and hour-lines, are parallel.

This, therefore, will be an horizontal dial to those who live under the equator or line.

To construct a *Polar dial*. See the article **DIAL**.

Polar projection is a representation of the earth, or heavens, projected on the plane of one of the polar circles.

POLARITY, the quality of a thing considered as having poles.

By heating an iron bar, and letting it cool in a vertical posture, it acquires a *Polarity*.—The lower end becomes the north pole, the upper the south.

Iron bars acquire a *Polarity*, by being kept a long time in an erect posture, even without heating.—Thus the bars of windows, &c. are frequently found to have poles. Nay, a rod of iron acquires a *Polarity*, by the mere holding it erect; the lower end in that case attracting the south-end of a magnetic needle, and the upper the north-end.—But these poles are mutable, and shift with the situation of the rod.

POLE *, **POLUS**, *πολύς*, in astronomy, one of the extremities of the axis, whereon the sphere revolves.

* The word is formed from the Greek *πολύς*, *vertere*, to turn.

These two points, each 90 deg. distant from the equator, are called, by way of excellence, the *Poles of the world*.

Wolfius defines the *poles*, those points on the surface of the sphere, through which the axis passes; such are the points I and K, (*tab. astron. fig. 21.*)—whereof, that visible to us, or raised above our horizon, I, is called the *arctic* or *north-pole*; and its opposite, K, the *antarctic* or *south-pole*.

Pole, in geography, is the extremity of the earth's axis, or one of the points on the surface of our globe, through which the axis passes. See **EARTH**.

Such are the points P, Q, (*tab. geogr. fig. 1.*) whereof that elevated above our horizon is called the *arctic* or *north-pole*; and its opposite Q, the *antarctic* or *south-pole*.

Dr. Halley shews, that the solstitial day, under the *Pole*, is as hot as under the equinoctial, when the sun is in the zenith; in regard all the 24 hours of that day under the *Pole*, the sun-beams are inclined to the horizon in an angle of 23 1/2 degrees; whereas, under the equinoctial, though the sun becomes vertical, yet he shines no more than 12 hours, and is absent 12 hours;—besides that for 3 hours, 8 minutes, of that 12 hours, which he is above the horizon there, he is not so much elevated as under the *Pole*.

The altitude, or elevation of the *Pole*, is an arch of the meridian intercepted between the *Pole* and the horizon.

To find this elevation, is a very popular problem in astronomy, geography, and navigation; this, and the latitude of the place, being always the same.

To observe the altitude of the Pole.—With a quadrant, observe both the greatest and least meridian altitude of the *Pole* star. Subtract the least from the greatest, and divide the difference by two; the quotient is the star's distance from the *Pole*; which added to the lesser altitude found, gives the elevation of the *Pole* required.

Thus M. Couplet the younger, at Lisbon, in 1697, in the end of September, observed the greatest meridian altitude $41^{\circ} 5' 40''$. The smallest $36^{\circ} 28' 0''$. The difference whereof is $4^{\circ} 37' 40''$; one half whereof $2^{\circ} 18' 50''$, added to the less, gives $38^{\circ} 46' 50''$, the altitude of the *Pole* of Lisbon.

The altitude of the *Pole*, together with the meridian line, being the basis of all astronomical observations; to determine it with the greater accuracy, the meridian altitudes must be corrected from the doctrine of refractions, hereafter to be delivered.

By means hereof, M. Couplet, subtracting $1' 25''$ in the proposed example, leaves the corrected altitude $38^{\circ} 45' 25''$. Hence 1. The altitude of the *Pole* being subtracted from 90° , leaves the altitude of the equator.

2. If the greatest meridian altitude of this star exceed the altitude of the equator, the latter subtracted from the former, leaves the declination of the star northward; if the altitude of the star be less than that of the equator, the former subtracted from the latter leaves the star's declination southward.

Dr. Hook, and some others, imagined the height of the *Pole*, and the position of the circles in the heavens, in respect of those on the earth, to be changed from what they anciently were: But M. Cassini thinks there is no ground for such a surmise, but that all the difference we now find in the latitudes of places, &c. in respect of the ancient accounts, arises from the inaccuracies of the ancient observations.

Indeed, it is no wonder they should err in their observations, considering what instruments they used. He adds, it is probable there may be some variation in the height of the *Pole*; but he thinks this never exceeds two minutes; and that even this will vanish after it is arrived to its highest difference.

POLE, in spherics, is a point equally distant from every part of the circumference of a greater circle of the sphere; as the centre is in a plain figure.

Or, *Pole* is a point 90° distant from the plane of a circle, and in a line passing perpendicularly thro' the centre, called the axis. The zenith and nadir are the *Poles* of the horizon.—The *Poles* of the equator are the same with those of the sphere or globe.

POLES of the ecliptic are two points on the surface of the sphere, $20^{\circ} 30'$ distant from the poles of the world, and 90° distant from every part of the ecliptic.

POLES, in magnetics, are two points in a load-stone, corresponding to the *Poles* of the world; the one pointing to the north, the other to the south.

If the stone be broken in ever so many pieces, each fragment will have its two *Poles*.—If a magnet be bisected by a line perpendicular to the axis; the two points before joined will become opposite *Poles*, one in each segment.

To touch a needle, &c. that part intended for the north end is touched with the south *Pole* of the magnet, and that intended for the south end with the north *Pole*.

A piece of iron acquires a polarity, by only holding it upright. But its *Poles* are not fixed, but shift, and are inverted as the iron is.—A fixed north *Pole* may be made all the ways a fixed south *Pole* is made, but not *vice versa*; and whatever way we get a fixed south *Pole*, it is always weaker than a fixed north *Pole* got the same way. Fire destroys all fixed *Poles*, but it strengthens the mutable ones.

The end of a rod being heated, and left to cool northward, Dr. Gilbert says, becomes a fixed north *Pole*, if southward, a fixed south *Pole*: Yet this doth not hold in all cases.—If the end be cooled, held downward, or to the nadir, it acquires somewhat more magnetism, than if cooled horizontally towards the north. But the best way is to cool it a little inclined to the north. Repeated ignitions do not avail to this purpose any more than a single one.

Dr. Power says, that if we hold a rod northwards, and hammer the north end in that position, it will become a fixed north *Pole*; and, contrarily, if you hammer the south end.—What is said of hammering is to be likewise understood of filing, grinding, sawing; nay, a gentle rubbing, provided it be continued long, will produce *Poles*.

The more heavy the blows are, *ceteris paribus*, the magnetism will be the stronger.—A few hard blows do as much as many. Old drills and punches have all fixed north *Poles*, because almost constantly used downwards. New drills have either mutable *Poles*, or weak north *Poles*. Drilling with such a one southward horizontally, it is a chance if you produce a fixed south *Pole*, much less if you drill south downwards; but if you drill south upwards, you always make a fixed south *Pole*.

A weak fixed *Pole* may degenerate into a mutable one in a day, nay, in a few minutes, by holding it in a position contrary to its *Pole*. The load-stone itself will not make a fixed *Pole* in any iron. It is required the iron have a length, if it be thick. Mr.

Ballard tells us, that in six or seven drills made before his face, the bit of each became a north *Pole* merely by hardening.

POLE of a glass, in optics, is the thickest part of a convex, or the thinnest of a concave glass.

If the glass be truly ground, the *Pole* will be exactly in the middle of its surface.

This is sometimes also called the *vertex* of the glass.

POLE, in surveying, is a measure containing 16 feet and an half; called also *perch*, and sometimes *rod*.

POLE STAR, or **POLAR STAR**, is a star of the second magnitude, the last in the tail of Ursa minor, or the little bear.

Its longitude, Mr. Flamsteed makes it $24^{\circ} 14' 41''$, its latitude $66^{\circ} 04' 11''$.

The nearness of this star to the *Pole*, whence it happens that it never sets, renders it of vast service in navigation, &c. for determining the meridian line, the elevation of the pole, and consequently the latitude of the place, &c.

POLEIN, in our ancient customs, a sort of shoe, sharp or picked at the point.

This fashion was first taken up in the time of king William Rufus; the picks being made so long, that they were tied up to the knees with silver or golden chains.

They were forbidden by stat. an. 4. Edw. IV. cap. 7.—*Tunc fluxus crimini, tunc luxus vestium, tunc usus calceorum cum arcuatis oculis inventus est.* Malmesb. in Will. II.

POLEMICAL, $\pi\omega\lambda\epsilon\mu\alpha\kappa\iota\kappa\omicron\varsigma$, an epithet applied to books of controversy, especially those in divinity.

* The word comes from the Greek $\pi\omega\lambda\epsilon\mu\omicron\varsigma$, war, battle.—Scaliger's exertions against Cardan make a pure polemical book.

Hence also we say, polemical divinity, for controversial, &c.

POLEMSCOPE, in optics, an oblique kind of prospective glass, contrived for the seeing of objects that do not lie directly before the eye.

It was invented by Hevelius, in 1637, who gave it this name, from the Greek $\pi\omega\lambda\epsilon\mu\omicron\varsigma$, battle; because it may be of use in war, in engagements, duels, &c.

Something of this kind are those now known among us under the name of ogling-glasses, or opera glasses, through which one sees a person in appearing to look at another.

Construction of the Polescope.—Any telescope will be a *Polescope*, if the tube be but crooked, like a rectangular syphon A B D M (tab. fig. 70.); and between the object-glass A B and first eye-glass G H (if there be several) be placed a plain mirror, in such manner as that the mirror is inclined to the horizon at an angle of 45° , and its reflected image found in the focus of the eye-glass G H.

For by this means, objects situate over-against the lens A B will appear the same as if the mirror K were away, and the object-glass, with the objects, were directly opposite to the eye-glasses.

If it be desired to look in at O, not at M, another plain mirror, N, must be added.

POLETA, in our ancient law-books, signifies the ball of the foot.—*Tris artilli fundantur de pede anteriori sine poleta*, Mat. Par. anno 1215.

POLEY, in medicine. See the article **POLITUM**.

POLICY, $\pi\omega\lambda\iota\tau\iota\kappa\iota\alpha$, the laws, orders, and regulations prescribed for the conduct and government of states and communities.

* The word is of Greek original, being derived from the Greek $\pi\omega\lambda\iota\varsigma$, civitas, city or state.

In the general, *Policy* is used in opposition to barbarism.—Different states have different kinds of *Policy*; thus the *Policy* of Athens differed from that of Sparta.

Loyseau observes, that *Policy* properly signifies the course and administration of justice in a city.—The direction of the *Policy* of London is in the hands of the lord-mayor.

At Paris they have a *chamber of Policy*, where people are verbally accused for contraventions of *Policy*.

Some divide *Policy* into two parts, *agoronomy*, that relating to affairs of merchandize; and *affynomy*, that concerning the civil and judiciary government of the citizens. Some add a third branch, *viz.* what relates to the ecclesiastical government. See **ECCLESIASTICAL**.

Richard Hooker has a fine treatise of the laws of ecclesiastical *Policy*.

POLICY of insurance or assurance, of ships, is a contract or convention whereby a person takes upon himself the risks of a sea-voyage; obliging himself to make good the losses and damages that may befall the Vessel, its equipage, tackle, victualing, lading, &c. either from tempests, shipwrecks, pirates, fire, war, reprisals, &c. in part or in whole; in consideration of a certain sum of seven, eight, or ten per cent. more or less, according to the risque run; which sum is paid down to the assurer by the assured, upon his signing the *Policy*.

There are some assurances for the going, some for the returning, and some for both; or for a limited time; though some maintain, that the time ought never to be limited, in that the contract thereby becomes usurious.

The *Policy* is to contain the name and dwelling of the person assured; his quality, whether as proprietor or agent; the effects, the name of the vessel, and of the master; those of the place where the goods are to be loaded or unloaded; the port whence and whither; as also the time, the risks, and the conditions. If the vessels or merchandizes assured be lost, the assured must notify the same by an act in form; declaring he surrenders the whole to the insurer, on his paying the sums assured in the time expressed.

The origin of these assurances is ascribed to the Jews, at the time they were expelled France, in 1182, who are said to have used this as a means to facilitate the transporting of their effects. The *Term Policy* is Spanish, and comes from *poliza*, schedule; but the practice comes from the Italians, and the Lombards, who, again, derived it originally from the Latin *pollicitatio*, promise.—Some say, the merchants of Marseilles were the first who set on foot this kind of commerce.

Anciently, *Policies* were given by word of mouth, called *Policies of credit*; it being supposed the assured would enter them in his ledger: but of late, that honesty is become less frequent among traders, they have been made constantly in writing. The grand mart for the assurance of ships is the city of Amsterdam. It is here not only the Dutch traders insure their own vessels; but, what is infinitely more considerable, such are the riches, reputation, &c. of the inhabitants, as to engage the generality of merchants of other countries to prefer them to their own countrymen, and to assure with the Dutch, when it would be much easier for them to find insurers at home, or in the ports where the vessels are laden.

The number of insurers at Amsterdam is not above 50 or 60 persons, yet is their wealth and character such, that a man never fails of an insurer, be the countries or ports what they will, the cargo ever so rich, or the dangers ever so imminent.

Policy of insurance, or assurance of houses, is an instrument formed on the model of that for vessels; whereby a person or community of persons take on themselves the risks and damages that may befall houses, their furniture, in whole or in part, &c. from fire; on consideration of a certain sum or sums, to be paid by the insurer, according to the terms of the agreement.

The insurance from fire is now a popular piece of commerce; and we have a number of societies erected into corporations for that purpose.

Policy of insurance of lives, is an instrument whereby a society of persons erected into a corporation, &c. oblige themselves to pay a certain sum of money, *e. gr.* an hundred pounds, upon the death of a person whose life they assure, in consideration of a sum of money, *e. gr.* one guinea paid quarterly, to the insurers during the life of the said person assured.

The *Policy* is under the seal of the office, and intitles the Heir person in whose favour it is granted, to make good his claim, according to the tenor of the articles, or by-laws of the society. There have also been lately set on foot, *Policies of assurance of houses*, from death, damages in travelling, diseases, being stolen, &c. in which cases the insurers are to make them good to the assured, &c.

Officers of Policy. See the article OFFICER.

POLICY, in letter-foundry, is sometimes used for a rule that regulates the number of letters of each kind in a complete font; *i. e.* to determine how many, in proportion to the whole set, there are to be of each particular kind.

For instance, in a font of an hundred thousand characters, there are to be a thousand for *a*, five thousand for *n*, three thousand for *m*, thirty only for *k*, as many or a little more for *s*, *y*, and *x*; and in proportion for the other letters, the great and small capitals, the initial letters, points, comma's, double letters, &c.

POLIOPTROM, or *POLYOPTRON*, in optics. See *POLYOPTRON*.

POLISH coins, measures, &c. See the articles COIN, MONEY, MEASURE, &c.

POLISHER, an instrument called also a *burnisher*, used for polishing and burnishing gold, silver, and other metals, when gilt or silvered; and matters of other kinds proper to take a polish.

The *Polisher* is different in the different arts and manufactures. The gliders use an iron *Polisher* to prepare their metals before gilding, and the blood-stone to give them the bright polish after gilding.

The *Polisher* used by the makers of spurs, bits, &c. is part iron, part steel, and part wood.—The instrument consists of an iron bar, with a wooden handle at one end, and a hook at the other, to fasten it to another piece of wood held in the vice, while the operator is at work. In the middle of the bow, within-side, is what they properly call the *Polisher*, which is a triangular piece of steel with a tail, whereby it is riveted to the bow. What the cutlers call their *Pelishers*, are a kind of wooden wheels for g.-nding, made of walnut-tree, an inch thick, and of a diameter at pleasure. They are turned by the great wheel; and it is on these they polish and smooth their works with emery and putty.

The *Pelishers* used in the manufacture of glass are very different from all these.—They consist of two pieces of wood, the one flat, covered with old hat; the other long, and half-round, is

fastened on the former, whose edge it exceeds on both sides by some inches, which serve the workman to take hold of, and to work it backwards and forwards by.

The *Pelishers* used by spectacle-makers are pieces of wood a foot long, seven or eight inches broad, and an inch and half thick, covered with old castor-hat, whereon they polish the shell and horn frames their spectacle-glasses are to be set in.

POLISHING, the art of giving a gloss, or lustre, to a thing; particularly a precious stone, marble, glass, a mirror, or the like.

POLISHING of glasses, lens's, &c. succeeds the grinding thereof.

See GRINDING.

The polishing of a mirror is the last preparation given it, with emery or putty.

For the *polishing of diamonds, &c.* see LAPIDARY.

POLITICAL *, *πολιτικος*, something that relates to policy, or civil government.

* The word is formed from the Greek *πολις*, *civitas*, city.

In this sense we say, *political interests, political views, political discourses, &c.*

POLITICAL arithmetic, is the application of arithmetical calculations to *political* uses and subjects; as, the public revenues, number of people, extent and value of lands, taxes, trade, commerce, manufactures, or whatever relates to the power, strength, riches, &c. of any nation or commonwealth.

The chief authors who have attempted calculations of this kind, are Sir William Petty, Major Grant, Dr. Halley Dr. Davenant, and Mr. King; and the principal points settled by them are as follow:

According to Sir William Petty's computations, tho' the land of Holland and Zealand be not above 1000000 acres, nor that of France less than 8000000, yet the former are near a third part as rich and strong as the latter.—That the rents of lands in Holland are to those in France as 7 or 8 to 1.—That the people of Amsterdam are $\frac{2}{3}$ of those of Paris or London; which, according to him, do not differ above a 20th part from one another.—That the value of the shipping of Europe is about two millions of tons, whereof the English have 500000, the Dutch 900000, the French 100000, the Hamburgers, Danes, Swedes, and Dantzickers, have 250000; and Spain, Portugal, Italy, &c. about as much.—That the value of goods then exported yearly from France into all parts, was quadruple of that exported into England alone, and consequently, in all about 5000000 *l.* What was then exported out of Holland into England, was worth 300000 *l.* and what was exported thence into all the world, 1800000 *l.*—That the money yearly raised by the French king, in time of peace, is about 6 $\frac{1}{2}$ millions sterling; and that the moneys raised in Holland and Zealand are about 2100000 *l.* and in all the provinces together, about 3000000 *l.*—That the people of England are about 6000000, and their expences at 7 *l.* *per annum* a head, 42000000 *l.* or 800000 *l.* a week.—That the rent of the lands is about 8 millions, and the interests and profits of the personal estates as much.—The rent of houses in England 4000000 *l.*—That the profits of the labour of all the people is 26000000 *l.* yearly.—That in Ireland the people amount to about 1200000.—That the corn spent in England, at 5 *s.* the bushel for wheat, and 2 *s.* 6 *d.* for barley, amounts to ten millions *per annum*.—That the navy of England (then) required 36000 men to man it, and other trade and shipping, about 48000.—That in France, to manage the whole shipping trade, there were at that time required but 1500 men.—That the whole people of France are about thirteen millions and a half; and those of England, Scotland, and Ireland, together, about nine millions and a half.—That in the three kingdoms are about 20000 churchmen; and in France above 270000.—That in the dominions of England are above 40000 seamen, and in France not above 10000.—That in England, Scotland, and Ireland, and all other dominions depending thereon, there was then about 60000 tun of shipping, which is worth about four millions and a half in money.—That the sea-line round England, Scotland, and Ireland, and the adjacent isles, is about 3800 miles.—That in the whole world are about 300 millions of people; whereof those, with whom the English and Dutch have any commerce, are not above 80 millions.—That the value of commodities annually traded for in the whole, is not above 45000000 *l.* That the manufactures exported out of England amount to about 5000000 *l.* *per annum*. Lead, tin, and coals to 500000 *l.* *per annum*.—That the value of the French commodities (then) brought into England, did not exceed 1200000 *l.* *per annum*.—That the whole cash of England, in current money, was then about 6000000 *l.* sterling.

Dr. Davenant gives some good reasons, why many of Sir Wm. Petty's numbers are not to be intirely depended upon; and therefore advances others of his own, founded on the observations of Mr. Greg. King.

Some of the particulars are,—That the land of England is 39 millions of acres.—That the number of people, according to his account, is about 5545000 souls, they increasing about 9000 every year, allowances being made for plagues, wars, shipping, and the plantations.—The people in London he reckons at 530000: Those in the other cities and market towns in England, 870000; and those in the villages and hamlets, at 4100000. The yearly rent of the land, he accounts to be

1000000 *l.*—That of the houses and buildings 200000 *l.* per annum.—The produce of all kinds of grain here reckoned to be worth 975000 *l.* in a year moderately plentiful.—The rent of the commons is usually 200000 *l.* and their neat produce, above 900000 *l.*—The rent of the pasture, meadows, woods, forests, commons, heaths, &c. 700000 *l.*—The annual produce by cattle, in butter, cheese, and milk, he thinks is about 250000 *l.*—The value of the wool yearly shorn, about 100000 *l.*—Of horses yearly bred, about 250000 *l.*—Of the ash yearly spent as food, about 335000 *l.*—Of the tallow and lard, about 600000 *l.*—Of the hay yearly consumed by horses, about 1300000 *l.*—Of hay consumed by other cattle, 1000000 *l.*—Of the timber yearly felled for building, 500000 *l.*—Of the wood yearly spent in firing, &c. about 500000 *l.*—The land of England to its inhabitants is now about 7 $\frac{1}{2}$ acres per head.—The value of the wheat, rye, and barley, necessary for the sustenance of England, amounts to at least 6000000 *l.* per annum.—The value of the woollen manufacture made here is about 8000000 *l.* per annum; and our exports of all kinds of the woollen manufacture amount to above 2000000 *l.* per annum.—The annual income of England, on which the whole people live and subsist, and out of which taxes of all kinds are paid, is now about 43 000000 *l.*—that of France 81000000 *l.* and that of Holland 18250000 *l.*

Major Quant, in his observations on the bills of mortality, computes, that there are 39000 square miles of land in England.—That in England and Wales there are 4600000 souls.—That the people of London are about 640000; being one fourteenth part of the people of England.—That in England and Wales are about 10000 parishes.—That there are 25 millions of acres in England and Wales, *viz.* about four acres to every head.—That but 64 out of 100 of the children born, are living at 6 years old.—That but 40 of 100 are alive at 16 years end.—That but 25 of 100 at 26 years end.—That but 16 at 36 years end.—That but 10 out of 100 at 46 years end.—That but 6 out of 100 at 56 years end.—That but 3 out of 100 at 66 years end.—And that but one out of 100 at 76 years end.—And that London doubles itself in about 64 years.

Sir William Petty, in his discourse about duplicate proportion, further tells us, that it is found by experience, that there are more persons living between 16 and 26, than of any other age; and laying down that as a supposition, he infers, that the figure roots of every number of mens ages under 16, (whose root is 4) shew the proportion of the probability of such persons reaching the age of 70 years.

Thus, it is 4 times more likely, that one of 16 years of age lives to be 70, than that a child of one year old does.—It is thrice as probable, that one of 9 years lives to be 70, as that a new-born child does, &c.—That the odds is five to 4, that one of 25 dies before one of 16 years.—That it is 6 to 5, (still as the square roots of the ages) that one of 36 years old dies before one of 25 years of age: and so on according to any declining age to 70; compared with a number between 4 and 5; which is the root of 21, the law-age.

Dr. Halley has made a very exact estimate of the degrees of the mortality of mankind, from a curious table of the births and burials, at the city of Breslaw, the capital of Silesia; with an attempt to ascertain the price of annuities upon lives.—From a table which he has calculated thence, published in the *Philos. Transact.* he derives the following uses.

1. To find in any multitude or body of people, the proportion of men able to bear arms, which he reckons from 18 to 56 years old; and accounts about $\frac{1}{4}$ of the whole.—2. To shew the different degrees of mortality, or rather vitality, in all ages; by which means he finds the odds there is, that any person of any age doth not die in a year's time, or before he attains such an age.—3. To shew in what number of years it is an even lay that such a person shall die; and finds, for instance, that it is an even lay, that a man of thirty years of age lives between twenty-seven and twenty-eight years.—4. To regulate the price of insurance upon lives.—5. And the valuation of annuities upon lives.—6. How to value two or three lives after the same manner. From the whole, he makes two very good observations: 1. How justly we use to complain of the shortness of our lives; for that it appears, that one half of those that are born, do not live above seventeen years.

2. That the growth and increase of mankind is not so much stunted by any thing in the nature of the species, as it is from the curious difficulty most people make of venturing on the state of marriage: and therefore that celibacy ought to be every way discouraged by all wise governments; and those who have numerous families of children, ought to be countenanced and encouraged by good laws; such as the *ius trium liberorum*, &c. among the Romans.

Farther particulars relating to the number of birth and burials, the proportion of males and females, &c. See under the articles MARRIAGE, MORTALITY, &c.

POLITICAL criticism. See the article CRITICISM.

POLITICS*, POLITICA, *πολιτικά* the first part of economy, or ethics, consisting in the governing and regulating of states,

for the maintenance of the public safety, order, tranquillity, and good morals. See ETHICS.

* The word is form'd from the Greek *πολις*, civitas, state.

The lord Bacon divides *politica* into three parts with regard to the three grand ends thereof, or the three offices incumbent on those who have the administration, *viz.* the preservation of the state, the happiness, and flourishing of the state, and the enlargement of its bounds.

The two first parts, he observes, are well handled by several authors; but about the third there is a deep silence.—He ranks this therefore in the number of the *defiderata*, and gives us a specimen of an essay to supply it.

We have several systems of *Politica* by Aristotle, Machiavel, Doria, Lipius, &c. in which last there is nothing but particles and conjunctions of the author's own, the body of the book being all quotations.

Academy of POLITICS. See the article ACADEMY.

POLITY, or POLICY. See the article POLICY.

POLIUM*, POLEY, a medicinal plant, which makes an ingredient in the treacle of Andromachus.

* It has its name from the Greek *πολιον*, *polite*, in regard the heads of the *polium* of the ancient, according to Dioscorides, and the leaves, according to Pliny, were white.

It grows in mountainous places, and is thence denominated *montanum*.—The tops of its branches are esteemed cephalic, proper to promote urine, and the menies, and to prevent putrefaction. See Supplement, article POLIUM.

POLL, a term used in ancient writings, for the head.

The word is doubtless formed from *pole*; this part being, as it were, the pole of the microcosm.

Hence, to *poll*, is to enter down the names of persons who give their votes or voices at an election.

POLLARD, among hunters, a stag, or male deer, which has cast its horns.

POLLARD, or POLLENGER, in agriculture, is applied to such trees as have been frequently polled or lopped; by which they are contradistinguished from timber-trees.

POLLEX, in anatomy, denotes either the thumb or great toe, according as either manus, or pedis, is added to it.

POLLICIS adductor. See the article ABDUCTOR.

POLLICIS adductor. See the article ABDUCTOR.

Extensor POLLICIS brevis, and longus. See the article EXTENSOR.

Flexor POLLICIS brevis and longus. See the article FLEXOR.

POLL-MONEY, or capitulation, a tax imposed by authority of parliament on the person or head; either on all indifferently, or according to some known mark of distinction as quality, calling, &c.

Thus by the statute 18 Car. II. every subject in the kingdom was affixed by the head or poll, according to his degree; every duke 100 *l.* marquis 80 *l.* baronet 30 *l.* knight 20 *l.* esquire 10 *l.* &c. and every single private person 12 *d.*

This was no new tax, as appears by former acts of parliament; particularly that anno 1380, where, *quilibet tam conjugatus quam solutus, utriusq; sexus, pro capite suo solvere cogebatur*. Walsing.

Camden, in his remains, of *coins*, says there was anciently a personal tribute, called *capitatio*, or poll-tax, imposed on the Poll, or person, of every one; on women from the age of 12 years, and on men from 14.

POLLUTION, POLLUTIO, the act of profaning a temple, or other holy place.

The Romanists hold a church to be polluted by the effusion of blood, or of feed, therein; and require its being consecrated anew.

The Jews were held polluted by the touching of a dead body, or of the menies of women; and were to be purified in form. See the laws hereof in *Leviticus*.

The Indians are so superstitious on the head of *Pollution*, that they break all the vessels which those of another religion have drank out of, or even only touched; and drain all the water out of a pond a stranger has bathed in.

POLLUTION, or self POLLUTION, is also used for the abusing or defiling of one's own body, by means of lascivious frictions and titillations, raised by art, to produce emission.

We read in scripture, that Onan, and as some critics also think, Er, were severely punished for having polluted themselves by spilling their seed on the ground; whence the crime has been denominated by some *Onania*.

Of *Pollutions*, some are voluntary, others involuntary, and nocturnal.

Nocturnal POLLUTION, is an involuntary emission of seed, arising either from a too great turgescence of the feminal vessels, or from the feed's being too sharp and irritating, or finally, from a weakness of the parts.

The Romish church puts up prayers in the clove of the evening office, to be preserved from nocturnal *Pollutions*.

POLLUX, in astronomy, the hind twin, or the posterior part of the constellation gemini.

POLLUX is also a fixed star of the second magnitude in the constellation gemini, or the twins.

POL

Its place is in the head of the hind-twin, named *Pollux*.—Its longitude 18° 56' 09". Its latitude 6° 39' 27". N. See *GENI*.

POLLUX is also used in meteorology. See *CASTOR*.

POLTROON, or *POLTRON*, a coward or dastard, wanting courage to perform any thing great or noble.

The word we borrow from the French, who, according to Salmalius, derive it a *police truncato*; because anciently those who would avoid going to the wars, cut off their thumbs.

But Menage, with more probability, derives it from the Italian, *poltrone*, and that from *poltra*, a bed; because timorous, pusillanimous people usually take pleasure in lying a-bed.—He adds, that the Italian, *poltra*, is again derived from the German, *polster*, a pillow, or cushion.

Others chuse to derive the word from the Italian, *poltro*, colt; because of that creature's readiness to run away.

POLTROON, in falconry, is a name given to a bird of prey, when the nails and talons of his hind toes are cut off, wherein his chief force and armour lay; in order to intimidate him, and prevent his flying at great game.

POLYACOUSTICS *, instruments contrived to multiply sounds; as multiplying-glasses, or polyscopes do the images of objects. See *PHONICS*.

* The word is compounded of the Greek, *πολυ*, much, and *ακουω*, audit, I hear.

POLYANTHEA, a collection of common-places in alphabetical order; of great service to orators, preachers, &c. of the lower class.

* The word is formed from the Greek, *πολυ*, much, and *ανθος*, flower, and is much of the same significance with *anthology*, or *hortology*.

The first author of the *Polyantha* was Dominic Nanni de Mirabellia, whose labour has been improved on by Barth. Amanius, and Franc. Tortius, and since these by Joh. Langius, under the title of *Polyantha novus*, 1673.

POLYANTHUS *, or *POLYANTHUM*, a garden flower, of the primrose kind. The word is also used in general to denote a plant which bears or produces several or many flowers.

* The word is compounded of *πολυ*, multus, much, and *ανθος*, flos, flower.

POLYCHREST *, *πολυχρηστος*, in pharmacy, a medicine that serves for many uses, or that cures many diseases.

* The word is compounded of the Greek, *πολυ*, much, and *χρηστος*, utilis, useful.

Sol POLYCHREST is a compound salt, made of equal parts of salt-petre and sulphur, laid on a crucible first heated red hot for the purpose.

POLYEDRON. See the article *POLYHEDRON*.

POLYGAMY *, *πολυγαμια*, a plurality of wives, or husbands, held by the same man, or woman, at the same time.

* The word is formed from the Greek, *πολυ*, multum, and *γαμος*, nuptus, wife.

Polygamy is prohibited among Christians, but it was allowed by divine appointment among the Jews; as it is still among the Mahometans.

Major Grant observes, that the males and females brought in to the world are nearly on a balance; only abating for a little excess on the sides of the males, to make up for the extraordinary expence thereof in war, and at sea: whence it evidently follows, that nature only intends one wife, or one husband, to the same person; since, if they have more, some others must go without any at all.

Hence he concludes, that the Christian law, which prohibits *Polygamy*, is more agreeable to the law of nature than the Mahometan; and we may add, than the Jewish law, which tolerated *Polygamy*.

Yet Selden has proved, in his *uxor Ebraica*, that plurality of wives was allowed of, not only among the Hebrews, but also among all other nations, and in all ages.—It is true, the ancient Romans were more severe in their morals; and never practised it, though it was not forbid among them: and Mark Antony is mentioned as the first who took the liberty of having two wives.

From that time it became pretty frequent in the empire, till the reigns of Theodosius, Honorius, and Arcadius, who first prohibited it by express law in 393.—After this the emperor Valentinian, by an edict, permitted all the subjects of the empire if they pleased to marry several wives: nor does it appear from the ecclesiastical history of those times, that the bishops made any opposition to this introduction of *Polygamy*.

In effect, there are some even among the Christian caluists, who do not look on *Polygamy* as in itself criminal. Jurieu observes, that the prohibition of *Polygamy* is a positive law, but from which a man may be exempted by sovereign necessity.—Baillet adds, that the example of the patriarchs is a very powerful argument in favour of *Polygamy*.

At London we had one years ago an artful treatise published in behalf of a plurality of wives, under the title of *polygamia triplex*; the author whereof assumes the name of *Theophilus Aletheus*, but his true name was *Lyferrus*: he was a native of Saxony.—It has been answered by several.

POLYGAMY is also used in the canon law for a plurality of wives, though only had successively, or one at a time.

In the Romish church this designates a man for the episcopate.

POL

POLYGLOTT *, *πολυγλωττα*, among divines and critics, chiefly denotes a bible printed in several languages.

* It is thus called from the Greek, *πολυ*, and *γλωττα*, tongue, language.

To first *Polyglott* bible is that of cardinal Ximenes, printed in 1575, at Alcalá de Henares; and commonly called the *bible of Complutum*, or the *Complutensian bible*.

It contains the Hebrew text, the Chaldee paraphrase on the pentateuch, the Greek version of the LXX, and the ancient Latin version.

In this *Polyglott* there is no other Latin version from the Hebrew beside this last; but there is added another literal one from the Greek septuagint.—The Greek text of the new testament is here printed without accents, to bring it nearer to the original of the apocryphes, or, at least, to the most ancient copies, wherein there are no accents found.

At the end is added an apparatus of grammars, dictionaries, and indices or tables.—The chief author, Ximenes de Cineres, cardinal and archbishop of Toledo, in his dedication to pope Leo X. observes, that it was necessary to give the holy scriptures in their originals; there being no translation, how good soever, that can render them perfectly.

The second *Polyglott* is that of Philip II. printed by Plantin at Antwerp, in 1572. and the care of the edition imposed on Arias Montanus.

In this, besides every thing in the bible of Complutum, there are added the Chaldee paraphrases on the rest of the old testament beside the pentateuch, with a Latin translation of those paraphrases. In this *Polyglott* is likewise a very literal Latin version of the Hebrew text, for the use of those who have a mind to learn the Hebrew language.

As to the new testament, beside the Greek and Latin of the bible of Alcalá, in this edition there is added an ancient Syriac version, both in Syriac and Hebrew characters, with points, to facilitate the reading thereof to those accustomed to read Hebrew.—To the Syriac is likewise added a Latin one, composed by Guy le Fevre, who had the care of the Syriac version of the new testament.

Lastly, in the *Polyglott* of Antwerp is added a more copious apparatus of grammars, dictionaries, &c. than in that of Complutum; with several little treatises judged necessary for clearing up the more difficult passages in the text.

The third *Polyglott* is that of M. le Jay, printed at Paris in 1645, which has this advantage over that of Philip II. that it has the Syriac and Arabic versions of the old testament with Latin interpretations.—In the pentateuch it has likewise the Hebrew and Samaritan text; and the Samaritan version in Samaritan characters.

As to the new testament, beside every thing in the *Polyglott* of Antwerp, here is added an Arabic translation with a Latin interpretation.—But here are wanting the apparatus, and the grammars and dictionaries, which are in both the former *Polyglotts*, which renders this great work very imperfect.

The fourth *Polyglott* is that of London, printed in 1657, called *Walton's Polyglott*, from the author of the edition, Dr. Brian Walton, afterwards bishop of Winchester.

This is indeed less magnificent than that of M. le Jay, with regard both to the size of the paper, and the beauty of the characters, but is in all other respects preferable; being both much more ample, and more commodious.

In this, the vulgate is printed according to the revised and corrected edition of Clement VIII. which is not done in that of Paris, where the vulgate is printed as it stands in that of Antwerp before that correction.

This likewise contains an interlinear Latin version of the Hebrew text; whereas the Paris edition has no other Latin version from the Hebrew beside the common vulgate: again, the Greek septuagint printed in this *Polyglott* is not the same with that printed in the bible of Complutum, which was retained in the editions of Antwerp and Paris, but the Greek text of the edition of Rome; to which are added, the various readings of another very ancient Greek copy called the *Alexandrian*, because brought from Alexandria.

The Latin version of the Greek of the septuagint is that published by Flaminius Nobilius, by authority of pope Sixtus V. Add, that in this *Polyglott* are found some parts of the bible in the Ethiopic and Persian, nothing whereof appears in any of the rest. Lastly, this edition has the advantage of preliminary discourses, called, *Prolegomena*, on the text both of the originals and versions; with a volume of various readings of all the different editions.

To the number of the *Polyglotts* may likewise be added the two pentateuchs printed by the Jews of Constantinople, in four languages; but all in Hebrew characters.

In one of these pentateuchs, printed in 1551, is found the Hebrew text in large characters; on one side whereof is the Chaldee paraphrase of Onkelos in middling characters; and on the other side a paraphrase in the Persian, composed by a Jew, one Jacob be Tous, so called from the city where he lived.—Beside these three columns, the Arabic paraphrase of Saadias Gaon is printed in small characters at top of the pages, and at bottom is added the commentary of Rashi.

The

The other *Polyglott* was printed at Constantinople in 1547, in three columns like the former.—The Hebrew text of the law is in the middle, a translation into the vulgar Greek on one side, and a Spanish translation on the other. These versions are both in Hebrew characters, with points to determine the pronunciation. At top of the page is added the Chaldee paraphrase of Onkelos, and at the bottom the commentaries of Rashi.

To all these may be added, as a seventh *Polyglott*, the Pfalter published by Aug. Justinian, a Dominican, and bishop of Nubio, at Genoa, 1515; containing the Hebrew, Greek, Arabic, and Chaldee, with Latin interpretations and glosses.

There are also various other editions of the bible either in whole or in part, which might be ranged under the article of *Polyglotts*; though they are not so denominated.—Such are the *Hexapla* and *Osiopla* of Origen.

And the bible of Hutter, printed at Hambourg, in Hebrew, Chaldee, Greek, Latin, German, Saxon, Italian, French, Slavonic, Danish, &c.

POLYGON *, $\pi\omega\lambda\gamma\omega\nu\theta\iota$, in geometry, a multilateral figure, or a figure whose perimeter consists of more than four sides and angles.

* The word is formed from the Greek $\pi\omega\lambda\upsilon$, many, and $\gamma\omega\nu\iota\alpha$, angle.

If the sides and angles be equal, the figure is called a *regular Polygon*. For *similar Polygons*, see *SIMILAR*.

Polygons are distinguished according to the number of their sides.

—Those of five sides are called *pentagons*; those of six, *hexagons*; those of seven, *heptagons*; those of eight, *octagons*, &c.—The particular properties, &c. of each whereof, see under its proper article, *PENTAGON*, *HEXAGON*, &c.

General properties of POLYGONS.—Euclid demonstrates these which follow.—1. That every *Polygon* may be divided into as many triangles as it hath sides.

This is done by affixing a point, as F, (*tab. geom. fig. 28.*) any-where within the *Polygon*, and thence drawing lines to every angle F A, F B, F C, F D, &c.

2. The angles of any *Polygon* taken together, make twice as many right ones, as the figure hath sides. Thus, if the *Polygon* have five sides; the double of that is 10; whence subtracting 4, there remain 6 right ones.

3. Every *Polygon* circumscribed about a circle is equal to a rectangled triangle, one of whose legs is the radius of the circle, and the other the perimeter or sum of all the sides of the *Polygon*.

Hence, every regular *Polygon* is equal to a rectangled triangle, one of whose legs is the perimeter of the *Polygon*, and the other a perpendicular drawn from the centre to one of the sides of the *Polygon*.

Hence also every *Polygon* circumscribed about a circle is bigger than it; and every *Polygon* inscribed, is less than the circle. The same likewise appears hence, that the thing containing is ever greater than the thing contained.

And hence again, the perimeter of every *Polygon* circumscribed about a circle, is greater than the circumference of that circle; and the perimeter of every *Polygon* inscribed, is less: whence it follows, that a circle is equal to a right-angled triangle, whose base is the circumference of the circle, and its height the radius; since this triangle is less than any *Polygon* circumscribed, and greater than any inscribed.

Nothing therefore is wanted to the quadrature of the circle, but to find a right line equal to the circumference of a circle.

To find the area of a regular *POLYGON*.—Multiply a side of the *Polygon*, as AB, by half the number of the sides, *e. gr.* the side of a hexagon by 3. Again, multiply the product by a perpendicular let fall from the centre of the circumscribing circle to the side AB; the product is the area required.

Thus, suppose AB 54; and half the number of sides $2\frac{1}{2}$; the product or femiperimeter is 135. Supposing then the perpendicular FG 29; the product of these two, 3915, is the area of the pentagon required.

To find the area of an irregular *POLYGON*, or *Trapezium*.—Resolve it into triangles; find the several areas of the several triangles; see *TRIANGLE*. The sum of these is the area of the *Polygon* required.

To find the sum of all the angles in any *POLYGON*.—Multiply the number of sides by 180°. From the product subtract 360; the remainder is the sum required.

Thus in a pentagon, 180 being multiplied by 5, gives 900; whence subtracting 360, there remain 540; the sum of the angles of a pentagon.

Hence, if the sum found be divided by the number of sides, the quotient will be the angle of a regular *Polygon*.

Or, the sum of the angles is more speedily found thus: Multiply 180 by a number less by two than the number of sides of the *Polygon*; the product is the quantity of the angles required; thus 180 being multiplied by 3, a number less by 2 than that of its sides, the product is 540, the quantity of angles as before.

The following table exhibits the sums of the angles in all rectilinear figures, from a triangle to a dodecagon; and is of good use both for the describing of regular figures, and for proving whether or no the quantity of angles have been truly taken with an instrument.

Numb. Sides.	Sum. Ang. Reg. Fig.	Numb. Sides.	Sum. Ang. Reg. Fig.
III. 180°	60°	VIII. 1080°	135
IV. 360	90	IX. 1260	140
V. 540	108	X. 1440	144
VI. 720	120	XI. 1620	147 $\frac{1}{2}$
VII. 900	128 $\frac{1}{2}$	XII. 1800	150

To inscribe a regular *POLYGON* in a circle.—Divide 360 by the number of sides in the *Polygon* required, to find the quantity of the angle EFD. Set off the angle at the centre, and apply the chord thereof ED, to the periphery, as often as it will go.—Thus will the *Polygon* be inscribed in the circle.

The resolution of this problem, though it be mechanical, yet is not to be despised, because both easy and universal.—Euclid indeed, gives us the construction of the pentagon, decagon, and quindecagon; and other authors give us those of the heptagon, enneagon, and hendecagon; but they are far from geometrical strictness.

Renaldinus lays down a catholic rule for the describing of all *Polygons*, which many other geometricians have borrowed from him; but Wagnerus and Wolfius have both demonstrated the falsity thereof.

On a regular *POLYGON* to circumscribe a circle: or, to circumscribe a regular *POLYGON* upon a circle.—Bisect two of the angles of the given *Polygon* A and E, by the right lines AF and EF, concurring in F; and from the point of concurrence with the radius EF describe a circle.

To circumscribe a *Polygon*, &c. divide 360 by the number of sides required, to find $e\text{F}d$; which let off from the centre F, and draw the line $e\text{F}d$; on this construct the *Polygon*, as in the following problem.

On a given line ED, to describe any given regular *POLYGON*.—Find an angle of the *Polygon* in the table; and in E set off an angle equal thereto, drawing EA=ED. Through the three points AED describe a circle. In this apply the given right line as often as it will go.—Thus will the required figure be described.

To inscribe or circumscribe a regular *POLYGON* trigonometrically.—Find the sine of the arch produced by dividing the femiperiphery 180 by the number of sides of the *Polygon*: the double of this is the chord of the double arch; and therefore the side AE to be inscribed in the circle.—If then the radius of a circle, wherein, *e. gr.* a pentagon is to be inscribed, be given in any certain measure, *e. gr.* 345, the side of the pentagon is found in the same measure by the rule of three, thus: as radius 1000 is to 1176; so is 345 to 4057, the side of the pentagon.—With the given radius therefore describe a circle; and therein set off the side of the *Polygon* as often as it will go; thus will a *Polygon* be inscribed in the circle.

To save the trouble of finding the ratio of the side of the *Polygon* to radius, by the canon of sines; we shall add a table expressing the sides of *Polygons* in such parts whereof radius contains 10000000. In practice, as many figures are cut off from the right-hand, as the circumstances of the case render needless.

Numb. Sides.	Quantity Side.	Numb. Sides.	Quantity Side.
III. 17320508		VIII. 7653668	
IV. 14142135		IX. 6840402	
V. 11755705		X. 6180339	
VI. 10000000		XI. 5634051	
VII. 8677674		XII. 5176380	

To describe a regular *POLYGON*, on a given right line, and to circumscribe a circle about a given *Polygon*, trigonometrically.—Taking the ratio of the side to the radius out of the table; find the radius in the same measure wherein the side is given. For the side and radius being had, a *Polygon* may be described by the last problem. And if with the interval of the radius, arches be struck from the two extremes of the given line, the point of intersection will be the centre of the circumscribing circle.

POLYGON, in fortification, denotes the figure or perimeter of a fortress, or fortified place. See *FORTIFICATION*.

Exterior POLYGON, is a right line drawn from the vertex or point of a bastion, to the vertex or point of the next adjacent bastion. See *BASTION*.

Such is the line CF, *tab. fortification, fig. 1.*

Interior POLYGON, is a right line drawn from the centre of one bastion to the centre of another. Such is the line GH.

Line of POLYGONS, is a line on the French factors, containing the homologous sides of the first 9 regular *Polygons* inscribed in the same circle, *i. e.* from an equilateral triangle to a dodecagon. See *SECTOR*.

POLYGONAL column. See the article *COLUMN*.

POLYGONAL number, in algebra, is the sum of a rank of numbers in arithmetical progression, beginning from unity—thus called, by reason the units of which it consists, may be so disposed as to represent the Figure of several equal sides and angles.

Polygonal Numbers are divided, with respect to the number of their terms, into *triangular*, which are those whose difference of terms is 1; *quadrangular* or *square*, where it is 2; *pentagonal*, where 3; *hexagonal*, where 4; *heptagonal*, where 5; *octagonal*, where 6, &c.

They have their names from the geometrical figures, into which points corresponding to their units may be disposed, *e. gr.* three points corresponding to the three units of a triangular number, may be disposed into a triangle; and so of the rest.

The genesis of the several kinds of *polygonal* numbers from the several arithmetical progressions, may be conceived from the following examples.

Arithmetical progression	1, 2, 3, 4, 5, 6, 7, 8
Triangular numbers	1, 3, 6, 10, 15, 21, 28, 36
Arithmetical progression	1, 3, 5, 7, 9, 11, 13, 15
Square numbers	1, 4, 9, 16, 25, 36, 49, 64
Arithmetical progression	1, 4, 7, 10, 13, 16, 19, 22
Pentagonal numbers	1, 5, 12, 22, 35, 51, 70, 92
Arithmetical progression	1, 5, 9, 13, 17, 21, 25, 29
Hexagonal numbers	1, 6, 15, 28, 45, 66, 91, 120

Side of a POLYGONAL number, is the number of terms of the arithmetical progression that compose it: and the number of angles is that which shows how many angles that figure has, whence the *polygonal* number takes its name.

The number of angles, therefore, in triangular numbers, is 3, in tetragonal 4, in pentagonal 5, &c. Consequently the number of angles exceeds the common difference of terms, by two.

To find a *POLYGONAL number*, the side and number of its angles being given. The canon is this: The *polygonal* number is the semi-difference of the factums of the square of the side into the number of angles diminished by two units; and of the side itself into the number of angles diminished by four units.

The sums of *polygonal* numbers collected in the same manner as the *polygonal* numbers themselves are, out of arithmetical progressions, are called *pyramidal numbers*.

POLYGRAPHY *, **POLYGRAPHIA**, or **POLYGRAPHICE**, the art of writing in various unusual manners or cyphers; as also the art of decyphering the same.

* The word is formed from the Greek *πολυ*, *multum*, and *γραφον*, *scriptura*, writing.

The word is usually confounded with *steganography* and *cryptography*.

The ancients seem to have been very little acquainted with this art; nor is there any mark of their having gone beyond the Lacedæmonian scytala. See **SCYTALA**.

Trithemius, Porta, Vigenere, and father Nicéron, have written on the subject of *Polygraphy* or cyphers. See **CYPHER**.

POLYHEDRON *, or **POLYEDRON**, *πολυεδρον*, in geometry, a body comprehended under many rectilinear sides or planes.

* The word is formed from the Greek *πολυ*, *much*, and *εδρον*, *seat*.

If the sides of the *Polyhedron* be regular *Polygons*, all similar and equal; the *Polyhedron* becomes a regular body, and may be inscribed in a sphere, that is, a sphere may be drawn round it, so as its surface shall touch all the solid angles of the body.

Chromatic POLYHEDRON, is a stone with several faces, whereon are projected various kinds of dials. See **DIAL**.

Of this kind that in the Privy-garden, London, now gone to ruin, was anciently the finest in the world.

POLYHEDRON, or **POLYSCOPE**, in optics, is a glass or lens consisting of several plain surfaces, disposed into a convex form; popularly called a *multiplying-glass*.

The phenomena of the *Polyhedron* are as follow:—If several rays, as E F, A B, C D, (*tab. optics*, fig. 71.) fall parallel on the surface of a *Polyhedron*, they will continue parallel after refraction.

If then the *Polyhedron* be supposed regular, L H, H I, I M, will be as tangents cutting the spherical convex lens in E, B, and D; consequently, rays falling on the points of contact, intersect the axis.—Wherefore, since the rest are parallel to these, they also will mutually intersect each other in G.

Hence, if the eye be placed where the parallel rays decussate, rays of the same object will be propagated to it still parallel from the several sides of the glass. Wherefore, since the chryselline humour, by its convexity, unites parallel rays; the rays will be united in as many different points of the retina, *a, b, c*, as the glass has sides.

Consequently, the eye, through a *Polyhedron*, sees the object repeated as many times as there are sides.—And hence, since rays coming from remote objects are parallel; a remote object is seen as often repeated through a *Polyhedron*, as that has sides.

2. If rays A B, A C, A D, (*fig. 72.*) proceeding from a radiant point A, fall on several sides of a regular *Polyhedron*; after refraction they will decussate in G, and proceed on a little diverging.

Hence, if the eye be placed where the rays coming from the several planes decussate, the rays will be propagated to it from the several planes a little diverging, *i. e.* as if they proceeded from different points. But since the chryselline humour, by its convexity, collects rays from several points into the same

point; the rays will be united in as many different points of the retina, *a, b, c*, as the glass has sides; consequently, the eye being placed in the focus G, will see even a near object repeated as often through the *Polyhedron*, as that has sides.

Thus may the images of objects be multiplied in a camera obscura, by placing a *Polyhedron* at its aperture, and adding a convex lens at a due distance from it.—And it makes a very pleasant appearance, if a prism be applied so as the coloured rays of the sun refracted therefrom be received on the *Polyhedron*: for by this means they will be thrown on a paper or wall near at hand in little lucid specks, much exceeding the brightness of any precious stone; and in the focus of the *Polyhedron*, where the rays decussate, (for in this experiment they are received on the convex side) will be a star of surprising lustre.

If images be painted in water-colours in the areole or little squares of a *Polyhedron*, and the glass applied to the aperture of a camera obscura; the sun's rays passing through it, will carry with them the images thereof, and project them on the opposite wall.

This artifice bears a resemblance to that other, whereby an image on paper is projected on the camera, *viz.* by wetting the paper with oil, and straining it tight in a frame; then applying it to the aperture of the camera obscura, so as the rays of a candle may pass through it upon the *Polyhedron*.

To make an *anamorphosis* or deformed image, which through a **POLYHEDRON** or multiplying-glass, shall appear regular and beautiful.

At one end of a horizontal table erect another at right-angles, whereon a figure may be designed; and on the other erect another, to serve as a fulcrum or support, moveable on the horizontal one.—To the fulcrum apply a plano-convex *Polyhedron*, consisting, *e. gr.* of 24 plain triangles; let the *Polyhedron* be fitted in a draw tube, whereof that end towards the eye to have only a very small aperture, and a little further off than the focus.—Remove the fulcrum from the other perpendicular table, till it be out of the distance of the focus; and that more, as the image is to be greater.—Before the little aperture place a lamp; and trace the luminous areolæ projected from the sides of the *Polyhedron*, with a black lead pencil, on the vertical plane, or a paper applied thereon.

In these several areolæ, design the several parts of an image, in such manner as that when joined together, they may make one whole, looking afresh every now and then through the tube, to guide, correct, &c. the colours, and to see that the several parts match aptly together.

The intermediate space fill up with any figures or designs at pleasure, contriving it so, as that to the naked eye the whole may exhibit some appearance very different from that intended to appear through the *Polyhedron*.

The eye now looking through the little aperture of the tube, will see the several parts and members dispersed among the areolæ to exhibit one continued image, all the intermediate ones disappearing. See **ANAMORPHOSIS**.

POLYMATHY *, **POLYMATHIA**, *πολυμαθια*, the knowledge of many arts and sciences; or an acquaintance with a great number of different subjects.

* The word comes from the Greek *πολυ*, *multum*, and *μαθια*, *disco*, I learn.

Ipsiuss, Sealiger, Kircher, Petavius, Grotius, Salmasius, Leibnitz, &c. were famous for *Polymathy*.—Among the ancients, such as were eminent this way were called *Polyhistores*.

Polymathy is frequently little more than a confused heap of useless erudition, occasionally detailed, either pertinently or impertinently, for parade.—The genuine *Polymathy* is an extensive erudition, or a knowledge of a great number of things, well digested and applied to the purpose, and never but where they are necessary.

POLYMYTHY, **POLYMYTHIA**, in poetry, denotes a multiplicity of fables, in an epic or dramatic poem; in lieu of an unity, or a single one.

Polymythia is a great fault.—It consists in joining a number of distinct actions or fables into one complex body.

Such a work Bossu compares to the *batrachomyomachia*, or one of the fables of Æsop: And such would be the idea of a Theſeid, an Heracleid, an Achilleid, or the like poems, which should comprehend all the actions of those heroes, compared with the Iliad or Æneid.

POLYNOMIAL, or **MULTINOMIAL roots**, in mathematics. See **MULTINOMIAL** and **ROOT**.

POLYOPTRUM *, in optics, a glass through which objects appear multiplied, but diminished.

* The word is formed from the Greek *πολυ*, *much*, *many*, and *οπτρικον*, *I see*.

The *Polyopttrum* differs both in structure and phenomena from the common multiplying-glasses, called *polyhedra*.

Construction of the POLYOPTRUM.—In aglals, plain on both sides, A B, (*tab. optics*, fig. 73.) and about three fingers thick, cut out spherical segments, scarce a fifth part of a digit in diameter.

If then the glass be removed from the eye, till you can take in all the cavities at one view, you will see the same object, as if through so many several concave glasses, as there are cavities, and all exceeding small.

If it this, as an object-glass, in a tube ABCD, whose aperture AB is equal to the diameter of the glass, and the other CD is equal to that of an eye-glass, *e. gr.* about a finger's breadth. The length of the tube AC to be accommodated to the object and eye-glass, by trial.

In CD fit a convex eye-glass, or in lieu thereof a meniscus, having the distance of its principal focus a little larger than the length of the tube; so that the point from which the rays diverge after refraction in the object-glass, may be in the focus. If then the eye be applied near to the eye-glass, a single object will be seen repeated as often as there are cavities in the object-glass, but still diminished.

POLYPETALOUS*, in botany, a flower consisting of several petals, or leaves.

* The word comes from *πολυ*, multum, and *πέταλον*, petalum.

The corollæ of flowers consist either of a single continued petal, whence they are called *monopetalous*; or of several distinct pieces, whence they are named *polypetalous*.

Polypetalous flowers are either regular or irregular.

Regular **POLYPETALOUS** flowers, according to some botanists, are either those consisting of two pieces, as the cinquefoil flower, or of four, thence called *poly-flowers*, as the flower of the clove-tree; or of five, usually *umbelliferous*, as fennel; or of six, as the white lily, thence called the *lily-kind*.

Those exceeding this number, in any quantity, equal or unequal, form a new class of *polypetalous* flowers; among which are also ranked all those, whose fruits differ from the rest, that the rules of genera require that they be distinguished from them.

Such is the flower of the water plantain, which though it has only three leaves, yet by the relation of its seed with that of the ranunculus, is ranged in this last class.—Such also is the flower of tormentil, which by reason of the difference of its fruit from the filique or filicule of the cross-flowers, cannot be ranged among them.—Such also is the pink, which, though consisting of five pieces, yet is excluded the class of umbelliferous plants, because its fruit is not divided into two parts.—Such, lastly, are the flowers of some ranunculus's, hellebore, and anemones; which, though they have six petals, yet never produce fruits divided into three lodges, as those of the lily-kind; and therefore cannot belong to their class.

Irregular **POLYPETALOUS** flowers, are so called from the odd figure and disposition of their petals, what number of them soever they have.

Such are those in two pieces resembling two chaps, as in fumitory; or those of five pieces resembling butterflies: these last are common to all leguminous plants.

POLYPODY*, *POLYPODIUM*, in botany, a plant of the parasitical kind, of considerable use in medicine, &c.

* The word is formed from the Greek *πολυ*, and *πους*, foot, in regard the root of the plant clings to walls and trees, by a great number of little fibres like claws.

Dispersatory writers make two kinds of this plant: — *Common Polyphy*, and *Polyphy of the oak*. The first usually grows on old walls in the country, among moss, &c. the latter called also by some *oak-fern*, from the resemblance it bears to fern, grows about the roots of that and other trees, in the places where they shoot or spread out, feeding on a little earth, collected there from the dust blown about by the wind, and watered with the rain.

Polyphy of the oak, *polypodium quercinum*, is supposed the better of the two.—It must be chosen new, well-tied, dry, brittle, of a tan-red without, green within, of a sweet taste resembling liquorice.

The root is what is chiefly used in medicine, being esteemed cathartic; though Dr. Quincey says it is no more than a common detergent; in which capacity it is much prescribed in medicated ales against the jaundice, scurvy, obstructions of the viscera, &c. See *Supplement, article POLYPODY*.

POLYPTOTON, *πολυπτοτον*, in rhetoric, a figure wherein the same word is repeated in different cases, genders, or numbers, *i. e.* with different terminations. See *FIGURE*.

Such is that of Cicero, *pro Arch.* Sed plene sunt omnes libri, plene sapientium cunctis, plena exemplarum virtutis. So Virg. *Æn.* l. 4. v. 28.

Litæra litteraribus contraria, fluctibus undas

Infractis, arma armis pugnent.

POLYPUS, *πολύπους*, or *πολύπους*, in medicine, a fleshy tumour, or excrescence arising on the inside of the nostrils, prejudicial to respiration and speech; called also, by way of distinction, *Polyplus narium*.

This *Polyplus* arises by several Roots from the os cribosum, and hangs down, sometimes as low as the lip; growing likewise backwards, so as to stop the hole of the palate, whereby the air and pituita descend out of the nose down into the throat; and by this means strangling the patient.

It has its name from the resemblance it bears to the fish *polypus*, called the *four-centred*, or *many-foot*.—Some derive the name from the resemblance its tubianc bears to that of the *Polyplus*; and others, from the resemblance its many roots bear to the many feet of that fish.

If it have no roots, or only one continued root, it is called a *sarcoma*, which is only a beginning *Polyplus*. See *SARCOMA*. *Polyplus*'s are chiefly found in scrophulous or cancerous con-

tutions, along with venereal cases, ulcers, ozenas, &c.—*Causæ*: fices, emollient fomentations, extirpation, and disjunctive powders and lotions are the usual remedies.

POLYPUS is also used for a morbid excrescence in the heart, consisting of a tough concretion of grumous blood lodged therein. Malpighi gives a very accurate description of this *Polyplus*. In the right ventricle of the heart, he observes, it is usually larger, and of a paler colour, like pituita, with reddish or blackish streaks; in the left ventricle it is smaller, blacker, and denser.—He adds, that it seems to have a sort of organism, and appears like a congeries of pellicles stretched over one another, which form a kind of nervous compages.

Polyplus's are often found upon opening the bodies of persons dying apoplectic; and are doubtless frequently the occasion of sudden death.—They are seldom discovered till they have dispatched the patient.

It is however a dispute among physicians, whether *Polyplus*'s be produced any considerable time before, or always immediately after death?—Mr. Gould has an express discourse in the *philos. transact.* to evince the former.

POLYPUS of the lungs.—In *philos. transact.* Dr. Rob. Clarke gives us a very odd instance of a patient, who cough'd up, at times, several hundred *Polyplus*'s of the lungs.

They seemed to have ionic organization, and were all perfectly alike.—The patient said, though they had no life, he had frequently pressed a slimy matter out of the body of them.

Dr. Lister observes, that such *Polyplus*'s are formed in the remoter and deeper branches of the alpera arteria, whence they are very difficult to get up.—The patient above-mentioned never brought them up till after a continued coughing of half a day and night.

He adds, that they are nothing but viscidous excretions of the small glands, hard baked in those parts whose form they receive.—M. Bussiere observes, they are frequently mistaken for pieces of the blood-vessels or lungs.

POLYPYRENEOUS*, *fruits*, in botany, are such as contain several kernels or seeds.

* They are thus called from the Greek *πολυ*, much, and *πυρην*, kernel, or berry.

POLYSCOPE, a multiplying-glass, *i. e.* a glass which represents one object to the eye as if it were many; called also *Polyhedron*.

POLYSPASTON*, *πολύσπαστον*, in mechanics, a machine so denominated by Vitruvius, consisting of an assemblage of several pulleys, used for raising of huge weights in a little time.

* The word comes from the Greek *πολυ*, and *σπασω*, I draw, *g. d.* that may be drawn many ways.

The multiplication of pulleys in the *polyspaston*, is to very good purpose; it being demonstrated in mechanics, that the force required to sustain a weight by means of a *polyspaston*, is to the weight itself as unity to the number of ropes, or of the pulleys; those ropes or pulleys being supposed parallel to each other. See *PULLEY*.

Hence the number of pulleys, and the power being given; the weight that will be sustained thereby is easily found, *viz.* by multiplying the power by the weight.

E. gr. Suppose the power 50 pounds, and the number of pulleys 5, the weight they will balance is 250 pounds.

In like manner, the number of pulleys being given, together with the weight sustained, the power is found by dividing the weight by the number of pulleys: Thus, if the weight be 900 pounds, and the number of pulleys 6, the power will be 150 pounds.

Dechaes observes, that it is found by experience, that a moderate man, standing barely on the ground, will lift 150 pounds; whence the same man, by means of a *polyspaston* consisting of 6 pulleys, will be able to sustain 900 pounds.

The power of the pulleys will be still exceedingly increased by joining several *polyspastons*.

To find the number of pulleys a *polyspaston* is to consist of, to raise a given weight by a given power.—Divide the weight by the power; the quotient is the number required.

Suppose, *e. gr.* the weight 600 pounds, and the power 150; the pulleys will be 4; whose diameters are to be all equal, supposing two of them upper and two lower, moveable on the same common axes.

POLYSPERMIOUS*, *πολύσπερμιος*, in botany, is applied to such plants as have more than four seeds succeeding each flower, without any certain order or number. See *PLANT*.

* The word is formed from the Greek *πολυ*, and *σπερμα*, seed.

These Mr. Ray makes a distinct kind of herbs, calling them *herbe semine nudo polyspermae*; where, by *semine nudo*, are meant such seeds as do not put off spontaneously the integuments or coverings which they either have, or appear to have, but fall off whole from the mother-plant. See *SEED*.

Polypermaus herbi are subdivided into, 1. Such as have a calyx or perianthium, consisting either, first; of three leaves, and the flower tripetalous, as the plantago aquatica, and the sagittaria, both water-plants; or the flower polypetalous, and the calyx falling with it, as the chelidonium minus; or remaining after the flower is dropped, as in the hepatica mobilis. Secondly, of five leaves, in some deciduous with the flower, as in the ranunculus; in others perennial, as in the helleborus niger ferulaceus; or annual, as in the flos Adonis. Thirdly, of eight leaves,

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leaves, as the malva and alcea. Fourthly, of *ten leaves*, as the caryophylla, fragaria, pentaphyllum, tormentilla, argentina, althaea, and pentaphylloides.

2. Such as have no calyx or perianthium; as the clematitis, filipendula, ulmaria, anemone nemorum, pulsatilla, &c.

POLYSTYLE columnade. See the article **COLONNADE**.

POLYSYLLABICAL echoes, those which repeat many syllables or words.

POLYSYLLABLE *, πολυσυλλαβος, in grammar, a word consisting of more than three syllables.

* The word comes from the Greek, πολυ, much; and συλλαβος, syllable.

A word of one syllable is called a *monosyllable*; one of two, *disyllable*; one of three, *trisyllable*; one of four or more, *polysyllable*.

POLYSYNDETON, πολυσυνδετον, in rhetoric, a figure consisting in the abundance, or even superfluity, of conjunctions copulative.

Such is, *me prece ceteris & colit, & observat, & diligit*.—In opposition to this stands *asyndeton*. See **ASYNDETON**.

POLYTHEISM *, the doctrine, or belief of a plurality of gods.

* The word comes from the Greek, πολυ, much, and Θεοι, Deities. See **IDOLATRY**.

POMADA, an exercise of vaulting the wooden horse, by laying one hand over the pommel of the saddle.

POMATUM, or **POMADO**, a composition of apples, with lard and rose-water; used by way of unguent on many occasions, particularly for diseases of the skin, pimples, scurfs, &c. and to soften the hands, render the skin smooth, the complexion fresh, &c.

Pomatums are occasionally made with jessamins, oranges, jonquils, tuberose, &c. i. e. they are perfumed with the odours of those flowers.

The best is said to be that prepared of kid's grease, pippins, an orange sliced, with a glass of rose-water, and half a glass of white-wine, boiled and strained, and at last sprinkled with oil of sweet almonds.

The unguentum *Pomatum*, prescribed by the college dispensatory, consists of hog's lard, sheep's suet, the apple called pome-water, rose-water and orris root, boiled till the apples are soft, strained, and perfumed with oil of rhodium.

Dr. Quincy observes, that the apple is of no significance at all in the recipe; and that the common *Pomatum* fold in the shops is only lard beat into a cream, with rose-water, and scented with lemons, thyme, or the like.

POME, among gardeners.—To **POME**, is to grow or knit into a round head, somewhat like an apple.

Thus, they say, a cabbage begins to *pome*, &c.—They sometimes use the term, to *cabbage*, in the same sense.

POMEGRANATE *, *malus punia*, or *granata*, a medicinal fruit, in form of an apple or quince; full of seeds or kernels, inclosed within a reddish pulp, sometimes sweet, sometimes acid.

* It is denominated from the abundance of its grains or kernels; *g. d. pomum granatum*, a kernelled apple; or from the country where it was anciently produced, *viz.* Granada.

The *Pomegranate* tree is of two kinds, the one wild, which produces a kind of flowers used in pharmacy, called *balaustia*.

The other, cultivated in gardens, whereof there are again two kinds; the one only bearing flowers; the other, both flowers and fruit.—The flowers of each, called *githi*, are inclosed in an oblong purple calyx, resembling a bell.

The trees never grow high; their branches are a little prickly; their leaves resemble those of the greater myrtle; and their fruit, which is composed of a great number of red angular grains, sometimes sweet, sometimes sour, and sometimes vinous, according to the quality of the tree, are all inclosed in little distinct cells, and covered, in common, with a thick brownish rind. Over this grows a kind of crowning, of the same nature with the rind, formed of a production of the calyx.

In the general, *Pomegranates* are not only agreeable to the taste, but good for the stomach, and of considerable use in medicine. Of the kernels are made syraps and conserves; and the peel or rind, which is called *malicorium*, is held very astringent, and is an ingredient in several remedies and pitans, for dysenteries, diarrhoeas, henteries, hemorrhages, and relaxations of the gums.—The ancients used the rind as the moderns do fumac, in the preparation of leather.

The rind ought always to be dried, after the grains are taken out; that dried without scouping always tasting musty, and being more likely to increase distempers, than cure them.

As to the conserve, there is but little of the true fold; it being very difficult to make.—That which ordinarily passes for it is only sugar melted down; to which they give the colour and sharp taste, with cochineal, cream of tartar, and alum.

POMEIS, in heraldry, are green roundles; so called by the English heralds, who express different coloured roundles by distinct names.

The French, who content themselves to denote the different colour of the roundles, call the *pomeis*, *torreaux vert*.

POMIFEROUS *, *apple-bearing*, in botany, a name given

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to those plants which have the largest fruit, covered with a thick hard rind; by which they are distinguished from the bacciferous, which have only a thin skin over the fruit.

* The word is formed from *ponum*, apple, and *fero*, I bear.

The *poniferous* kind have a naked monopetalous flower, divided into five partitions, and growing on the top of the succeeding fruit.—They are divided into

1. *Capreolate*, or those creeping along the ground, &c. by means of tendrils; as the cucurbita, melo, cucumis, cepo, balsamina; anguria, and colocynthis.
2. Without *caproli*, or *tendrils*, as the cucurbita clypeata, or melo-cepo clypeiformis.

POMME, or **POMMETTE**, in heraldry,—a *cross pomme*, or *pommette*, called also *trophée*, is a cross with a ball or knob, like an apple, at each end.

POMMEL, or **PUMMEL**, in the manage, a piece of brass of other matter at top and in the middle of the saddle-bow, to which are fastened the holsters, stirrup-leathers, &c.

POMMEL is also a round ball of silver, steel, or the like, fixed at the end of the guard and grasp of a sword; to serve, in some measure, as a counterpoise.

Balzac observes, that there are still extant charters and privileges granted by Charlemagne, which were sealed with the *Pommel* of his sword, which, ordinarily, he promises to defend with the same sword.

POMMETTE. See the article **POMME**.

POMP. See the articles **CIRCUS**, **CAVALCADE**, &c.

POMPHOLYX *, *αμφολύξ*, in pharmacy, a sort of metalline flower; being a white, light and friable substance, found adhering to the lid or cover of the crucibles or furnaces, where in copper is melted with calamine stone; for the making of brass.

* The word is Greek, where it literally denotes a bubble arising on water.

It is esteemed deterfive and desiccative, though only applied externally.

The apothecaries sometimes call it *nil*, or *nibili album*, and sometimes *white tutty*, in regard of its resemblance to tutty in virtue.

POMUM *Adams*, in anatomy, a protuberance in the fore-part of the throat.

Some fancy it is thus called upon a strange conceit, that a piece of the forbidden apple, which Adam eat, stuck by the way, and was the occasion of it.

In reality, it is only the convex part of the first cartilage of the larynx, called *fundiformis*.

POND, in geography, a little lake, which neither receives nor emits its waters into any river.

Fish Ponds. See the article **FISH POND**.

PONDERATE, in our ancient customs; a method of curing sick children, by weighing them at the tomb of some saint; counterpoising or balancing the scale with money, wheat-bread, or any other thing the parents were willing to offer to God, his saints, or the church.

But a sum of money was always to make part of the counterbalance. By this means the cure was effected.—*Ad sepulchrum sancti nummo se ponderabat*.

PONDUS, *weight*. See the article **WEIGHT**.

PONDUS, in ancient records, denotes a duty paid to the king, according to the weight of merchandizes.

PONDUS regis, the standard-weights anciently appointed by the king; being that which we now call *Troy-weight*. See **STANDARD** and **TROY-WEIGHT**.

Ad PONDUS omnium. See the article **AD**.

Temperamentum ad PONDUS. See **TEMPERAMENTUM**.

PONE, a writ, whereby a cause depending in the county, or other inferior court, is removed to the common-pleas, or sometimes to the king's-bench.

PONE, *per vadium*, is a writ commanding the sheriff to take surety of one for his appearance at a day assigned.

PONIARD *, a little pointed dagger, very sharp edged; borne in the hand, or at the girdle, or hid in the pocket.

* The word is formed from the French *poignard*, and that from *poignée*, handful.

The *Poniard* was anciently in very great use, but is now in good measure set aside, except among assassins. See **ASSASSIN**.

Sword and *Poniard* were the ancient arms of duellists; and are said to continue still so among the Spaniards.—The practice of sword and *Poniard* still make a part of the exercise taught by the masters of defence.

PONS *varoli*, or *varolii*; or **PONS cerebri**, in anatomy, the upper part of a duct in the third ventricle of the brain, situate in the cerebellum, and leading to the infundibulum.—See *tab. anat. (osteol.) fig. 5. litt. g. g.*

It is thus called from its discoverer, Varolus, an Italian physician, who flourished in the university of Padua about the year 1572.

PONTAGE, **PONTAGIUM**, a contribution towards the maintenance, repairing, and rebuilding of bridges. See **BRIDGE**.

This was anciently one of the three general national charges, whence no person of any degree whatever was exempted.

The three things called *trinitas necessitas*, whence, Ingulphus tells us, *nulli possunt laxari*, were, the expedition to the wars, the building of castles, and the building and repairing of bridges. Mr. Selden, in his notes on Eadmerus, observes, that *ne quidem episcopi, abbates, & monachi immunes erant*.—And Mat. Paris adds, anno 1244, that in all grants of privileges to the monasteries, those three things were always excepted, for the public good, and that the people might be better able to resist any enemy.

PONTAGE, is also a due anciently belonging to the lord of the fee, for persons or merchandizes, that pass over rivers, bridges, &c. called in the later Latin *pontagium*, or *pontomagium*, pontage.

PONTIBUS reparandis, a writ directed to the sheriff, commanding him to charge one or more persons to repair a bridge, to whom it belongs.

PONTIFEX, **PONTIF**, *high-priest*, a person who has the superintendence and direction of divine worship; as the offering of sacrifices, and other religious solemnities.

The Romans had a college of *Pontifices*, and over those a sovereign *Pontif*, or *pontifex maximus*, instituted by Numa; whose function it was to prescribe the ceremonies each God was to be worshipped withal, compose the ritual, direct the vestals; and for a good while to perform the business of augury; till on some superstitious occasions he was prohibited intermeddling therewith.

He consecrated the statues of the gods, ere they were put up in the temples; blessed the figures of some of Jove's thunderbolts, to preserve the people from harms; and compiled their statutes.

The Jews too had their *Pontif* or high-priest; and among the Romans, the Pope is still styled the *sovereign Pontif*.

Authors differ about the origin of the word *Pontifex*. Some derive it from *pons facer*, that is, from the authority the *Pontif*'s had to sacrifice; others, as Varro, from *pontis*, because they built the Sublician bridge, that they might go and offer sacrifice on the other side of the Tiber.

PONTIFICAL, **PONTIFICAL**, a book of the rites and ceremonies belonging to pontiffs, bishops, popes, &c. See **RITUAL** and **CEREMONIAL**.

PONTIFICALIA, the robes and ornaments wherein a bishop performs divine service. See **EPISCOPALIA**.

PONTIFICATE, **PONTIFICATUS**, the state or dignity of a pontiff, or high-priest.

Cæsar reformed the calendar in the time of his *Pontificate*. See **CALENDAR**.

PONTIFICATE is more peculiarly used in modern writers for the reign of a pope.

The concordat was passed in the *Pontificate* of Leo X. There was a *Pontificate* that only lasted twenty-four hours.

PONTON, or **PONTOON**, in war, denotes a little floating bridge, made of boats and planks.

The *Pontoon* is a machine consisting of two vessels, at a little distance, joined by beams, with planks laid across, for the passage of the cavalry, the canon, infantry, &c. over a river, an arm of the sea, &c.

The late invented *Pontoon* is of copper, furnished with an anchor, &c. to fix it.—To make a bridge, several of these are disposed two yards asunder, with beams across them, and over those, are put boards or planks.

They are also linked to each other, and fastened on each side the river, by a rope run through a ring in each of their heads, and fixed to a tree or stake on either shore.—The whole makes one firm, uniform bridge, over which a train of artillery may pass.

Cæsar and Aulus Gellius both mention *Pontons*; but theirs were no more than a kind of square flat vessels, proper for the carrying over of horse, &c. Ours however take their names from them; those authors call them *pontones*, or *pontois*.

PONTON, *being in a cage*, a kind of bridge used in sieges; made of two small bridges laid over one another, and so contrived by means of cords and pulleys placed along the sides of the under-bridge, that the upper may be pushed forwards, till it join the place where it is designed to be fixed; the whole length of both not to be above five fathom, lest they should break with the weight of the men. See **BRIDGE**.

POOL is properly a reservoir of water, supplied with springs, and discharging the overplus by sluices, defenders, weirs, and other cause-ways.

Mill Pool is a flock of water, by whose force, &c. the motion of a mill is effected.

Whirl Pool. See the article **WHIRL POOL**.

POOP, **PUPPIS**, *stern*; the highest or uppermost part of a ship's hull a-stern.—See *tab. ship. fig. 2. lit. P*. See also **STERN** and **SHIP**.

POPE, **PAPA**, the bishop of Rome; being the head or patriarch of the Roman-catholic church.

Father le Cointe, in his annals observes, from St. Jerom, St. Cyprian, St. Gregory, St. Augustin, and Sidonius Apollinaris, that the title *Pope* was anciently given to all bishops. See **BISHOP**.

They were also addressed under the term *holiness*, and *beatitude*; and their churches were called *apostolical sees*.

He adds, that it was only in the eleventh century, that Gregory VII. first appointed, in a synod held at Rome, that the title *Pope* should be restrained to the bishop of Rome, as a particular distinction and prerogative.

In the council of the Lateran, held under Innocent III. the *Pope* was declared *ordinary of ordinaries*.

The *Pope* is chosen by the cardinals, out of their own body.

His see is at Rome, whence he issues out his orders, called *briefs*, and *bulls*, throughout the catholic world.

History mentions a pope, Joan.—The reality hereof has been opposed and defended by many learned men.—The tradition might possibly take its rise from the weakness of pope John VIII. in restoring Photius to his communion, and owning him as true patriarch: for he hence got the appellation of woman; as that prince called king Mary did, by leaving himself to be governed by queen Mary his wife.

M. Spanheim, professor of theology at Leyden, has lately written very amply on the subject; and shews it to be a question *de facto*, scarce determinable at this time of day.

POPE, **PAPA**, among the Romans, was a name given to certain inferior officers, or ministers of sacrifice. See **SACRIFICE**.

The business of the *Pope* was, to whet the sacrificing knife, to bind the victim, prepare the water, and other necessities, to smite the victim, &c.

They did their office naked to the girdle, and crowned with laurel.

POPES, in anatomy, the inner part of the juncture whereby the thigh-bone is articulated with the tibia; popularly called the *ham*.

POPULICANI, **POPULICANI**, or **PUBLICANS**, a name given in the west to the Manichees; or rather to a particular branch thereof, called in the east *Paulicians*.

POPULITEUS, or **SUB-POPULITEUS**, a muscle which arises from the external and inferior protuberance of the thigh-bone, and passing over the joint obliquely, is inserted into the superior and internal part of the tibia.—It assists in bending of the leg, and turns it inwards.—See *tab. anat. (Myol.) fig. 7. n. 27. 27. 27*. See also **LEO**.

POPULITEA, in anatomy, is a name given to the third vein of the leg.

It arises from the heel, where it is formed out of several branches coming both from the heel and ankle.

It lies pretty deep in the flesh; and ascending up to the ham, terminates in the crural vein.

POPPY, **PAPAYER**, a medicinal plant, famed for its narcotic quality.

There are divers kinds; some wild, some cultivated, white, purple, scarlet, &c.—Those most used, are the white, *papaver hortense fœmine albo*; and black, *papaver hortense fœmine nigro*.

The heads of these plants are of singular virtue to promote sleep, alluage pain, &c. They stop diarrhoea's, hemorrhages, &c.

Of the juice of the white *Poppy* is prepared the opium fold in the shops; and of the juice of the leaves, meconium.

POPPY WATER. See the article **WATER**.

POPULAR, **POPULARIS**, something that relates to the common people.

The Roman nobility was distinguished into two factions; the *optimates*, who adhered strenuously to the ministry, the senate, &c. in opposition to the people.—And the *Populares*, who favoured the rights and pretensions of the people, in opposition to the noblesse.

POPULAR ACTION. See the article **ACTION**.

POPULAR diseases, are such as become common, and run through the body of the people; called also *endemic* and *epidemic* diseases.

Hippocrates has written expressly, *de morbis popularibus*.

POPULAR errors, are such as people imbrace from one another, by custom, education, and tradition, without having considered the reason or foundations thereof.

POPULEUM, or **POPULNEUM**, in pharmacy, an unguent prepared of the buds of black poplar, violet leaves, navel-wort, and laid bruised and macerated; to which are added bramble-tops, leaves of black poppies, mandragora, henbane, nightshade, lettuce, and burdock, boiled in rose-water, and strained.

It is much used as a cooler, in burns, scalds, and all sorts of inflammations, and also to alluage arthritic pains.

POPULICANL. See the article **POPULICANI**.

POPULNEUM. See the article **POPULEUM**.

PORCELAIN *, or **PORCELAIN**, a fine sort of earthen-ware, chiefly manufactured in China, and thence also called *china*, or *china-ware*; but brought into Europe from other parts of the east; especially Japan, Siam, Surat, and Persia.

* The Chinese call it *se-ki*. The word *Porcelain* is but little known there; except among a few workmen and merchants; and seems derived from the Portuguese, *porcelana*, a cup.

Scaliger and Cardan, though generally of contrary sentiments, are yet agreed, that what the Romans called *vasa murrhina*, are yet agreed, that what the Romans called *vasa murrhina*, *murrina*

murrina and *murrea*, which were first seen at Rome in Pompey's triumph, and afterwards became to very precious, were the *Porcelain* of our times.

This may be true: but if the opinion be only founded on Pliny's description of those vessels*, one would rather take them to have been made of a kind of precious stones, of a whitish colour, but variously veined and variegated; found in some parts of Parthia.

* *Oriens murrina mittit.* Inveniuntur enim ibi in pluribus locis, nec insignibus maxime Parthici regni: præcipue tamen in Carmania. Humorem putant sub terra calore densari. Amplitudine nusquam parvos excedunt abacos: crassitudine raro, quanta dictum est vasi potiorio. Splendor his sine viribus: nitorque verius quam splendor. Sed in pretio varietas colorum, subinde circumagentibus se maculis in purpuram candoremque, & tertium ex utroque ignescentem, veluti per transitum coloris, in purpurea aut rufescente lacteo. Sunt qui maxime in eis laudant extremitatem, & quoddam colorum repercutus, quales in coelesti area spectantur. His maculæ pingues placent. Translucent quidquam aut pallere, vitium est. Item sales verrucosæ; non eminentes, sed ut in corpore etiam plerumque fissiles. Aliqua & in odore commendatio est. Plin. Hist. Nat. l. 37. c. 2.

Be this as it will, it is certain, that both Cardan and Scaliger are mistaken when they tell us, that *Porcelain* is made of eggs and sea-shells, beaten small, and buried under-ground for 80 or 100 years. The account we shall here give will put that matter out of all question.

It is not known who was the inventor of *Porcelain*; the Chinese annals, which use to contain every thing in any wife memorable, are perfectly silent about it; nor do we know much more of the time of its invention: only it is certain it must have been before the beginning of the fifth century, the annals of Feuliang relating, that from the second year of the reign of the emperor Tam, about the year of Christ 442, the workers in *Porcelain* of that province had alone furnished the emperors therewith.

Porcelain is now made chiefly, some say wholly, at Kingteching, a large town in the province of Kyanghi.

There is some indeed made in the provinces of Kanton and Fokyen; but it is of little account, being far inferior in beauty and value to the *Porcelain* of Kingteching. That of Fokyen is perfectly white, without either glaze or painting. Attempts have been made to remove the manufacture from Kingteching to Peking, and other places, but in vain; the *Porcelain* made in the new manufactories never coming up to that of the old: so that Kingteching has the honour of supplying the greatest part of the world with this commodity. F. du Halde assures us, that even the Japanese come to China for it.

Manufacture of PORCELAIN.—*Porcelain* makes a very curious article in commerce, and not less so in natural history. Its manufacture has hitherto passed for a mystery in Europe; and that in spite of all the endeavours of the Jesuit missionaries to penetrate into the secret. The veil, however, is at length drawn; and in a letter of F. d'Entrecolles to F. Orry, from Jauchew, dated September the first, 1712, and lately published in French, the whole process is described in all its circumstances; with an extract whereof we shall here gratify the curious reader. In the manufacture of *Porcelain* there are four principal things to be considered, viz. the matter it is made of; the art of forming the vessels, and other works; the colours wherewith it is painted; and, lastly, the baking or giving it the proper degree of fire.—Each of which will make the subject of a several article.

Materials of PORCELAIN.—There are two kinds of earths, and as many kinds of oils, or varnishes, used in the composition of *Porcelain*. The first earth, called *kaulin*, is beset with glittering corpuscles; the second, called *petunse*, is a plain white, but exceedingly fine, and soft to the touch. They are both found in quarries twenty or thirty leagues from Kingteching; and hither these earths, or rather stones, are brought in an infinite number of little barks, incessantly passing up and down the river Jauchew, for that purpose. The *petunses* are brought in form of bricks; having been so cut out of the quarries, where they are naturally pieces of a very hard rock. The white of the best *petunse* is to border a little on green.

The first preparation of these bricks is, to break and pound them, first into a coarse powder with iron mallets, then in mortars with pebbles that have stone heads, armed with iron, and wrought either with the hand, or with mills.

When the powder is rendered almost impalpable, they throw it in a large urn full of water, stirring it briskly about with an iron instrument. After the water has rested a little while, they skim off from the top a white substance formed there, of the thickness of four or five fingers, and dipose this scum or cream in another vessel of water. They then stir again the water of the first urn, and again skim it, and thus alternately, till there remain nothing but the gravel of the *petunses* at bottom; which they lay atch under the mill, for a new powder.

As to the second urn, when the water is put the skimings of the first, when the water is well settled, and become quite clear, they pour it off; and with the sediment, collected at bottom in form of a paste, fill a kind of moulds: whence, when almost dry, they take it out, and cut it into square pieces, which are what they properly call square *petunses*; reserving them to be mixed with the *kaulin* in the proportion hereafter assigned.

These squares are sold by the hundred, but it is very rare to

meet with them unfalsified. The workmen, who, like the rest of the Chinese, are ant knaves in their dealings, usually mixing refuse along with them; so that they are commonly obliged to purify them ere they can be employed.

The *kaulin*, which is the other earth used in *Porcelain*, is much softer than the *petunse*, when dug out of the quarry; yet is it this, which, by its mixture with the other, gives the strength and firmness to the work. F. d'Entrecolles observes, that some English or Dutch, having procured some *petunses* to be bought privately; upon their attempting to make *Porcelain* at their return into their own country, could not succeed for want of taking *kaulin* along with it: which the Chinese being apprised of, said, drolling, "That the Europeans were wonderful people, to go about to make a body, whose flesh was to sustain itself without bones."

The mountains whence the *kaulin* is dug, are covered without side with a reddish earth. The mines are deep, and the matter is found in glebes or clods. The author is of opinion, that the white earth of Malta is not much different from the *kaulin*, except that it wants the silvered particles. The preparation of *kaulin* is the same with that of the *petunses*, except that the matter being less hard, less labour is required. The oil or varnish, which makes the third ingredient in *Porcelain*, is a whitish liquid substance: this is drawn from the hard stone, whereof the *petunses* are formed; that which is whitest, and whose stains are the greenest, being always chosen for this purpose.

The manner of preparing the oil, is thus: The *petunses*, being washed, undergo the same preparations as for making the squares; excepting that the matter of the second urn is not put in moulds, but the finest part of it taken to compose the oil. To an hundred pounds of this matter they cast a mineral stone called *shekau*, resembling our alum: This stone is first heated red-hot, and thus reduced in a mortar into an impalpable powder; and serves to give the oil a consistence; which however, is still to be kept liquid.

The oil of lime makes the fourth ingredient; the preparation whereof is much more tedious and circumstantial. They first dissolve large pieces of quick-lime, and reduce it to a powder, by sprinkling water on it; on this powder they lay a couch of dry fern, and on the fern another of the slacked lime, and thus alternately, till they have got a moderate pile; which done, they set fire to the fern: the whole being consumed, they divide the ashes that remain on new couches of dry fern; setting them on fire as before. And this they repeat five or six times successively, or even more; the oil being still the better, as the ashes are oftener burnt.

In the annals of Feuliang 'tis said, that instead of fern they anciently used the wood of a kind of medlar-tree; and that it was this gave the ancient *Porcelains* that admirable hue, which the moderns cannot come up to for want of that wood. 'Tis certain, however, the quality of the fern and lime contribute very much to the goodness of the oil.

A quantity of these ashes of fern and lime are now thrown into an urn full of water; and to an hundred pounds of ashes is added a pound of *shekau*, which dissolves therein. The rest being performed after the same manner as in preparing the earth of the *petunses*; the sediment found at the bottom of the second urn, and which is to be kept liquid, is what they call the *oil of lime*; which the Chinese esteem as the soul of the former oil, and which gives the *Porcelain* all its lustre. This oil is easily sophisticated by adding water to increase the quantity; adding at the same time proportionably of the same *shekau* to maintain the consistence. Ten measures of oil of *petunse* usually go to one of lime. To have the mixture just, the two oils should be equally thick.

Forming of PORCELAIN vessels.—The first thing is, to purify the *petunse* and *kaulin*; which, for the first, is done after the manner already described in preparing the squares. For the second as its softness makes it dissolve easily, 'tis sufficient, without breaking it, to plunge it in an urn full of water in an open basket. The dregs that remain are perfectly useless, and are emptied out of the work-house, when a quantity is got together.

The work-houses are properly vast yards walled round, with sheds, and other conveniences for the workmen to work under; as well as other buildings for them to live in. It is almost inconceivable what number of persons are employed in these works; there being scarce a piece of *Porcelain* but passes through above twenty hands, ere it comes to the painter's work-house, and above sixty, ere it be brought to perfection.

To make a just mixture of *petunse* and *kaulin*, regard must be had to the fineness of the *Porcelain* to be made: for the finer *Porcelains*, they use equal quantities; four parts of *kaulin* to fix of *petunse*, for moderate ones; and never less than one of *kaulin* to three of *petunse*, for the coarsest.

The hardest part of the work is the kneading and tewing the two earths together; which is done in a kind of large basins, or pits, well paved and cemented, wherein the workmen trample continually with their feet, relieving one another, till the mass be well mixed, grow hard, and become of the consistence required to be used by the potter.

The earth, when taken out of the basins, is kneaded a second time, but piece-meal, and with the hands, on large plates for the purpose; and on this preparation, in effect, it is, that the per-

fection of the work depends; the least heterogeneous body remaining in the matter, or the least vacuity that may be found in it, being enough to spoil the whole. The smallest grain of sand, nay, sometimes a single hair, shall make the *Porcelain* crack, splinter, run, or warp.

The *Porcelain* is fashioned or formed either with the wheel, like our earthen ware, or in moulds. See POTT ERY. Smooth pieces, as cups, urns, dishes, &c. are made with the wheel. The rest, i. e. such as are in relieve, as figures of men, animals, &c. are formed in moulds, but finished with the chissel.

The large pieces are made at twice; one half of the piece is raised on the wheel by three or four workmen, who hold it till it have acquired its figure; which done, they apply it to the other half, which has been formed in the same manner; uniting the two with *Porcelain earth*, made liquid by adding water to it, and polishing the juncture with a kind of iron spatula.

After the same manner it is that they join the several pieces of *Porcelain* formed in moulds, or by the hand; and after the same manner they add handles, &c. to the cups, and other works formed with the wheel.

The moulds are made after the manner of those of our sculptors; viz. of divers pieces, which severally give their respective figure to the several parts of the model to be represented; and which are afterwards united to form a mould for an intire figure. The earth they are made of is yellow and fat, dug out of its proper quarries, whereof there are abundance about Kingtching. It is kneaded like potters earth, and when sufficiently mellow, fine, and moderately dry, beating it floudy, they form it into moulds, according to the works required, either by hand, or on the wheel. These moulds are sold very dear, but they last a long time.

All the works made in moulds are finished by the hand, with several instruments proper to dig, smooth, polish, and to touch up the strokes that escape the mould; so that 'tis rather a work of sculpture than of pottery. There are some works whereon reliefs are added, ready made, as dragons, flowers, &c. others that have impressions in creux; which last are engraven with a kind of puncheons. In the general, all *Porcelain* works are to be sheltered from the cold; their natural humidity making them liable to break when they dry unequally.

To conceive the number of hands each piece of *Porcelain* passes through ere perfect, we shall close this article with what F. d'Entrecolles instances of a common tea-cup, ere it be fit for the painter. The cup begins with the potter, who has the management of the wheel, where it acquires its form, height, and diameter. This operator has not a faithfull sterling for a plate furnished with twenty-six cups; accordingly, they go out of his hands exceedingly imperfect, especially towards the feet, which are only unformed lumps of earth, to be afterwards cut with the chissel, when the cup is dry. When it comes from the wheel, the cup is received by a second workman, who fits it to its base. A third takes it immediately from him, and applies it on a mould to bring it to its true form. This mould is on a kind of lathe. A fourth workman polishes the cup with a chissel, especially about the edges; and brings it to the thinness necessary to make it transparent: in doing which, he moistens it from time to time, lest its dryness should make it break. When of its proper thickness, another workman turns it gently on a mould, to smooth its inside; taking a deal of care it be done equally, lest any cavity be formed, or it warp. Other workmen add some ornaments in relieve; others, impressions in creux; others, only handles; as the quality of the cup requires. At last, they round and hollow the foot on the inside with a chissel; which is the function of a particular artist, who does nothing else.

This multiplicity of workmen, is so far from retarding the work, that it is found, by experience, to go on the faster for it; as well as to be the better done; each workman, by a continual attention to the same thing, becoming very dextrous at it: besides saving the time of changing instruments, &c.

Painting of PORCELAIN.—The Chinese painters, especially those that meddle with human figures, our author observes, are all sorry workmen: he adds, that the defect is scarce any-where so sensible as in the whapey, or *porcelain* painters, among whom, setting aside flowers and landkips, which are sometimes tolerable, the greatest masters are not to be compared to ordinary apprentices among the Europeans, for the beauty and justness of design. But it is otherwise with the colours these whapey use; which are so exceeding lively and brilliant, that there are but little hopes our workmen should ever come to vie with them.

The painting work is distributed among a great number of workmen, in the same laboratory: to one it belongs to form the coloured circle about the edges of the *Porcelain*; another traces out flowers, which another paints: this is for waters and mountains alone; that for birds and other animals; and a third for human figures.

There are *Porcelains* made of all colours; both with regard to the grounds, and to the representations thereon. As to the colour of landkips, &c. some are simple; such are all blues, which are these most usually seen in Europe; others are mixed up of several tints; and others, again, are heighten'd with gold.

The blue is made of lapis lazuli, prepared by burning it the space of twenty four hours, in a kiln, where it is buried up to the height of half a foot; when burnt, they reduce it

into an impalpable powder in *porcelain* mortars, not varnished, and with pebbles of the same matter.

For the red, they use coppers, which they call *shansun*; a pound of this they put in a cover'd crucible, in the lid whereof is left a little aperture, through which the matter on occasion may be seen. The crucible is heated with a reverberatory fire, till the black smoke cease to ascend, and a fine red one succeeds it. A pound of coppers yields four ounces of red matter, which is found at the bottom of the crucible, though the finest part is that that usually adhering to the lid and sides of the crucible.

The powder of flint is likewise an ingredient in most of the other colours; e. gr. for green, to three ounces of tongwhapeen, or scoria of beaten copper, they use half an ounce of powder of flint, and an ounce of ceruse. Violet is made by adding a dole of white to the green already prepared; the more green is added, the deeper is the violet. For yellow, they use seven drachms of white, and three of the coppers-red.

Most of these colours are mixed up with gum-water, for application; with little salt-petre, sometimes ceruse or coppers, but more usually coppers alone, being first dissolved in the water. Indeed for *Porcelains* that are to be quite red, the colour is usually applied with oil; i. e. with the common oil of the *Porcelain*, or another made of the white flints.

There is also another kind of red, called *blaton red*, because in reality applied by blowing with a pipe, one of whose orifices is covered with a very fine gauze. The bottom of this tube is lightly applied to the colour wherewith the gauze is lined; when blowing against the *Porcelain*, it becomes all sprinkled over with little points. This *Porcelain* is very rare, and of great price. Black *Porcelain*, which they call *uniam*, has likewise its beauty: this colour has a leady cast, like our metal burning mirrors; and is usually heightened with gold. It is made of three ounces of lapis lazuli, with seven of the common oil of stone; though that proportion is varied, as the colour is designed to be more or less deep. The black is not given the *Porcelain* till it be dry, nor must the work be put to the fire till the colour be dry.

The gold is not applied till after the baking, and is rebaked in an oven for the purpose. To apply gold, they break and dissolve it in water at the bottom of a vessel of *Porcelain*, till a thin gilded cloud arise on the surface: it is used with gum-water, and to give it a body, they add three parts of ceruse to thirty of gold.

There is likewise a kind of marbled *Porcelain*, which is not made by applying the marblings with the pencil, but for oil to varnish it withal, using that of white flints, which hatches and cuts the work with a thousand humorous strokes, in manner of Mosaic work. The colour this oil gives, is a white, somewhat ashy. The *Porcelain* is called *tsuiki*.

There are several other kinds of *Porcelain*; but they are such as are rather for curiosity than use: the prettiest are the magic *Porcelains*, whose colours only appear when filled with some liquor. These are made double: the outside is white, and all laid out in compartments; the inside is a solid cup, of colour'd *Porcelain*; though the cup is sometimes of glass, which has a better effect than *Porcelain*. The secret of these magic *Porcelains*, which the Chinese call *kiatsun*, is almost lost; yet F. d'Entrecolles has furnished us with the following account.

The *Porcelain* to be painted thus must be very thin; and the colours, which in other *Porcelains* are applied on the out-side, are here applied on the inside. When the colour is dry, they lay over it a light coat of a size made of the *Porcelain* earth; by which means the colour is inclosed between two earthen laminae. When the size is dry, they throw oil within the *Porcelain*; and when it has enough, they return it to the mould, and the wheel, to render it as thin and transparent as possible. When dry, it is baked in the common furnace. The colours here used are always the finest, and the figures painted are as filices; as the most suitable to the liquor put within them, and in which they seem to swim.

The several kinds of *Porcelains* above-mentioned, being quite painted, with their several colours, and all the colours dry, are to be polished, to prepare them to receive the oil or varnish; which is done with a pencil of very fine feathers, moistened with water, and passed lightly over, to take off even the smallest inequalities.

The oiling or varnishing is the last preparation of the *Porcelain*, before it be carried to the oven: this is applied more or less thick, and seldom or oftener repeated, according to the quality of the work. For thin, fine *Porcelain*, they give two very thin couches; to others one; but that one equivalent to the other two. There is a deal of art in applying the varnish; both that it be done equally, and not in too great quantity. The couches on the inside are given by apertion, i. e. by casting in as much varnish as is necessary: those on the out-side, by immersion, or by plunging the pieces in a vessel of oil.

It must be observed, that the foot is not yet formed, but continues in a mere mass, till the work has been varnished: it is as length finished on the wheel; and when hollowed, a little circle is painted in it, and sometimes a Chinese letter. This painting being dry, the foot is varnished, and the work now carry'd to the oven to be baked.

Our curious author omits nothing; not even the dexterity of the people, who carry the *Porcelain* to the bake-house. He has

been frequently surprized, he tells us, to see a man pass through several streets full of people, with two very long, narrow boards, ranged with *porcelains* on his shoulders, full preserving the equilibrium so accurately, as not to do any damage to so frail a commodity.

Baking or nealing of Porcelain.—There are two kinds of ovens used in baking of *Porcelain*: large ones, for works that are only used to come to the fire once, which is the common way; and small ones for such as require a double baking. The large ones are two Chinese fathoms deep, and almost four wide. They are formed of a mixture of three earths; one whereof, yellow and common, make the basis; the two others are scarcer, and dug out of deep mines, wherein people can only work in winter. One of them, called *laoutou*, is a very strong stiff earth; the other *youtou*, oily.

The sides and roof of the ovens are so thick, that one may lay the hand on them, when the fire is at its height, without danger of burning. At the top of the dome, which is in form of a tunnel, is a large aperture to give vent to the flames and smoke, which mount up incessantly, as soon as fire is once set to the oven. Beside the principal aperture, there are four or five small ones around; which by being opened and shut, serve to augment or diminish the heat: like the holes in the chimneys furnaces, called *registers*. The hearth, which takes up the whole breadth of the oven, is placed in front, precisely against the opening of the door, and is two or three feet deep, and two broad; people passing over it on a plank, to go into the furnace to range the *Porcelain*.

As soon as the fire is lighted, the door is wall'd up, only leaving an aperture for the conveyance of wood. Lastly, the bottom of the oven is covered with sand, wherein part of the first *Porcelain* cases are buried. The oven itself is usually placed at the extremity of a long, narrow vestibule, which serves in lieu of bellows, the cold air and wind being thus driven directly in the face of each oven.

Each piece of *Porcelain* of any note, is disposed, in the furnace, in its peculiar, separate case, or coffin. Indeed, as to tea-dishes, &c. the same case serves for several. The cases are all of the same matter with the oven; they have no lids, but serve each other mutually, the bottom of a second case fitting into the aperture of the first; and thus successively, to the top of each column. Each coffin, which is usually of a cylindrical form, that the fire may communicate itself more equably to the *Porcelains* inclosed, has, at bottom, a little lay of very fine sand, covered over with dust of kaulin, that the sand may not stick to the work; and care is taken that the *Porcelain* may not touch the sides of the case. In the larger cases, which hold the small pieces, they leave the middle vacant, in regard *Porcelains* placed there would want the necessary heat. Each of these little pieces is mounted on a little massive of earth of the thickness of two crowns covered with powder of kaulin.

F. d'Entrecolles observes, that the *Porcelains* are put in cases, to prevent any diminution of lustre from the too violent effect of a naked fire; adding, that it is owing to those thick veils, that the beauty, or, as he calls it, the complexion of the *Porcelains*, is not tainted by the heat of the fire.

As fast as the cases are filled, a workman ranges them in the cavity of the furnace; forming them into piles or columns, whereof those in the middle are at least seven feet high: The two cases at the bottom of each column are left empty, because being partly sunk in the sand, the fire has the less effect on them; and for the same reason, the uppermost one is left empty. In this manner is the whole cavity of the oven filled with columns, excepting that part precisely under the grand aperture. In ranging the cases, they observe always to place the finest piles of *Porcelain* in the centre; the coarsest at the bottom: and those that are high-coloured, and consist of as much petasie as kaulin, and wherein the worst oil is used, at the mouth.

These piles are all placed very near one another, and are bound together at top, at bottom, and in the middle, by pieces of earth; in such manner, as that the flame may have a free passage among them, and insinuate equally on all sides: in which a great part of the workman's art lies, and on which the perfection of the *Porcelain* much depends. Another thing to be observed, is, that an oven must never be set altogether with new coffins; but half one, half the other: the old ones at the bottoms and tops of the pile, and the new ones in the middle. Indeed it were better to have them all burnt in an oven apart, ere they come to be used for *Porcelain*; as was anciently done. The cases, our author observes, are brought ready prepared from a large village on the river, a league distant from Kingteching. Ere burnt, they are yellow; and afterwards of a dark red.

When the oven is filled, they wall up the door, only leaving a little aperture for the throwing in of little pieces of wood, a foot long, but very slender, to keep up the fire. It is then heated, by degrees, for the space of a day and night; after which two men, who relieve one another, continue to throw in wood without any intermission. To know when the *Porcelain* is baked enough, they open one of the lesser holes of the oven, and with a pair of tongs take off the lid of one of the piles. If the fire appear very brisk and clear, and the piles equally inflamed; and especially if the colours of the *Porcelains*

that are uncovered, dart forth a noble lustre; the coction is sufficient, they discontinue the fire, and wall up what remained of the door of the furnace.

If the oven be only filled with small *Porcelain*, they take them out twelve or fifteen hours after the fire is extinct: if it be filled with larger, they defer opening it for two or three days. In this the modern practice differs from the ancient; wherein the door was not opened till after ten days for the large pieces, and five for the small ones.

One thing very surprizing, and almost inconceivable, F. d'Entrecolles observes, is, that there are never found any ashes on the hearth of the oven, what quantity of wood soever is consumed. He adds another thing, which with him, passes for equally strange, that the workmen employed about the furnaces, slake their thirst by continually drinking hot tea, with salt dissolved in it.

The Chinese make another kind of *Porcelain*, which they paint and bake twice; and for this second baking they have a kind of little ovens on purpose. These ovens, when very small, are made of iron; or otherwise, of a kind of bricks an inch thick, a foot high, and half a foot broad, made of the same earth with the *porcelain* cases. The biggest of these ovens does not exceed five foot in height, and three in diameter; and being made much in form of bee-hives, the bricks are arched a little, to form the curvity the better. The hearth is of earth half a foot high, formed of two or three ranges of bricks; and on this massive is the oven built. Around the oven, at the distance of about half a foot, is raised a shell of common bricks, joined to the oven itself, by a kind of archabout of earth, which serves to strengthen it. They usually build four or five of these ovens at equal distances from each other. At the bottom of the shell are holes to give air to the fire when lighted: at-top is an aperture, which they cover up with a piece of the baked earth, when the *Porcelains* are laid in the oven.

The *Porcelains*, here, are not inclosed in coffins, as in the common ovens; the oven itself serving that purpose, and being so exactly closed, that they receive no other impression of the fire, but that of the heat of the charcoal disposed in the hearth, at the bottom of the oven, as well as at-top of the vault, and in the interval between the oven and the shell, or brick-wall.

To prepare the *Porcelains* for a second baking, they must have had their varnish in the common manner, and have passed the great oven. In this state they are painted with various colours, after which, without giving them any new varnish, they are ranged in piles in the little oven; setting the little ones over the larger, in form of pyramids.

This second baking is sometimes intended to preserve the lustre of the colours the better, and at the same time to give them a kind of relieve. But, more usually, its design is to hide defective places, by covering them over with colours; but the artifice is easily found out, by passing the hand over them.

When the workman judges his *Porcelain* enough baked, he takes off the piece that covers the aperture; and if the works appear glittering, and the colours glowing, he takes out the charcoal; and when the oven is cold, the *Porcelain* is so too.

How beautiful soever the modern *Porcelain* may be, the taste for antiquity, which reigns in China, as well as in Europe, gives the ancient *Porcelain* a value far above that of the modern. It must be owned, the ancient seems finer as to the matter, more perfect as to the baking, and of a more pleasant cast, both as to the white of the ground, and the other colours; yet it is certain, the most able and discerning may be deceived herein: and there are workmen who make it their business to counterfeit the ancient *Porcelain*, called *kutong*, in the modern. The matter of the false *kutong* is a soft and yellowish earth, found near Kingteching. There is nothing particular in the first part of the process, except that they are made thicker, and that they are varnished with an oil drawn from the yellow-stone, mixed with the common oil, which gives them a kind of sea-green hue. When taken out of the oven, they throw it into a fatty broth, made of capons, &c. in which they boil it a second time; they then bury it in the filthiest sink they can find, for a month or six weeks, or more, according as they would give it the greater appearance of antiquity. Besides their thickness and their colour, these false antiques resemble the true ones in this, that they do not resound when struck, nor even give the least buzz, when held to the ear.

Notwithstanding the vast quantity of *Porcelains* made in almost all the provinces of the empire of China, they still continue very dear; though not near so dear as anciently. The Chinese annals tell us of times wherein a single urn cost ninety or an hundred crowns on the spot. What chiefly occasions the extraordinary price of this commodity, especially in Europe, is, beside the great profits of the merchants in Europe, and their factors in China, that it rarely happens an oven succeeds throughout; that it is frequently quite spoiled, so that upon opening it, in lieu of fine *Porcelains*, is found a hard unformed mass, into which both the *Porcelains*, and their coffins, are converted, either by excess of heat, or some ill qualities in the matter.

Another reason of the dearth of *Porcelain*, is, that the ingredients it is made of, and the wood wherewith it is burnt, grow more and more scarce. One may add a third reason for the excessive

effective price of *Porcelains* to the Europeans; and it is this, that most of those sent to Europe are formed on new models, frequently very capricious, and difficult to succeed in; which yet, for the smallest defects, are turned on the manufacturer's hands: and he not being able to dispose of them to the Chinese, because not to their taste, nor to their use, is forced to charge the *Porcelain* he delivers, the higher, to pay himself for those refused.

The French have been these fifteen years attempting to imitate *Porcelain*. The first essays made at Rouen, are said to have succeeded tolerably well; and M. Savary tells us, are now carried to such a point in the manufactories at Paris and St. Cloud, that the French *Porcelains* want nothing to make them of equal value with the Chinese, but to be brought five or six thousand leagues. In effect, for the fineness of the grain of the matter, the beauty and turn of the vessels, the exactitude of the design, and the lustre of the colours, at least the blues, the French are not much behind the Chinese.—But their great defect is in the white of the ground, which is usually dingy and dull, and easily distinguishes itself from the pure brightly white of the Chinese.

But the Saxons seem to have exceeded the French: There is a manufacture at Mifsen, the capital of Misnia, which the baron de Pollnitz assures us, produces *Porcelain*, painted and enamelled in such perfection, that they are more beautiful, as well as dearer, than those of China itself. The invention is owing to an alchemist, who being clapped up in the castle of Konigstein, by the late king of Poland, on a suspicion of being master of the secret of the philosopher's stone, had leisure enough, not indeed to make gold, but to invent a ware, which by the great vent of it considerably enriches the country.

PORCELAIN also denotes a kind of little white sea-shell, found on the shores along with the sponges; and current in several parts of Asia, Africa, and America, by way of Money.

Authors have hitherto been of opinion, that these shells were the matter whereof the *Porcelain*, or China-ware, was made. They are of some use in medicine, and are prescribed pounded or broken, in manner of pearls.

PORCH, *atrium*, a kind of vestibule, supported by columns; much used at the entrance of the ancient temples, halls, churches, &c.

In the ancient architecture, a *Porch* was a vestibule, or a disposition of insulated columns, usually crowned with a pediment, forming a covert place before the principal door of a temple, or court of justice.—Such is that before the door of St. Paul's, Covent-garden, the work of Inigo Jones.

When it had four columns in front, it was called a *tetrasyle*; when six, *hexasyle*; when eight, *octosyle*; when ten, *decasyle*, &c.—Vitruvius calls it *pronaos*, Pollux, *εὐκλυστῆρ, προδῶνος*; when finer than ordinary, the ancients called it also *prostyleum*.

PORF *, a little interface between the particles of matter which constitute bodies; either empty, or filled with some insensible medium.

* The word *Pore* is formed from the Greek *πῶρος*, aperture, or duct, through which a thing passes.

Condensation, and rarefaction, are only performed by closing and opening the *Pores*.

The transparency of bodies is usually supposed to arise from their *Pores* being directly opposite to one another.

The matter of insensible perspiration is conveyed through the *Pores* of the cutis.

Sir Isaac Newton shews, that bodies are much more rare and porous, than is commonly believed: water, *e. gr.* is 10 times lighter, and consequently rarer than gold: and gold itself is so rare, as very readily, and without the least opposition, to transmit magnetic effluvia, and easily to admit quicksilver into its *Pores*, and to let even water pass thro' it: for a concave sphere of gold hath, when filled with water, and folded up, upon pressing with a great force, lets the water squeeze through it, and stand all over its outside, in multitudes of small drops like dew, without bursting or cracking the gold. Whence it may be concluded, that gold has more *Pores* than solid parts; and by consequence that water hath above forty times more *Pores* than parts.

The magnet transmits its virtues without any diminution or alteration, through all cold bodies that are not magnetic; as gold, silver, brass, glass, water, &c. See **MAGNET**.

The rays of light, let them be either bodies actually coming to us from the sun, or only motions or impressions upon the medium, move in right lines, and are hardly ever, unless by great chance reflected back again in the same line, after their impingence upon objects; and yet we see, that light is transmitted to the greatest distances through pellucid bodies, and that in right lines.

Now how bodies should have *Pores* sufficient for these effects, may be difficult to conceive, but not impossible: for Sir Isaac shews, that the colours of all bodies arise from their particles being of such a determinate size or magnitude. Wherefore, if we conceive these particles to be so disposed, as that there is as much porosity, as there is of matter, and in like manner

those particles to be composed of others much less, and that have as much interperied vacuity or space, as their quantity of matter amounts to; and so on, till we come to solid particles without *Pores*; then, if in any body there be (for instance) three of these sizes of particles, and that the last be of the solid, or least sort; that body will have seven times as much vacuity as solid matter: if four such degrees, and the last be least and solid, that body will have fifteen times as much porosity as solidity: if five such degrees, it will have thirty-one times as much space as solidity: and if six degrees, then it will have sixty-three times as much vacuity, as solid matter.

And perhaps in the wonderful conformation and fabric of natural bodies, there may be other proportions of space to matter, which are to us wholly unknown; whence it is possible, there may be yet farther great quantities of interperied vacuity.

PORES, in anatomy, are certain permeable spaces, between the parts of the skin; whereby we sweat, or perspire, &c.—See *tab. anat. (myol.) fig. 8. litt. dd. fig. 9. litt. aa and c.*

The *Pores* are most remarkable in the hands and feet. By viewing the palm of the hand with a moderate glass, after washing it well, we perceive innumerable little ridges, of equal size and distance, running parallel to each other; especially on the tips and joints of the fingers, &c. where they are regularly disposed into spherical triangles and ellipses.

On these ridges stand the *Pores*, in even rows, big enough to be seen by a good eye without a glass; but with one, every *Pore* looks like a little fountain; and the sweat may be seen to stand therein, clear as rock-water; and as often as it is wiped off, it springs up again.

The *Pores* are placed on the ridges, not in the furrows between them; that they might be less liable to be stopped by compression: for the same reason, the *Pores* of the hands and feet are larger than the rest; those parts being more used and pressed than the rest; and hence again, there are no ridges on other parts.

These *Pores* serve as a convenient out-let for the more noxious parts of the blood, which by the continual use of the hands and feet, are plentifully brought into them: whence in hypochondriac and hysterical people, there is a continual burning in the palms and soles.

In the stoppage or constriction of the *Pores* of the skin, that disease we popularly called a *cold*, is commonly supposed to consist; tho' Dr. Keil maintains a quite contrary opinion, in a dissertation at the end of his *medicina stativa Britannica*.

In the philosophical transactions, we have an instance of a student near Leyden, much addicted to astronomy, who spending many nights in star-gazing, had, by the nocturnal wet and cold, so obstructed the pores of his skin, that little or nothing exhaled from his body; as appeared hence, that the third he had worn five or six weeks, was then as white as if it had only been worn one day. In the mean while, a water was collected under the skin, whereof he was afterwards cured.

Bilary PORE. See the articles **BILARY**, and **POROUS**.

PORIME *, **PORIMA**, in geometry, a theorem, or proposition, so easily demonstrated, that it is almost self-evident.

* The word is formed from the Greek *πῶρος*, pervious, a thing easy to penetrate or conceive, and which opens the way to something more difficult.

Such, *e. gr.* is this, that a chord is wholly within the circle.

Porime stands opposed to **aporime**, which denotes a proposition so difficult, as to be almost impossible to be demonstrated.—Such as the quadrature of the circle is now, and as the squaring of any assigned portion of Hippocrates's lunes formerly was.

The **porime** coincides nearly with the lemma, or assumption.

PORISM *, **PORISMA**, in mathematics, a general theorem, or canon, deduced from a geometrical locus, and serving for the solution of other general and difficult problems.

* Proclus derives the word from the Greek *πῶρος*, I establish, and conclude from something already done and demonstrated; and accordingly defines **porisma**, a theorem drawn occasionally from some other theorem already demonstrated.—In which sense it coincides with what we otherwise call corollary.

PORISTIC method, in mathematics, is that which determines when, by what means, and how many different ways, a problem may be solved.

PORPHYRIANA arbor. See the article **ARBOR**.

PORPHYRIANS, a name given to the Arians, in the fourth century, by authority of Constantine.

That prince, publishing an edict against Arius and his writings, declares, that as Arius has imitated Porphyry in composing books against religion, he deserves to be noted with his infamy; and that as Porphyry is become the reproach of posterity, and his writings suppressed; so he wills, that Arius and his followers be called **Porphyrians**, &c.

The propriety of the name seems to consist in this, that the Arians endeavoured to restore idolatry: for in laying that the son, whom they call a *begotten God*, is a creature, they put a creature in the rank of God; and only differ from the Heathens in this, that the one give the quality of God to one creature, the other to a great many.

PORPHYROGENITUS, in antiquity, an appellation given to the children of the eastern emperors: implying as much as, *born in purple*.

Cedrenus will have the word to signify, *born in the purple palace*, or the *palace of porphyry*, a palace so called in Constantinople; wherein the emperors used to lie in. Others derive the appellation hence, that the imperial children, as soon as born, were wrapped in purple; others from this, that the chamber wherein they were born was hung with purple hangings.

PORPHYRY, **PORPHYRYTES**, in natural history, &c. a precious kind of stone, or marble, of a brownish-red colour; frequently interperfed with white spots; anciently brought from Egypt, and exceeding all other marbles in hardness.

There are three famous *Porphyry* pillars, or obelisks, in Egypt; one near Cairo, and the other two at Alexandria. The Franks call them *aguglia's*, the English *Cleopatra's needles*.

'Tis difficult to conceive whence they should have been brought, for Dr. Huntingdon assures us, that there is no quarry or rock of such stone in all the lower parts of Egypt; so far as the Nile overflows being perfect foil. *V. Ray's Trav. T. 2. p. 461.*

The art of cutting *Porphyry*, practised among the ancients, seems lost. In effect, it is hard to conceive what kind of tools they must have used for the fashioning of these huge columns, and other *Porphyry* works found in some of the antique buildings in Rome.

One of the most considerable pieces, now remaining intire, is a tomb of Constantia, daughter of the emperor Constantine, in the church of St. Agnes without the walls; ordinarily called, *the tomb of Bacchus*, because of several boys represented herein, playing among the vine-leaves. Add to this Apollo's, and the busts of twelve emperors, all in *Porphyry*, in the palace of the Tuilleries.

Some of the ancient pieces appear to have been wrought with the chissel, others with the saw, others with wheels, and others ground down by degrees with emery. Yet the modern tools will scarce touch *Porphyry*: it should seem therefore that the ancients had the secret of tempering steel better than we; not as some incline to think, that they had the art of softening the *Porphyry*: though it is probable, that time and air have contributed to increase its hardness.

Mr. Addison tells us, he saw a workman at Rome employed in the cutting of *Porphyry*; but his advances were exceedingly slow, and almost insensible.

All the way the Italian sculptors have to work the pieces of old *Porphyry* columns still remaining, (for the *Porphyry* quarries are long since lost) is with a brass saw without any teeth. With this, together with emery and water, they rub and wear the stone with infinite patience.

Yet have many excellent persons endeavoured to retrieve the ancient art, particularly Leon Baptista Alberti; who searching for the necessary materials for temper, says, he found goats blood the best of any: yet even this availed but little; for in working with chissels tempered herein, sparks of fire came much more plentifully than pieces of the stone. By means hereof, the sculptors were able to make a flat or oval form; but could never attain to any thing like a figure.

It is true, in 1555, Cosmo de Medicis is said to have distilled a water from certain herbs, wherewith his sculptor Francesco Tadda, gave his tools such an admirable hardness and temper, as that he performed some fine works with them; particularly, our Saviour's head in demi-relievo, and Cosmo's head, and his dutchess's. Even the very hair, and beard, how difficult soever, are here well conducted; and there is nothing of the kind better in all the works of the ancients: but the secret seems to have died with him.

The French have lately found another method of cutting *Porphyry*, viz. with an iron saw without teeth, and *grex*, a kind of free stone pulverized, and water. The authors of this invention pretend, they could form the whole contour of a column hereby, had they matter to work on. See *Supplement, article PORPHYRYTES*.

PORRACEOUS*, in medicine, a term applied to the bile, feces, &c. when their colour is green, approaching that of a leek.

* The word is formed from the Latin *porrum*, leek.

PORRETANI, a religious sect, the followers of Gilbert de la Porree, bishop of Poitiers, condemned in the twelfth century, for admitting a physical distinction between God and his attributes; or, as Marham says, for having written too curiously on the subject of the Trinity: for his real sentiments, we are not over-well acquainted withal.

However, he gave occasion for those suspicions, by maintaining that this proposition, *Deus est bonitas*, is not true, unless reduced to this, *Deus est bonus*. And there are some passages noted by St. Bernard, who wrote warmly against him, wherein he seems to admit a real distinction between the nature of God and his attributes.—The *Porretani* are set in opposition to the *Nominali*.

PORT, *haven*, or *harbour*, a commodious place situate on the sea-coast, or at the mouth of a river, with depth of water sufficient for ships of burden, and convenient bottom for anchorage; where vessels lie by, to load or unload; screened from the wind, and safe from any enterprize of enemies; either

by the disposition of the place, or by means of a mole, or dike, or the like, with a chain and light-house.

Ports are either *natural* or *artificial*.

Natural PORTS are those which providence seems to have formed for the communication of commerce.

Artificial PORTS are those formed with moles, or projectures into the sea.

The English coasts are exceedingly thin of *Ports*. France has the advantage of all other countries in the number and excellence of *Ports*: that of Breſt is the finest natural *Port* in the world, as that of Dunkirk was lately the strongest artificial one.

Bar PORTS, *PORTS de barre*, are such as can only be entered with the tide, as that of Goa.

Close PORTS, are those within the body of a city; as those of Rhodes, of Venice, Amsterdam, Rochel, Bayonne, and St. John de Luz.

Free PORT, in commerce, a *Port* open and free for merchants of all nations to load and unload their vessels in, without paying any duties or customs.

Such are the *Ports* of Genoa and Leghorn.—The emperor, since his being in possession of the states in Italy, formerly belonging to Spain, has seemed determined to establish a *free Port* in some of the cities he possesses on the Adriatic sea.—bearing date the 5th of March 1669.

Free PORT is also used for a total exemption and franchise, which any set of merchants enjoy, for goods imported into a state, or those of the growth of the country exported.

Such was the privilege the English enjoyed for several years after their discovery of the *Port* of Archangel; and which was taken from them on account of the regicide in 1648.

Cinque PORTS. See *CINQUE PORTS*.

PORT is also sometimes used for the burden of a ship. See *BURDEN*.

The capacity of a vessel is estimated in tuns; each whereof may contain about two thousand pounds weight of sea-water. When we say, a vessel is of the *Port* or burden of a thousand tuns; it is not meant, as some imagine, that it bears so many casks full of merchandize; but that the sea-water, which would be contained in the space which the capacity of the vessel possesses in the sea, weighs a thousand tuns, which, at the rate of 2000 pounds each, is as much as to say, it bears a burden of two millions weight.

PORT is also used for the palace of the grand signior, or emperor of the Turks.

PORT is also used for a strong wine brought from Oporto, or Port-a-port in Portugal; whence its name. See *WINE*.

PORT of the voice, in music, the faculty and habit of making the shakes, passages, and diminutions, wherein the beauty of a song, or piece of music, consists; and which the Italians comprehend under the terms *trilli*, *gruppi*, *sfascini*.

PORT, among sailors, denotes the larboard, or left side of the ship.

To Port a helm, is to put the helm on the left side of the ship, that the ship may go to the right, or the starboard.

PORTA, in anatomy, or *vena PORTA*, a very considerable vein, employed in bringing the blood from several parts, by an infinite number of branches, which it is divided into, to the liver, through the whole substance whereof it is diffused.—See *tab. anat. (angiel.) fig. 4. lit. a: (splanch.) fig. 5. lit. i.*

The *vena porta* is formed of two large veins; the mesenteric and splenic; which are again formed of several other minuter veins coming from the stomach, intestines, spleen, epiploon, &c.

The ancients gave it the name *porta*, as imagining it to bring the chyle, by its mesenteric branch, from the intestines to the liver; but some of the moderns have found another use for it.

It is remarkable of the *porta*, that, after the manner of the arteries, it shoots itself from a trunk into branches; and being at last lost in capillaries, it delivers the blood into the cava, by which it is immediately reconveyed to the heart.

The *porta* is formed out of the concurrence of divers veins, which, meeting together, make one of the most considerable venous trunks of the body, as to its bulk; though, contrary to the course of other veins, it runs not far in a trunk, but is, as before observed, soon distributed again, by ramifications, into the liver.

This vein is vulgarly divided into *branches without the liver*, and *branches within*, and a *trunk intermediate*: but this division is not very clear, the *branches*, as they are called, without the liver, not being so properly branches as roots; which have, by anatomists, been dignified with distinct names from the parts whence they come.

The veins which conspire towards the formation of this trunk, which having been described in their proper places, or being to be described there, we shall not here enlarge upon, are, from the placenta uterina, in a fetus, the *vena umbilicalis*; from the gall-bladder, the *cystica gemellæ*; from the upper part of the stomach, the *pylorica*, or *gastrica dextra*, which goes to the trunk; the *gastrica major*, and *minor sinistra*, from the stomach (of which the major is formed out of the coronaria

ventriculi; the epiplois sinistra and posica, from the omentum; the vas, or vasa brevia, from the stomach; the splenica, from the spleen: all which join to form the *left*, or *spleen-branch* of the porta.

The *right*, or *mesenteric branch*, consists of the gastrica and epiploica dextra, from the stomach and omentum; the duodena, from the duodenum and jejunum; the hæmorrhoidalis interna, from the intestinum rectum and colon; the mælaræ, from the mælenteria.

By means of all these vessels, the *Porta* receives the blood from most of the viscera of the abdomen; and, after the coalescence of its branches, enters the liver in a trunk; immediately under the surface whereof, having first formed a kind of sinus, it is divided into two principal branches, and those again into five, which scatter innumerable ramifications through the whole substance of the liver.

The true use of this vein, hitherto unknown, Dr. Keil thinks he has discovered: he says it is this: The bile, says he, being to be mixed with the chyle, as it comes out of the stomach into the duodenum, could no-where be so conveniently secreted from the blood, as where the liver is placed: but if all the branches of the cæliac artery carried all the blood to the liver, from which the gall was to be separated; it is evident, considering the nearness of the liver to the heart, and the intestine motion of the blood, that so viscid a secretion as the gall is, could never have been formed.

Nature therefore is forced to alter her constant method of sending the blood to all parts of the body by arteries: she here forms a vein, by which she sends the blood from the branches of the mælenteric and cæliac arteries to the liver.

By this means the blood is brought a great way about, ere it arrive at the liver; so that its celerity being diminished, all the corpuscles that are to form the gall, may have time to attract one another, and unite ere they come to their secretory vessel.

Keil's *anim. secret.* p. 36, &c.

PORTABLE, something easy of carriage.

Books in 12^{mo} are valued for their being *Portable*; easily put in the pocket. This machine is the better, as being *Portable*. Armies carry with them *Portable* bridges, *Portable* mills, boats, ovens, forges, &c.

PORTABLE barometer, is a barometer so contrived as that it may be carried from place to place without being disordered. See **BAROMETER**.

A *Portable barometer* was an extraordinary thing a little while ago: at present they are made *Portable* of all sorts; being so contrived, as that the mercury may be screwed quite up to the sealed end of the tube; by which means it is secured from swagging, and so endangering the breaking of the tube. A contrivance for which we are indebted to Mr. Patrick.

PORTAIL, in architecture, the face or frontispiece of a church, viewed on the side wherein is the great door.

Portail is also used for the great door itself of a palace, castle, &c.

PORTAL*, in architecture, a term used for a little square corner of a room, cut off from the rest of the room, by the waincot; frequent in the ancient buildings, but now disused.

* The word seems a diminutive of the French, *port*, door, gate; it being through this that they entered into the room.

PORTAL is sometimes also used for a little gate, *portella*; where there are two gates of a different bigness. See **GATE**.

PORTAL is sometimes also used for a kind of arch of joiner's work before a door.

PORTATE, in heraldry.—A *cross* **PORTATE** is a cross which does not stand upright, as crosses generally do; but lies athwart the escutcheon, in bend, as if it were carried on a man's shoulder. See **CROSS**.

Colombiere tells us, it is by some called *porté*, that is, carried; because, when our Saviour went to suffer death, he was obliged to carry his cross, which is always thus represented sloping, and inclined after this manner.

PORT-CRAION, a *pencil-case*, an instrument serving to inclose a pencil, and occasionally also used as a handle for holding it. See **PENCIL**.

It is usually four or five inches long, and contrived so as the pencil may be slid up and down it by means of a spring and button. Its outside is filed into eight sides or faces, whereon are drawn the sector-lines; its inside is round: sometimes it is made round or cylindrical both without-side and within, and has its length divided into inches and parts of inches.

PORTCULLICE, called also *herse* and *farrafin*, in fortification, an assemblage of several great pieces of wood laid or joined across one another, like an harrow; and each pointed at the bottom with iron. See **HERSE** and **SARRASIN**.

These formerly used to be hung over the gate-ways of fortified places, to be ready to let down in case of a surprize, when the enemy should come so quick, as not to allow time to shut the gates.

But now a-days, the organs are more generally used, as being found to answer the purpose better.

PORT-DIEU, among the French, is a parish-priest, whose business is to carry the viaticum, or sacrament, to sick people.

PORTER, in the circuit of justices, is an officer who carries a verge, or white rod, before the justice in eye; so called à *portanda virgam*.

PORTER, of the door of the parliament-house, is a necessary officer belonging to that high court; who enjoys the privileges accordingly. *Cram. jurisd.*

Groom PORTER. See the article **GROOM PORTER**.

PORT-FIRE, a paper-tube, about ten inches long, filled with a composition of meal-powder, sulphur and salt-petre, rammed moderately hard; used to fire guns and mortars instead of match.

PORT-GLAIVE, *sword bearer*, an order of knights in Poland, called by the Latins *enferi*.

It was confirmed by pope Innocent III. and by him sent into Livonia to defend the preachers of the gospel against the infidels at the first conversion of that country. Being too weak to effect that business, they united themselves with the Teutonic or Marian knights, by the pope's authority; and instead of knights of the sword, were called, *knights of the cross*.—They separated again under Univus, their great master, anno 1541. The Teutonic knights being then dispossessed of Prussia, and the *Port-glaves* going into Luther's opinions, soon dwindled away; for in the year 1557, they fell out with the bishop of Riga, of the house of Brandenburg, because he would not embrace their notions; and he, to secure his own estate, put Riga into the hands of the Polanders.

Afterwards, the knights having had most of Livonia taken from them by the Muscovites, put themselves under the protection of Sigismund Augustus, king of Poland, anno 1559, but William of Furtembourg, their great master, being betrayed by his own mercenaries into the hands of the Muscovites, Gothard Ketter his successor, following the example of Albert, the great master of Prussia, transacted with the aforesaid Sigismund for the whole estate, which he surrendered to his own use in the castle of Riga, together with his cross, the seal of the order, the charters and grants of the several popes and emperors, which concerned the same; as also the keys of the city and castle of Riga, the office of great-master, the rights of coinage, and all the powers and privileges appertaining to it; receiving back again from Radzivil, the king's commissioner, the dukedom of Courland to him and his heirs for ever.

PORT-GREVE*, or **PORTGRAVE**, was anciently the principal magistrate in ports and other maritime towns.

* The word is formed from the Saxon *port*, a port or other town; and *gereaf*, a governor.—It is sometimes also written *port-reve*.

Camden observes, that the chief magistrate of London was antiently called *Port greve*; instead of whom, Richard I. ordained two bailiffs; and soon afterwards king John granted them a mayor for their yearly magistrate. See **MAJOR**.

The charter of William the conqueror to the city of London runs thus: "William king, grete William bishop, and Godfrey "*Port greve*, and all the burghs within London, French and "*Englilh*. I grant you that I will that ye be all your law- "*worth* that ye were in Edward's day the king. And I will "*that* each child be his fader's eyer, and I will not suffer that "*any* man you any wrongs breed, and God you keepe."

PORT-HOLES, in a ship, are the embrasures, or holes in the sides of the vessel, through which the muzzles of the cannons are put.

Large ships have three rows of *Port-holes*, or batteries; each usually consisting of fifteen *Port-holes*.

In forms, they use to shut up the *Port-holes*, to prevent the water's driving through them.

In English, Dutch, and French ships, their valves or casements are fastened at top of the apertures; in Spanish vessels aside of them.

PORTICO, in architecture, a kind of gallery on the ground; or a piazza encompassed with arches supported by columns, where people walk under covert.

The roof is usually vaulted, sometimes flat. The ancients called it *lacunar*.

Though the word *Portico* be derived from *porta*, gate, door; yet it is applied to any disposition of columns which form a gallery, without any immediate relation to doors or gates.

The most celebrated *Portico's* of antiquity were those of Solomon's temple, which formed the atrium or court, and encompassed the sanctuary: that of Athens, built for the people to divert themselves in, and wherein the philosophers held their disputes and conversations; which occasioned the disciples of Zeno to be called *stoics*, from the Greek *στα*, *porticus*; and that of Pompey at Rome, raised merely for magnificence, consisting of several rows of columns supporting a plat-form of vast extent: a draught whereof, Serlio gives us in his antique buildings.

Among the modern *Portico's*, the most celebrated is the piazza of St. Peter of the Vatican.—That of Covent-Garden, London, the work of Inigo Jones, is also much admired.

PORTIO, **PORTION**, a part, or division of any thing. See **PART** and **DIVISION**.

PORTION, in the canon law, is that allowance, or proportion, which a vicar ordinarily has out of a rectory, or impropriation; be it certain or uncertain.

PORTIO dura, and **mollis**, in anatomy, a partition of the fifth pair of nerves of the brain; which, before its egress out of the dura mater, is apparently divided into two branches; the one pretty tough and firm, called *portio dura*; the other soft and lax, called *portio mollis*.

PORTIONER, PORTIONARIUS. Where a parsonage is served sometimes by two, sometimes by three ministers, alternately; as Bromyard, Burford, &c. in Shropshire; the vicars or incumbents are called *Portioners*, because they have but their portion or proportion of tithes, or profits of the living.

PORTLAND stone. See the article STONE.

PORT-LAST, in a ship, denotes the gun-wale. See *tab. ship. fig. 2. n. 19.*

When a yard is down on the dock, they say, *the yard is down a Port-last*.

PORTMANNIMOTE, in old records, the port-mens court, held in any city or town. See **PORT-MEN**.

PORT-MANTEAU, a piece of joiners work, fastened to the wall, in a wardrobe, armory, &c. proper for the hanging on of cloaks, hats, &c.

PORT-MANTEAU is also used for a cloak bag, of cloth, leather, or the like, wherein the cloak and other habiliments of travellers are disposed, and laid on the horse's crupper.

PORT-MANTEAU is also an officer under the king of France, whereof there are twelve: their business is to keep the king's hat, gloves, cane, sword, &c. to take them from him, and to bring them to him again when wanted.

The Dauphin has also his *Port-manteau*. Answerable to these are the cardinals, cardinals, or tail-bearers.

The Romish bishops have also their *port-croix*, *port-mitres*, &c. i. e. crozier-bearers, mitre-bearers, &c.

PORT-MEN, the twelve burgesses of Ipswich; thus called in the stat. 13 Eliz.

Camden adds, that the name was common to the inhabitants of all the cinque-ports. See **QUINQUE portus**.

PORTMOTE*, signifies a court kept in port or haven town; as *swani-mote* in the forest.—It is sometimes also called the *Portmote court*.

* The word is formed from the Saxon, *port*, port, and *gemot* conventus, meeting; q. d. *portgemot*.

Portmotes are also held in some inland towns, as at Knolst in Cheshire.

PORT-NAILS, in a ship, such as are used to fasten the hinges to the ports.

PORTRAIT, PORTRAIT, or POURTRAITURE, in painting, the representation of a person, and especially a face, done from the life.

In this sense, we say, *Portrait-painting*, in opposition to history-painting, where all resemblance of person is disregarded.

Portraits are usually painted in oil-colours, sometimes in water; sometimes in miniature, with crayons, pens, pastels, &c. It was said of a great painter, who never succeeded in the likeness, (Sir Peter Lely, if we mistake not) that he made a great many fine pictures, but all poor *Portraits*.

PORT-ROPES, in a ship, those which serve to haul up the ports of the ordnance.

PORT-ROYAL, a term that makes a considerable figure in the republic of learning.—Its origin is this:

Philip Augustus, wandering from his company in hunting near Chevreuse, westward of Paris, found a little chapel, where he put up, expecting that some of his attendants might meet him. This happening accordingly, he gave the place the name of the *king's port*, *Port du roi*, or *Port-royal*; and to give thanks for his deliverance, he resolved to erect a monastery there.

Odo, bishop of Paris, apprized of his intention, prevented him; and with the concurrence of Mathilda, wife of Matth. Montmorency, first lord of Marly, built a nunnery in 1204, filling it with Cistercians, who continued under the jurisdiction of the general of that order till the year 1627, when they were removed to a house given them in the Faubourg St. Jacques at Paris.

In 1647, they quitted the habit of Cistercians, and embraced the institution of the perpetual adoration of the sacrament. The same year the archbishop of Paris allowed them to remand some of their religious to their former abbey, and to re-establish the same.

Some time after, the formulary of Alexander VII. being appointed to be subscribed throughout the kingdom; the religious of *Port-royal* in the city signed it; those remitted to the former abbey scrupled it extremely, and at last only signed it with great restrictions.

Still persisting in the same sentiments, the king finding no way to reduce them but by dispersing them; that was executed in 1709, and the revenues given to the other monastery.

Upon this evacuation, several ecclesiastics, and others, who had the like sentiments with regard to the subscription as the religious, retired to *Port royal*, and had apartments there: and there published several books both on the subject of this dispute, and other topics—whence all that adhered to that party, took the name of *Port-royalists*, and their books, *books of Port-royal*.

Hence we say, the writers of *Port-royal*, Messieurs de *Port royal*, the translations of *Port-royal*, the Greek and Latin methods of *Port-royal*, which are grammars of that language.

PORT SALE, a public sale of goods to the highest bidder. *Port-sale*, in the stat. an. 35. Hen. 8. cap. 7. denotes the sale of fish presently upon its arrival in the port or haven.

PORT-SOKEN*, or **PORT-SOKA**, the suburb of a city; or a place within the liberties and jurisdiction thereof.

* The word is formed from the Saxon, *port*, city; and *soka*, jurisdiction.—*Concessi quod nullus de civitate, vel port soka sua capiat*, &c. Somn. Genslind.

PORTUGUESE coin. See the article COINS.

PORTUGUESE measure. See the article MEASURE.

QUINQUE PORTUS. See the article **QUINQUE Portus**.

PORT-VENT, in an organ, is a wooden pipe, well closed, which serves to convey the wind from the bellows to the foundation-board of the organ.

PORUS bilarius, bilary PORE, or *hepatic duct*, in anatomy, a duct, which, with the cystic, or choledoc duct, forms the common canal of the bile.

Fallopius was mistaken in imagining, that the *Perus bilarius* carried the bile into the gall-bladder. Its office is to convey it into the intestines by the *ductus communis*; for in blowing into it, that intestine is found to swell. See **BILARY**, and **DUCTUS communis**.

POSE, in heraldry, denotes a lion, horse, or other beast standing still, with all four feet on the ground; to denote thereby, that it is not in a moving posture.

POSITION, in physics, *sit, or situation*; an affection of place, which expresses the manner of any body's being therein. See **BODY** and **PLACE**.

POSITION, in architecture, denotes the situation of a building, with regard to the points of the horizon.

Vitruvius directs the *Position* of a building to be such, as that the four corners point directly to the four winds.

POSITION, in astronomy. The *Position* of the sphere is either right, parallel, or oblique; whence arises the inequality of our days, difference of seasons, &c.

Circles of POSITION, are six great circles passing through the intersection of the meridian and horizon, and dividing the equator into twelve equal parts.

The spaces included between these circles, are what the astrologers call the *twelve houses*; and which they refer to the twelve triangles marked in their themes.

These circles are represented on the globe by the semicircle of *Position*.

POSITION, in dancing, the manner of disposing the feet, with regard to each other.

There are four regular *Positions*: the first is when the feet are joined in a line parallel to the shoulders: the second, when the heels are perpendicularly under the shoulders; and of consequence, the width of the shoulders apart: the third, when one foot is before the other, in such manner, as that the heel is in the cavity form'd by the rotula and carpus of the foot: the fourth, when one foot is the width of the shoulders apart from the other, the heel still answering to the cavity above-mentioned, which is the only regular manner of walking.

POSITION, in arithmetic, a rule, so called, for *supposition*.—The rule of *falsæ Position*, or of *falsehood*, consists in calculating on several false numbers, taken at random, as if they were the true ones; and from the differences found therein, determining the number sought.

Position is either *single* or *double*.

Single POSITION is, when there happens in the proposition some partition of numbers into parts proportional; in which case, the question may be resolved at one operation by this rule: Imagine a number at pleasure, and work therewith according to the tenour of the question, as if it were the true number: and what proportion there is between the false conclusion and the false *Position*, such proportion the given number has to the number sought.

Therefore the number found by argumentation shall be the first term of the rule of three; the number supposed, the second term; and the given number, the third.

Double POSITION is, when there can be no partition in the numbers to make a proportion.

In this case, therefore, you must make a supposition twice; proceeding therein according to the tenour of the question.

If neither of the supposed numbers solve the proposition, observe the errors, and whether they be greater or lesser than the resolution requires; and mark the errors accordingly, with the signs + and —.

Multiply, contrariwise, the one *Position* by the other error; and if the errors be both too great, or both too little, subtract the one product from the other, and divide the difference of the products by the difference of the errors.

If the errors be unlike, as the one +, and the other —, add the products, and divide the sum thereof by the sum of the errors added together. For the proportion of the errors is the same with the proportion of the excesses or defects of the numbers supposed, to the numbers sought.

POSITION, in geometry, is a term sometimes used in contradistinction to *magnitude*.—Thus, a line is said to be given in *Position, positione data*, when its situation, bearing, or direction, with regard to some other line, is given: on the contrary, a line is given in *magnitude*, when its length is given, but not its situation.

Sir Isaac Newton shews how to find a point, from which three lines, perpendicularly let fall to three other lines given in *Position*, have any given ratio, &c.

POSITION is also used for a thesis or proposition maintained in the schools. See **THESIS**.

Traiterous POSITION. See the article **TRAITEROUS**.

POSITIVE, a term of relation sometimes opposed to *negative*.

Thus, we say, the commandments are some of them *Positive*, others *negative*.

POSITIVE quantity, in algebra, a real or affirmative quantity; or a quantity greater than nothing;—thus called, in opposition to a privative or negative quantity, which is less than nothing. See **QUANTITY**.

Positive quantities are design'd by the character + prefixed to them, or supposed to be prefixed.

POSITIVE is also used in opposition to *relative*, or *arbitrary*.

Thus we say, beauty is no *positive* thing, but depends on the different tastes of the people. See **RELATIVE**.

POSITIVE is also used in opposition to *natural*. See **NATURAL**. Thus we say, a thing is of *Positive* right, meaning, it is founded on a law which depends absolutely on the authority of him who made it.

The prohibition of eating certain beasts, under the old law, was of *Positive* right; the command to honour father and mother, of *natural* right.

POSITIVE degree, in grammar, is the adjective in its simple signification; without any comparison. See **DEGREE**.

Or, *Positive degree* is that termination of an adjective, which expresses its subject simply and absolutely, without comparing it with any other.

Thus, good, *bonus*, fair, *pulcher*, &c. are in the *Positive degree*; better, *fairer*, &c. in the comparative.

POSITIVE theology, is that which consists in the simple understanding or exposition of the dogma's and articles of faith, as contained in the holy scriptures, or explained by the fathers and councils, clear of all disputes and controversies.

In this sense, *Positive* theology stands opposed to *scholastic* and *polemical* theology. See **SCHOLASTIC** and **POLEMICAL**.

POSITIVE, in music, denotes the little organ usually behind, or at the foot of the organist, played with the same wind, and the same bellows, and consisting of the same number of pipes with the large one, though those much smaller, and in a certain proportion. See **ORGAN**.

In the organs of the Jesuits, the *Positive* is in the grand body.

POSITIVE levity. See the article **LEVITY**.

POSITIVE cold. See the article **COLD**.

POSITIVE modest. See the article **MODE**.

POSSE COMITATUS, **POWER of the county**, a phrase in law, signifying the aid and attendance of all knights, gentlemen, yeomen, labourers, servants, apprentices, villains, and other persons, above the age of fifteen years, within the county; because all above that age are bound to have harness by the statute of Winchester: only women, ecclesiastical persons, and such as are decrepit and infirm, are excused.

It is used where a riot is committed, a possession kept upon a forcible entry, or any force of rescue used, contrary to the command of the king's writ, or in opposition to the execution of justice. *Stat. 2. Hen. 5.*

POSSESSION, **POSSESSIO**, in law, *quasi pedis positio*; an action whereby we hold or occupy any thing, either *de jure*, or *de facto*.

POSSESSION de facto, is when there is an actual and effectual enjoyment of the thing.

POSSESSION de jure, or in law, is the title a man has to enjoy a thing, though it be sometimes usurped, and in the actual *Possession* of another.

Unity of POSSESSION makes what the civilians call *consolidation*. *E. gr.* If a lord purchase a tenancy, held of himself by herriot service; the service becomes extinct by *unity of Possession*, i. e. by the feignory and tenancy's coming into the same hand.

Long Possession beyond the memory of man begets a right.

By the French laws, a *Possession* of three years, in matters personal, begets a right; and in real estates, a *Possession* of ten years, among persons living near the premises, and twenty years among those that live elsewhere.

Annual Possession is the *usucapio*, which gives a right to moveables: a triennial and peaceable *Possession* of a benefice, is sufficient to maintain it; provided it be founded on a plausible title.

A *Possession* of an estate for ten years by a person present, and of twenty years by one absent, with a title; or of thirty years without any, gives a full right.

Centenary Possession constitutes *Possession* immemorial; which is the best and most indisputable of all titles.

POSSESSION is sometimes also used for the act of taking *Possession*, which is performed with certain formalities, whereby a person is justified to be in the enjoyment of any thing.

Anciently, upon buying an estate, *Possession* was taken with a deal of ceremony: in some places, by a stick, a branch, or a straw, put into the hands of the buyer by the seller.

POSSESSION of a benefice, in some customs, is taken by entering the church, kneeling down, kissing the altar, and ringing the bell. See **INDUCTION**.

In some cases, *Possession* is taken by the sight of the steeple.

The emperors anciently put prelates in *Possession*, by giving them a ring and a staff.

POSSESSION is also used for the state of a person *possessed* by the devil.

Possession differs from *obsession*, in that in the former the devil acts inwardly; and in the latter outwardly. See **DEMONIACK**.

POSSESSIVE, in grammar, is applied to pronouns, which denote the enjoyment or possession of any thing, either in particular, or in common.

Thus, *mine*, *thine*, *his*, *ours*, &c. are pronouns *Possessive*.

POSSIBILITAS, **POSSIBILITY**, in our old law-books, is sometimes used for a thing done wilfully or wittingly.

In which sense it stands opposed to *impossibilitas*, a thing done against the will. *Si autem oculos affuisset, reddat veram ejus, & impossibilitatis accusetur in eo facto.* Leg. Alfred. Again, —*Si quis agat impossibiliter, non est omnino simile ac si voluntarie faciat.* Leg. Canut. c. 6.

POSSIBILITY, **POSSIBILITAS**, denotes a non-repugnance to existing in a thing that does not any way exist. See **POSSIBLE**.

This non-repugnance to existing is no other than the producibility of any thing; which consists in this, that there are sufficient causes actually existing, or at least possible, whereby the thing may be produced, or be brought to exist; principally as there is a God, or an almighty cause. See **EXISTENCE**.

So that *Possibility* does not imply any thing in the thing possible, but it is a mere extrinsic denomination taken from the power of the cause, and principally of God.

In effect, if a creatable thing had any intrinsic *Possibility*, it would follow, that such a thing must exist even without the cause.

And yet we may allow an intrinsic *Possibility* of a thing, if by *Possibility* we do not understand its producibility, or its non-repugnance to exist; but only the non-repugnance of the attributes contained in its idea. But such *Possibility* is merely logical.

POSSIBLE, **POSSIBLE**, is sometimes opposed to real existence, and understood, in the schools, of a thing, which, though it does not actually exist, yet may exist;—as, a new star, another world, &c. which are particularly said to be *physically Possible*.

It is also opposed to *impossible*. In which sense it is applicable to any thing that does not contradict itself, or involve contradictory predicates; whether it actually exist or not: as a man, fire, &c.—These are also said to be *logically Possible*.

It is a great point of controversy among the school philosophers, whether and how far things may be said to have entity, while only in a state of *Possibility*?

Possibles are ordinarily conceived to be three-fold; *future*, *potential*, and *merely Possible*.

Future POSSIBLE, is that whose production is decreed and ascertained;—*v. gr.* the futuration of all those events fixed by the immutable decree, or the immutable will, of the Almighty.

Potential POSSIBLE, is that which is contained or lies hid in its causes;—as, the tree in the seed, the fruit in the tree, &c.

Mere POSSIBLE, is that which might exist, though it never shall.

Others distinguish *Possibles* into *metaphysical*, *physical* and *ethical*.

Metaphysical POSSIBLE, is that which may at least be brought to being by some supernatural and divine power;—as, the resurrection of the dead.

In which sense the word is opposed to an *impossible* even to God himself; as, a crooked straightness, a square circle, an infinitely perfect creature, a mortal God.

Physical POSSIBLE, is that which may be effected by a natural power;—as, to overturn the Turkish empire.

In opposition to such things as cannot be produced by any finite power; as, to restore the dead, &c.

Ethical POSSIBLE, is that which may be done by prudent persons, using all the proper means they have for the same.—Again, it is used for any thing done according to right reason, and consistently with the laws.

In the first sense, it is *Possible* for the Venetians to beat the Turks at sea: In the second, *whatever* is right and just, is *Possible*.

POSSIBILITY of issue extinct. See **TAIL**.

POST, in the military art, is any spot of ground capable of lodging soldiers.

The word is formed from the Latin, *positus*, placed; some derive it from *potestas*, power.

A *Post* denotes any ground or place, fortified or not, where a body of men may make a stand, and fortify themselves, or remain in a condition to fight an enemy.

Hence they say, the *Post* was relieved, the *Post* was quitted, the *Post* was taken sword in hand, &c.

A spot of ground seized by a party to secure the front of an army, and to cover the *Posts* that are behind, is called an *advance Post*.

The advance guard, or the right of the two lines of an army, &c. is called the *Post of honour*, and is always given to the eldest regiments.

Posts, in building, large pieces of timber, placed upright in houses, &c.

The corner *Posts* are called the *principal Posts*;—the *Posts* framed into breffummers between principal *Posts* for strengthening the carcase of the house, are called the *brick Post*.

An excellent method to preserve *Posts* from rotting, is, to burn the ends that are to be set in the ground, the outside to a very coal.

Crown Post. See the article **CROWN Post**.

Post *, also denotes the dispatch a courier or letter-carrier makes by changing horses from time to time.

* The name is borrowed hence, that the horses are *posti*, placed, polted, or dipoled from distance to distance.

The word is also applied to the person himself; the houses where he takes up, and lays down his charge; and the stages, or distances between house and house.—Hence the phrases, *Post-boy*, *Post-horse*, *Post-house*, &c.

We find mention made of *Post-horses* in the Theodosian Code, *de cursu publico*; but these were very different from the present establishment, and were only publick horses first appointed by Trajan; till whose time, the messengers seized any horses that came in their way.

Lewis Hornigk has an express treatise on *Posts*, whereof he makes four kinds, viz. on *horseback*, in *chariots*, in *boats*, and on *foot*: which last kind is in use in Italy, Turkey, and Peru.

Herodotus ascribes the origin of *Posts* to Cyrus, or Xerxes; but the *Posts* instituted by those princes were no more than couriers.

In effect, *Posts* on the present footing are but a modern invention; though some go back as high as Charlemaign.—It is certain it was the policy, or rather the diffidence, of Louis XI. of France that they owed their rise to; that unclesy prince first settling them by an ordinance of the 19th of June 1464. to be the sooner, and the more surely, advertised of what passed in his own kingdom, and in the neighbouring states.

From France, the institution propagated itself, by degrees, through the several other parts of Europe. In Germany, Hornigk observes, *Posts* were first settled by the count de Taxis at his own expence; in acknowledgment whereof, the emperor Matthias in 1616, gave him, in fief, the charge of *Post-master* under him and his successors.

In England, *Post* were first established by act of parliament 12 Car. 2. which enabled the king to settle a *Post-office*, and appoint a governor.

The English *Post-office* is now managed by two commissioners, who have under them about forty other officers of their own appointing. These are all sworn, and give security for their faithful discharge, &c. as the *receiver*, *comptroller*, *accountant*, *fix clerks* of the several roads, a *window man*, and sixteen *sorters*, for the inland office. For the foreign office are, a *comptroller*, an *alphabet-keeper*, *fix clerks*, and a foreign officer; besides solicitors and clerks, and sixty-seven letter-carriers.

From this office letters and packets us'd to be only dispatched every Monday, to France, Spain, Italy, Germany, Sweden, Kent, and the Downs; every Tuesday to all parts of England, Scotland, and Ireland; also to Holland, Germany, Sweden, &c. every Wednesday to Kent only, and the Downs; every Thursday to all parts of England and Scotland, as also to France, Spain, and Italy; every Friday to Flanders and Holland, Germany, Sweden, Kent, and the Downs; and every Saturday to all parts of England, Scotland, and Ireland, but the *Posts* are now made more frequent.

Again, letters are returned to London from all parts of England and Scotland, Wales only excepted, every Monday, Wednesday, and Friday: from Wales every Monday and Friday; and from Kent and the Downs every Day.

On this grand office depend 182 *Post-masters* in England and Scotland, who keep regular offices in their several stages, and *sub-post-masters* in their branches.

Though the number of letters in England was anciently very inconsiderable; yet it is now so increased, that this office, before the addition of the *penny-post*, was farmed at 50000 *l.* per annum.

The charge of a letter of a sheet of paper 80 miles, is 3 *d.* of two sheets, 6 *d.* for above 80 miles, a sheet 4 *d.* two 8 *d.* An ounce of letters for 80 miles, 1 *s.* for above, 1 *r.* 6 *d.*

Note. The *Post* travels at the rate of 120 miles in 24 hours. For those who chuse to travel with the *Post*, horses are ready, at the rate of 3 *d.* per mile, and 4 *d.* to the boy every stage.

The Great Mogul performs part of his *postage* by pigeons, kept in several places, for the conveyance of letters on extraordinary occasions. They will carry them from one end of that vast empire to another. The same vehicles have been used by the Dutch in fiefs. And at this day, Tavernier observes, the consul of Alexandria sends news daily to Aleppo, in five hours time, by means of pigeons; though those two places are three days journey on horseback apart.

Penny Post, a *Post* established for the benefit of London, and the parts adjacent; whereby any letter or parcel, not exceeding sixteen ounces weight, or ten pounds value, is speedily and safely conveyed to and from all parts within the bills of mortality, to most towns and villages within ten miles of London, for one penny each packet, letter, &c.

This office is managed by a comptroller; under whom are an accountant, collector, fix sorters, seven sub-sorters, and above an hundred messengers.

Posts, in sculpture, &c. denote ornaments formed after the manner of rolls, or wreathings; thus called, because they seem to run after one another.

Some are simple; others enriched, or flourished.

Post, after, is also a Latin preposition, used in composition with several English words, and generally implying a relation of *Posteriority*.

POST-BOOK. See the article **BOOK**.

POST-COMMUNION, a prayer which the priest recites after the communion. See **COMMUNION**.

POST-DATE. See the article **DATE**.

POST DIEM, a fee, by way of penalty, on a sheriff, for his neglect in returning a writ after the day assigned.

For this the *custos brevium* has four-pence; whereas he has nothing, if it be returned at the day.

POST-DISEIZIN, a writ given by the statute of Westminster, for him who having recovered lands or tenements, by precept quod reddat, upon default or reddition, is again disseized by the former disseizor.

POSTEA, in law, a return or certificate of the proceedings by nisi prius into the court of common pleas, after a verdict; and there afterwards recorded.

POSTERIOR, a term of relation, implying something behind, or that comes after another.—In which sense it is used in opposition to *prior* and *anterior*.

The back and hips are the *posterior* parts of man. Aristotle has given *prior* and *posterior* analytics. A date is said to be *posterior* to another, when it is later or fresher. See **DATE**.

Ramus POSTERIOR. See the article **RAMUS**.

POSTERIORITY, in law, a term of comparison, and relation in tenure, opposite to *priority*.

A man holding lands or tenements of two lords, holds of his ancestor lord by *priority*, and of his later lord by *posteriority*.

POSTERN, in fortification, a small gate, usually made in the angle of the flank of a bastion, or in that of the curtain, or near the orillon, descending into the ditch; whereby the garison can march in and out, unperceived by the enemy, either to relieve the works, or to make private sallies, &c.

The word is also used in the general for any private, or back-door.—*Potestas habere posternam in omni curia penitus inhibetur, sed unicus sit ingressus*, &c. Fleta.

POST-FINE, a duty belonging to the king for a fine formerly acknowledged before him, in his court; paid by the cognizee after the fine is fully passed, and all things touching the same are accomplished.

The rate is so much, and half so much, as was paid to the king for the *pre-fine*; and is collected by the sheriff of the county where the land lies, and to be answered by him into the exchequer.

POSTHUMUS *, or **POSTHUMOUS**, a child born after the death of his father, or taken out of the body of a dead mother.

* The word is composed of the Latin, *post*, and *humus*, ground.

Among the Romans, *Posthumus* was also used for a child born after the making of a testament, which occasioned the testator to alter it.

POSTHUMOUS is also applied figuratively to the works of an author that were not published till after his death, or interment.

POSTICUS *peroneus*, *serratus* **POSTICUS**, *tibialis* **POSTICUS**. See the articles **PERONEUS**, **SERRATUS**, **TIBIALIS**.

POSTIL, **POSTILLA**, a name anciently given to a note, or remark, written in the margin of the bible; afterwards also to a note written in any other book posterior to the text.

Trivet in his chronicle, speaking of St. Langton, archbishop of Canterbury, says, *Super bibliam postillas fecit, & cam per capitula, quibus nunc utuntur moderni, distinxit*: That Alexander, bishop of Chelster, *super psalterium postillas scripsit*.—Knighton, another of our historians, speaking of one Hugo, a Dominican and cardinal, says, *Totam bibliam postillavit*.

POSTING, among merchants, the putting an account forward from one book to another; particularly, from the journal or waste-book into the ledger.

POSTIQUE *, in architecture, &c. an ornament of sculpture is said to be *postique*, when it is superadded after the work itself is done.

* The word is formed from the Italian, *posticcia*, added.

A table of marble, or other matter, is also said to be *postique*, when it is incrustated in a decoration of architecture, &c.

POSTLIMINIUM, **POSTLIMINY**, among the Romans, the return of one who had gone to sojourn elsewhere, or had been banished, or been taken by the enemy, to his own country and state.

It was thus called, according to Aul. Gellius, from *post*, after, and *limen*, threshold, *q. d.* a return to the same bounds, or threshold:—though others, after Amm. Marcellinus, will have it so denominated, because persons were restored into the house through a hole in the wall, *post limen*, not by going over the threshold, which was esteemed ominous.

POSTLIMINIUM was also a law, or action, whereby one recovered an inheritance, or other matter, that had been lost, from a stranger or enemy.

POST NATI, in our statutes, is particularly used for such persons as were born in Scotland, after the accession of king James I. to the crown of England.

7 Jac. r. it was by all the judges solemnly adjudged, that such persons were no aliens in England; as, on the contrary, the *ante nati*, or those born in Scotland before that accession, were aliens here in respect to the time of their birth.

POST-NATUS is also used by Braddon, Fleta, Glanville, &c. for the second son, as distinguished from the eldest.
Thus in Brompton, lib. 2. *Ej. consuetudo in quibusdam partibus, quod post-natus prefertur primogenito.*

POSTPONING, the putting any thing after, or behind another, with regard either to the order of time or place.
Sometimes it is taken in an ill part; as when we say, the book-binder has *postponed* a flicet, &c. of a book.

POSTSCENIUM, in the ancient theatre. See **PARASCENIUM**.

POSTSCRIPT, an after-thought, or article added to a letter or memoir; containing something learnt or recollected after the subscription or conclusion of the piece.

It is usually marked thus, P. S. The *Spektator* observes, that a woman's mind is ever better learnt from her P. S. than her letter.

POST-PREDICAMENTS, in logic, are certain general affections, or properties arising from a comparison of predicaments with each other; or modes following the predicaments, and often belonging to many.

Such, according to Aristotle, are *oppositum*, *prius*, *simul*, *motus*, and *habere*; the three first of which are in all *predicaments*.

POST-TERM, or **P. ST-TERMINUM**, a fee, or penalty, taken by the custos brevium of the court of common pleas, for the return of a writ, not only after the day, but after the term or time in which such writs are returnable.—For which the custos brevium has twenty pence.

POSTULATE, **POSTULATUM**, in mathematics, a clear, evident proposition; wherein it is affirmed, or denied, that something may, or may not be done. See **PROPOSITION**.

A thing immediately deduced from the consideration of one single definition, if it expresses something to agree or disagree to another, is called an *axiom*.—If it affirm, that something may or may not be done, it is called a *Postulate*.

Thus, *e. gr.* from the genesis of a circle, it is evident, that all right lines drawn from the centre to the circumference, are equal; since they only represent one and the same line, in a different situation: this proposition, therefore, is esteemed an axiom. See **AXIOM**.

But, since it is evident from the same definition, that a circle may be described with any interval, and from any point; this is accounted a *Postulate*.

Axioms and *Postulates*, therefore, seem to have nearly the same relation to each other that theorems and problems have.

POSTULATION, **POSTULATIO**, in the canon law, the nomination of a person to a dignity in the church, to which, by the canons, he cannot be elected; as, for want of age, of birth, because already possessed of a benefice incompatible therewith, or for the like impediment.

Thus the formal election of such a person being faulty, they are obliged to proceed by way of *Postulation*; that is, the chapter bestows the person to whom the confirmation of the election belongs, to approve of it, though it be not canonical. See **ELECTION**.

The person to whom the supplication is made by the protestants in Germany, is the emperor; by the papists, the pope.

Wicquefort observes, that when a part of the chapter elects, and another *postulates*, the number of *Postulants* must be twice as great as that of the electors, to bring the matter to a *Postulation*.

POSTURE, in painting and sculpture, the situation of a figure with regard to the eye, and of the several principal members thereof with regard to one another, whereby its action is expressed.

A good part of the painter's art consists in adjusting the *Postures*: in giving the most agreeable *Postures* to his figures; in accommodating them to the characters of the respective figures, and the part each has in the action, and in conducting and pursuing them throughout.

Postures are either *natural*, or *artificial*.

Natural POSTURES are such as nature seems to have had a view to in the mechanism of the body; or rather, such as the ordinary actions and occasions of life lead us to exhibit while young, and the joints, muscles, ligaments, &c. flexible.

Artificial POSTURES are those which some extraordinary views or occasions lead us to exhibit.—Such, *e. gr.* are those of our *balance* and *posture-masters*.

A painter would be strangely puzzled with the figure of Clark, (the late famous *posture-master* of Pall mall) in a history-piece. This man, we are told in the *Philos. Trans.* had such an absolute command of his muscles, &c. that he could disjoint almost his whole body; so that he imposed on that great surgeon, Mullens, who looked on him to be in such a miserable condition, he would not undertake his cure. Though a well-made man, he would appear with all the deformities imaginable; hunch-backed, pot bellied, sharp-breasted, &c. He disjointed his arms, shoulders, legs, and thighs; and rendered himself such an object of pity, that he has frequently extorted money, in

quality of a cripple, from the same company he had the minute before been in, in quality of a companion. He would make his hips stand a considerable way out from his loins; and so high as to invade the place of his back. Yet his face was the most changeable part about him, and shewed more *Postures* than all the rest. Of himself he could exhibit all the uncouth odd faces of a Quaker's meeting.

Hotch POT. See the article **HOTCH pot**.

White POT. See the article **WHITE**.

POTABLE, **POTABILIS**, somewhat that may be taken, or swallowed, by way of drink.

The chymists talk much of *Potable gold*, *aurum potabile*. See **AURUM** and **GOLD**.

POT-ASHES, are properly the lixivious ashes of certain vegetables, used in the making of glass and soap.

Such are the ashes of the herb kali, called also *salt-wort*, *glass-weed*, &c. from its great use in glass-making.

Pot-ashes are also called *cineres clovellati*, and make the basis of salt of tartar, and most of the lixivial salts, as our chymists of late manage them for cheapness.

The English and Dutch make a considerable commerce of *Pot-ashes*, which they bring from about the Black sea; using great quantities thereof in the preparation of their cloths, &c. those ashes being found excellent to scour withal.

POT-ASHES is also a denomination popularly applied to all kinds of wood-ashes bought up and down the country, and mixed together, for the making of green glass.—The best of English *Pot-ashes* are those made of the smaller common high-way thistle; though all thistles in general are good. Fern also makes excellent *Pot-ashes*.

POTENT, or **POTENCE**, in heraldry, a term for a kind of a cross, whose ends all terminate like the head of a crutch.

This is otherwise called the *Jerusalem cross*; and is represented in *tab. herald. fig. 47*.

He beareth fable, a cross *Potent*, or, by the name of *Allyn*.

POTENTIA, **POWER**, that whereby a thing is capable either of acting, or being acted upon. See **POWER**.

Hence it is of two kinds, *active* and *passive*.

POTENTIA activa, or *active POWER*, called also by a barbarous, but significant school-term, *operativus*, is the efficacy or faculty of any being, in virtue whereof something arises, or is produced by it.—Such is the power of speaking in man.

POTENTIA passiva, vel *receptiva*, *passiva*, or *receptive POWER*, is a capacity of receiving some act; *e. gr.* of knowing a man.

This is also called *subjeiva* *Potentia*, subjective power.

To *exist* in **POTENTIA**, is used among school-writers, to denote that existence which a thing has in a cause capable of producing it, but which has not as yet actually produced it.—In which it stands opposed to existence *actu*.

POTENTIAL, **POTENTIALIS**, in the schools, is used to denote and distinguish a kind of qualities, which are supposed to exist in the body in *potentia* only; by which they capable, in some manner, of affecting and impressing on us the ideas of such qualities, though not actually inherent in themselves.

In this sense we say, *Potential heat*, *Potential cold*, &c. Brandy and pepper, though cold to the touch, are *potentially* hot.

POTENTIAL cold is a relative term, by which we mean, that such a thing is not actually cold to the touch, but in its effects and operations, it taken inwardly.

This quality is supposed to arise from the size, shape, &c. of the component particles of a body, which give some check or retardation to the blood's motion, whereby it is less agitated, and upon which the sensible parts of the body are not so briskly struck by it; the perception of which diminution or change of motion in the organs of feeling, is called *cold*.

Hence every thing that lessens the blood's motion, with relation to the sensation before made, is cold;—and every thing which increases it, may be called *potentially* hot.

POTENTIAL, in medicine, &c.—Cauteries are either actual, viz. a button of red-hot iron; or *Potential*, as lime, and other caustic drugs.

POTENTIAL calcination. See the article **CALCINATION**.

POTENTIAL fire. See the article **FIRE**.

POTENTIAL is also used by schoolmen, for something that has the quality of a genus.

A *Potential* whole is that which has its parts under it, as a genus has its species; to distinguish it from an *actual* whole, which has its parts in itself; as a body composed of matter and form.

Grotius, with a view hereto, uses the phrase, *Potential parts of a state*, in opposition to the *subjective parts*. See **PART**.

By *Potential*, he means those parts possessed of the sovereign power; by *subjective*, those subject thereto; which are that, with regard to the sovereign power, that several species are with regard to the genus whereof they are the subjective parts.

Grotius maintains, that though the sovereign power be one and indivisible, yet it may have several *Potential* parts: for, as in the Roman empire there have been two *Potential* heads, the one ruling in the east, the other in the west; yet the imperial authority, all the while, single and indivisible: so is it possible, the subjective parts combining to give away their sovereignty, may not give it intire, but reserve a part of it for certain emergencies.

gencies. In which case the subjective part becomes *Potential*: and thus there are two *Potential* parts, and yet the sovereignty single.

POTENTIAL, in grammar, gives the denomination to one of the moods of verbs.

The *Potential* mood is the same in form with the subjunctive; but differs from it in this, that it hath always implied in it, either *possūm, volo, or debeo*: as *roget*, that is, *regare potest*, the man may ask.

It is sometimes called the *permissive* mood, because it often implies a permission or concession to do a thing: as, *Habcat, valeat, vivat, cum illa*. Terent.

POTERII antihelium. See the article **ANTIHECTICUM**.

POTION, POTIO, a liquid medicine, in the quantity of a draught, or so much as is to be taken at one time.

A *Potion* only differs from a *julep*, or a *mixture*, in the quantity; as being confined to one dose.

There are purging *Potions*, emetic *Potions*, diaphoretic, pectoral, cephalic, cardiac, stomachic, hysseric, vulnerary, carminative, &c. *Potions*.

POTTERY, the art of making earthen pots and vessels; or, the manufacture of earthen ware.

The wheel and lathe are the chief, almost the only instruments used in *Pottery*; the first for large works, the second for small: though, in reality, they are much the same as to the manner of using them.

The potter's wheel consists principally in its nut, which is a beam or axis, whose foot or pivot plays perpendicularly on a free-stone sole or bottom. From the four corners a-top of this beam, which does not exceed two feet in height, arise four iron bars, called the *spokes* of the wheel; which forming diagonal lines with the beam, defend, and are fastened at bottom to the edges of a strong wooden circle, four feet in diameter, perfectly like the felloes of a coach-wheel; except that it has neither axis nor radii; and is only joined to the beam, which serves it as an axis, by the iron bars. The top of the nut is flat, of a circular figure, and a foot in diameter. On this is laid a piece of the clay or earth, to be turned and fashioned.

The wheel thus disposed, is encompassed with four sides of four different pieces of wood, sustained on a wooden frame: the hind-piece, which is that whereon the workman sits, is made a little inclining towards the wheel: on the fore-piece are placed the pieces of prepared earth: lastly, the side-pieces serve the workman to rest his feet against; and are made inclining to give him more or less room, according to the size of the vessel to be turned. By his side is a trough of water, wherewith from time to time he wets his hands, to prevent the earth's sticking to them.

To use the wheel.—The potter having prepared his clay or earth, and laid a piece of it suitable to the work he intends, on the top of the beam, sits down; his thighs and legs much expanded, and his feet rested on the side-pieces, as is most convenient.

In this situation he turns the wheel round, till it has got the proper velocity; when, wetting his hands in the water, he bores the cavity of the vessel, continuing to widen it from the middle; and thus turns it into form, turning the wheel atreth, and wetting his hands from time to time.

When the vessel is too thick, they use a flat piece of iron with a hole in the middle, and somewhat sharp on one edge, to pare off what is redundant. Lastly, when the vessel is finished, they take it off from the circular head by a wire passed underneath the vessel.

The potter's lathe is also a kind of wheel, but much simpler and lighter than the former. Its three chief members are an iron beam or axis, three feet and an half high, and two inches in diameter; a little wooden wheel all of a piece, an inch thick, and seven or eight in diameter, placed horizontally a-top of the beam, and serving to form the vessel on; and another larger wooden wheel, all of a piece, three inches thick, and two or three feet broad, fastened to the same beam at bottom, parallel to the horizon. The beam or axis turns by a pivot at bottom, in an iron stand.

The workman gives the motion to the lathe with his feet, by pushing the great wheel alternately with each foot; still giving it a greater or lesser degree of motion, as his work requires. They work with the lathe, with the same instruments, and after the same manner, as with the wheel.

But neither the one nor the other serve for any more than forming the body of the vessel, &c. The feet, handles, and ornaments, if there be any, beside the mouldings, being to be made and set on by hand; if there be any sculpture in the work, it is usually done in earthen or wooden moulds, prepared by a sculptor, unless the potter have skill enough to do it himself, which is very rare.

As to the glazing, or varnishing of the work, it is usually done with sand, litharge or lead-ashes, wood-ashes and salt, melted into a cake.

For the Chinese POTTERY, see the article **PORCELAIN**.

POTTLE, an English measure, containing two quarts. See **MEASURE**.

Two of these *Pottles*, in the liquids, make a gallon; but in dry measure three go to a gallon.

POUDER. See the article **POWDER**.

Pie POWDER court. See the article **PIE powder court**.

POULTICE, or **POULTIS**, a form of medicine, called also *cataplasma*. See **CATAPLASM**.

POULTRY. See the article **FOWL**.

POUNCE*, among artificers, a little heap of charcoal-duff, inclosed in some open stuff, to be pushed over holes pricked in a work, in order to mark the lines or designs thereof on a paper placed underneath; which are to be afterwards finished with a pencil, a needle, or the like.

* The word is formed from the French, *pence*, pumice-stone; in regard they anciently used pumice-stone powdered for this purpose.

Pounce is much used by embroiderers, to transfer their patterns upon their stuffs; by lace-makers, and sometimes also by engravers, and a kind made of gum sandarack by writing-masters.

POUNCES, in falconry, the talons or claws of a bird of prey.

POUND*, **LIBRA**, a weight of a certain proportion, much used as a standard for determining the gravities and quantities of bodies.

* The word is deriv'd from the Saxon, *pund*, or *pond*, *pondus*, weight.

We have two different *Pounds* in England; the *Pound troy*, and the *Pound avoirdupois*.

The *Pound troy* consists of 12 ounces, each ounce of 20 penny-weights, and each penny-weight of 24 grains; so that 480 grains make an ounce, and 5760 grains a *Pound*.

This *Pound* is used in the weighing of silver, gold, precious stones, all kinds of grains, &c.

It is also used by the apothecaries, though differently divided: among them 24 grains make a scruple, 3 scruples a drachm, 8 drachms an ounce, and 12 ounces a *Pound*.

The *Pound avoirdupois* consists of 16 ounces; but then the avoirdupois ounce is less by 42 grains than the troy ounce, which amounts to nearly a 12th part of the whole, so that the ounce avoirdupois only contains 438 grains, and the troy ounce 480.

The difference whereof is nearly as that of 73 to 80, i. e. 73 ounces troy make 80 ounces avoirdupois. 112 avoirdupois *Pounds* make the hundred weight, or quintal.

By this *Pound* are weighed all large and coarse commodities, flesh, butter, cheese, iron, hemp, lead, steel, &c.

An avoirdupois *Pound* is equal to 14 ounces $\frac{1}{2}$ of a Paris *Pound*; so that 100 of the former *Pounds* make 91 of the latter.

The French *Pound* contains 16 ounces; but one French *Pound* is equal to one *Pound* one ounce $\frac{1}{2}$ of an avoirdupois *Pound*; so that 100 Paris *Pounds* make 109 English avoirdupois *Pounds*.

The Paris *Pound* is divided in two manners; the first division is into two marcs, the marc into eight ounces, the ounce into eight gros, the gros into three deniers, the denier into twenty-four grains, each weighing a grain of wheat.

The second division of the *Pound* is into two half-*Pounds*; the half-*Pound* into quarters; the quarter into two demi-*quarters*; the demi-*quarter* into two ounces; the ounce into two half-ounces, &c.

The first division is usually followed in weighing gold, silver, and other precious wares; and the latter in those of less value.

At Lyons the *Pound* is 14 ounces.—One hundred Paris *Pounds* make 116 Lyons *Pounds*.—At Venice, the *Pound* is equal to eight ounces three quarters of the French *Pound*, &c.

For the several *Pounds* of the several cities and countries, their proportion, reduction, division, &c. See **WEIGHT**.

Pound also denotes an imaginary money used in accounting; containing more or less, according to the several names added to it, and the several countries it is used in.

Thus in England we say a *Pound sterling*; in France, a *Pound*, or *livre tournois* and *Paris*; in Holland and Flanders, a *Pound*, or *livre de gros*, &c.

The term took its rise hence, that the ancient *Pound sterling*, though it only contained 240 pence, as ours does, yet each penny being equal to five of ours, the *Pound* of silver weighed a *Pound troy*.

The *Pound sterling*, or English *Pound*, contains twenty shillings, the shilling twelve pence, and the penny four farthings.

Anciently there were three ways of paying a *Pound* of money into the exchequer: 1. The payment of a *Pound de numera*, which was just twenty shillings in tale. 2. *Ad solum*, which was 6 d. over and above the 20 s. 3. *Ad pensam*, which was giving the full weight of twelve ounces.

The French *Pound*, or *livre tournois*, contains twenty sols or shillings, and the sol 12 deniers or pence tournois; which was the value of an ancient French coin called *franc*, a term still synonymous with *livre*.

The *Pound*, or *livre tournois*, contains, in like manner, 20 sols or shillings, and the sol 12 deniers or pence Paris. Each sol Paris is equal to 15 deniers tournois; so that a *Pound Paris* is equal to 25 sols tournois.

The *Pound*, or *livre de gros*, of Holland, is divided into 20 shillings gros, and the shilling into 12 pence gros. It is equal to five florins; the florin valued at 24 sols tournois; suppose for the exchange on the footing of 100 pence gros for a French crown of 3 livres tournois; so that the *Pound* gros amounts to 12 shillings and 11 pence farthing sterling.—The *Pound* gros of Flan-

ders and Brabant is divided like that of Holland; and like that too, is equal to six florins: but the florin is equal to 25 sols tournois; so that the Flanders *Pound* is equal to 7 livres, 10 sols tournois, or 11 s. 3 d. sterling.

Merchants, factors, bankers, &c. use characters, or initial letters, to express the several kinds of *Pounds* of account, as *L.* or *L. St.* *Pounds* sterling. *L. G.* *Pounds* gros; and *L.* or *lb.* ton. *Pounds* tournois.

POUND nails. See the article **NAILS**.

POUND, PARCUS, is also an inclosure, or strong place, where cattle distrained, or caught in any trespass, are put, till they are replevied or redeemed.

The *Pound* is either *overt*, or *covert* and *close*.

POUND overt, is an open *Pound*, built upon the lord's waste: and thence also called, the *lord's Pound*; because he provides it for the use of himself, and his tenants.

Pound overt also includes back-fides, court-yards, pasture-grounds, or any place whatever, to which the owner of beasts impounded may come to give them meat and drink, without offence or trespass.

POUND covert or close, on the contrary, is such a one as the owner cannot come to for the said purpose without trespass or offence; as some close house, castle, fortress, &c.

POUNDAGE, a subsidy granted to the king upon all manner of merchandise imported or exported, by all merchants, natives, denizens, and aliens.

It is called *Poundage*, because fixed at the rate of so much *per pound*, viz. one shilling in every pound, or twenty shillings; and for English commodities exported by aliens, one shilling more.

It was first granted to Edward VI. for term of his life; and afterwards to K. Charles II. anno 12 Car. 2.

POUP, or POOP, PUPPIS, in navigation, the hind-part of a vessel, or that where the helm is fixed, called also *stern*.

The French frequently call it *quene*, tail; because the rudder here applied serves the same purposes in a ship, as the tail does to fishes.

The poop is divided into three or four stories, which, all together, form the *poop-castle*, or hind-castle; the outside whereof is richly adorned with balconies, galleries, pilasters, trophies, the arms of the prince, &c.

To have the *wind* in *Poop*, in the sea phrase, is to have it behind, or favourable.

POOP is more particularly used among us for the floor, or deck over the round-house, or master's cabin; being the highest part of a ship's hull a-stern.—See *tab. ship. fig. 2. lit. P.*

POURALLEE. See the article **PURLUE**.

POUR-PARTIE, or POUR-PARTY, in law, a term used in opposition to *pro-indiviso*, denoting the share or part of an estate first held in common by parceners; which is by partition allotted to any of them.

To make *Pour partie*, is to divide and sever the lands that fall to parceners; which, before partition, they held jointly and *pro indiviso*.

POURPLE. See the article **PURPURE**.

POUR-PRESTURE, or PURPRESTURE, POURPRESTURA, in law, is defined by Glanville to be, when any thing is unjustly occupied, that properly belonged to the king; as if the case in the encroaching on his grounds, obstructing the highways, diverting public rivers from their proper course, or building any thing over the high-streets of a city; and in the general, where any thing is done to the prejudice of the king's tenements, high-ways, or cities.

Crompton in his *Jurisd.* says, *pour-presture* is properly when a man takes to himself, or encroaches any thing which he ought not; whether it be in jurisdiction, in land, or in franchise; and, generally, where any thing is done to the nuisance of the king's tenants.

Some authors divide *pour-presture* into three kinds: the first against the king, the second against the lord, the third against a neighbour.

Pour-presture against the king, lib. nig. in *scacc. fol.* 38. is that happening through the negligence of the sheriff, or the long continuance of wars, &c. when those that have lands near the crown-lands, inclose part of them, or lay them to their own.

Pour-presture against the lord, is when the tenant neglects to perform what he is bound to do for the chief lord, or deprives him of his right.

Pour-presture against a neighbour, is a nuisance against a neighbour, &c. mentioned in the *Monast. tom. 1.*

POURSUIVANT*, or PURSUIVANT, a messenger, anciently attending the king, in his wars, or at council-table, or in the exchequer; to be dispatched upon any occasion or message: as, for the apprehension of a person suspected, or accused, &c.

* The word is formed from the French *poursuivre*, to pursue.

Many of the nobility too had their *Poursuivants*: a knight banneret was allowed a *Poursuivant*, with the consent of a herald.

Upton, *de re militari*, calls the *Poursuivants*, *milites linguarum*; because, says he, their chief honour was in *custodia lingue*.

He divides them into foot and horse *Poursuivants*, *cursores equitantes* & *prosecutores*.

There were also *Poursuivants* particularly employed in martial causes, called

POURSUIVANTS at arms, a term anciently applied to gentlemen who attended the heralds, and aspired to their office; to which they could not rise, till after seven years apprenticeship passed in this quality.

They were intirely dependent on the heralds, and assisted at their chapter; officiating for them in preparing and assigning tournaments, and all other parts of their ministry.

They were baptized at solemn feasts with some gallant name, as Jolicœur, Verlusant, Sanfementir, &c.

Their coats of arms were different from those of the heralds, and they bore plain staffs without ornament.

Of the great number of *Poursuivants* anciently on foot, there are now only four remaining, viz. *blae-mantle*, *rouge-croisi*, *rouge-dragon*, and *portuculice*; who are the lowest order of officers belonging to the college of arms.

Their business is to attend with the heralds in marshalling and ordering public solemnities, funerals, interviews, cavalcades, &c.

Stow, speaking of Richard the third's end, has these words: "His body was naked to the skin; not so much as one clout about him; and was trussed behind a *Poursuivant* at arms, like a hog, or a calf."

POURTRAIT, or POURTRAITURE. See the article **PORTRAIT**.

POURVEYANCE, or PURVEYANCE, the providing of corn, victuals, fuel, and other necessities for the king's house.

By a stat. 12 Car. 2. no person, under colour of *Purveyance*, shall take any timber, cattle, corn, or other matter, from any subject, without his free consent.

POURVEYOR, or PURVEYOR, an officer of the household, who provides and buys in corn, and other victuals, &c. for the king's house; mentioned in *magna charta*, and several statutes.

Purveyor became a term so odious in times past, that by stat. 36 Edw. 3. the heinous name *Purveyor* was changed into that of *achator*, or *buyer*.—The office itself was much restrained by the stat. 12 Car. 2.

POWDER, or POWDER, in pharmacy, a dry medicine pulverized, or prepared, by being broken and reduced into almost imperceptible atoms, either in a mortar, or by chymical operations, &c.

We say, a *styptic Powder*, a *sympathetic Powder*, &c.—*Viper Powder*, *pulvis viperinus*, has of late days come much in request, under the denomination of animal bezoard.

POWDER for the hair, is flour of wheat, or beans, well sifted and prepared, to give it an agreeable odour.

That wherein starch grounds is mixed, is much us'd. See **STARCH**.

Jeſuits Powder, *pulvis patrum*. See the article **CORTEX Peruvianus**.

GUN POWDER. See the article **GUN Powder**.

POWDER-CHESTS, in the sea-language, are boards joined in form of a triangle, and filled with gun-powder, pebbles, &c. which they set fire to, when the ship is boarded by an enemy, and soon make it clear before them.

Cornachine Powder. See the article **CORNACHINE**.

Emetic Powder. See the article **EMETIC**.

Flux Powders. See the article **FLUX**.

Powder of projection. See the article **PROJECTION**.

POWDERINGS, in building, a term sometimes used for devices serving to fill up vacant spaces, in carved works: as also in escutcheons, writings, &c.

POWDERINGS, in heraldry. See the article **FUR**.

POWER, POTENTIA, in physics, a natural faculty of doing or suffering any thing.

Mr. Locke explains the origin of our idea of *Power* to the following effect: The mind being daily informed by the senses, of the alterations of the simple ideas of things without, and reflecting on what passes within itself, and observing a constant change of its ideas, sometimes by the impressions of outward objects upon the senses, and sometimes by the determinations of its own choice; and concluding from what it has so constantly observed to have been, that the like changes will for the future be made in the same things, by the same agents, and by the like ways; considers, in one thing, the possibility of having any of its simple ideas changed; and in another, the possibility of making that change: and so comes by that idea which we call *Power*.

Thus we say, fire has a *Power* to melt gold, and make it fluid; and gold has a *Power* to be melted.

Power, thus considered, is twofold, viz. as able to *make*, or able to *receive* any change: the one may be called *active*, the other *passive Power*. See **ACTIVE** and **PASSIVE**.

Of *passive Power*, all sensible things abundantly furnish us with ideas; nor have we of *active Power* fewer instances: since whatever change is observed, the mind must suppose a *Power* somewhere able to make that change. See **CAUSE**.

Yet, if we attentively consider it, bodies, by our senses, do not afford us so clear and distinct an idea of *active Power*, as we have from reflection on the operations of our minds: for all *Power* relating to action, and there being but two sorts of action,

action, viz. thinking and motion, it may be considered whence we have the clearest ideas of the Powers which produce those actions.

Of thinking, body affords us no ideas at all; it is only from reflection that we have that: neither have we from body any idea of the beginning of motion. A body, at rest, affords us no idea of any active Power to move; and when it is set in motion itself, that motion is rather a passion, than an action in it. The idea of the beginning of motion, we have only by reflection on what passes in ourselves; where we find by experience, that barely by willing it, we can move the parts of our bodies, which before were at rest.

We find in ourselves a Power to begin or forbear, continue or end, several actions of our minds, and motions of our bodies, barely by a thought or preference of the mind. This Power, which the mind has, thus to order the consideration of any idea, or the forbearing to consider it, or to prefer the motion of any part of the body to its rest, and vice versa, in any particular instance, is what we call the will.—And the actual exercise of that Power, is that which we call volition, or willing.

The forbearance or performance of that action, consequent to such an order or command of the mind, is called voluntary: and whatsoever action is performed without such a thought of the mind, is called involuntary.

The Power of perception, is what we call the understanding.

Perception, which we make the act of the understanding, is of three sorts: the perception of ideas in our minds: the perception of the signification of signs; and the perception of the agreement or disagreement of any distinct ideas. See PERCEPTION.

These Powers of the mind, viz. those of perceiving, and preferring, are usually called by another name; and the ordinary way of speaking is, that the understanding and will are two faculties or Powers of the mind. A word proper enough, if used so as not to breed any confusion in mens thoughts, by being supposed (as there is room to suspect it has been) to express some real beings in the soul, that perform those actions of understanding and volition.

From the consideration of the extent of the Power of the mind over the actions of the man, which every one finds in himself, arise the ideas of liberty and necessity.

So far as a man has a Power to think, or not to think; to move, or not to move, according to the preference or direction of his own mind; so far is a man free.

Where-ever any performance or forbearance are not equally in a man's Power; where-ever doing or not doing will not equally follow upon the preference of his mind; there he is not free, though perhaps the action may be voluntary.

So that the idea of liberty is the idea of a Power in any agent, to do or forbear any action, according to the determination or thought of the mind, whereby either of them is preferred to the other: where either of them is not in the Power of the agent to be produced by him according to his volition, there he is not at liberty; that agent is under necessity. So that liberty cannot be where there is no thought, no volition, no will: but there may be thought, there may be will, there may be volition, where there is no liberty. Thus a tennis-ball, whether in motion by the stroke of a racket, or lying still at rest, is not by any one taken to be a free agent; because we conceive not a tennis-ball to think, and consequently not to have any volition, or preference of motion to rest, or vice versa. So a man striking himself or his friend by a convulsive motion of his arm, which it is not in his Power by volition, or the direction of his mind, to stop or forbear; nobody thinks, he has liberty in this; every one pities him, as acting by necessity and constraint. Again, suppose a man be carried, whilst fast asleep, into a room, where there is a person he longs to see, and be there locked fast in, beyond his Power to get out; he awakes, and is glad to see himself in so desirable company, which he stays willingly in; that is, he prefers his staying to going away: Is not this stay voluntary? Nobody will doubt it; and yet being locked fast in, he is not at liberty to stay, he has not freedom to be gone.

Liberty, therefore, is not an idea belonging to volition, or preferring; but to the person having the Power of doing, or forbearing to do, according as the mind shall chuse or direct. As it is in the motions of the body, so it is in the thoughts of our minds: where any one is such, that we have Power to take it up, or to lay it by, according to the preference of the mind, there we are at liberty.

A waking man is not at liberty to think, or not to think, no more than he is at liberty, whether his body shall touch any other or no: but whether he will remove his contemplation from one idea to another, is many times in his choice; and then he is, in respect of his ideas, as much at liberty, as he is in respect of bodies he rests on. He can at pleasure remove himself from one to another.

Yet some ideas to the mind, like some motions to the body, are such, as in certain circumstances it cannot avoid, nor obtain their absence, by the utmost effort it can use: thus a man on the rack is not at liberty to lay by the idea of pain, and entertain other contemplations.

Where-ever thought is wholly wanting, or the Power to act or forbear, according to the direction of thought, there necessity

takes place. This, in an agent capable of volition, when the beginning or continuation of any action is contrary to the preference of his mind, is called compulsion; when the hindering or stopping any action is contrary to his volition, it is called restraint. Agents, that have no thought, no volition at all, are in every thing necessary agents.

POWER, in mechanics, denotes a force, which being applied to a machine, tends to produce motion; whether it does actually produce it or not.

In the former case, it is called a moving Power; in the latter, a sustaining Power.

If the Power be a man, or a brute, it is called an animated Power; if the air, water, fire, gravity, or elasticity, an inanimate Power.

Attractive Power. See the article ATTRACTIVE.

Conspiring Power. See the article CONSPIRING.

Repelling Power. See the article REPELLING.

POWER is also used in mechanics, for any of the fix simple machines, viz. the lever, balance, screw, axis in peritrochio, wedge, and pully; which are particularly called the mechanic Powers.

See also each Power under its proper article, LEVER, BALANCE, &c.

POWERS, in pharmacy, the result of a combination or union of the essential oils with the spirit of a plant; wherein, it is supposed, are contained all the principal virtues thereof: whence the name.

The Powers of scabious and mullein are prepared by beating and incorporating the expressed juices of these plants when green, with lard, and afterwards exposing them several days to the sun; such beating and insolation being several times repeated at due distances.

POWER, in the feudal jurisprudence, a right which the lord has to re-unite to his fief, a dependent fee hold of him, when the vassal has alienated it, upon reimbursing the money given for it, with the legal costs.

The lord is to exercise his Power over the fee, within a year after he has notice of the fall; otherwise he loses it.

The word is also used for the right a lord has to seize a dependent fee, to compel the payment of all dues, services, &c.

POWERS, potentia, is also used among the fathers, &c. for the sixth order in the hierarchy of angels, reckoning from Seraphim.

These they suppose to be the spirits who bridle and restrain the Power of the devils; preside over inferior causes; and prevent contrary qualities from disturbing the oeconomy of the world.

See ANGEL.

POWER, in optics.—The POWER of a glass is used by some for the distance of the convexity from its solar focus. See FOCUS.

POWER, in arithmetic, the produce of a number, or other quantity, multiplied into itself.

Thus the produce of the number 3, multiplied by itself, viz. 9, is the second Power of 3; the factum of 9, multiplied by 3, viz. 27, is the third Power; and the product of 27, again multiplied by 3, viz. 81, is the fourth Power; and so on to infinity.—In respect hereof, the first number, 3, is called the root, or first Power.

The second Power is called the square; with respect to which, 3 is the square root.

The third Power, 27, is called the cube; with respect to which, the 3 is the cube root.

The fourth Power, 81, is called the biquadrate, or quadrato-quadratum; with respect to which, 3 is the biquadratic root.

The number which shews how often the root is multiplied into itself, to form the Power; or how oft the Power is to be divided by its root, to come at the root, is called the exponent of the Power.

The moderns, after des Cartes, are contented to distinguish most of their Powers by the exponents; as, first, second, third, &c.

The particular names of the several Powers were introduced by the Arabs, viz. square, cube, quadrato-quadratum or biquadrate, surdsolid, square of the cube, second surdsolid, quadrato-quadrato-quadratum, cube of the cube, square of the surdsolid, third surdsolid, &c.

The names given by Diophantus, followed by Vieta and Oughtred, are, the side or root, square, cube, quadrato-quadratum, quadrato-cubus, cubo-cubus, quadrato-quadrato-cubus, quadrato-cubo-cubus, cubo-cubo-cubus, &c.

The characters wherewith the several Powers are denoted, both in the Arabic and Cartesian notation, are as follow:

	2	4	8	16	32	64	128	256	512	1024
Arab.	R	q	c	bg	s	gc	Bf	tg	bc	fq
Cartes.	a	a ²	a ³	a ⁴	a ⁵	a ⁶	a ⁷	a ⁸	a ⁹	a ¹⁰

Hence, to raise a quantity to a given Power or dignity, is the same as to find the factum arising upon its being multiplied a given number of times into itself: e. gr. to raise 2 to the 3d Power, is the same as to find the factum 8; whose factors are 2, 2, 2.

Powers of the same degree are to one another in the ratio of the roots as manifest as their exponent contains units: thus, squares are in a duplicate ratio; cubes in a triplicate ratio; quadrato-quadrata, or fourth Powers, in a quadruple ratio. See RATIO. The Powers of proportional quantities are also proportional to one another.

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From a given Power to extract the root, or side, is the same as to find a number, *e. gr.* 2, which multiplied any number of times, *e. gr.* twice, produces the given Power, *e. gr.* the 3d Power, or 8. See Root and Side.

To multiply or divide any power by another of the same root, 1^o. For multiplication, add the exponents of the factors; the sum is the exponent of the factum. Thus :

$$\begin{array}{l} \text{Factors } \left\{ \begin{array}{l} x^2 \quad y^m \quad y^n \quad a^m \quad x^2 \\ x^2 \quad y^m \quad y^n \quad a^r \quad x^2 \end{array} \right. \\ \hline \text{Prod. } x^4 \quad y^{2m} \quad y^{2n} \quad a^{m+r} \quad x^4 \end{array}$$

2^o. For division, subtract the exponent of the Power of the divisor, from the exponent of the dividend; the remainder is the exponent of the quotient. Thus :

$$\begin{array}{l} \text{Divid. } x^2 \left(x^2 \parallel y^m + n \right) \left(y^m \parallel a^m - r \right) n - 5 \\ \text{Divif. } x^2 \left(x^2 \parallel y^m + n \right) \left(y^m \parallel a^r \right) x \end{array}$$

M. de la Hire gives us a very odd property common to all Powers : M. Carre had observed with regard to the number 6, that all the natural cubic numbers, 8, 27, 64, 125, whose root is less than 6, being divided by 6, the remainder of the division is the root itself; and if we go farther, 216, the cube of 6, being divided by 6, leaves no remainder; but the divisor 6, is itself the root. Again; 343, the cube of 7, being divided by 6, leaves 1; which, added to the divisor 6, makes 7 the root, &c. M. de la Hire, on considering this, has found that all numbers, raised to any Power whatever, have divisors, which have the same effect with regard thereto, that 6 has with regard to cubic numbers.

For the finding of these divisors, he discovered the following general rule :

If the exponent of the Power of a number be even, *i. e.* if the number be raised to the 2d, 4th, 6th Power, &c. it must be divided by 2; the remainder of the division, in case there be any, added to 2, or to a multiple of 2, gives the root of this number, corresponding to its Power, *i. e.* the 2d, 6th, &c. root.

If the exponent of the Power be an uneven number, *i. e.* if the number be raised to the 3d, 5th, 7th, &c. Power; the double of this exponent will be the divisor, which has the property mentioned.

Thus it is found in 6, double of 3, the exponent of the Power of all the cubes; thus, also, 10 is the divisor of all numbers raised to the 5th Power, &c.

Commensurable in Power. See COMMENSURABLE.

POWER, of an hyperbola, in conics, is the square of the right line CI, or AI (*tab. conics, fig. 20.*)

The Power of the hyperbola, is the fourth part of the square of the conjugate semi-axis; or the sixteenth part of the square of the conjugate axis. See HYPERBOLA.

POWER of the country. See POSSE COMITATUS.

POX, in medicine, a disease under which name there are several kinds : as, *small Pox, French Pox, chicken Pox, swine Pox, &c.*

Small Pox, variolæ, is a contagious disease appearing on the Surface of the skin, which it covers with pustules, or ulcerous eruptions, that leave scars behind them. Or, it is a general eruption of particular pustules tending to suppuration, and attended with a fever.

The origin of this disease is uncertain : we find no mention of it before the Arab physicians.—It bears a great resemblance to the measles; so that for the two or three first days it is difficult to distinguish them : they both arise from an impure blood, and corrupt humours; with this difference, that in the *small Pox*, the peccant matter is more thick and viscid; in the measles more subtle, hot, and bilious; and neither of them are known to return after the having passed them once. See MEASLES.

Doleus says, that the cause of the *small Pox* is brought into the world with us, and lies hid till it find an opportunity of bursting forth : he adds, that there is scarce one in many thousands that escapes it all his life.

Dr. Drake observes, that the *small Pox* not being founded in any permanent habitual disposition, has its period within a limited time necessary for the extrusion of the peccant matter out of the pores of the skin. For the salt serum of the blood being in this disease, by an accidental fever, thrown out in great quantities on the glands of the skin, acts much after the manner as in the lepra Arabum; but when the blood is depurated, the scales dry, and fall off. So that he thinks it would be no great impropriety to call the *small Pox*, a temporary, critical lepra.

The *small Pox* are of two kinds : the *distinct*, where the pustules stand apart; and the *confluent*, where they run into one continued cake.

The *distinct, or regular small Pox*, Sydenham observes, begins with a shuddering and chilliness, which is succeeded by an intense heat, violent pain of the head and back, vomiting, drowsiness, especially in children, and sometimes epileptic fits; which shew the *Pox* to be ready to burst forth, and that they will be mild.

The eruptions are usually on the fourth day; upon which the feverish symptoms vanish, except that adults are prone to sweat. The pustules first appear in the face, then the neck, &c. They are at first reddish, by degrees they swell and grow whiter; on the eleventh day the swelling and inflammation of the face vanishes, and the pustules begin to wither. If ever this kind kill, it is on the fourteenth or fifteenth day.

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The symptoms of the *distinct small Pox*, as enumerated by Dr. Shaw, are, 1. A pain in the head, back, and scrobiculus cordis. 2. A fever, which decreases as the eruptions increase, with redness of the eyes. 3. Nausea and retchings. 4. Little reddish spots, or beginning pustules, appearing on the neck, face, breast, &c. about the third or fourth day inclusive, from the beginning of the illness. 5. Restlessness. 6. About the seventh or eighth day, other little red spots usually appear between the growing pustules. 7. The pustules about the ninth day are at their state; being then generally as big as a large pea, the matter in them well concocted, of a whitish colour inclined to yellow; at which time, 8. The patient is usually light-headed and feverish. 9. About the tenth day the pustules begin to dry on the face. 10. And about the fifteenth they appear shrunk, and begin to scale off; and now the danger is esteemed to be over.

The *distinct* kind is here considered unattended with a looseness, and other symptoms, which sometimes happen in it, as well as in the other.

The *confluent, or flux small Pox* has the same symptoms with the *distinct*, only in a more violent degree : they usually come out on the third day; not separate, as in the *distinct* kind, but spread into one another; and at length appear all like one whitish pellicle, over the whole skin. After the eighth day, the pellicle darkens. In adults this kind is attended with a salivation; in children with a diarrhoea. The salivation frequently succeeds immediately after eruption; the diarrhoea later. The *confluent* kind usually kill on the eleventh day.

The symptoms of the *confluent* kind, according to Dr. Shaw, are, 1. Violent pain in the head, back, and scrobiculus cordis. 2. Nausea and retching, with a fever, which rather increases than decreases after the eruption. 3. In children a diarrhoea, which usually precedes the eruption, and attends the distemper throughout. 4. A pyralismus in adults, and but seldom a diarrhoea. 5. Delirium, convulsions, hoarseness, difficulty of breathing, fixedness of the eyes, and restlessness; which may also in a lesser degree attend the *distinct* fort. 6. The spots are here more red, thick, and close, than in the *distinct*; and the spaces between them more inflamed and swelled; purple or livid spots also often appear in these spaces; whence the *small Pox* with purples. At other times in these spaces, or on the edges of the eruptions, appear bladders full of clear water, vulgarly called the *white bives*. Lastly, these eruptions are frequently depressed in the middle, and there turn black; whence the *black small Pox*.

The eruptions often rise and sink again in the progress of the distemper. They usually first appear about the fourth or fifth day, and come to their state about the fifteenth.

Morton divides the disease into four stages : the *apparatus* or preparation, from the time of the first infection to the eruption of the pustules. The *eruption*, which comprehends three states; *eruption, maturation, and desecation*, in which last the pustules are first incriminated with a scab, then wither and dry off.

When the eruptions are very round, distinct, encompassed with a red margin, &c. they are said to be *benign*; otherwise *malignant*.

There are four degrees of malignancy, *viz.* when the pustules are universally confluent; particularly confluent; distinct, but very small and coherent; and distinct, with petechiae and miliar eruptions.

Dr. Freind, Dr. Cade, &c. recommend purging and phlebotomy after an imperfect crisis of the *small Pox*, *i. e.* where the fever remains after the pustules decline; many oppose it : indeed reason seems on its side; but prescription is against it. Al-faharavius, in the first stage of the *small Pox*, prescribes phlebotomy, even to a swooning, and great quantities of cool water to be drank. In the malignant *small Pox*, Dr. Lister found the blood, when cold, excessively tender and friable, so as the softest feather would easily divide its globules. Etmuller says, there is nothing to be more regarded than the breath and voice; where these are good, it is an excellent sign. He adds, that horfending is an admirable medicine, in that it promotes sweat, saves the throat, &c.

A method of managing the *small Pox*, lately introduced from abroad, is by inoculating them. For the reason, process, and advantages whereof, see INOCULATION.

Why the *small Pox* scarce ever visit a person above once, is a famous problem; long canvassed, and with little success! Dr. Drake accounts for it very plausibly from the alteration made in the skin by that disease. For the distention the glands and pores of the skin suffer therein is so great, that they scarce ever recover their tone again, so as to be able any more to arrest the matter in its course outwards long enough, or in quantity enough, to create those ulcerous pustules which are the diagnostics of the disease. For though the same feverish disposition should arise again in the blood, yet the passages through the skin being more open, the matter will never be stopped, so as to exhibit the appearance of the *small Pox*.

Accordingly we find, that in persons feverishly handled with this disease, the face (which is usually the fullest, from the extraordinary obstruction the matter meets with by the great condensation of the pores) seldom returns to its former dimensions; which enlargement he accounts for from the dilatation of the aræolæ of the glands and pores of the skin, not from any augmentation of the substance itself.

POX

What confirms this hypothesis, is, that nurses, &c. who attend persons sick of the *small Pox*, are frequently a little affected with it, and have now-and-then two or three eruptions; that they have no more, seems to follow from the free course of the matter through the skin. With this, too, agrees that constant observation, that people of coarse skins, in whom the pores are largest, are always more favourably treated by this distemper than others, and that it constantly leaves fine skins coarser than it found them.

This solution would seem more probable, were it not that some have to very few of these eruptions, perhaps not above twenty or thirty; which cannot fairly be allowed so far to enlarge the pores of the whole skin, as to prevent any return.

Others hold, that in a genuine eruption, the cause of the distemper is so far evacuated, as scarce to leave a possibility of a return of it; and that if part of the original cause did remain behind, it might, when the air favours it, or when by other accidents it is secreted from the blood, appear in the form of eruptions, and so prove to be the measles, *chicken Pox*, &c.

It may, indeed, be objected, that these last-mentioned often happen before the *small Pox*: but whatever be the cause of the *small Pox*, the separating power must be in such a determined proportion, or it will fail to cause a regular *small Pox*, and so acting proportionably, may produce any of the other distempers just mentioned.

The *occasional causes* of the *small Pox* may be, 1. Some alteration in the air; since they happen most frequently about the spring- season; and both in Europe, and elsewhere, are more epidemic and mortal at particular times. 2. From fear; which appears more evident, than easy to explain. 3. From surfeits, as by eating any thing too chilling to the blood, as cucumbers, oranges, &c. in hot seasons; or when the body is heated by motion, the drinking of cold liquors. 4. From too plentiful feeding. 5. From any over-heating the blood, or too suddenly cooling it after it is heated, whereby a sudden check is given to perspiration; and this more especially, if the air favours such an eruption.

As to *pregnastic signs* of the *small Pox*; 1. The sooner they appear in the spring, and the more the air is disposed to favour the distemper, the more fatal they usually prove. 2. The confluent species both in adults and children, is dangerous; and the more so, if attended with a suppression of urine, nausea, retching, delirium, purple spots, crystallines, bloody urine, &c. after the eruption; but the blackness of them is not dangerous before the crisis. 3. Diarrhoeas in the confluent kind, are not so bad in children as in adults. 4. A pyelismus is a regular attendant of the confluent kind in adults from the sixth or seventh day till after the crisis; and is so necessary, that if it stop suddenly, and return not for twenty-four hours, the patient is supposed to be in great danger. 5. A quincy here is highly dangerous. 6. The eruptions swelling, and sinking suddenly, are bad signs. 7. The danger is not over till about the twentieth day in the confluent species. But if the eruptions be distinct, few, round, plump, rise full, and grow up sharp at the top; if the sickness, vomiting, &c. go off, or remit upon the appearance of the eruptions, and the patient be under no dreadful apprehensions; the danger is usually over about the tenth day in the distinct kind. Convulsions attending the first symptoms of the *small Pox* in children, are said to forebode the appearance of eruptions within twelve hours; which then generally prove distinct, and the patient does well. The *small Pox* succeeding a debauch in liquors, or happening upon an irregular course of life, is usually mortal.

Chicken Pox, a cutaneous disease, frequent in children, wherein the skin is covered with pustules like those of the *small Pox* as to figure and magnitude; and only distinguishable therefrom, in that those of the *small Pox* appear with a redness and inflammation, and those of the *chicken Pox* whiter, resembling vesiculæ full of a ferous humour; which in three days time burst, and dry away, without any danger, and usually without any fever.

The *chicken Pox* and *swine Pox* seem to be the *small Pox* in a less degree, though they sometimes precede, and sometimes succeed the *small Pox*. The pustules appear to be of the same kind; only in the *swine Pox* they are much larger, and in the *chicken Pox* somewhat less than in the *small Pox*. There commonly appear five or six, sometimes twenty or thirty on the face, and but very few on the body.

The patient is very little indisposed, either before, at, or after their appearance; though the sudden sinking of them often causes some disorder; but it is presently relieved by a little sack and saffron, or a dose of treacle-water.

Grown persons seldom keep within doors for either; and upon that account the eruptions may continue the longer, because the cold air is supposed to hinder their ripening; so that it is sometimes three weeks or a month before they totally disappear.

French Pox, a contagious disease, contracted by a poisonous humour, usually in infection; and manifesting itself in ulcers and pums. See *VENEREAL disease*.

The French call it *mal de Naples*, the Neapolitan disease, because first observed among the soldiery at the siege of Naples under Charles VIII. The Italians call it *mal Francese*, and we the *French disease*, because first caught by the French. The

PRA

Spaniards call it *mal bubas*, or *faraxa del Indio*, because first brought from the West Indies. Trev. See *1.1.1.*

POYNING's *law*, an act of parliament made in Ireland under Henry VII. whereby all the statutes or force in England were made of force in Ireland; which before that time they were not.—Nor are any now in force there, made in England since that time.

The law took its name from Sir Edward Poyning, lord lieutenant of that kingdom at the time of its making.

POZZOLANA, a greyish kind of earth, used in Italy for building under water.

The best is found about Pozzuoli, Baia, and Conne, in the kingdom of Naples, from the first of which places it takes its name.

Pozzolana, mixed with lime, makes the best mortar in the world.—It hardens and petrifies in water: builders assure us that it penetrates black flints, and whitens them. It is of particular service in making moles, and other buildings, in maritime places. Agricola takes it to be of an aluminous and sulphurous nature. See Vitruvius, Pliny, de Lorme, &c. who set a great Value on it. See Supplement, article PUTREANUS PULVIS.

PRACTICAL arithmetic, }
PRACTICAL geometry, } See { ARITHMETIC.
PRACTICAL mathematics, } GEOMETRY.
PRACTICAL music, } MATHEMATICS.
PRACTICAL philosophy, } PHILOSOPHY.
PRACTICE, in arithmetic, PRACTICA Italica, or Italian usages; certain compendious ways of working the rule of proportion, or golden rule; especially where the first term is 1, or unity.

They were thus called from their expediting of *Practice* and business, and because first introduced by the merchants and negotiants of Italy.

The most useful of these *Practices* are as follow—1. Since the use of the rule of three is to find a fourth proportional to three given numbers, divide the first and second, or the first and third, by some common number, if that can be done exactly, and work with the quotients in their stead: as in the following example.

Price of 3 lb is 9 shill. What is the price of 7 lb?

$$\begin{array}{r} 3 \) \ 4 \ 3 \\ \underline{3} \\ 1 \end{array}$$

facit 21 shill.

Price of 14 lb is 26 shill. What is the price of 7 lb?

$$\begin{array}{r} 7 \) \ 2 \ 6 \\ \underline{7} \\ 1 \end{array}$$

facit 13 shill.

2. If the first term be 1, and the second an aliquot part of a pound, shilling, or penny; divide the third by the aliquot part: the quotient is the answer. Note, To find the aliquot part; those who cannot do it otherwise, may fee the table of aliquot parts of a pound under the article ALIQUOT.

E. gr. If 1 ell cost 10 shill. What cost 957 ells?

facit 1478 : 10 s.

3. If the first or third number be 1; the other not exceeding large, and the middle term a compound, i. e. consist of several denominations, it may be wrought without reduction thus:

Price of 1 lb is 3 s. 8 d. 3 q. What is the price of 5 lb?

$$\begin{array}{r} 5 \\ \hline \end{array}$$

facit 18 s. 7 d. 3 q.

For 4 farthings making a penny, 5 times 3 farthings make 3 d. 3 q. and 12 pence making 1 shilling, five times eight pence make 3 s. 4 d. which, with 3 d. from the place of farthings, make 3 s. 7 d. Lastly, five times 3 shillings make 15 shillings, and with the 3 shillings from the place of pence, 18 s. The price required therefore is 18 s. 7 d. 3 q.

4. If the middle term be not an aliquot, but an aliquot part, resolve the aliquot part into its aliquot parts, divide the middle term by the several aliquots, the sum of the quotients is the answer. To find the aliquot parts contained in an aliquot, see the table of aliquot parts of a pound under the article ALIQUANT.

For an instance of this rule:

If 1 ell cost 15 shill. What cost 124 ells?

$$\begin{array}{r} 15 \) \ 1 \ 24 \\ \underline{15} \\ 4 \end{array}$$

facit 93 l.

5. If the first or second term be 1, and in the former case, the second or third, in the latter the first, be resolvable into factors, the whole operation may be performed in the mind without writing down any figures, as in the following example.

Price of 1 lb is 24 shill. What is the Price of 20 lb?

$$\begin{array}{r} 4 \\ 6 \\ \hline 80 \\ 6 \end{array}$$

facit 48 : 0 s.—24 l.

6. Where one of the given numbers is 1, we have several compendious usages, to save multiplication and division. E. gr. If 9 lb cost 20 shill. What does 1 lb cost?

PRA

It is obvious the sum required is had by adding to the tenth part of 20 s. viz. 2 s. the ninth part of that tenth, viz. 3 d. $\frac{1}{2}$, and $\frac{1}{4}$ of a penny; the answer therefore is 2 s. 3 d. $\frac{1}{2}$ and $\frac{1}{4}$.

Again: If 5 lb cost 64 shil. What costs 1 lb?
Since 5 is half of 10, the double of the tenth part of the given price, viz. 10 s. 9 d. $\frac{1}{2}$ q. is the sum required.

Again: If 1 lb cost 18 d. What will 19 lb cost?

Since $19=20-1$; from the given price doubled, and increased by a cypher, viz. 360, subtract the simple 18; the remainder is 342 d. = 28 s. 6 d. the sum required.

7. If two terms of the same denomination differ by an unit, we have a peculiar kind of compend, which will be clear from the following examples. *E. gr.* If 5 lb cost 30 s. What will 4 lb cost?

Since the price of 4 lb is one fifth part short of that of 5 lb, divide the given price 30 by 5; the quotient 6 being subtracted from the dividend, the remainder, viz. 24 s. is the sum required.

Again: If 8 lb cost 24 s. What cost 9 lb?

Since the price of 9 lb exceeds that of eight by one eighth part; divide the given price 24 by 8; and add the quotient 3 to the dividend; the sum 27 is the answer.

8. Sometimes one may use several of these compends or *Practices* in the same question. *E. gr.* If 100 lb cost 30 s. 4 d. What costs 50 lb?
50)2. 2

facit 15 s. 2 d.
Again: 60 lb cost 4 s. What cost 2520?

6	42
24	6
7	7

168 l.

PRÆ, a Latin preposition, literally signifying *before*; it is used in composition with several words in our language, to denote the relation of priority. See *PRÆPOSITION* and *COMPOSITION*.

Of late, our writers, in Latin words anglicized, for *Præ*, usually write *pre*, restraining the Latin orthography to words that are still Latin, or used as such. Hence, for

PRÆADAMITE,
PRÆBENDARY,
PRÆCEPTORY,
PRÆCESSION,
PRÆCINCTA toga,
PRÆCIPE,
PRÆCONTRACT,
PRÆCORDIA,
PRÆDECESSOR,
PRÆDESTINATION,
PRÆDETERMINATION,
PRÆDICTION,
PRÆDOMINANT,
PRÆEMPTION,
PRÆEXISTENCE,
PRÆFECTUS,
PRÆMIUM,
PRÆMONSTRANTES,
PRÆNESTINE sortes,
PRÆNOMEN,
PRÆPARANTIA,
PRÆPUTIUM,
PRÆROGATIVUM omnia,
PRÆSEPE,
PRÆTEXTA,
PRÆTOR,
PRÆTORIAN,

See the articles

PRÆDMITE,
PRÆBENDARY,
PRÆCEPTORY,
PRÆCESSION,
TOGA,
PRÆCIPE,
PRÆCONTRACT,
PRÆCORDIA,
PRÆDECESSOR,
PRÆDESTINATION,
PRÆDETERMINATION,
PREDICTION,
PREDOMINANT,
PREEMPTION,
PREEXISTENCE,
PREFECT and AUGUSTALIS,
PREMIUM,
PREMONSTRANTES,
SORTES,
PRENOMEN,
PREPARANTIA,
PREPOSITUS,
PREPUTIUM,
OMEN,
PRESEPE,
PRETEXTA,
PRETOR,
PRETORIAN.

PRAGMATIC * *sanction*, in the civil law, is defined by Hottoman, a rescript, or answer of the sovereign, delivered by advice of his council, to some college, order, or body of people, upon their consulting him on some case of their community.

* The word is formed from the Greek *πραγμα*, *negotium*, business.—It is sometimes also called absolutely *pragmatic*, *no κατὰ λόγον*.

The like answer given to any particular person, is called simply *rescript*, *rescriptum*.

The term *Pragmatic sanction* is chiefly used among the modern writers, for that famous ordinance of Charles VII. of France, published in 1268, containing a regulation of ecclesiastical discipline, conformable to the canons of the council of Basil; and since used by the Gallican church, as a barrier against the enterprizes and encroachments of the court of Rome.

The scope of the *Pragmatic sanction* was to regulate the form of elections made by the clergy; to declare the collations to be long to ordinaries, the prevention alone reserved to establish prebends; to assign a third of the benefices to graduates; and to abolish reservations, annates, and other like grievances.

Pope Pius II. obtained an abrogation of this sanction from Louis XI. on which occasion the court of Rome, transported with joy, dragged the *Pragmatic* through the streets, whipping it all the way, as Xerxes anciently did the Hellepont.

PRE

But the parliament opposed this abrogation with a great deal of vigour, and refused its consent to the last. So that maugre all the efforts of Rome, the *sanction* still held in force; till the concordat passed between pope Leo X. and Francis I. in 1515, when the *Pragmatic sanction* was abolished. See *CONCORDAT*.

The parliament of Paris again opposed the innovation, and refused to confirm the concordat; and was not brought to give its consent at last, till after repeated orders of the king; together with a secret resolution taken, always to judge conformably to the tenor of the *Pragmatic sanction*.

PRAGMATICAL, *PRAGMATICUS*, a term sometimes used in the same sense as *practical*, *mechanical*, or *problematical*, Stevinus, in his hydrostatical elements, calls certain of his mechanical or practical experiments, which he undertakes to instruct his reader how to make, by the name of *Pragmatical* examples; and in the like sense is the word sometimes used by other naturalists.

PRATIQUE *, or *PRATTIC*, in commerce, a negotiation or communication of commerce, which a merchant-vessel obtains in the ports it arrives in, and the countries it discovers.

* The word is French, and signifies, literally, *practice*.

Hence to obtain *Pratique*, is to obtain a liberty to frequent a port, to go ashore, buy and sell, &c. We could never have any *Pratique* with the inhabitants of Nova Zembla.

PRATIQUE is particularly used for a licence to traffick, granted to the master of a ship in the parts of Italy, upon a bill of health; that is, a certificate that the place whence he came, is not annoyed with any infectious disease.

PRAXEANS, a sect of heretics, so called, from their author Praxeas.

This heresiarch was of Asia, and lived in the second century. He was at first a disciple of Montanus, but quitted him, and soon after set up a sect of his own; teaching, that there was no plurality of persons in the godhead; and that it was the Father himself that suffered on the cross. Which sentiment was afterwards adopted by the Monarchici, Sabellians, and Patripassians.

PRAYER, in theology, a petition put up to God, either for the obtaining of some future favour, or the returning of thanks for a past one.

Divines distinguish three kinds of *Prayer*:

Vocal, which is clothed in words and sounds to be uttered with the mouth.

Mental, which is only formed or conceived in the mind, and not delivered in words.

Ejaculatory, which is a short, sudden flight, without study, order, or method.

Mytic divines, again, distinguish *Prayer* into *active* and *passive*. Among us, *Prayer* is most frequently considered under the divisions of *preconceived* and *extemporary*.

Under the first come all set forms, whether public or private, by which the mind is directed in the order, manner, expression, &c. of its petitions.

The second is that where the mind is left to itself, its own conduct, both as to matter, manner, words, &c.

The Romanists also prefer *Prayers* to saints, the virgin, the angel Gabriel, &c. See *SAINT*, *OFFICE*, *Ave Mary*, &c.

PREACHING *, in theology, the declaration, or promulgation of the word of God, in public, by a person authorized, and in a place appointed for the purpose.

* The word is derived from the Hebrew *parashah*, *expeluit*, he expounded.

Anciently, none but bishops were allowed to *preach*: now, not only priests, but deacons, are qualified. See *BISHOP* and *DEACON*.

Bishop Wilkins has delivered the art of *Preaching*, in a treatise called *Ecclesiastes*, or the preacher.

The religious of the order of St. Dominic assume the quality of *Preaching-brothers*, friars-predicator, or predicants. See *SERMON*.

PRÆADAMITE, *PRÆADAMITA*, a denomination given to the inhabitants of the earth, conceived, by some people to have lived before Adam.

Isaac de la Pereyra, in 1655, published a book to evince the reality of *Præadamites*, by which he gained a considerable number of profelytes to the opinion: but the answer of Demarets, professor of theology at Groningen, published the year following, put a stop to its progress; though Pereyra made a reply.

His system was this: The Jews he calls *Adamites*, and supposes them to have issued from Adam, and gives the title *Præadamites* to the Gentiles, whom he supposes to have been a long time before Adam.

But this being expressly contrary to the first words of Genesis, Pereyra had recourse to the fabulous antiquities of the Egyptians and Chaldeans, and to some of the idle rabbins, who imagined there had been another world before that deservied by Moses.

He was apprehended by the inquisitors in Flanders, and very roughly used, though in the service of the Dauphin. But he appealed from their sentence to Rome, whither he went in the time of Alexander VII. and where he printed a retractation of his book of *Præadamites*.

PREAMBLE, in law, the beginning of an act of parliament, &c. serving, as it were, for a key, to open the intent of the makers

makers of the act, and the mischief intended to be prevented or remedied thereby. See ACT.

PREBEND, PRÆBENDA, the portion a prebendary receives for his maintenance out of the estate of a cathedral, or collegiate church.

The term *Prebend* is usually confounded with *canonicate*, or *canonica*; yet there is a real difference. A *Prebend* is properly a right which an ecclesiastic has in a cathedral, or collegiate church where he officiates, to receive certain ecclesiastical revenues, and to enjoy certain dues, either in money or in kind; (so called à *præbendo*, q. d. *afforded* or *allowed* him; not à *præbendo auxilium* or *consilium episcopo*) whereas *canonica* is a mere title, or spiritual quality, which a person enjoys independent of any præstation, or any temporal revenue: so that the *Prebend* may subsist without the *canonicate*; but the *canonicate* is inseparable from the *Prebend*.

For it is not to the *Prebend* that the right of suffrage, and other spiritual rights are annexed, but to the *canonicate*; and when the *Prebend* is joined to the *canonicate*, it becomes spiritual by virtue of the *canonicate* to which it is attached.

Anciently the pope created canons with a right of having place in the choir, a deliberative voice in the chapter, and an expectation of the first *Prebend* that should become vacant; but this was prohibited by the council of Trent: yet the pope still confers the *canonicate* without any *Prebend*, when he would confer a dignity in a church, for the obtaining whereof, it is required the candidate be a canon.

This they call a *canonicate ad effectum*, and sometimes a *jus ventosum*, which is no more than an empty title, conferred purely to qualify a man for a dignity restrained to the capacity of canon.

In some churches there are double *Prebends*, and in others *semi-Prebends*.

Originally the *Prebend* was only a livery, or portion of things necessary to life, given daily; at present the rents and profits of the church are divided into fixed portions, called *Prebends*, which are enjoyed independently. The nomination to *Prebends* is in the king. In France it is one of the honorary rights of the king, on his joyful accession to the crown, to nominate to the first *Prebends* vacant by death in the cathedral and collegiate churches.

Prebends are either *simple*, or with *dignity*.—The latter are such as, beside their *Prebends*, have some jurisdiction annexed to them.

Theological, or divinity **PREBEND**, is a *Prebend* appropriated to a doctor in divinity, in each cathedral and collegiate church throughout France, for preaching on Sundays, and making a public lecture thrice a week.

PRECEPTORIAL **PREBEND**, is that *Prebend* whose revenues are destined for the support of a preceptor or master, who is obliged to instruct the youth of the place *gratis*.

The *canonicate* is not here necessary to the *Prebend*.

Panorm. observes, that in the cathedral church of Chartres, there are *Prebends* appropriated to laymen, and for the subsistence of some persons of birth and distinction.

PREBENDARY, PRÆBENDARIUS, an ecclesiastic who enjoys a *prebend*.

Prebendaries and canons of cathedral and collegiate churches have this in common, that they have each a portion of the revenues of the church for their subsistence; the one under the title of *præbenda*, *prebend*; the other under the title of *canonica*, or *canonicate*; and have each places; and voices in the chapter: but they differ in this, that the former receives his portion or *prebend* in consideration of his officiating and serving in the church; but the latter without any such consideration, merely by his being received into the cathedral or college, *per assignatum stallum in choro, & locum in capitulo*.

Golden **PREBENDARY** of *Hereford*, called also *præbendarius episcopi*, is one of the twenty-eight minor *Prebendaries*, who has, *ex officio*, the fifth canon's place that falls.

He was anciently confessor of the bishop and cathedral, and had the altars; on which account he was called the *golden Prebendary*.

PRECARIE, or **PRECES**, in our ancient law-books, days works, which the tenants of certain manors are bound to give their lords in harvest-time.

These, in some places, are corruptly called *bind-days*, for *biden-days*, from the Saxon, *biddan*, to pray.

Magna **PRECARIA** was a great or general reaping-day.

The lord of the manor of Harrow in Middlesex had, 21 Ric. 2. a custom, that by summons of his bailiff on a general reaping-day, then called *magna precaria*, the tenants should do one hundred ninety-nine days work for him; every tenant that had a chimney sending a man.

PRECAIOUS, in commerce, an appellation given to a kind of trade carried on between two nations at war, by the intervention of a third at peace with them both.

Thus the English hold a *precarius* commerce with the Spaniards by means of the Portuguese; when the two former nations being at war, the third lends its vessels, its colours, and name, to continue their trade.

PRECAIOUS, in jurisprudence, is applied to a fund or flock, of

which a person has not the full propriety, whereof he cannot dispose absolutely, and which is most of it borrowed.

PRECE partium, in law, the continuance of a suit by consent of both parties.

PRECEDENCE, PRECEDENCY, or PRÆCEDENCY, a place of honour which a person is intitled to in companies; either sitting, or walking.

Precedency is either of *courtesy*, or *de jure*, of right.

The former is that which is due to age, to estate, &c. which is regulated by custom and civility.

The latter is settled by authority, and where broken in upon, gives an action at law.

The point of *Precedency* is thus ordered by the heralds:—After the king, the princes of the blood, viz. the sons, grandsons, brothers, and nephews of the king, take place; then the great officers of the church and crown, viz. the archbishop of Canterbury; then the lord chancellor, or lord keeper of the great seal; next, the archbishop of York; the lord high treasurer; the lord president of the privy-council; the lord privy-seal; next, dukes, then marquises, dukes eldest sons, earls, marquises eldest sons, dukes younger sons, viscounts, earls eldest sons, marquises younger sons, bishops, barons, viscounts eldest sons, earls younger sons, barons eldest sons, privy-counsellors, judges, masters in chancery, viscounts younger sons, barons younger sons, knights bannerets, baronets, knights of the bath, knights bachelor, colonels, sergeants at law, doctors, esquires, lieutenant colonels, majors, captains, bachelors of divinity, law, &c. masters of arts, gentlemen, yeomen, tradesmen, mechanics.

Note, That great officers of court, of what degree soever they are, take place above all other persons who are of the same degree or order of nobility, viz. the master of the horse, lord great chamberlain of England, lord high constable of England, lord marshal of England, lord admiral of England, lord steward, and lord chamberlain of his majesty's household.—So the secretaries of state, if peers, take place of all that degree, except the great officers aforesaid.—Dukes, marquises, earls, barons, &c. not having any of the said offices, nor being descended of the blood-royal, take place according to the seniority of their creation.—The ladies take place, or *Precedency*, according to the degree of quality of their husbands.

PRECEDENT, in law, frequently denotes an original, authentic instrument, or writing; serving as a form to draw others by.

Hence *precedent-books*, &c. full of draughts of deeds, conveyances, &c. for attornies.

PRECENTOR*, **PRÆCENTOR**, a dignitary in cathedral churches, popularly called the *chanor*, or *master of the choir*.

* The *Præcentor* is so called, from the Latin *præ*, and *cans*; because he is supposed to lead the choir, and sing before the rest.

PRECEPT, PRÆCEPTUM, in law, a command in writing, sent by a chief justice, justice of peace, or other like officer, for the bringing of a person, record, or other matter, before him.

PRECEPT is also used for the command, or incitement, whereby one man stirs up another to commit felony, theft, &c.—Bracton speaks of three diversities of offending in murder, viz. *præceptio, fortia, consilium*.

Præceptio, is the instigation used before-hand; *fortia*, the assistance in the fact; *consilium*, the advice given either before or after.

PRECEPTORIAL *prebend*. See the article **PREBEND**.

PRECEPTORY, PRÆCEPTORIA, commandry; a kind of benefice held by the more eminent among the ancient knights-templars, who were created by the grand master, with the title of *præceptores templi*, i. e. *masters of the temple*.

Stephens, *de jurisd. lib. 4.* says, the *Preceptories* were only a kind of cells, all subordinate to their principal mansion, the temple in London.

Of these *Preceptories*, Dugdale says, he finds sixteen recorded; as anciently belonging to the templars in England, viz. *Cressing Temple, Balfal, Shengay, Newland, Yevely, Witham, Temple-Bruere, Willington, Rotheley, Ovingington, Temple-Comb, Trebigh, Ribfane, Mount St. John, Temple-Newium, and Temple-Hurft*. But there were more. See **COMMANDRY**.

PRECES. See the article **PRECARIE**.

PRECESSION, PRÆCESSIO, in astronomy, a term applied to the equinoxes, which, by a very slow insensible motion, change their place, going backwards, or westward, i. e. in *antecedentia*, as astronomers call it, or contrary to the order of the signs.

It is shewn, in the new astronomy, that the pole, the solstices, the equinoxes, and all the other points of the ecliptic, have a retrograde motion; and are continually moving from east to west, or from aries towards pisces, &c. by means whereof the equinoctial points are carried further and further back, among the preceding signs of stars, at the rate of about 50 seconds each year; which retrograde motion is called the *Præcessio, recession, or retrocession of the equinoxes*.

Hence, as the fixed stars remain immovable, and the equinoxes go backward, the stars will seem to move more and more eastward with respect thereto; whence the longitudes of the stars, which are reckoned from the first point of aries, or the vernal equinox, are continually increasing.

Hence it is that the constellations have all changed the places assigned them by the ancient astronomers: in the time of Hipparchus, and the oldest astronomers, the equinoctial points were fixed to the first stars of aries and libra; but the signs are now no longer in the same points; and the stars which were then in conjunction with the sun when he was in the equinox, are now a whole sign, or 30 degrees, to the east thereof: thus the first star of aries is now in the portion of the ecliptic called *taurus*; and the first star of *taurus* now resides in *gemini*; and *gemini* is advanced into *cancer*, &c.

The equinoxes will have made their revolution westward, and will be returned to aries again; or the constellations will have made theirs eastward, and will again fall into their former places, with regard to the equinoxes, in 25816 years, according to Tycho; in 25920, according to Ricciolus; and in 24800, according to Cassini.

The ancients, and even some among the moderns, have taken the equinoxes to be immovable; and ascribed that change of distance of the stars herefrom, to a real motion of the orb of the fixed stars, which they supposed to have a slow revolution about the poles of the ecliptic; so as that all the stars perform their circuits in the ecliptic, or its parallels, in the space of 25920 years; after which they should all return again to their former places.

This Period the ancients called the *Platonic*, or *great year*; and imagined, that at its completion every thing would begin as at first; and all things come round in the same order as they have already done. See *Platonic Year*.

The physical cause of the *precession* of the equinoxes, Sir Isaac Newton demonstrates, does arise from the broad spheroidal figure of the earth; which itself arises from the earth's rotation around its axis.

PRECIOUS, or **PRETIOUS** *stone*, called also *gem* and *jewel*, is a stone extraordinarily hard, durable, transparent, and of a beautiful colour or water.

Of these we may distinguish three kinds:

1. Such as are intirely transparent; which again may be divided into such as are either colourless, as the *diamond*, or coloured, as the *emerald*, *ruby*, &c.—Which division of coloured gems may be subdivided into those of one colour, as the *ruby*; and those with several, as the *opal*.

2. Brilliant, or shining, but less transparent, as the *Bohemian granate*.

3. Semi-transparent, as the *onyx*.

Bishop Wilkins divides *precious stones* into *more* and *less transparent*.

The *less transparent* he distinguishes by their colours; into red, as the *fardian* and *cornelian*; pale, fleshy colour, like that of a man's nail, as the *onyx*; bluish, as the *turquois*; and those of various colours, as *opal* and *cat's eye*.

The *more transparent* he distinguishes into such as are colourless, as the *diamond* and white *sapphire*; and coloured, which are either red, as the *ruby*, *carbuncle*, and *granate*; yellow, as the *chrysolite* and *topaz*; green, as the *emerald*, *smaragd*, and *beryl*; bluish, as the *sapphire*; and purple or violaceous, as the *amethyst*.

Dr. Woodward divides *precious stones* somewhat more precisely, into *opaque*, *semi-opaque*, and *transparent*.

The *opaque* are either of one colour, as the *turquois*; or of various colours, as the *lapis lazuli*, and *jasper*.

Semi-opaque either have their colours *permanent*, as the *agat*, *chalcadony*, *onyx*, *fardonyx*, *cornelian*, and *beryl*; or their colours *vary* according to the position of the light, as in the *oculus cati*, and *opal*.

Transparent stones are either *with colours*; as the *topaz* and *hyacinth*, yellow, or partaking thereof; *granate*, *ruby* and *amethyst*, red; *sapphire*, *water-sapphire*, and *aquamarine*, blue; and *emerald*, or *chrysolite*, green, or partaking thereof:—or *without colours*, as the *crystal*, *pseudo-diamond*, white *sapphire*, and *diamond*.

The *natural history*, *characters*, *properties*, &c. of *each stone*, see under its proper article, **DIAMOND**, **CORNELIAN**, **RUBY**, **TURQUOIS**, **ONYX**, **EMERALD**, **CHRYSOLEITE**, &c.—For the medicinal virtues of precious stones, or gems, in the general, see **GEM**.—The origin and formation of precious stones, see under **STONE**.—For the art of engraving on precious stones, see **ENGRAVING**.—The art of cutting them, see under **LAPIDARY**. Mosaic work of precious stones, see **MOSAIC**.

PRECIPE, or **PRACIPE** *quod reddat*, a writ of great diversity both as to form and use; extending as well to writs of right, as to other writs of entry and possession.

It is sometimes called a *writ of right close*, as when it issues out of the court of chancery close; sometimes a *writ of right patent*, as when it issues out of chancery patent, or open, to any lord's court, for any of his tenants deforced, against his deforser.

PRECIPITANT, **PRÆCIPITANS**, in chymistry, a term applied to any liquor, which, being poured on a dissolution, separates what is there dissolved, and makes it *precipitate*, i. e. fall to the bottom of the vessel.

Thus oil of tartar, and the volatile spirit of sal armoniac, are *Precipitants* with regard to the dissolution of gold in aqua regalis; and common water is a *Precipitant* with regard to the dissolution of jalap in spirit of wine.

PRECIPITANT is also used in medicine, for a remedy which separates and precipitates any heterogeneous matter contained in the mass of blood; and by this means abates any irregular fermentations, effluences, or the like disorders, which that matter had excited.

Among the number of *Precipitants* are ranked harts-horn, crabs-eyes, ivory, bezoard, barks of oak, and guaiacum, iron, quinquina, chalk, &c.

PRECIPITATE, **PRÆCIPITATUS**, in chymistry, a substance which having been dissolved in a proper menstruum, is again separated from its dissolvent, and thrown down to the bottom of the vessel, by the pouring in of some other liquor.

The chymists make various *Precipitates* of mercury, which are of various colours, as the precipitants vary, viz. *white*, *red*, *yellow*, *green*, &c.

White, called also *sweet PRECIPITATE*, is prepared of mercury dissolved in spirit of nitre, and precipitated with salt-water, or spirit of salt, into a white powder.

If, in lieu of the former precipitants, hot urine be poured on the dissolution, we have a *pale rose-coloured Precipitate*.

To make the *red* or *corrosive PRECIPITATE*, they take the dissolution of mercury made in spirit of nitre; evaporate all the humidity over a gentle fire, till nothing remains but a white mass; which, by increasing the fire, they rubify, or raise to a red colour.

Green PRECIPITATE is made with mercury, copper, and acid spirits;—*yellow Precipitate* with mercury, and oil of vitriol.

But these three last are improperly called *Precipitates*, because not procured by *PRECIPITATION*.

PRECIPITATION, **PRÆCIPITATIO**, an operation in chymistry; being a kind of separation, whereby a body dissolved and suspended in any menstruous liquor, is detached therefrom, and falls down to the bottom of the vessel.

Precipitation is either *spontaneous*, or *artificial*.

Spontaneous PRECIPITATION is, when the particles of the dissolved body separate of themselves from their dissolvent.

Artificial PRECIPITATION is, when some other body, called a *precipitant*, is added to procure this separation.

There is also a *total Precipitation*, wherein the dissolved parts are all separated, and sunk to the bottom; and a—*partial Precipitation*, wherein some of the parts dissolved are still suspended in the fluid, and do not fall down.

To account for the operation of *PRECIPITATION*: It may be observed, that a fluid menstruum may be made to sustain a body specifically heavier than itself, either by making the resistance, arising from the cohesion of the parts of the fluid, equal to the excess of specific gravity of those bodies above that of the menstruum.

Or, by the heavy body's being joined to some lighter one; so that the two together only make one whole, equal in weight to the fluid.

In the first case, the resistance, we know, is still proportional to the surface of the corpuscles; so that the surface being diminished, the resistance is weakened: the proportion therefore of the tenacity of the menstruum, to the gravity of the corpuscles, being thus destroyed, a *Precipitation* must ensue.

Precipitation, then, may be effected two ways, on this foundation, viz. either by the dropping in a liquor specifically lighter, or specifically heavier. In the former case, the gravity of the menstruum, which is always proportional to the compound gravities of both, will by this mixture become lighter: thus, the menstruum being diluted, the force of cohesion is also weakened, so as to become unable any longer to sustain the bodies; so hydrometers, which are easily sustained in water, upon pouring in a good deal of any burning spirits, sink to the bottom of the glass.

And this agrees not only with the laws of mechanics, but with experiments: thus spirit of sal armoniac does very plentifully precipitate the filings of metals, dissolved in acid menstrooms; though it be abundantly lighter than any of them.

The same thing is done quicker by spirit of wine, whose gravity is known to be almost the last of any liquor.

By this spirit also, all salts, when dissolved in water, are precipitated, and to unite in a solid mass. If you drop distilled vinegar into the scoria of antimony dissolved in water, it falls to the bottom, and affords the genuine sulphur.

After the same manner, water, vinegar, &c. make a *Precipitation* from acids, though more sparingly: nay, acids themselves being poured upon others, which are heavier, will precipitate whatever is swimming in them. Thus spirit of salt precipitates either lead, copper, or tin, dissolved in oil of vitriol: so little need is there of alkalies in this business, though the chymists have unanimously contended for them as absolutely necessary.

In the second case, *Precipitation* will succeed by the addition of a heavier liquor to the menstruum. For the particles of this liquor, what with their weight, and what with the impetus they acquire in their descent, carry down and sink all the solid corpuscles they meet with in their way; so that the corpuscles being thus forced down, and kept there by this adventitious liquor, cannot mount up into their former situation.

To try the truth of this reasoning by experiments; not only acid spirits, but even mere water, will be found to precipitate tinctures of vegetables extracted by spirit of wine: and the very same tinctures,

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tinctures, extracted with water or wine, are precipitated very copiously by acid spirits, which are heavier. Metals, when dissolved in spirit of sal armoniac, are precipitated with oil of vitriol, or spirit of nitre. When suspended in aqua fortis, they are precipitated with oil of vitriol, or bezoartic spirit of nitre.

As to bodies suspended by means of their union with other lighter ones : this is properly the case of dissolved metals ; and to this may the last case of *Precipitation* be reduced. Here, the particles of a metal being separated by a dissolvent, and rendered imperceptible by their extreme littleness, only float, because united to very light particles of the acid spirit, which keeps them suspended ; though the great surface they have, both on account of their smallness, and of their union with the acids, frequently contributes to the effect.

Now, as they are in a forced equilibrium with the fluid wherein they swim ; and as the causes that sustain them, are only accidental, they must of course be precipitated to the bottom, when the acid or menstruum abandons them, from whatever cause it be : it is even sometimes sufficient, that the quantity of the fluid, wherein they are sustained, be diminished. For then several of the metallic particles, though still joined to their acid, coming to meet and unite, assume a smaller surface, with regard to their mass ; and thus, being no longer held up by the largeness of their surfaces, they subside to the bottom.

When the menstruum abandons a dissolved body, if that body be lighter than the menstruum, the contrary to *Precipitation* will ensue, i. e. the body will rise to the surface : thus camphor being mixed in oil of olives, and the whole distilled, the camphor rises first, &c.

If it happen, that the particles, when abandoned by the dissolvent, are equally heavy with the sustaining fluid, they will neither rise nor fall, only several of them now reuniting, form little masses, sufficient to spoil the limpidness and transparency of the fluid, as is the case in resin dissolved in spirit of wine, and water poured over them ; where the water uniting closely with the spirit of wine, makes it let go the greatest part of the resinous particles.

Thus is effected what we call an *imperfect Precipitation*, which, in reality, is no more than a disposition to precipitate.

If in this case, the aqueous particles of the fluid be hid, and, as it were, absorbed among the gross molecules of the dissolved matter, it forms what they call a *coagulum*. See COAGULATION.

Sometimes, when the liquors are poured on one another, the salts with which they abound, being put into motion, by their attractive force, they run mutually to embrace one another, and because they do not recoil far back after the congress, they are at length so united, as to become like a solid, there being very little phlegm remaining, as is very observable in tartarum vitriolatum.

In these experiments there happens such a conflict and effervescence, as evaporates almost all the moisture, with which the salts are diluted. And upon this depends the rationale of chymical coagulation, a thing of very great consequence in the business of *Precipitation*. Nor can we account for oil of tartar's precipitating bodies dissolved in acids, any otherwise than from its making a kind of coagulum with their corpules, and thereby becoming too heavy for, and exceeding the tenacity of, the menstruum.

Such are the general principles of *Precipitation*.

PRECIPUT*, *q. d. precipitate*, in the French jurisprudence, an advantage belonging to any one, in a thing to be divided, or a portion taken off, and let by, in his favour, ere the division be made.

* The word is formed from the Latin, *precipuus*, chief, principal.

In noble partition, the eldest has always the principal sief, or manor, for his *Preciput*.—In which view, the *Preciput* coincides with the right of primogeniture.

PRECISION, *PRÆCISIO*, in the schools, the same with *abstraction*.

PRECONISATION, a proposition or declaration, which the cardinal patron makes in the consistory at Rome, of a person nominated by some prince to a prelature, by virtue of letters whereof he is the bearer ; which the pope complying with, gives his collation.

The date of the bulls is dispatched on the same day with the *Preconisation*.

PRECONTRACT, *PRÆCONTRACTUS*, a contract made before, or prior to another ; chiefly used in relation to marriages.

PRÆCORDIA, or *PRÆCORDIA*, &c. the parts about the heart, *e. gr.* the pericardium, the diaphragm, the hypochondria, and even the heart itself, with the lungs, spleen, &c.

The word is also ordinarily used for the fore-part of the region of the thorax. See THORAX.

Pliny, and some other authors, use it for all the viscera or entrails : *Præcordia vocamus uno nomine exta in homine*.

One of the principal differences between men and brutes consists in this, that there is a greater correspondence and communication between the head and heart of the former than in the latter ; which correspondence is effected by means of a greater number of nerves, sent from the brain to the heart and Pre-

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cordia ; brutes only receiving nerves to the *Præcordia* by the branches of the par vagum ; but man, likewise, by the intercostal pair.

The reason, Dr. Willis well observes, is, that brutes being void of discretion, and but little subject to passions, need not, like man, a double passage for the spirits, the one for the service of the vital functions, the other for the reciprocal impression of the affections.

PRECURSOR, *PRÆCURSOR*, *fore-runner*, in theology, a person who goes before any one to notify his coming.

The term is peculiarly applied to St. John Baptist, who is styled the *Precurser* of Jesus Christ, from what is said of him by St. Luke, *Thou, child, shalt go before the face of the Lord, to prepare his way*.

PREDECESSOR, a person who has preceded another in the same office or employ. See ANCESTOR.

PREDESTINARIAN, a person who adheres to the doctrine of absolute predestination.

St. Augustin is looked on as the founder of the sect of *Predestinarians*, he being the first of the fathers that seems to have asserted the doctrine in such express terms ; though the Janfenists and Jesuits are still greatly divided about the real doctrine of St. Augustin, in this article, each interpreting him consistently with their own scheme.

Father Sirmond contends for an ancient sect of *Predestinarians*, or *predestinians*, *prædestinati*, cotemporary with St. Augustin himself, and who had their rise in Africa, in the monastery of Adrumetum, from a misunderstanding of St. Augustin's doctrine. It is added, that the opinion spread thence throughout the Gauls, where one of them, a priest, named Lucidus, was condemned by Faustus bishop of Rheggio, and his sentence was confirmed by two councils.

The doctrine was again broached in the ninth century, by Godeschalvus a Benedictine ; who, as Hincmar in a letter to pope Nicolas, says, maintained with the ancient *Predestinarians*, who had been already anathematized, that God *predestinated* some to eternal Life, and others to eternal death ; that God did not will all people to be saved ; that Jesus Christ did not die for all, but only the elect, or those that are saved, &c. See GRACE, &c.

This doctrine was again condemned in a synod held at Mentz : but the Janfenists, particularly the friends of Meff. de Port-Royal, and among the rest, the president Mauguin, have refuted F. Sirmond, and shewn, that the heresy of the *Predestinarians* is a mere chimæra ; adding, that St. Fulgentius, St. Prosper, and the other disciples of St. Augustin, only looked on it as an imaginary heresy, invented by the enemies of St. Augustin's doctrine, to traduce it.

In effect, the chief evidences father Sirmond produces to the contrary, are the priests of Marfeilles, who are suspected of semi-pelagianism.

PREDESTINATION, *PRÆDESTINATIO*, in theology, a judgment, or decree of God, whereby he has resolved, from all eternity, to save a certain number of persons, hence named elect.

Others define *Predestination*, a decree to give faith in Jesus Christ, to a certain number of men, and to leave the rest to their own malice, and hardness of heart. See FAITH.

The Remonstrants define *Predestination* more laxly and generally, the decree of saving believers, and damning unbelievers.

The greatest difficulties wherewith the modern theology is clogged, turn on the article of *Predestination* : both the Romish and Reformed churches are divided about it : the Lutherans speak of it with horror ; the Calvinists contend for it with the greatest zeal ; the Molinists and Jesuits preach it down as a most dangerous doctrine ; the Janfenists assert it as an article of faith : the Arminians, Remonstrants, and Pelagians, are all avowed enemies of *Predestination*.

Those strenuous patrons of Janfenism, the Port-Royalists, teach, that God *predestinates* those who he foresees will co-operate with his grace to the end. Du Pin adds, that men do not fall into sin, because not *predestinated* ; but they are not *predestinated*, because God foresaw their sins.

PREDESTINATION is also used for a concatenation of second causes appointed by providence, in virtue whereof, things are brought to pass by a fatal necessity, contrary to all appearances, and in spite of all opposition.

The Turks are great *predestinarians* ; they esteem the lightest accident predetermined, and on this account, are much more daring in battle, and run greater risks of their lives, than they would otherwise do. See ELECTION and REPROBATION.

PREDETERMINATION, *PRÆDETERMINATIO*, in philosophy and theology.—The schoolmen call that concurrence of God, which makes men act, and determines them in all their actions both good and evil, *physical Predetermination*, or *premotion*.

Divines hold, that God has no part in sin, inasmuch as he only affords his concurrence to the physical part of human actions, not to the moral part.

Physical Predetermination, or *premotion*, if there be any such thing, is that action of God, whereby he excites a second cause to act ; or by which, antecedently to all operation of the creature, or before it could operate in consequence either of the order of nature or reason, he really and effectually moves, and occasions

occasions it to produce all its actions: that is, whatever the creature does or acts, is really done and acted by the agency of God on the creature, who is all the time passive. So that without such *Predetermination* of God, all creatures must remain in an eternal state of inactivity, and with such *Predetermination*, it is impossible but that they should do what they are thus put upon doing.

It is strongly controverted, whether or no such a *physical Predetermination* be necessary to the action of natural causes? The Scotists maintain the negative; urging, that all natural causes are, of their own nature, determined to a certain action; whence it should seem needless to call in a new *Predetermination* of God, *e. gr.* to fire, to make it warm the hand. For if an object be, by the course of divine providence, applied to fire; what need a second application of the fire, to make it warm the object applied thereto? since beings are not to be multiplied unnecessarily.

And such *Predetermination* some philosophers hold still less requisite to produce the acts of the will: at least, say they, the human mind must be allowed the common power and privilege of a second cause, and therefore be intitled to produce its own acts, as well as other strictly natural agents. See *WILL*. The Thomists, on the other hand, stand up strenuously for the *physical Predetermination*: one of their principal arguments is drawn from the subordination of second causes to the first. Where there are several subordinate agents, say they, the lower agents do not act, unless first moved and determined thereto by the first; this being the very essence of subordination.

Again, the like they argue from the dominion of God over all his creatures: it is of the essence of dominion, say they, to apply and direct things subject thereto, to its own operations, and this, if the dominion be only moral, morally; but if it be also physical, physically. And that this is the case in respect of God and his creatures, is confessed. See *GOD* and *LIBERTY*.

PREDIAL tithes, *decimæ PRÆDIALES*, are tithes paid of things which grow from the ground only, as corn, hay, fruit, &c. See *TITHES*.

PREDIATORY debt. See the article *DEBT*.

PREDICABLE, *PRÆDICABILE*, in logic, a general quality, or epithet, which may be predicated of, or applied to, several subjects.

Thus animal is *Predicable* both of man and beast: man is *Predicable* of Peter and James: triangle is *Predicable* of an hundred different kinds of figures, as right angles, scalenes, isosceles, &c.

The schoolmen reduce the *Predicables* to five classes, *viz.* *genus, species, proprium, differentia*, and *accident*, under one or other of which all that can be predicated of any subject, is included.

A *Predicable* is also called *universale logicum*, as having respect to other, particular, and inferior, or subject things: thus animal is an universal, with regard to man and beast.

It is called a *logical universal*, to distinguish it from a metaphysical one, which is a common being, considered in itself, and therefore denominated universal in essendo; whereas the logical one is only universal as to our conception and application.

Among the schoolmen, *Predicable* is usually defined *unum, aptum prædicari de multis, univocè, & divisiim*: or, somewhat more clearly, a *Predicable* is a nature which may be predicated univocally of all things to which it is common, and which, as it is divinely multiplied in all its subordinations, may be aptly predicated of them all.

Thus, when the appellation of *virtue* is attributed to justice, prudence, temperance, fortitude, charity, &c, the same reason may be given why each is distinguished by such name, as being all founded in a mediocrity, and being agreeable to right reason, which is the character of virtue.

Hence, if there be several things called by some common name, but the reason of such name is not the same in all, but different; these do not come under the number of *Predicables*. As in the instance, *canis*, dog, which is both applied to a domestic animal, distinguished by its barking; to a constellation of the heavens; and to a sea-fish.

The way by which the mind comes to form such *Predicables*, or universals, is this: among those things which fall under our observation, we find some characters and properties common to several, and others peculiar to each: what we find common, we consider apart, and thus we form an universal equally applicable to all. See *UNIVERSAL*.

PREDICABLY, *PRÆDICABILITER*, is used in the schools in opposition to *predicamentally*.—Thus, matter is said to be united to form *Predicably*, or *per accident*, to exclude the notion of a predicamental accident.

PREDICAMENT, *PRÆDICAMENTUM*, in logic, a class, or order of beings, or substances, ranged according to their natures, called also *category*, and sometimes *categorema*.

The word *prædicamentum* was first introduced by Boethius, in lieu of the Greek *κατηγορία*; and is used among the school-writers with a good deal of latitude and variety: for it either signifies the act of *predicating*, or a common predicate itself; or, the genus or basis of any category; or, the collection of

several common predicates disposed in a certain order:—which last is its most usual acceptation.

Hence some define *Predicament*, a series of predicates traced from the genus, or highest term, through all the inferior genera and species.—Thus, a series of *substance* drawn from *substance* through *body, living, animal, man*, to *Peter*, is called the *Predicament* of substance.

The usual definition among logicians is, that *Predicament* is a natural order, or scheme, of some most general or universal thing, and of all that is contained under the same, that is, all the subordinate genera, species, and individuals.

The properties of a *Predicament*, *ex parte vocis*, i. e. of the term or word whereby the *Predicament* or predicamental series is denoted, the logicians hold, are, that it be *one, simple, precise, and concinnous*.

Vox una, & simplex, rebus concinna locandis.

The conditions requisite *ex parte rei*, or of the thing to be ranged in a *Predicament*, are contained in the following verse:

Entia per se, finita, realia, tota.

i. e. it must be a *positive being*, in exclusion of non-entities, negations, privations, impossibilities, &c. and a being *per se*, to exclude accidental things, factitious things, &c. and *finite*, that is, of a limited nature and extent, to exclude God and other transcendents: *real*, since its intention is for the better and more commodious disposing of things in their places, to be the more distinctly known and conceived; and *subale*, or complete, as not being in the relation of a component part, or as only accessory to some other.

PREDICAMENTAL accident. See the article *ACCIDENT*.

PREDICATE, *PRÆDICATUM*, in logic, that part of a proposition which affirms or denies something of the subject.

Thus, in, *God made the world*; *made the world* is the predicate; and *God* is the subject.

A *Predicate*, say the schoolmen, is properly a name predicated or spoken of another, as its subject: as *man*, in the proposition, *Peter is a man*.

It is a celebrated rule or law of *Predicates*, that nothing is esteemed to be absolutely spoken or affirmed of another, unless it be affirmed thereof in such manner, or by such an affirmation, as wants nothing either in the subject, *Predicate*, or copula, to make it true.

This also is a noted property of a *Predicate*, that it contains, in some measure, its own subject: thus, metal contains gold, copper, iron, &c. of which it is predicated.

The word *Predicate* is sometimes used indifferently with *attribute*; but the more accurate writers make a distinction. Every *Predicate* is indeed an attribute, since whatever is predicated of a thing, is attributed to it: so, if animated be predicated of man, it is also attributed to him: but every attribute is not a *Predicate*: thus soul, learning, &c. are attributed to man, but not predicated of him.

PREDICATING, in logic, is properly the act of affirming or denying somewhat of something.—As, *Man is not a stone*; *body is a substance*. The thing thus predicated, is called *predicate*.

In the doctrine of universals, or predicables, to *predicate* is to speak or declare a thing truly, directly, and affirmatively. Thus man is predicated of several, i. e. it is truly and directly affirmed that these several are men; as when I say, *Socrates is man, Plato is man, Aristotle is man*, &c.

The things predicated of others are reducible to three classes: genera, as animal, of man, &c. *formæ*, as whiteness, of a swan, &c. and *equals*, of things of equal extent, as species, difference, proprium, &c.

The schoolmen distinguish several ways of *Predicating*, as, 1. *In quod tantum*, which is to predicate essentially, both as to the thing and the manner, as, *Justice is a virtue*. 2. *In quale tantum*, which is to predicate accidentally, both as to the thing and the manner, as, *Peter is learned*. And, 3. *In quale quid*, or *in quale post quid*, which is to predicate both essentially and accidentally, as, *Man is rational*.

PREDICTION, *PRÆDICTIO*, divination, prophecy, or foretelling of what is to come, either by divine revelation, by art and human invention, or by conjecture.

Divines labour hard to make the *Predictions* in the Old Testament tally with the events in the New.

The *Predictions* of oracles were all dark and ambiguous.

PREDOMINANT, *PRÆDOMINANS*, that which prevails, appears most, or has some superiority or ascendancy over another thing.

Thus we say, bitterness is the *Predominant* quality among tastes, or that which is most perceived. It is a rule, that sugar is never to predominate in confections, nor pepper in ragouts.

PRE-EMPTION, *PRÆEMPTIO*, a privilege anciently allowed the king's purveyor, of having the choice and first buying of corn and other provisions for the king's house, but taken away by the *stat. 10. Car. 2.*

PREENING, in natural history, the action of birds, cleaning, composing and dressing their feathers, to enable them to glide more easily through the air.

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For the use herein, nature has given them an admirable piece of furniture, viz. two peculiar glands, which secrete an unctuous matter into an oil-bag, perforated; out of which the bird, on occasion, draws it with his bill. See OIL-BAG.

PRE-ESTABLISHED *harmony*. See the article HARMONY.

PRE-EXISTENCE, *PRÆEXISTENTIA*, the state of a thing actually in being before another.

The ancient Pythagoreans and Platonists all asserted the *Pre-existence* of human souls, i. e. that they were in being before they were joined to our bodies.

Origen also held the eternal *Pre-existence* of souls.

The orthodox believe, that God created the world out of nothing; and not of a *pre-existent* matter.

Some persons have held mankind *pre-existent* to Adam. See *PRE-ADAMITE*.

PREFACE *, *PRÆFATIO*, an advertisement in the beginning of a book, to inform the reader of the design, order, method, &c. observed therein; of what is necessary to receive its full effect, and facilitate the understanding thereof.

* The word is formed from the Latin *præ* and *fari*, q. d. to speak before.

There is no part of writing that requires more art and address, or that fewer authors succeed in, than *Prefaces*. Prefacing is, in effect, a particular species of writing, and has its peculiar character and taste, to distinguish it from all others. It is neither argumentation, discourse, narration, nor apology.

PREFACE of the mass.—The Romanists call that part of their mass, which precedes the consecration, and which is to be rehearsed in a peculiar tone, *Preface*.

The use of *Prefaces* in the church, they contend, is very ancient; and conjecture, from some passages of St. Cyprian, &c. that it was in use in the times of the apostles.

The *Preface* to the mass anciently had, and still has, very different names in different churches. In the Gothic, or Gallican rite, it is called *immolation*; in the Mozarabic rite, *illation*; anciently among the French, it was called *consecration*; in the Roman church alone, it is called *Præfatio*, *Preface*.

PREFECT, *PRÆFECTUS*, in ancient Rome, was one of their chief magistrates, who governed in the absence of the kings, consuls, and emperors.

His power was somewhat different at different times; but was always greatest under the emperors. His principal care was the government and administration of the city of Rome.

He took cognizance of all crimes committed in the city, or within an hundred miles thereof. He judged capitally and finally, no appeal lying from him; and even by the 62d novel, he presided in the senate, taking place before all the patricii and consulares, &c.

He had the superintendence of the provisions, policy, buildings, and navigation.

There is still a *Prefect* of modern Rome, who is a kind of governor; differing little from the ancient *præfektus*, except that his authority only extends to 40 miles round the city, whereas that of the *Prefect* of ancient Rome reached 100 miles round.

PREFECT of the pretorium, *PRÆFECTUS prætorii*, was the chief or leader of the pretorian bands, or cohorts, destined for the emperor's guard.

The pretorian legion, according to Dion, consisted of ten thousand men. Suetonius refers the institution of *præfektus prætorii* to Augustus. It is added, that he was usually taken from among the Roman knights.

By the favour of the emperors, his authority grew very considerable; insomuch that he became the arbiter and supreme judge of all affairs.

To reduce this extravagant authority, Constantine divided the *præfektura* of the pretorium into four *præfekturas*; and each of these he again subdivided into civil and military departments; though the name was only referred to him who was invested with the civil authority; and that of *comes belli* given him who had the command of the cohorts. See *COUNT*.

Thus the office of *Prefect* of the pretorium, which, in its origin, and till the time of Constantine, was military, and succeeded to that of *magister equitum*, now commenced a purely civil magistrature; and at length became the prime dignity of the empire.

The succeeding emperors, following Constantine's division, divided the empire into four *præfekturas prætorii*, as into four dioceses, viz. the Gauls, Illyria, Italy, and the East. See *DIOCESIS*.

The provinces whereof these dioceses consisted, had their particular governors; at the head of whom was the *Prefect*, who, though he had not the command of the army, yet had the power of the sword, decided ultimately of all causes, and had all the marks and honours of sovereignty.

Justinian created a fifth *Prefect* of the pretorium for the government of Egypt, which had been torn off from the diocese of the East by the invasion of the Vandals during the empire of that prince.

Under Augustus, the officer sent to govern Egypt with a consular authority, was called *præfektus Augustalis*.

PREGNANCY, the state of a woman when she has conceived, or is with child.

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The same state, with a view to the bearing of the child in the womb, is called *gestation*.

Hence also the act of *impregnating*. See *GENERATION*, *FLOWER*, and *SEED*.

PREGNANT.—*Negative PREGNANT*, in law. See *NEGATIVE*.

PREJUDICE, *PRÆJUDICIUM*, a false notion or opinion of any thing, conceived without a due previous examination thereof.

Prejudice, q. d. pre-judgment, does not import a judgment merely as prior to another in respect of time, but as being prior thereto in respect of knowledge, or of sufficient attention to the thing; the preposition *præ* expressing an anticipation, not so much of time, as of knowledge and due attention. See *ERROR*.

Hence *Prejudice* is also called among the schoolmen *anticipatio*, & *præventa cognitio*, a preconceived opinion, &c.

PREJUDICIAL *action*. See the article *ACTION*.

PRELATE *, *PRÆLATUS*, an ecclesiastical superior, raised to some eminent and superior dignity of the church.

* The word comes from the Latin *præ*, before, and *ferre*, I bear, carry.

Patriarchs, primates, archbishops, bishops, generals of religious orders, certain crosiers and mitred abbots, and even deans and archdeacons, are ranked among the number of *Prelates*.

PRELATE of the garter, is the first officer of that noble order, and is as ancient as the institution itself.

William de Edynton, then bishop of Winchester, was the first *Prelate* at the erection of the order; and it has been continued in that fee ever since.

It is an office of great honour, but has neither salary nor fees; only a convenient lodging allowed in Windsor-castle; and as oft as the *Prelate* comes thither, (by the sovereign's command) he is to have court-livery allowed for himself and servants.

PRELIMINARY *, or *PRÆLIMINARY*, something to be examined, dispatched, or determined, ere an affair can be treated of thoroughly, and to purpose.

* The word is formed from the Latin, *præ*, before, and *limen*, threshold.

Preliminaries of peace generally take up the greatest part of treaties. They consist in examining of powers, qualities of princes, ranks of ambassadors, &c.

PRELUDE, *PRÆLUDIUM*, in music, a symphony used by way of introduction or preparation to what follows.

A *Prelude* is usually a flourish, or an irregular air, which the musician plays off-hand, to see if his instrument be in tune; and to lead him into the piece to be played.

PREMISES, *PRÆMISSÆ*, in logic, the two first propositions of a syllogism.

When a syllogism is in form, the two *Premises* being granted, the conclusion cannot be denied.

The *Premises*, says Chauvin, are properly the parts of the antecedent of an argument, when complex; and are called *præmissæ*, because premised to the conclusion.

Thus in the argument, *Every man is an animal, Peter is a man, therefore Peter is an animal*: the propositions, *every man, &c.* and *Peter, &c.* are the *premisses*.

Premises are the principles of our reasonings; as being clear, evident, and demonstrative propositions, from the relations whereof to one another, we draw or infer new truths, propositions, &c.

The *Premises* are either equal, where neither suffices alone for the drawing a conclusion, as in the instance above; or *unequal*, the one *major*, greater, from which alone the conclusion is drawn; the other *minor*, or less, which only serves in applying the antecedent to the consequent.

In the common practice of the schools, however, every syllogism, or formal argument, of what kind soever, is said to have a *major* and a *minor*, how equal soever the *Premises* may be. See *MAJOR* and *MINOR*.

PREMISES, in law, the lands, &c. mentioned in the preamble or beginning of a deed, lease, conveyance, or the like.

PREMIUM, or *PRÆMIUM*, literally denotes a reward or recompence.

Among merchants it is taken for that sum of money, viz. 8 or 10 per cent. which is given to an insurer, for insuring the safe return of any ship or merchandize.

PREMIUM is also used in the money and paper-trade, for what is given for a thing above par.

Thus, lottery-tickets, &c. are said to bear so much, *e. gr.* 10 or 20 s. *Premium*, when they are sold for so much beyond the prime cost, at which the government issued them.

PREMONSTRANTES, or *PRÆMONSTRATENSES*, a religious order of regular canons instituted in 1120, by S. Norbert; and thence also called *Norbertines*.

The first monastery of this order was built by Norbert in the Isle of France, three leagues to the west of Laon; and by him called *Præmonstre*, *Præmonstratum*, whence the order itself was denominated; though, as to the occasion of that name, the writers of that order are divided.

The order was approved by Honorius II. in 1126, and again by several succeeding popes. At first the abstinence from flesh was rigidly observed. In 1245, Innocent IV. complained of its being neglected, to a general chapter. In 1288, their general,

William, procured leave of pope Nicolas IV. for those of the order to eat flesh on jurnies. In 1460, Pius II. granted them a general permission to eat meat, excepting from Septuagesima to Easter.

The religious of this order are clothed in white, with a scapulary before the cassolet. Out of doors they wear a white cloak and white hat; within, a little camail, and at church, a surplice, &c.

In the first monasteries built by Norbert, there was one for men, and another for women, only separated by a wall. In 1137, by a decree of a general chapter, this practice was prohibited, and the women removed out of those already built to a greater distance from those of the men.

PREMOTION, PRÆMOTIO, in the schools, the action of God co-operating with the creature, and determining him to act.

Physical Premotion, according to Alvarez, Lemos, &c. is a complement of the active power, whereby it passes from the first act to the second, i. e. from a complete, and next power, to action. It is an influence or participation of the virtue of the first cause, which makes the second cause actually active. See **CAUSE**.

PREMUNIENTES, in law, writs dispatched to each bishop to call them to parliament, warning them to bring with them the deans and archdeacons, one proctor for each chapter, and two for the clergy of his diocese. See **CONVOCACTION**.

PREMUNIRE*, a term used both for an offence, for a writ granted thereupon, and for the punishment thereof.

* The word is a corruption of the Latin, *præmonere*, q. d. to forewarn, or bid the offender take care; of which a reason may be drawn from the words of the statute 27 Edw. 3. and the form of the writ, *Præmunire facias præfatum præpositum, &c. J. R. procuratorem, &c. quod tunc faciat coram nobis*.

These will all be understood from one; anciently, then, the church of Rome, on pretence of her supremacy, and the dignity of St. Peter's chair, took upon her the disposal of most of the bishopricks, abbeyes, and other ecclesiastical benefices of worth, by mandates or bulls, called *expectative graces*, and *provisions*, before they become void.

Edward III. not brooking so intolerable an incroachment, made several statutes against those who drew the king's people out of the realm, to answer to things properly belonging to the king's court; and another to restrain the privilege of the pope.

The pontiff, however, still persisted in his pretensions; and the conflix of people from England to Rome, to sue for them, was as great as ever.

This occasioned Richard II. to make several statutes of the like import. With those of Edward III. and particularly one, where he assigned their punishment to be this; *That they should be out of the king's protection, attached by their bodies, i. e. imprisoned during life; and lose their lands, goods and chattels; which is since called the penalty of a premunire*.

Henry IV. made new statutes against other abuses of this kind not fully obviated in those of his predecessors; adding certain new cases, and laying on them the same penalty.

By later statutes, the like penalty of *premunire* is laid on some other offenders; as, e. g. by that 1 Eliz. on him who denies the king's supremacy a second time.—By 13 Eliz. on those who assist the pope's authority, or refuse the oath of supremacy; on seditious talkers of the inheritance of the crown; and such as affirm the king or queen to be a heretic.—And by statute 13 Car. 2. on those who affirm that the parliament begun November 1st 40. is not yet dissolved; or that there is any obligation in an oath or covenant, &c. to endeavour a change of government either in church or state; or that the houses of parliament have a legislative authority without the king.

PREMUNIRE is now chiefly used for the punishment appointed the statutes above-mentioned.—Thus, when it is said a man for an offence *shall incur a premunire*, it is meant, he shall incur the penalty appointed by the statute 16 Ric. 2. commonly called the *statute of premunire*.

PRENDER*, in law, a power or right of taking a thing before it is forfeited.

* The word is formed from the French, *prendre*, to take.

Such a thing *lies in render, but not in prender*. *Coke's Rep. part 1.* Sir John Peter's case.

PRENDER de baron is an exception to disabla a woman from pursuing an appeal of murder against the killer of her former husband, taken from her having married a second. See **APPEAL**.

PRENOMEN, PRÆNOMEN, among the Romans, a proper name, or name prefixed to the general name of the family; as, Caius, Lucius, Marcus, &c. See **NAME**.

The *Prænomens* answers to our Christian name, Peter, Paul, &c. It was not introduced among the Romans till long time after the *nomen*.

The name of the family was given by the Romans to their children the day after their birth; but the *Prænomens* was not given them till they took the virile habit.

Varro reckons up thirty *prænomina* among the Romans. The usual ones may be reduced to eighteen.

The Greeks had no *prænomina*; they had but one name. See **NAME**.

PRENOTION, PRÆNOTIO, or **PRÆCOGNITIO**, a notice,

or piece of knowledge preceding some other, in respect of time. Such is the knowledge of the antecedent; which must precede that of the conclusion.

PREPARANTIA, or **PRÆPARANTIA vasa**, in anatomy, the spermatie vessels; being two arteries, and as many veins of the testicles; thus called by the ancients, from an opinion that the seed began to be prepared herein. See **SPERMATIC vessels**, and **GENERATION**.

PREPARATION, PRÆPARATIO, apparatus, in mathematics, makes one of the parts or branches of a demonstration.

It is to be a proposition in geometry that is to be demonstrated, the *Preparation* consists in certain lines to be drawn in the figure: if a proposition in arithmetic, in some computation to be made to come the more easily at the demonstration.

PREPARATION, in chymistry and pharmacy, is applied to the several manners of managing the materia medica, and of disposing it to serve the several purposes.

There are various *Preparations* of mercury, antimony, and other drugs to purify them, sublime, calcine, edulcorate them, &c.

Crude antimony is used in sudorific decoctions; though, when it has undergone a certain *Preparation*, it becomes a violent vomitive.

PREPARATORY torture. See the article **TORTURE**.

PREPARED antimony. See the article **ANTIMONY**.

PREPARED opium. See the article **OPIMUM**.

PREPENSED, PRÆPENSUS, in law, denotes *fore-thought*.

In which sense we say, *prepened malice, &c.*

If, when a man is slain upon a sudden quarrel, there were malice *prepened* formerly between them, it makes it murder; and, as it is called in some statutes, *prepened murder*.

PREPOSITION, PRÆPOSITIO, in grammar, one of the parts of speech or discourse.

The *Preposition* is an indeclinable particle, which yet serves to govern the nouns that follow it. Such are, *per, pro, propter, in, with, through, from, by, &c.*

They are called *Prepositions*, because *præpositæ*, placed before the nouns they govern.

F. Buffer does not allow the *Preposition* to be a part of speech, but merely a modificative of a part of speech, viz. of the noun; serving only to modify or circumstantiate it. See **MODIFICATIVE**.

PREPOSITUS villæ is sometimes used for the chief officer of the king, in a town, manor, or village.

In ancient records, the *Præpositus villæ* was no more than the bailiff of the lord of the manor.

Præpositus villæ is sometimes also used, in later writers, for the constable of a town, or petty constable. See **CONSTABLE**.

PREPOSITUS ecclesiæ. See the article **CHURCH reeve**.

Quatuor homines PRÆPOSITI, in Crompton, &c. denote four men of each town, which are to appear before the justices of the forest in their circuit.

PREPUCE, PRÆPUTIUM, in anatomy, the *fore-skin*; a prolongation of the cutis of the penis, covering the glans, or extremity of the yard.—See *tab. anat. (splanch.) fig. 10. lit. c.c.*

Dr. Drake observes, that nature does not seem more various in any part of her works than in the *Prepuce*; for the figure and proportion whereof there does not seem any standard.

Hence, probably, arose the necessity of circumcision, so generally practised throughout the oriental parts of the world; not out of a view to religion, but to cleanliness, and to prevent diseases, which a detention of the mucus of the *sub-preputal* glans might breed in those hot countries. For even here, the same author adds, he has known some, who, having large *Prepuces*, called *filbert-Prepuces*, have been frighted at the appearance of a mucus oozing out upon a mere plenitude from between the *Prepuce* and glans; which, it is probable, the great legislator of the Jews might have a view, to in the first institution of circumcision.

The skin of the *Prepuce* is double; at the connexion of the internal skin, to the other part, are several oval and roundish glandules placed irregularly about the joining of the glans to the corpora cavernosa, and on the glans itself.

Their use is to separate a liquor to render the agitation of the *Prepuce* on the glans easy. When this liquor becomes rancid, as upon old age, or venereal contacts, it excoriates the glans and *Prepuce*; and even sometimes contracts the latter, and renders it necessary to be divided, to afford a passage to the glans. See **PHIMOSIS** and **PARAPHIMOSIS**.

PREROGATIVE, PRÆROGATIVA, a privilege or pre-eminence, which one person has over another.

The word is borrowed from the appellation of a century in ancient Rome, which gave the first vote, or suffrage, in the *comitia*, or assemblies for the election of magistrates; *quasi prærogati*; because first asked, or their suffrage first required.

Their vote was called *omen prærogativum*, because the rest usually gave their votes the same way.

PRÆROGATIVE of the king, PRÆROGATIVA regis, is that power, pre-eminence, and privilege, which the king hath over, not only other persons, but over the ordinary course of the common law, in right of his crown.

Such

Such are these, that the king may pardon a person condemned to die: that the king's person is subject to no man's suit: his possessions cannot be taken from him by any violence, or wrongful seizure: his goods and chattels are subject to no tribute, toll, or custom, nor are they distrainable, &c.

PREROGATIVE COURT, is a court belonging to the archbishop of Canterbury, wherein all wills are proved, and all administrations granted, that belong to the archbishop by his *Prerogative*; that is, where the party at his death had bona notabilia, five pounds or upwards, out of the diocese where he died, and within the archbishop's province.

All citations and decrees of this court run in the name of the archbishop.

This court, for the province of Canterbury, is kept in the common-hall in Doctors Commons, in the afternoon, next day after the arches.

The judge is attended by the register, who sets down the decrees and acts of court; and keeps records, &c. all original wills and testaments of parties dying, having bona notabilia.

The place is usually called the *Prerogative office*, it is now kept in Dean's court; where, for a moderate fee, one may have a copy of any such will. See **WILL**.

The archbishop of York hath also the like court, called his *exchequer*.

PRÆSAGE, PRÆSAGIUM, an augury, or sign of something to come.

The Romans judged of future events by certain signs, which their superstition, or the artifice of their priests, had invented. Their most celebrated *Præfages* were founded on the flight of birds, or the entrails of victims: all night-birds passed for birds of ill *Præfage*.

It is a popular error, that comets *Præfage* misfortunes.

Close weather, and a southern wind, *Præfage* rain.

PREBYTA, *myopes*, in optics, a term applied to persons in whom the configuration of the crystalline of the eye is too flat, so that they see distant things clearly, but those near at hand confusedly.

The reason is, that in near objects, the visual rays passing the retina before they unite, there can be no distinctness, since the distinct base falls too far off beyond the retina.

This defect is helped only with convex-glasses, or spectacles; which will make the rays converge sooner, and if they are well fitted, fall exactly on the retina.

The word is formed from the Greek, *μυωβος*, *senex*; because old people are naturally subject to this defect; time, and the friction of the eye lids, &c. gradually wearing the ball flat.

Prebytae are opposed to *myopes*, in whom the crystalline is too round.

If the distance between the retina and the crystalline be too small, the person will likewise be a *Prebyta*. See **EYE** and **VISION**.

PREBYTER, a priest, or person in priests orders.

He is thus called, from the Greek, *πρεβυτερος*, *elder*, of *πρεβος*, *old*; because, anciently, none were ordained but such as were advanced in years.

The great dispute between the retainers to the Geneva and the Roman discipline, is about the sameness or difference of *Prebyters* and bishops, in the times of the apostles.

The *prebyterial* character is held indelible.

PREBYTERIANS, a name assumed by the Calvinists of Great Britain.

The *Presbyterians*, as to doctrine, agree with the church of England: their chief difference lies in the point of discipline, viz. who shall appoint the governors of the church, and what subordination there shall or shall not be between them?

The *Presbyterians* allow of no hierarchy, no subordination in the persons of their ministers; bishops and priests, they maintain, in the times of the apostles, were the same; and therefore, though they allow episcopacy as now settled in the church of England to be very ancient, yet they deny it to be *jure divino*.

In lieu of a series of ministers one over another, in quality of priests, bishops, and archbishops, their polity consists in a series of assemblies, or synods: thus every minister is to be obedient to the classis under which he lives; and that class to a synod, provincial, classical, or oecumenical.

The power of ordination, with them, resides in a classis, and none are admitted to administer the sacrament, but those ordained by the imposition of hands of other ministers.

They make use of deacons to take care of their poor; and in the government of the church, they call in lay-elders; whence their name, from the Greek, *πρεβυτερος*, signifying *senior*, *elder*.

This is now the reigning discipline in the church of Scotland; as it was, during the inter-regnum, in England.

PREBYTERIUM, PRESBYTERIUM, πρεβυτεριον, an assembly of the order of presbyters, or priests, with lay-elders, for the exercise of church discipline. See **PREBYTERIAN**.

The kirk, or church of Scotland, is divided into sixty-nine *presbyteries*, each consisting of a number of parishes, not exceeding twenty-four, nor less than twelve.

The ministers of these parishes, with one ruling elder chosen half-yearly, constitute a *Presbytery*, who, meeting in their

chief town, whence the *Presbytery* is denominated, chuse a moderator, or more properly a prolocutor, half-yearly.

They determine all appeals from kirk sessions, i. e. from the several parochial assemblies; but can try nothing at the first instance cognizable before a kirk session.

They compose all differences between ministers and people; for which end they hold *presbyteral* visitations in each parish, where they examine the registers of the kirk sessions, &c.

They inquire into repairs of churches; see that the glebe, &c. suffer no dilapidations; appoint schools in the parishes; and see that the funds be not misapplied.

It is they alone can exclude from the communion, license probationers, suspend, depose, and, in effect, determine all ecclesiastical matters within their district. From the *Presbytery* there lies an appeal in all cases to provincial synods.

PRESBYTERY, presbyterium, is sometimes also used for the choir of a church, because anciently appropriated to the presbyters.

In opposition to the *nave*, or body of the church, which was for the people.

PRESCIENCE, in theology, *prevision*, or *fore-knowledge*; that knowledge which God has of things to come.

The doctrine of predestination is founded on the *prescience* of God, and on the supposition of all futurity's being present to him.

Human reason can scarce reconcile the *prescience* of God with the free-agency of man.

How are we to admire the depth of the *prescience* and wisdom of God; who, in giving the first motion to matter, foresaw all the possible combinations this first impression might undergo during infinite ages! Malebr.

PRESCRIPTION, PRÆSCRIPTIO, in law, a right or title acquired by use and time.

Prescription is a sort of title introduced for assuring the property of effects in favour of persons who have possessed them a certain time; and to keep off any who would disquiet them, or recover the thing possessed, after the term fixed by the laws.

Tourneil calls *Prescription* a penalty imposed by the laws upon negligence; and adds, that possessors who have no other title to plead but *Prescription*, are only legal usurpers.

In effect, however, the law of *Prescription* does not punish the indolence of proprietors; but only interprets their silence for their consent, presuming, that a man who neglects to assert his right for a long series of years, gives it up.

There are some of the lawyers who doubt, whether time and unjust *Prescription* be any legitimate means of acquiring? Others, more favourable, call it the *patroness of mankind*; as being a general presumption, under which the law will have men live in peace.

In the common law, *Prescription* is usually understood of a possession from time immemorial, or beyond the memory of man; as, when my ancestors, or his from whom I have an estate, have enjoyed and used it all the time whereof any memory remains.

But in the civil law, and even in our common law, there are *Prescriptions* of a much shorter date. *Prescription* of forty years excludes all actions whatever. *Reform. Leg. Eccles.*

The custom of Paris allows of a *Prescription* of ten years, if the parties be present; and of twenty, if absent, in favour of peaceable possessors of an inheritance, if they have any title, however controverted; and of thirty years in favour of those who possess without any title at all.

In Normandy, a *Prescription* of forty years peaceable possession is equivalent to a title, to immovables; and for moveables, and personal actions, a *Prescription* of thirty years suffices.

In Romish countries, *Prescription* does not avail against the church, if short of an hundred years. In France, *Prescription* of twenty years is admitted against all crimes, except duelling, which was excluded by a declaration of the year 1679. In matters of adultery, five years suffice, i. e. provided there have been a discontinuance of prosecution all that time.

By our statutes, a judge or clerk convicted of false entering pleas, &c. may be fined within two years; but, those elapsed, he *prescribes* against the punishment of the statute.

The crime of maintenance or embracery, whereby perjury is committed by a jury, must be prosecuted within six days; or otherwise the parties *prescribe*.

There is no *prescribing* against a man's lord; no *Prescription* avails to take off any servitude or tenure: a title is always required there.

The author of the history of the inquisition observes, that no time of *Prescription* avails in matters of heresy; even death itself does not secure the suspected from the researches of that tremendous court.

PRESCRIPTION, in medicine, the act or art of assigning a proper and adequate remedy to a disease, from an examination of the symptoms thereof, and an acquaintance with the virtues and effects of the materia medica.

The methodus prescribendi is the last, finishing piece of furniture of a physician, and is the result of all the rest, joined with a ready, present thought.

To *prescribe* with judgment, elegance, &c. a moderate acquaintance with pharmacy, *i. e.* with the forms and preparations of medicines, is required.

The merits of a bill or *Prescription* consist in its being concise, pertinent, efficacious, and agreeable; in the best and suitable materials being pitched on; those assembled in the most judicious proportions, made up in the best and most convenient form, and applied in the justest dose, a due regard being still had to the non-naturals, regimen, intervals of application, &c. Sydenham particularly excelled in *Prescription*.

Prescription is either *official*, or *extemporaneous*; the former consists in ordering the medicines which the apothecaries keep by them ready prepared according to their dispensatory.

Extemporaneous is that which the physician frames of himself, *pro re nata*, according to the circumstances of the patient, to be made up by the apothecary according to the physician's bill.

PRESENCE, *PRÆSENTIA*, a term of relation, used in opposition to *absence*, and signifying the existence of a person in a certain place, or the state of a person considered as co-existing with another.

In this sense, an obligation is said to be passed in *Presence* of a notary and witnesses. At the breaking open a seal of a minor, or an absent person, the *Presence* of a substitute is necessary.

The schoolmen held, that *Presence*, in speaking of bodies, denotes not only a co-existence, but a sort of contact.

They distinguish two kinds of *Presence*; the one *virtual*, in which sense a spirit, or mind, is said to be *present* to a body when it acts thereon; the other *corporeal*, which consists in a physical contact.

The treasurers, &c. of France have what they call a *right of Presence*, a certain sum due on their actual attendance in their offices, to oblige them to be the more assiduous in their function.

A person absent in the service of the king, or a community, is reputed as *present*.

The Roman catholics believe the real *Presence* of Jesus Christ in the eucharist, both in body and soul. See *TRANSUBSTANTIATION*.

PRESENT, *PRÆSENS*, in grammar, the first tense, or inflexion of verbs, expressing the time *Present*, or that which now is.

It is a particular piece of address in eloquence, to make use of the *Present* for a past tense, in order to express a past action with the more force and warmth.—Thus, The fleet is no sooner in full sea, than the heavens begin to lour, the winds rise, the waves dash against each other, thunder rolls, and lightning glares on all sides; the ships lose their masts and rudders, and are driven impetuously against the rocks.

PRESENTATION, *PRÆSENTATIO*, in the canon law, the act of a patron, nominating and offering his clerk to the bishop or collator, to be instituted in a benefice of his gift, which is void.

The *Presentation* must be tendered to the bishop within an hundred eighty-two days after the living is vacant, else it lapses to the bishop, and if the bishop do not collate in half a year more, it lapses to the archbishop, and from him in a like time to the king, who may stay as long as he pleases, for *nullum tempus occurrit regi*.

By some customs, a lay-patron has only four months time to make his *Presentation* in, and if he have presented a person incapable, he may vary it, and make a new *Presentation* within the four months.

The word is formed from the ancient phrase, *præsentare ad ecclesiam*, which originally signified the patron's sending, or placing a person in a church, and which itself is formed from *repræsentare*, which, Selden observes, is used in the council of Lateran, and elsewhere, for *præsentare*. See *PARSON*.

PRESENTATION of the virgin, is a feast of the Romish church held on the twenty-first of November, in memory of the holy virgin's being presented by her parents in the temple, to be there educated.

It is pretended, that there were young women brought up in the temple of Jerusalem, which some endeavour to prove from the second book of Maccabees, *Sed & virginis quæ conclusæ erant, procurrebant ad Oniam*, which is the sentiment of Eutochius on this passage. And Lyranus adds, that other more ancient authors observe, that young women were educated till marriage, either in the temple, or at least in buildings contiguous thereto.

Emanuel Comnenus, who began to reign in 1143, makes mention of this feast in his constitution. Some even imagine it to have been established in the eleventh century among the Greeks, and think they see evident proofs of it in some homilies of George of Nicomedia, who lived in the time of Photius, so that it seems a mistake in some modern critics to refer its institution to Gregory XI. in 1372.

Some take it to have been instituted in memory of the ceremony practised among the Jews for their new-born females; corresponding to the circumcision on the eighth day for males.

PRÉSENTATION of our lady also gives the title to three orders of nuns.

The first, projected in 1618, by a maid named *Joan of Cambray*. The habit of the nuns, according to the vision the pretended to have, was to be a grey gown of natural wool, &c. but this project was never accomplished.

The second was established in France about the year 1627, by Nic. Sanguin, bishop of Senlis. It was approved by Urban VIII. This order never made any great progress.

The third was established in 1664, when Fred. Borromeo, being apostolical visitor in the Valtelline, was intreated by some devout maids at Morbegnoubourg to allow them to live in community in a retired place; which he granted and erected them into a congregation, under the title of *congregation of our lady*. They live under the rule of St. Augustin.

PRESENTEE, in the canon law, a clerk presented by a patron to a collator. See *PRESENTATION*.

PRESENTMENT, in law, a denunciation or information of the jurors themselves, or of some other officer, as a justice, constable, searcher, surveyor, &c. of an offence, inquirable in the court whereto it is presented.

Assize of darrein PRESENTMENT. See the article *ASSIZE*.

PRESENTS, *PRÆSENTIA*, free-gifts, or gratuities; especially those given by the clergy, or the states of a realm, to a king.

They are so called, because given into the hands of a person present; by which they are distinguished from *munera*, gifts, which are sent to the party, or delivered by the intervention of a third person.

Thus the XVIIIth law, *de verb. signif. Absentibus res denari dicantur, munera autem mitti, & præsenta offerri*.

There is no accosting the eastern princes without making them fine *Presents*. Kings usually make rich *Presents* to ambassadors sent to their courts.

PRESEPE, or *PRÆSEPE*, in astronomy, a name given to three nebulous stars in the breast of the sign cancer, or the crab; two of them are of the seventh, the third of the sixth magnitude.—Their longitudes, latitudes, &c. see among those of the other stars in *CANCER*.

PRESERVATIVE, or *PRÆSERVATIVE*, in medicine, a remedy taken by way of precaution; or to secure a man from a disease that threatens him.

The principal *Preservatives*, according to Boerhaave, are abstinence, quiet, drinking of warm water; and, after this, a gentle and continued motion till the first appearance of sweat; then a profuse sleeping, the body well covered.

By such means, cras humours are diluted, the vessels are relaxed, and noxious matter excreted. He adds, that the best defence against the force of external cold, is to lessen the winter's cloathing late in the spring, and to increase the summer's cloathing soon in autumn.

In time of plague, *Preservatives* are very necessary against the contagion of the air, &c.—See *PLAGUE* and *CONTAGION*.

Generous wines, cardiacs, and sudorifics, are *Preservatives*.

Dr. Alprunus tells us, he made incisions with a lancet in inguine dextro & sinistro, and put in setons, to give passage to the venom; which proved an excellent *Preservative* against the plague that raged at Prague in 1680.

Dr. Wenceslaus Dobr. Zensky de Negro Ponte gives us an universal *Preservative* against infection in all diseases. Whoever, says he, in conversing with patients of any kind, would preserve himself from infection, he must, while he is within the sphere of their effluvia, never swallow his spittle, but spit it out: for this author conceives it to be the spittle that first imbibes the infection.

PRESERVING of timber. See the article *TIMBER*.

PRESIDENT, *PRÆSES*, an officer created, or elected, to preside over a company, or assembly; so called in contradistinction to the other members, who are termed *residents*.

Lord PRESIDENT of the council is the fourth great officer of the crown; as ancient as the time of king John, when he was styled *conciliaris capitalis*. See *COUNCIL*.

His office is to attend on the king, to propose business at the council-table, and to report to the king the several transactions there.

PRESIDIAL, a tribunal, or bench of judges, established in the several considerable cities of France, to judge ultimately, or in the last resort, of the several causes brought before them by way of appeal from the subaltern judges.

The *Presidials* make one company with the officers of the bailiages and seneschauccies, where they are established.

The edict of 1551, establishes *Presidials* under these two conditions; first, that they may judge definitely, and without appeal, to the sum of 250 livres or 10 livres *per annum*. And, 2, to the sum of 1500 livres by provision.

When they judge in the former case, they are obliged to pronounce it with these words, *par jugement dernier*; in the second, *par jugement presidial*.

When they judge finally of appeals from inferior judges, they may not pronounce the sentence or appeal, *au neant*, void; that form only belonging to the sovereign courts; but are to pronounce

pronounce simply, that it has been well or ill judged.—To judge *presidially* and finally, they must be at least seven in number.

PRESS, PRELUM, in the mechanic arts, a machine made of iron or wood; serving to squeeze or compress any body very close.

The ordinary *Presses* consist of six members or pieces, viz. two flat, smooth planks, between which the things to be pressed are laid; two screws, or worms, fastened to the lower plank, and passing through two holes in the upper; and two nuts in form of an S, serving to drive the upper plank, which is moveable against the lower, which is stable, and without motion.

Presses used for expressing of liquors, are of various kinds; some, in most respects the same with the common *Presses*, excepting that the under plank is perforated with a great number of holes, to let the juice expelled run through into a tub, or receiver, underneath.

Others have only one screw, or arbor, which passes through the middle of the moveable plank; which is made to defend into a kind of square box, full of holes on all sides, through which the juices flow in proportion as the arbor is turned, by means of a little lever applied thereto.

Press used by joiners, to keep close the pieces they have glued, especially panels, &c. of waincoat, is very simple; consisting of four members, viz. two screws and two pieces of wood, four or five inches square, and two or three feet long, whereof the holes at the two ends serve for nuts to the screws.

Press used by inlayers, resembles the joiners press, except that the pieces of wood are thicker, and that only one of them is moveable; the other, which is in form of a tressel, being sustained by two legs, or pillars, jointed into it, at each end.

This *Press* serves them for sawing and cleaving the pieces of wood required in marquetry, or inlaid work.

Founders Press, is a strong square frame, consisting of four pieces of wood firmly joined together with tenons, &c.

This *Press* is of various sizes, according to the sizes of the moulds; two of them are required to each mould, at the two extremes whereof they are placed; so that by driving wooden wedges between the mould and the sides of the *Presses*, the two parts of the mould wherein the metal is to be run, may be pressed close together.

Printing Press is a very complex machine, serving to *press* the sheet of paper upon the forms, which the workman has first smeared or beat over with ink; so as that the characters, or types, whereof the forms are composed, may leave their marks or impressions thereon.

The parts of this *Press* are the two *cheeks*; see **CHEEK**; the four planks, viz. the *cap*, *head*, *shoulder*, and *winter*, the *back* of the *press*, where the ink is placed, the *spindle* with its *nut*, the *base* with its *books*, the *platen-plate* with its *plug*, the *carriage*, the *coffin*, *gallews*, *typen*, and its *joint*, &c. Lastly, the *handle*, to bring the plank on which the *coffin* is fixed backwards and forwards; and the *bar* to work the spindle, and *press* the *platen* on the forms.

See the form and use of these several parts described under the article **PRINTING PRESS**.

Messenger of the Press. See the article **MESSANGER**.

Rolling Press, is a machine used for the taking off prints from copper-plates.

It is much less complex than that of the letter-printers. See its description and use, under the article **Rolling-press PRINTING**.

Press, in coining, is one of the machines used in the striking of money; differing from the balance, in that it has only one iron-bar to give it motion, and *press* the moulds or coins; is not charged with lead at its extreme, nor drawn by cordage.

Binders Press, or *cutting Press*, is a machine used equally by book-binders, stationers, and pasteboard-makers; consisting of two large pieces of wood, in form of cheeks, joined by two strong wooden screws; which being turned by an iron bar, draw together, or set asunder, the cheeks as much as is necessary, for the putting in of the books, or paper, to be cut.

The cheeks are placed flat on a wooden stand, in form of a chest, into which the cuttings fall. A-side of the cheeks are two pieces of wood, of the same length with the screws; serving to direct the cheeks, and prevent their approaching or opening unequally upon turning the screw.

Upon the cheeks is the shaft or fult, to which the cutting-knife is fastened by a screw, which has its key to dismount it on occasion, to be sharpened.

The shaft consists of several parts; among the rest, a wooden screw or worm, which catching within the nuts of the two feet that sustain it on the cheeks, brings the knife to the book or paper, which is fastened in the *Press* between two boards. This screw, which is pretty long, has two directories, or pieces of wood, which, both as to their form and effect, resemble those of the screws of the cheeks. To make the knife slide square and even on the cheeks, so that the knife pushed along by the workman, may make an equal passing; that foot of the shaft where the knife is not fixed, has a kind of groove, directed by a

thread fastened along one of the cheeks. Lastly, the knife is a piece of steel, six or seven inches long, flat, thin and sharp; terminating at one end in a point like that of a sword; and at the other in a square form, which serves to fasten it to the shaft. See **Book binding**.

Press, in the woollen manufactory, is a large wooden machine, serving to *press* cloths, serges, rattons, &c. thereby to render them smooth and even, and to give them a gloss.

This machine consists of several members; the principal whereof are the *cheeks*, the *nut*, and the *worm* or *screw*, accompanied with its bar, which serves to turn it round, and make it descend perpendicularly on the middle of a thick wooden plank, under which the stuffs to be pressed are placed.

The calender is also a kind of *Press*, serving to *press* or *calender* linens, silks, &c.

PRESSING, in the manufactures, the action of violently squeezing a cloth, stuff, linen, &c. in a *press*, to render it even, smooth, polished, and glossy.

This, in the silken and linen manufactures, they properly call *calendering*.

There are two manners of *Pressing*; the one *hot*, the other *cold*.

Method of PRESSING cold.—After the stuff has had all its preparations, i. e. has been scoured, fulled, and thorn, (see **FULLING** and **SHEERING**) it is folded square, in equal plaits; and a skin of velum, or fine smooth pasteboard, is put between each plait. Over the whole is laid a square wooden plank; and in this condition it is put in the *press*; which is driven tight down by means of the screw turned full upon it, by the hands assisted with levers.

After it has lain a sufficient time under the *press*, they take it out, remove the pasteboards or velums; and lay it up to keep. It may be observed, that some do not use a *press* with a screw in *pressing cold*; but content themselves with laying the stuff on a firm table, after plaiting and pasteboarding it as before; covering the whole with a wooden plank, and loading this with a weight, greater or less, as is judged necessary.

Method of PRESSING hot.—The stuff having received all its preparations, as before, it is sprinkled a little with water, sometimes with gum-water spurted over it with the mouth; then plaited equally; and between each two plaits are put leaves of pasteboard; and between every sixth and seventh plait, as well as over the whole, an iron or brass plate, well heated in a kind of furnace prepared for the purpose.

This done, it is laid upon the *press*; and a screw is brought forcibly down upon it, by means of a long iron bar.

Under this *press* are laid five or six pieces one over another, at the same time; all furnished with their pasteboard and iron plates. When the plates are well cold, they take the stuffs from under the *press*, remove the pasteboards and plaits, and stitch it a little together, to keep it in the plaits.

This manner of *Pressing* woollen stuffs is very pernicious, and was only invented by the manufacturers to cover the defects of the stuffs, and excuse their not giving them all the shearings, dyes, and preparations, that are necessary to render them perfect. Accordingly it has been frequently prohibited.

PRESSING is death. See the article **PAIN** *fort & dure*.

PRESSION, or **PRESSURE**, in the Cartesian philosophy, an impulsive kind of motion, or rather an endeavour to move, impressed on a fluid medium, and propagated through it.

In such a *Pression* the Cartesians suppose the action of light to consist; see **LIGHT**. And in the various modifications of this *Pression* by the surfaces of bodies, whereon that medium is thus pressed, they suppose the various colours to consist, &c.

But Sir Isaac Newton has taught us better: for if light, *e. g.* consisted only in a *Pression* propagated without actual motion; it could not agitate and warm such bodies as reflect and refract it, as we actually find it does; and if it consisted in an instantaneous motion, or one propagated to all distances in an instant; as such *Pression* supposes, there would be required an infinite force to produce that motion every moment in every lucid particle.

And if light consisted either in *Pression*, or in motion propagated in a fluid medium, whether instantaneously, or in time, it must follow, that it would infect itself *ad unbram*; for *Pression* or motion in a fluid medium, cannot be propagated in right lines beyond any obstacle which shall hinder any part of the motion; but will infect and diffuse itself every way into those parts of the quiescent medium, which lie beyond the said obstacle.

Thus the force of gravity tends downwards, but the *Pression* which arises from that force of gravity, tends every way with an equable force; and with equal ease and force is propagated in crooked lines as in strait. Waves on the surface of water, while they slide by the sides of any large obstacle, do infect, dilate, and diffuse themselves by degrees into the quiescent water lying beyond the obstacle. The waves, pulses, or vibrations of our air, in which sounds consist, do manifestly infect themselves, though not so much as the waves of water; for the sound of a bell, or of a cannon, can be heard over a hill, which intercepts the sonorous object from our sight; and sounds will be propagated as easily through crooked tubes as through strait.

But light is never observed to go in curve lines, nor to infect itself *ad umbram*. For the fixed stars do immediately disappear on the interposition of any of the planets, as well as some parts of the sun's body by the interposition of the moon, Venus, or Mercury.

PRESSURE of the air. See the article **AIR**.

Most of the effects anciently ascribed to the *fuga vacui*, are now accounted for from the weight and *Pressure of the air*.

The *Pressure of the air* on the surface of our earth, is balanced by a column of water of the same base, and about thirty-five feet high; or one of mercury of about twenty-nine inches.

The *Pressure of the air* on every square inch on the surface of the earth, is computed to be about fifteen pounds avoirdupois. See **ATMOSPHERE**.

PRESSURE of fluids. See the article **FLUID**.

PREST*, a duty in money, paid by the sheriff upon his accounts in the exchequer, for money left or remaining in his hands.

* The word is French, *prest*, where it signifies ready.

PREST-MONEY is a sum of money which binds those who receive it, to be ready at command, at all times appointed: chiefly understood in the lifting of soldiers.

PREST-SAIL, in the sea language, is when a ship carries all the sail she can possibly crowd.

This is sometimes done in giving chase, &c. but it is a dangerous experiment, lest the ship overfet, or bring her masts by the board; in which latter case she becomes an easy prey.

Auditors of the Prest. See the article **AUDITOR**.

PRESTATION-MONEY, a sum of money paid yearly by archdeacons, and other dignitaries, to their bishop, *pro exteriori jurisdictione*.

PRESTATION, PRÆSTATIO, was also anciently used for other payments: *Et quieti sint de præstatione muragii*, Chart. Hen. 7. — Sometimes also for *pourvoyance*.

PRESTER*, a meteor, consisting of an exhalation thrown from the clouds downwards with such violence, as that by the collision it is set on fire.

* The word is Greek, *πρεστερ*, the name of a kind of serpent, called also *dygas*, to which this meteor is supposed to bear a resemblance.

The *Prester* differs from the thunder-bolt in the manner of its inflammation; and in its burning and breaking every thing it touches with greater vehemence. See **THUNDER-BOLT**.

PRESTER John, or *Jean*, an appellation given the emperor of the Abyssinians; because anciently the princes of this country were really priests, and the word *jean* in their language signifies king.

It was the French who first made him known in Europe under this title. His empire was anciently of vast extent; at present it is confined to six kingdoms, each about the bigness of Portugal.

The name *Prester John* is altogether unknown in Ethiopia, and took its rise hence, that the people of a province, where this prince usually resides, when they request any thing, say, *Jean-roi, i. e. my king*. His proper title is, *The Grand Negus*.

There is also a *Prester John* of Asia, mentioned by M. Polo, the Venetian. His jurisdiction is in the country of Canguing, between China, Siam, and Thibet; a kingdom mightily valued by the Chinese for its policy, and the number of its fortified cities; though they have usually the utmost contempt for foreign countries.

Some say this latter is so called from a Nestorian priest, mentioned by Albericus, towards the year 1145, to have mounted the throne. Others, that he takes the name from a cross which he bears in his hand as a symbol of his religion.

PRESTIMONY, PRÆSTIMONIA, in the canon law, a term about which authors are much divided. — It is derived a *præstatione quotidiana*, and is by some defined a kind of benefice served by a single priest: in which sense, *Prestimony* is the same with a presbyterial chapel.

Others will have *Prestimony* to be the incumbency of a chapel, without any title or collation; such as are most of those in castles, where prayers or masses are said; and which are mere oratories unendowed. — Whence also the term is applied in the Romish church to certain perpetual offices bestowed on canons, religious, or others, for the saying of masses, by way of augmentation of their livings.

Others, again, will have *Prestimony* to be a lease or concession of any ecclesiastical fund, or revenue belonging to a monastery, to be enjoyed during life.

Du Moulin makes *Prestimony* a profane benefice, which, however, has a perpetual title, and an ecclesiastical office with certain revenues attached to it; which the incumbent is allowed to sell, and which may be possessed without tithes: such as the lay church-wardens of Notre-dame. He adds, that in property, the canons of chapels are benefices of this nature.

Upon the whole, the safest opinion seems to be this, that *Prestimony* is a fund or revenue appropriated by the founder for the subsistence of a priest, without being erected into any title of benefice, chapel, prebend, or priory; and which is not subject either to the pope, or to the ordinary; but whereof the patron, and those who have a right from him, are the collators, and nominate and consecrate, *pleno jure*.

PRESUMPTION, PRÆSUMPTIO, in law, a suspicion, or conjecture founded on a verisimilitude.

Presumption is of three sorts. — 1. *Violent*, which many times is allowed a full proof: as if one be killed in a house, and a man is seen to come out of the house with a bloody sword, and no other person was at that time in the house; this, though but a *Presumption*, is a proof. — 2. *Probable*, which has but a small effect. — 3. *Light*, or *temerarious*, which is of no prevalence at all.

In cases of a charter, or seoffment, if all the witnesses to the deed be dead; the violent *Presumption* that stands for a proof, gives continual and quiet possession: *Stabit præsumptio, donec probetur in contrarium*. Coke on Lit.

PRESUMPTION was also anciently used for *intrusion*. See **INTRUSION**.

PRESUMPTIVE heir, denotes the next relation, or heir at law, to a person, who is to inherit from him *ab intestato*; and who, it is presumed, will be heir: nothing but a contrary disposition of the testator being able to prevent him.

PRETENCE, in heraldry. See the articles **INESCUTCHEON** and **ESCUTCHEON of pretence**.

PRETENSED, or FRETENDED right, in law, is where one is in possession of lands and tenements, which another, who is out, claims and sues for. — Here the *pretensed right* is in him who fo claims or sues.

PRETER naturam, in medicine, &c. See the article **NATURE**.

PRETER, or **PRETERIT, PRÆTERITUS, præter**, in grammar, an inflexion of verbs, expressing the tense or time passed.

Preter, or *preterit*, is a general name that comprehends all the inflexions corresponding to the several tenses, or several circumstances and relations of the time past; all which the Latins, &c. distinguish by particular inflexions or terminations of the verb; which make the proper notion of tenses. See **TENSE**.

The modern languages, particularly the English, in lieu of different terminations of the verbs themselves, have usually recourse to those of their auxiliaries and participles.

The *preter*, or past time, is subdivided by grammarians into *preter-imperfect*; as, *e. gr. I had, I thought*; in the Latin, *Habebam, cogitabam*; in the French, *J'avois, je pensois* — the *preter-perfect*, as, *I have had, I have thought, habui, cogitavi*, *J'ai eu, j'ai pensé* — and *preter-pluperfect*, as, *I had thought, I had had, habueram, cogitaveram, j'eus eu, j'eus pensé*.

The English have properly but two cases or kinds of the *preter tense*, *viz.* the *preter time of the imperfect action*; as, *I was at supper then*, but had not yet done it: and the *preter time of the perfect action*; as, *I had then supped*, and it was then done. — The *preter tense* is oftentimes joined of the present tense, by adding *ed*; as, *I burned*.

The French have a particular case of the *preter-perfect*, which F. Buffer calls the *preterit-simple*, in opposition to the former, called the *preterit-composite*; others call it the *preterit-indefinite*, because expressing a thing done indeterminate; as, *j'écrivis hier*. This answers to the aoristus of the Greeks; and in the distinction of this from the compound *preterit* does one of the greatest niceties in the practice of the French language consist. See **AORISTUS**.

In the passive voice, the Latins, French, &c. have recourse to participles and auxiliaries, like the English, to form their *preter tenses*; as, *I was loved, amatus eram, j'étais aimé*, &c.

PRETERIT, PRÆTERITUS, in the Roman jurisprudence. — *Infans PRÆTERITUS* is a child of whom the father has forgot to make mention in his testament; which renders it intirely null.

Exheredation of his son is allowed in a father, but never *preterition*.

PRETERITION, or PRETERMISSION, in rhetoric, a figure whereby, in pretending to pass over a thing untouched, we make a summary mention thereof.

I will not say he is valiant, he is learned, he is just, &c.

The most artful praises are those given by way of *Preterition*. See **RETICENCY**.

PRETERNATURAL rains. See the article **RAIN**.

PRETEXT, or PRETENCE, a colour, motive, or cause, either real, or apparent.

PRETEXTA, or PRÆTEXTA, among the Romans, was a long white gown, or toga, having a band or border of purple at bottom.

It was worn by children of quality till the age of puberty, *i. e.* by boys till seventeen, at which time they laid it aside, and assumed the virile gown. Girls wore it till marriage.

It took its name *Pretexta*, according to Godwyn, *quod ei purpura Prætexta erat*, because guarded about with purple silk.

The *Pretexta*, at first, was a robe of state, or ceremony, worn only by the chief magistrates, and the priests; nor was it lawful for such who wore this gown to be arraigned, or sentence to pass against them, till it was pulled off.

In continuance of time it was permitted to noblemen's children; and, at length, even to all Roman children in general. See **TOGA**.

PRETIOUS. See the article **PRECIOUS**.

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PRETIUM sepulchri, in old law-books, &c. those goods accruing to the church wherein a corps is buried.

In the Irish canons, *lib. 19. cap. 6.* it is ordered, that along with every body that is buried, there go his cow, horse, apparel, and the furniture of his bed; none of which may be disposed of otherwise than for the payment of debts, &c. as being familiars and domestics of the deceased.

PRETOR, PRÆTOR, an eminent magistrate, or minister of justice, in ancient Rome.

In the first ages of the commonwealth, all the great magistrates were styled *Prætors*; afterwards, the title was bestowed on all the principal officers of the army: at last, *Prætor* became restricted to a particular magistracy.

About the year of Rome 388. the people soliciting to have one of the consuls always chosen from among themselves, the senators granted it, on condition that a new magistracy should be erected, to be filled wholly from among the patricians: such was the origin of the *præture*, *prætura*; which, *Livy* observes, was first discharged by *Spurius Furius*; and whose office was to look to the administration of justice and equity between man and man; much in quality of a lord chief justice, or lord chancellor, or rather both in one.

But business increasing in proportion as the empire was enlarged, a second *prætor* was created, to take cognizance of the affairs of foreigners residing at Rome: upon which the former was distinguished by the title of *prætor urbanus*, or *major*; and the latter by that of *prætor peregrinus*, or *minor*.

The number, in after-times, was much increased: under the reign of Augustus there were no less than twelve *Prætors*, and afterwards eighteen; two whereof were called *prætores cereales*, as being charged with the providing of corn and grain; and two others *prætores fidei commissarii*.—In the code, *l. 1. t. 1. 39.* we find a law of the emperors Valentinian and Marcian, which reduces the *Prætors* to three.

The office of the *Prætor*, or *prætor urbanus*, was to render justice in the city: he had a power to interpret the laws, to supply and reform them; and even to make new ones, when the public good required it. See *CIVIL LAW*.

In the institutes, the edicts of the *Prætors* are called *jus honorarium*; whence it should seem, they had only the force of laws out of respect to that eminent magistrature; the business of the *Prætor* being rather to look to the observation of the old laws, than to make new ones. See *EDICT*.

Some are of opinion, he had not the *jus gladii*, the power of the sword; the cognizance of criminal matters being the special province of the prefect of Rome. See *PREFECT*.

But others are of another sentiment. In the general, it is very difficult to fix precisely how far his power extended. When he walked, he was preceded by six lictors; and was clothed with the robe called *trabea*.

His authority, like that of the other magistrates, was very much weakened and reduced under the emperors. In the Digest and Code is a title *de officio prætoris*.

PRETOR was also a title among the Romans, given the governor of a province, who had served the office of *Prætor*.

Whence provinces governed by *Prætors*, or restrained to those who had discharged that office, were called *prætorian provinces*.

PRETORIAN guards, PRÆTORII cohortes, were the foldiers of the emperors guard; so called, as some imagine, from their place or station in the palace or court called *prætorium*.

Their institution is owing to Scipio Africanus, who first established a company of the bravest men in his army, picked out for the purpose, to be his guard, and never to stir from his side in battle.

Their number was at length increased, as *Dion* tells us, to ten thousand. They were commanded by an officer created by Augustus, called *præfectus prætorii*. See *PREFECT*.

PRETORIUM, PRÆTORIUM, among the Romans, the place, hall, or court, wherein the prætor of a province lived, and wherein that magistrate sat to administer justice to the people. See *PRETOR*.

There were of these *Prætoriums* in all the cities of the Roman empire.—The scripture mentions that of Jerusalem under the name of *judgment-hall*; and there are still some remains of one at Nîmes in Languedoc.

PRETORIUM was also the tent or pavilion of the general of the Roman army; wherein councils of war, &c. were held.

From the time of Augustus, the emperor's tent in the camp was distinguished by the title of *prætorium Augustale*.

PRETORIUM was also a place in Rome where the prætorian guards were lodged.

Some will have the *Prætorium* to be properly the tribunal of the *præfectus prætorii*, or an auditory destined for the rendering of justice in the emperor's palace. See *PREFECT*.

This they argue from St. Paul's epistle to the Philippians; and from this place called *prætorium*, they will have the guards to have been denominated *prætoriani*, because assembled here for the emperor's safety.

Others will not allow the *Prætorium* to be any tribunal, or seat of justice, but merely the imperial guard-house.

Perizonius has an exprels dissertation to prove, that the *Pre-*

PRI

torium was no court of justice in St. Paul's time; but the camp or place where the *prætorium* guards were quartered. He adds, that the name *Prætorium* was not given to places where justice was administered till long time after; when the office of the *præfectus prætorii* was converted into a civil function.

PREVARICATION, PRÆVARICATIO, in the civil law, is where the informer colludes with the defendant, and so makes only a feigned prosecution.

Sylvius, in his comments on *Cicero, pro Cluentio*, gives us the difference between the three terms, *calumniari, prævaricari, and tergiversari*. He who in his accusation forges faults which were never committed, is said *calumniari*: he who undertakes one's suit, and either will not add reasons in behalf of his client, or not answer the objections of his adversary, when he is able, is said *prævaricari*: and he who desists in his accusation, and lets the suit drop, *tergiversari*.

PREVARICATION, in our law, is when a man falsely and deceitfully seems to undertake a thing, with intention that he may defraud it: *e. g.* where a lawyer pleads booty, or acts by collusion, &c.

PREVARICATION is also used for a secret abuse committed in the exercise of a public office, or of a commission given by a private person.

PREVARICATOR, PRÆVARICATOR, in the university of Cambridge, is a master of arts, chosen at a commencement, to make an ingenious, satirical speech, reflecting on the misdemeanors of the principal members. See *TERRÆ filius*.

PREVENTION, PRÆVENTIO, in the canon, &c. law, the right which a superior person or officer has to lay hold of, claim, or transact an affair, prior to an inferior one, to whom otherwise it more immediately belongs.

The word is chiefly used in speaking of the pope's preventing the ordinary collators; and of the royal judges preventing two altern ones.

The Roman canonists maintain, that the pope, who is the source of all jurisdiction, has not transmitted it privatively to the ordinary collators; but that he may still not only collate concurrently with them, but he also may prevent them by using his original power as head of the church.

These *Preventions* are grown odious in several countries, where they do not now obtain without a world of modifications and restrictions; and the civil power in France always judges in favour of the ordinary collators.

The pope has no *Prevention* to the prejudice of lay-patrons; but by the concordat he has reserved to himself the right of conferring elective benefices by *Prevention*, and even cathedral and collegiate dignities.

If the provisions of the pope, and collations of the ordinary, bear date on the same day, the Ultramontane canonists give the preference to the pope; the French to the ordinary.

The cardinals have a particular indulgence not to be prevented by the pope within six months.

PRIAPEIA, in poetry, a name given to certain obscene epigrams, and other pieces, composed on the god *Priapus*; whereof we have many instances in the Greek Catalecta. See *PRIAPUS*.

PRIAPISM, priapismus, in medicine, a continual and painful erection or tension of the yard.

The term is derived from *Priapus*, a heathen god, whom the poets and painters represent with a yard always stiff and erect.

As satyrs are usually painted after the same manner, the disease is also called *satyriasis*, or *satyriasmus*.

Some, however, distinguish between the *satyriasis* and *priapismus*; in that the latter is without any effusion, or desire of coition; but the former attended with both.

The immediate cause of a *Priapism* is the heat, pungency, or acrimony of the semen, accompanied with a convulsion of the muscles of the part, which compressing the veins and cavernous bodies, prevent the return of the blood.

The more remote causes are too hot, sharp, stimulating foods; cantharides are also found to perform the same effect, but with much more violence. There are instances of people, especially old men, who, making use of cantharides to enable them to satisfy their passions the better, have been seized with a *Priapism*, which has been followed with universal convulsions, and even death.

PRIAPUS, priapus, a term sometimes applied to the genital parts of men, *viz.* the penis, and testes.

The name took its rise from *Priapus*, a fabulous deity, particularly adored at Lampsacus, the place of his birth; who, for the extraordinary size of his parts, was exceedingly revered by the women; inasmuch that the scripture seems to tell us, king Aha dethroned his mother Maachab, because she had consecrated a grove to Priapus, and presided at his sacrifices.

PRICE, PRÆTIUM, the value of a thing. See *VALUE*.

PRICE current, in commerce, a weekly account of the current value of most commodities. See *CURRENT*.

PRICK post, in building. See *POST*.

PRICKED wine. See the article *WINE*.

PRICKING,

PRICKING, in the sea-language.—To *PRICK the plot*, or chart, is to make a point therein, near about where the ship is now, or is to be at such a time, in order to find the course they are to steer.

PRIER *age*. See the article *AGE*.

PRIER *aid*. See the article *AID*.

PRIEST, *facerdos*, a person set apart for the performance of sacrifice, and other offices and ceremonies of religion.

Thus the false gods and goddesses of the heathens had their *Priest*; *Priests* of Mars, of Bacchus, of Hercules, of Isis; and some of them their priestesses. See *PONTIFF*, &c.

The Jews had two orders, *viz.* *Priests* and *levites*, who served in the temple.

The Mahometans have their *Priests* called *scheik* and *musti*; and the Indians and Chinese their *bramins* and *bonzas*. See *MUSTI* and *BRACHMAN*.

PRIEST, PRESBYTER, in the Christian church, is a person invested with holy orders; in virtue whereof, he has a power to preach, pray, administer the sacraments, &c. and, in the Romish church also, to bless, absolve, &c.

By the canons, a man must be twenty-four years of age ere he be admitted to the priesthood; anciently thirty years were required.

The holy scripture usually confounds the title of *Priest*, *presbyter*, with that of *bishop*, *episcopus*; and does not seem to give any superiority to the one over the other: and yet, the absolute equality among all the *Priests* in the government of the church has few instances but what are contested.

Blondel and Salmassius maintain with a world of reason, that in the primitive church, the *Priests* governed with perfect equality, and without any other pre-eminence beside that of age; and yet to consult the fathers, and tradition, the *presbyterian* form of government would scarce seem to have been known among the ancients.

In effect, the primitive writers speak of nothing but episcopacy; and of that too, frequently in such terms, as if they esteemed it of apostolical institution. See *EPISCOPACY* and *BISHOP*.

As, in the ancient church, the deacons had the management and administration of the revenues of the church, their authority grew away, and in a little time they were got above the *Priests*. St. Jerom used its utmost endeavours to prove, that deacons were originally inferior to *Priests*; and the council of Nice decided, the question in favour of the latter. See *DEACON*.

Indeed, an order of deacons having been instituted without any other function than to assist the *Priest* at the altar; these have made no difficulty of owning the superiority of the *Priests*. Add to this, that the order of a deacon being now become necessary to arrive at that of a *Priest*, there is no room to dispute the precedence: but the deacons who had retained their function, had the disposal of the revenues, and paid the *Priests* their pensions, still maintained the superiority. Upon which, the sixth council in Trullo pronounced once more on the dispute, and gave the pre-eminence to the *Priests*.

Arch Priest, see the article *ARCH Priest*.

Cardinal Priest, see the article *CARDINAL*.

High Priest, see the article *PONTIFF*.

Regular Priest, see the article *REGULAR*.

Priests of the oratory, see the article *ORATORY*.

Priest's cap, in fortification, see *BONNET à pretre*.

PRIMA naturalia, in physics, atoms, or the first particles whereof natural bodies are primarily composed; called also *minima naturalia*, which see: see also *PARTICLE* and *ATOM*.

Tria prima, in chymistry, see the article *TRIA*.

PRIME, *viz.* in medicine, the first passages of the chyle; including the oesophagus, stomach, intestines, and their appendices. See *CHYLE* and *VIZ.*

PRIMAGE, a duty at the water-side, appointed by a statute of Henry VIII. to be paid to the master and mariners of the ship, by the merchants whose goods are loaded or unloaded. It is paid to the master for the use of his cables and ropes, in moving the goods; and to the mariners for their service and assistance.

This is different, in different places; in some 12 d. per tun, in others, a penny per pound; in others, six-pence per bale or pack. See *DUTY* and *CUSTOM*.

PRIMARY planet, a planet which revolves round the sun as a centre.

Such are Saturn, Jupiter, Mars, the Earth, Venus and Mercury; thus called in opposition to secondary planets, or satellites.

Some authors restrain the *primary planets* to the superior ones, *viz.* Saturn, Jupiter and Mars; but very impertinently.

PRIMARY affections,

PRIMARY collateral prints,

PRIMARY dial,

PRIMARY motion,

PRIMARY place,

PRIMARY quality,

PRIMATE, *PRIMAS*, an archbishop, invested with a jurisdiction over several archbishops, or bishops.

Father S. mond derives the origin of *Primates* hence; that the large provinces having been divided and subdivided by the emperors; the first divisions were called *firsts*, others *seconds*,

others *thirds*, &c. and the title *Primate* given to the metropolitan, *i. e.* to the bishop of the city which was the capital of the province, ere the division was made.

This metropolitan *Primate* had some jurisdiction over the bishops of the interior provinces; and was also called *patriarch*.

The term *Primate* is Latin, and signifies the first, or president of a society: the Greek word corresponding to it is *ἐπίσκοπος*, *exarch*.

Those who held for a strict ecclesiastic hierarchy, maintain a *Primate* to be he who has several metropolitans under him; as a patriarch has several *Primates*. Yet it is pretty evident from history, that *Primates* were at first confounded with patriarchs: thus Socrates, enumerating ten patriarchs, does not make any distinction thereof from *Primates*.

In Africa, after the distinction was made, the *Primates* were not at all subject to the patriarch: thus the bishop of Carthage, who was *Primate*, paid no obedience to the bishop of Alexandria, who was patriarch.

Nor, to be a *Primate*, was it necessary to have metropolitans for suffragans: each province of Africa, except those which composed the diocese of Alexandria, had its *Primate*; this quality being given to age.

In France, the subdivision of provinces gave occasion to the erection of *Primates*: thus Aquitaine, *e. gr.* being divided into two provinces, the archbishop of Bourges became *Primate* of the Aquitaines, because Bourges was the capital of the first.

Thus also the division of Eng'nd into two provinces, Canterbury and York, in 1152, gave occasion to the introduction of *primacies* among us; Canterbury, which was the metropolis before, thence giving the title of *Primate* of all England to its prelate, though the archbishop of York still claims that of *Primate of England*. And accordingly, the first has some jurisdiction over all England, relating to administrations, &c. which the latter has only within his own province.

PRIME, *PRIMUS*, the first in order, degree, or dignity, among several things of the same or like kind.

Thus we say, *Prime minister*, *Prime mover*, *Prime cost*, &c. See *MINISTER*, *MOBILE*, &c.

PRIME, or *PRIME minute*, in geometry, denotes the sixtieth part of a degree. See *DEGREE*.

PRIME is sometimes also used for the tenth part of an unit. See *DECIMAL*.

In weights, it is used for the twenty-fourth part of a grain. See *GRAIN*.

PRIME number, in arithmetic, a number which can only be measured by unity; or whereof 1 is the only aliquot part: such are 5, 7, 11, 13, &c.

Prime numbers inter se, among themselves, are those which have no common measure besides unity; thus 12 and 19 are *Prime numbers inter se*.

PRIME figure, in geometry, is that which cannot be divided into any other figures more simple than itself. See *FIGURE*. Such is a triangle among planes; and the pyramid in solids.—For all planes are made of the first, and all bodies or solids are compounded of the second.

PRIME vertical, is the vertical circle which passes through the poles of the meridian.

PRIME verticals, in dialing, or **PRIME vertical dials**, are those projected on the plane of the *Prime vertical circle*, or on planes parallel thereto.

These are what we likewise call direct, erect, north or south dials.—But since every plane hath that pole raised or depressed thereon, which lies open to it; therefore this plane (if a direct south) hath the south pole elevated, and consequently the style (whose height must be the complement of the latitude of the place) will point downwards. Wherefore to find the hour's distance from the meridian upon this plane, the proportion is, as the radius is to the sine of the style's height, or co-latitude; so is the tangent of the hour, or angle at the pole, to the tangent of the several hours distance from the meridian. By this canon, the hours requisite for the plane, as also the half-hours, quarters, &c. being calculated and set in a table; the dial is described after the same manner, as the horizontal dial. North direct erect dials are but the backside of the south, because lying in the same azimuth with it; therefore it is no more but turning the south dial upside-down, and leaving out the superfluous hours between 5 and 7, and 4 and 8, and the north dial is made. Only note, that the style must point upwards to the north pole. Harris.

PRIME of the moon is the new moon at her first appearance, for about three days after her change. See *NEW moon*.

PRIME is also used in the Romish church, for the first of the canonical hours, succeeding to lauds. See *HOURS*, *LAUD*, &c.

PRIME, in fencing, is the first and chief of the guards; which is that the body is in, immediately after drawing the sword; being fittest to menace and terrify the enemy, by reason the point of the sword is held higher up to the eye, than in any of the other guards.

PRIME, or **PRIMING of a gun**. See *PRIMING*.

PRIMICERUS, in antiquity, the first, or chief person in any office or dignity. See **CHIEF**, **PRINCIPAL**, &c.

In this sense the word occurs frequently in the code, and even in our old English laws: though it is there also occasionally used for a nobleman; as, *Primicerius totius Anglie*.

The Romans had great variety of *primicerii*, both in church, and the emperor's court; as a *Primicerius of the empress*, *Primicerius augustalis*, *Primicerius of the barbarians*, *Primicerii of the legions*, of the court, of the chamber, of the palace, &c.

The ecclesiastical *Primicerius*, Du Cange observes, was the same with the *chanter* among us.

In the church of Metz, the *Primicerius* is the first dignitary of the diocese, and presides at assemblies of the clergy, in prejudice of the bishop.

At Venice, the dean of the church of St. Mark is called *Primicerius*, or *Primicerio*: he is independent of the patriarch of Venice, and enjoys episcopal privileges.

PRIMER *seisin*, in law, *PRIMA seisin*, or the first *seisin*; a branch of the king's prerogative, whereby he had the first possession of all lands and tenements held of him in chief, whereof his tenant died seized in fee; and consequently the rents and profits thereof: till the heir, if he were of age, did homage; and if under age, till he became of age.—But all charges arising by *Primer seisin*, are annulled by a fiat, 12. Car. II.

PRIMING, or **PRIME** of a Gun, is the gun-powder put in the pan or touch-hole of a piece, to give it fire by.

The *Priming* is the last thing done in charging. See **CHARGE**. For pieces of ordnance, they have a pointed iron-rod to pierce the cartridge through the touch-hole, called the *primer*, or *Priming-iron*.

PRIMING, among painters, signifies the laying on of the first colour.

PRIMPILARI, or **PRIMOPILARI**, or **PRIMPILARES**, in antiquity, were properly such as had formerly borne the office of *primipilus*, or first centurion of a legion, to whom was entrusted the care of the banner.

Some will also have *Primpilarii* to have been a denomination given to the soldiers of the first cohort of a legion.

The *Primpilarii* had considerable advantages; one of the chief was, that most of the soldiers who died in the campaign, left them their heirs.

PRIMPILUS, or **PRIMOPILUS**, or **PRIMPILI centurio**, in antiquity, the centurion of the first cohort of a legion, who had charge of the Roman eagle.

PRIMITIE, the first fruits gathered of the earth; whereof the ancients made presents to the gods.

In Leviticus, the *Primitie* of all fruits are enjoined to be offered to God.

In our law, the *Primitie* are one year's profits, after avoidance, of every spiritual living, as rated in the king's books. See **FIRST fruits**.

PRIMITIVE, in grammar, a *root*; or a word in a language, which is neither derived from any other language, nor compounded from any other words of the same. See **ROOT**, **WORD**, &c. Thus *God* is a *Primitive*; *Godly*, a derivative; *God-like*, a compound.

PRIMITIVE, in arithmetic. See **PRIME** and **NUMBER**.

PRIMO beneficio ecclesiastico habendo, in law, a writ directed from the king to the lord chancellor, appointing him to bestow the benefice that shall first fall in the king's gift, above or under such a value, upon this or that clerk. See **BENEFICE**.

Proposio de PRIMO adjacente. See **PROPOSITION**.

PRIMOGENITURE, **PRIMOGENITURA**, the right of first-born, or eldest son or child.

The right of *Primogeniture* seems to be an unjust prerogative, and contrary to natural right: for since it is birth alone that gives children a title to the paternal succession, the chance of *Primogeniture* should not throw an inequality among them.

Accordingly, the right of *Primogeniture*, which calls the elder-born to the crown, preferably to the others, was not introduced into France till very late: it was unknown to the first race of kings; and even to the second.

The four sons of Clovis shared the kingdom equally among themselves; and Louis le Debonnaire did the same: it was not till the race of Hugh Capet, that the prerogative of succession to the crown was appropriated to the first-born.

By the ancient custom of *gavel-kind*, still preserved in some parts of our island, *Primogeniture* is of no account; the paternal estate being equally shared by all the sons. See **GAVEL-KIND**.

PRIMOPILUS. See the article **PRIMPILUS**.

PRIMUM ens. See the article **ENS**.

PRIMUM mobile, in the Ptolemaic astronomy, the ninth or highest sphere of the heavens, whose centre is that of the world, and in comparison of which the earth is but a point. See **MOBILE**.

This they will have to contain all the other spheres within it, and to give motion to them, turning itself, and all them, quite round in twenty-four hours.

PRIMUS peroneus. See the article **PERONEUS**.

PRIMUS scilensius. See the article **SCALENIUS**.

PRINCE, **PRINCIPES**, in politics, a person invested with the

supreme command of a state or country, independent of any superior.

PRINCE is also used for a person who is sovereign in his own territory; yet holds of some other, as his superior or lord, and pays homage or tribute to him.

Thus all the *Princes* of Germany are feudataries of the emperor: they are as absolute in their respective principalities, as the emperor himself; yet are all bound in certain services to him.

PRINCE, in ancient records, frequently signifies no more than *lord*.—Du Cange gives a great number of instances of this usage.

In effect, the word *princeps* in Latin, whence *Prince* in English, originally signifies only the *chief*, or *first*: it is compounded of the Latin *primus*, and *caput*; and is properly a word of dignity and office, not of property and sovereignty.

Thus, in the charter of king Offa, after the bishops had subscribed their names, we read, *Brordanus patriarchus, Binnanus princeps*; and afterwards the dukes subscribed their names.

And in a charter of king Edgar, in *Mon. Angl. tom. 3. p. 307*. *Ego Edgarus rex rogatus ab episcopo meo Deowulfe, & principe meo Aldredo, &c.* And in *Mat. Paris, p. 155*. *Ego Halden princeps regis pro viribus assensum præbeo, & ego Iurketillus dux concedo.*

PRINCE of the youth.—Among the ancient Romans, it was the custom for the emperor in his life-time to nominate him whom he would have to succeed in the empire, under the title of *princeps juventutis*, & *Cæsar*.

In the *ludus Trojanus*, the youth who was chosen captain, was also called *princeps juventutis*.

PRINCE is also a title given to the issue of *Princes*, or those of the royal family.

In which sense they are called, particularly in France, *Princes of the blood*; as partaking of the blood to which the sovereignty is appropriated: and not by any hereditary right, but as a patrimony substituted to all the royal race.

In England, the king's children are called *sons and daughters of England*: the eldest son is created *Prince of Wales*. The cadets, or younger, are created dukes or earls, with what title the king pleases. They have no apanages, as in France; but only what the good pleasure of the king bestows on them.

The sons are all by birth counsellors of state: and the daughters are styled *princesses*; to violate the eldest of which, unmarried, is at this day high treason.

To all the king's children belong the title of *royal highness*: all subjects are to kneel, when admitted to kiss their hand; and at table, out of the king's presence, they are served on the knee. The first *Prince* of the blood in France is called absolutely *monseigneur le Prince*.—The quality of *Prince of the blood* gives a rank and precedence, but it does not include any jurisdiction; they are *Princes* by order, not by office.

Wicquefort observes, that it is not fifty years since the *Princes* of the blood of France gave place to all ambassadors, even those of republics; and it was at the king's request, that they were since allowed the precedence.

The moment a pope is elected, all his relations become *Princes*.

PRINCE of Wales, the eldest son of England. See **SON**.

He is born duke of Cornwall; and immediately entitled to all the rights, revenues, &c. belonging thereto; as being deemed, in law, at full age on his birth day.

He is afterwards created *Prince of Wales*; the investiture whereof is performed by imposition of a cap of state, and a coronet, a verge of gold, and a ring. He holds the principality by patent, granted him and his heirs, by the kings of England.

The title and principality were first given by king Edward the first to his eldest son: till that time, the eldest son of England was called *lord Prince*. While Normandy remained to the king of England, the eldest son was always styled duke of Normandy: since the union, his title is *Magnæ Britanniæ princeps*.

He is reputed, in law, the same person with the king: to imagine his death, or to violate his wife, is high-treason. His revenues, as duke of Cornwall, are computed at 14,000 *l. per annum*. The revenues of the principality were estimated, 300 years ago, at 4680 *l. per ann.*

PRINCE's metal. See the article **METAL**.

PRINCIPAL, **PRINCIPALIS**, the chief, most considerable, or necessary part of a thing.

Thus we say, the mayor is the *principal* magistrate of a city or town: a council of war consists of the *principal* officers. In a peroration, the *principal* points insisted on, are to be briefly summed up. The *Principal* of a college, or hall, is the master thereof.

PRINCIPAL, in commerce, is the capital of a sum due or lent; in which sense the word is used in opposition to *interest*.

PRINCIPAL is also used for the first fund or sum put by partners into common stock; by which it is distinguished from the calls or accessions sometimes required, when the former proves insufficient.

PRINCIPAL point, in perspective, is a point in the perspective plane; upon which a line drawn from the eye, perpendicular to the plane, falls.

This point is in the intersection of the horizontal and vertical plane, and is also called the *point of sight*, and *point of the eye*. See **SIGHT**, &c.

PRINCIPAL ray, in perspective, is that which passes perpendicularly from the spectator's eye to the perspective plane, or picture.

Whence the point, where this ray falls on the plane, is by some also called the *principal point*, which other writers call the *centre of the picture*, and the *point of concurrence*. See **POINT**.

PRINCIPAL, **PRINCIPALITY**, in old law-writers, is sometimes used for a *heir-loom*.

In Urchenfield *com. Hereford*, certain *Principals*, as the best beast, best bed, best table, &c. pass to the eldest child, and are not subject to partition.

PRINCIPAL is sometimes also used for a *mortuary*, or *corse present*.—*Item lego equum meum vocatum le bay gelding, ut offeratur ante corpus meum in die sepulture mee, nomini principali. Test. Job. de Macclesfield, 9 Hen. 5.*

PRINCIPAL cause,
PRINCIPAL challenge,
PRINCIPAL officers of the navy,
PRINCIPAL petitio,
PRINCIPLE, **PRINCIPIUM**, a term frequently used for the cause, source, or origin of any thing. See **CAUSE**, &c.

In which sense we say, the *Principle of thinking, of willing, &c.*

In physics, we must ever have recourse to a first *Principle*, which is God.

The Manichees admit of two *Principles*, the one of good, the other of evil; which they establish in the quality of two contrary deities, constantly opposing each other. See **MANICHEE**. See also **GOOD** and **EVIL**.

According to the doctrine of Pelagius, our own wills are the *Principles of our good actions*, and we ourselves the *Principles of our good wills*.

PRINCIPLE is defined, among the school philosophers, to be that from which any thing is, is done, or known: *unde aliquid est, fit, aut cognoscitur*; which is a very extensive signification, and agrees to all kinds of *Principles*.

Thus, the premises are *Principles*, in respect of the conclusion; and thus fire, and every other agent, are the *Principles of things* which they produce.

The Thomists define *Principle* to the like effect: *id a quo aliquid procedit aliquo modo*.

Philosophers usually distinguish *Principles*, into those of *being*, *principia essendi*; and those of *knowing*, *principia cognoscendi*: or, *principia rei*, and *cognitionis*.

Of the first they make two kinds, viz. *Principles of origination*, which are those from which something proceeds really the same with the *Principle*; as in the procession of the Son and Spirit from the Father in the Trinity.—And *Principles of dependency*; in which sense, any cause may be a *Principle*, in respect of the thing caused; or a subject, in respect of the accidents inherent in it.

The second is that from which we borrow, or derive our knowledge of some other thing; or, it is that which makes the thing be known.—Such are *axioms, definitions, hypotheses*; such also are *examples, explanations, &c.*

Innate PRINCIPLES. See the article **INNATE**.

PRINCIPLE, in physics, or **PRINCIPLE of a natural body**, is something that contributes to the essence of a body; or, whereof a natural body is primarily constituted.

Aristotle defines *Principles* to be those things which are not made or constituted of themselves, nor of other things, but all things of them: *Quæ non fiunt ex se invicem, nec ex aliis, sed ex iis omnia*.

To give an idea of natural *Principles*, consider a body in several states; a coal, e. g. that was just now a piece of wood: it is evident there is something in the coal, which before existed in the wood; this, whatever it is, is a *Principle*, and is what we call *matter*.

Again, there must be something joined with this matter, to make it wood rather than fire, or fire rather than wood: this is another *Principle*, and is what we denominate *form*. See **FORM**. Matter and form, then, are universal *Principles of natural bodies*. The *Peripatetics* add a third *Principle*, viz. *privation*; for though, say they, a thing is not made from nothing; yet it must be made from its not being that thing before.—This Aristotle calls *privation*, and admits it as a third *Principle*.—But the moderns reject it: for if *privation* be a *Principle*, it is at least so in a very different sense from matter and form.

Some late philosophers admit no *Principles* but *acid* and *alkali*. Aristotle distinguishes two sorts of natural *Principles*, as they concur in the generation, or in the composition of bodies.

PRINCIPLES of generation, or of a body in *feri*, are those without which a natural generation can neither be, nor be conceived.—Such are the three *Principles* above-mentioned; *matter, form, and privation*.

PRINCIPLES of composition, or of a body in *facto esse*, already made, are those whereof natural bodies really consist.—Such, according to him, are *matter and form*; to which some add a third, viz. union, to connect the two others together.—But this is only necessary upon supposition of substantial forms.

Principles are usually confounded with *elements*; yet is there a real difference: elements are properly the first and simplest beings, arising from the first determination or assemblage of *Principles*. They are the simplest things in which matter and

from are combined.—Elements and *Principles*, therefore, differ in this, that a *Principle*, as matter, is only a begun, not a complete nature; but an element is perfect and complete. See **ELEMENT**.

To this head may likewise be referred what we call *mechanical Principles of bodies*, which serve to account for the mechanism or artificial structure of things, and all the varieties and differences of bodies from motion, figure, and other common affections.

These *Principles* are differently maintained by three or four different sects of philosophers, viz. the ancient Epicureans, or Corporealists, to whom may be added the modern Galenists; the Cartesians; and the Newtonians.

PRINCIPLES, in chymistry, are the first and simplest parts whereof natural bodies are compounded; and into which they are again resolvable by fire.

These are more properly, as well as more commonly, called *elements*.

The chymists make five *Principles*; three whereof are called *active Principles*; which are supposed to act on themselves, and do not need to be put in motion by others: such as salt; sulphur, or oil; and mercury, or spirit.—The salt they suppose the foundation of all favours. The sulphur, of all odours; and the spirit, or mercury, of colours. See each under its proper Head, **SALT**, &c.

The two *passive Principles*, which have no force inherent in themselves, and only act by being joined with some of the others, are phlegm, and caput mortuum, which they also call *elementary Principles*.

PRINCIPLES, among Hermetic philosophers.—According to these gentlemen, the two universal *Principles of sensible nature*, are subtle and solid, which being joined in a greater or less degree, generate all that beautiful variety of beings in the universe.

The three natural *Principles* are, salt, sulphur, and mercury. These *Principles* generate the four elements; and are, as it were, secondary elements, inasmuch as they are contained in all mixed bodies. Sulphur is the first, and stands in the place of male; mercury the second, standing in the place of female; and salt the third, which copulates the others together. *Did. Hermet.*

PRINCIPLE is also applied to the foundations of arts and sciences.

In this sense we say, *Principles* are not to be proved; they must be common notions.

There is no disputing against a man that denies *Principles*: the worst reasoning is that which includes a *petitio principii*, i. e. which supposes a *Principle* that ought to be proved.

PRINCIPLE is also applied by extension to the first rules or maxims of an art.

In this sense we say, a man is ignorant of the *Principles of geometry*; meaning, he has not learnt Euclid's Elements.—The *Principles of most arts and sciences* are found in this dictionary, under their respective heads.

PRINTER, *typographus*, a person who composes, and takes impressions from moveable characters, ranged in order, or from plates engraven, by means of ink, and a press.

Fust, Guttenberg, Scheffer, Mentel, and Koster, were the first *Printers*. The first that practised it in England was Fred. Corseilles, brought over from Haarlem, under king Henry VI. In France, Gering; at Rome, Conrad Sweynheim, and Arnold Pannartz, both Germans; at Naples, Sixtus Rufinger.

The great *Printers* were Aldus, and Paulus Minutius; the two Badii; William and Frederic Morel; Oporin; Frobenius; Rob. Hen. and Char. Stephens; Gryphus, Turnebus, Torres, Commelin, Plantin, Raphelengius, Vascosan, Bleau, Crispin, and the two Elzevirs.—The learned *Printers* were, the Manutii, the Stephens's, the Badii, Turnebus, Wechel, Morel, Junter, &c.

Plantin had the title of *arch-printer*, archi-typographus, given him by the king of Spain, in consideration of his printing the polyglot of Antwerp.

The names, characters, and elogies of all the famous *Printers* are found in part II. of the first tome of the *jugemens des sçavans*.

The *Printers*, since the establishment of that art, are esteemed a part of the company of stationers and booksellers: before that establishment, the company consisted only of booksellers, binders, writers, illuminers, and parchment-makers.—The *parchment-makers* prepared the skins, and made the parchment or velum; which were then almost the only matters books were written on. The *writers*, or *copyists*, wrote and transcribed books after copies given them by the booksellers. The *binders* were charged with the binding of those days, which was very coarse, only consisting of two slight boards covered with some paltry leather. The *illuminers* painted in miniature, and gilt initial letters, head-pieces, tail-pieces, and other compartments. Lastly, the *stationers or booksellers* set the *writers* to work, and sold their copies in shops, and other places, on the days allowed them by the statutes to expose the same.

PRINTING, *typographia*, the art of taking impressions with ink, from characters and figures moveable or immovable, upon paper, velum, or the like matter.

There are two kinds of *Printing*; the one for books, the other from copper-plates, for pictures.—The first called *common press-printing*, the second *rolling-press-printing*.

The prime difference between the two consists in this, that the characters of the former are cast in relief, and those of the latter are engraven in creux. See RELIEVO, ENGRAVING, &c. The art of *Printing* is a modern invention: it is, indeed, of a very ancient standing among the Chinese; but then their *Printing* is very different from ours. It must be owned, the European *Printing*, in its original, was much the same with the Chinese; yet, as there was at that time no commerce or correspondence between Europe and China, the passage into the east by the cape of Good Hope being as yet undiscovered by the Portuguese; there is no room to charge the Europeans with borrowing their art from the Chinese: but each must be owned to have fallen on the same thing, though at very different times. Father Couplet assures us, that *Printing* has been in use in China from the year 930. Father le Comte speaks more largely; saying, that it has been there from almost all ages: he adds, that there is this difference between theirs and ours, that, whereas we have but a very small number of letters in our alphabets, and by the various arrangement of these, are able to form infinite volumes; we have the advantage, by making our characters moveable, to print the largest works with an inconsiderable quantity of letter; those that served for the first sheets, serving over again for the succeeding one: the Chinese, on the contrary, by reason of the prodigious number of their letters, are precluded this resource; and find it more easy, and less expensive, to cut all their letters on wooden blocks; and thus to make as many blocks as there are pages in a book, and these of no further use but for that single work. Their method of printing see hereafter.

Origin of PRINTING.—Who the first inventors of the European *Printing* were, in what city, and what year, it was first set on foot, is a famous problem long disputed among the learned. In effect, as the Grecian cities contended for the birth of Homer, so do the German cities for that of *Printing*. Mentz, Haerlem, and Strasburg, are the warmest on this point of honour: Italy also would have entered the lists; but the sufrage being at first divided between the first three pretenders, they are left in possession of the question, which, in reality, is not yet justly decided; though it must be owned, Mentz has always had the majority of voices.

We shall not here enter into a nice disquisition of the merits of the cause, but only propose the pretensions of each.—John Mantel of Strasburg, John Guttemberg and John Fust of Mentz, and L. John Koster of Haerlem, are the persons to whom this honour is severally ascribed, by their respective countrymen; and they have all their advocates among the learned. Mantel, a physician of Paris, enters the lists in behalf of his name-ake of Strasburg; and contends that it was he first invented *Printing* in the year 1442, and that in consideration hereof, the emperor Frederic III. gave him a coat of arms corresponding thereto: he adds, that Guttemberg, whom he had taken in as a partner or associate, carried it to Mentz, where he took in Fust a partner.

The Haerlemers, with Boxhornius, Schrevelius, &c. refer the first invention to Laurens Janz Koster of Haerlem, in the year 1430, adding, that his associate Guttemberg stole away his tools while he was at church, and carried them to Mentz, where he set up for the first inventor; though others attribute this theft, &c. to his partner Fust.

Munster, Polydore Virgil, Pasquier, &c. will have Guttemberg, or Guttemburgh, to have really been the inventor of *Printing*; and add, that he took in Fust and Schoeffer for associates.

Naude, in his *Marcurat*, espouses the cause of Fust, or Faust, or Fautus; and will have him to be the first *Printer* in Europe, and that he took in Guttemberg for a partner. His reason for putting Fust in possession of this privilege, is, that the first books that were printed, appear to have been all of his impression. It is more than probable, had Guttemberg or Koster had a greater or an equal share in the invention, they would not have allowed him to attribute the whole to himself and his son-in-law Schoeffer, as he has done, without ever offering to do the like, or in the least contradicting him, and asserting their own right.

These editions are, 1. The *Catholican Januensis*, dated in 1460, and now in the king's library. Fust's name, indeed, is not to this; but it is perfectly like the following ones, where it is

2. The Latin bible of 1462, now in the French king's library.

3. Tully's Offices, in 4^{to} (the rest being all folio's) in the year 1465, and 1466, for there are copies in the Bodleian, and the library of C. C. college, Oxon, of both those dates. 4. Other Bibles of 1471. 5. St. Augustine de civitate Dei, 1473. 6. Mercurius Trimegistus de potestate & sapientia Dei, in 1503. 7. Titus Livius, in 1518.

Add to this, that at the beginning of Livy, is a privilege granted by the emperor Maximilian to Schoeffer, for the sole power of *Printing* that author for ten years; and for six years, to all the other books he should print thereafter, in consideration of his father-in-law, Fust's, having invented the art of *Printing*. This privilege is dated 1518, and signed Jac. Spiegel.

Erasmus, however, in the epistle after that privilege, does not positively aver the fact; he only observes, that the first, or the chief inventor of that art is held to be J. Fust. In the advertisement to the said book, Nic. Carbachius speaks to the same effect as the privilege, and Erasmus.

As to Guttemberg, Mantel, and Koster, Naude observes, the person is not yet born that can say he has ever seen books print-

ed by any of them, before, or as early as those of Fust. All that is urged on their behalf, is only founded on reports, conjectures, probabilities, forged authorities, and the jealousies of cities against one another.

Yet Salmuth, in his additions to Pancirollus, cites a public act, whereby it appears, that Fust, after having invented *Printing*, and sustained it a long time on his own footing; at length took in Guttemberg as a partner, to contribute to the expence; which was very great, by reason the first books were most of them printed on velum, or at least on parchment, and after the Chinese way.

But the cause is not thus decided: the advocates for Koster urge divers things, which seem to put him in the place here assigned to Fust. Mr. Ellis, in the philosophical transactions, fathers books on him prior to any of those above referred to Fust; and even some as early as 1430, and 1432. It is certain, the Haerlemers shew printed books of that date, which agreeing so well with the account given by Theod. Schrevelius, and others, leaves Mr. Ellis little room to doubt, whether the honour of the invention be his or the other's due. All that belongs to Fust, according to this writer, is the honour of establishing the art in greater lustre and perfection at another place many years after.

But the difficulty lies, either in shewing why the practice should be at a stand from 1432, to the reviving of it at Mentz by Fust and Schoeffer, in 1465, or else in giving some account of the condition and progress of this invention during that interval.

Now, Boxhornius, Schrevelius, and other authors, expressly affirm, that so large a work as the *De Spiegel, Speculum Salutis*, of Koster, shewn at Haerlem for the first printed book, could never be his first essay: he must have had the art in its rougher rudiments before, and have made many trials on lesser works: no doubt his first attempts were on loose sheets, which we may suppose were easily lost. In effect, it must be allowed no inconsiderable argument in Koster's behalf, that the rudest and most artless performances seem to be his: Mr. Ellis mentions some things of this kind without date, which he had seen in the king's library at St. James's, in that of Bennet college and the Bodleian at Oxford, with all the marks of the utmost simplicity, and which might fairly bid for first essays. There is something so awkward and coarse in them, that any body almost might have done them; mere nature being sufficient, without any art or experience at all. The ink was only common writing ink, unartfully spread upon wooden blocks, very clumsily cut, &c.

By this time we have traced up the art to such a state, that it may, perhaps, scarce seem worth the contesting who it was invented to; and no doubt, *Printing*, as it now stands, owes more to the genius and address of some of the later improvers, than it did to its first author.

The same consideration may make us more easy under our present ignorance of the inventors of most other arts; many of which had such simple unmeaning originals, that you or I should, perhaps, think it no mighty credit to be esteemed the authors of inventions nothing less artful and ingenious.

Progress of PRINTING.—The first printers, then, whoever they were, whether Koster, Fust, Schoeffer, or Guttemberg, made their first essays on wooden blocks, or forms, after the Chinese manner.

It is not improbable, says Mr. Bagford, they might take the hint from ancient medals and seals; but others rather imagine it to have come from the method of making playing cards, which, it is certain, bears a near resemblance to the primitive process of *Printing*; as appears from the first specimens of that art above-mentioned.

The book at Haerlem, the vocabulary called *Catholicon*, and the pieces in the Bodleian and Bennet's college, are all performed in this way; and the impression appears to have been only given on one side the leaves; after which the two blank sides were pasted together.

But they soon found the inconveniencies of this method; and therefore bethought themselves of an improvement; which was by making single moveable letters, distinct from one another.

These being first done in wood, gave room for a second improvement; which was the making of them, at length, of metal; and, in order to that, cutting moulds, matrices, &c. for casting them.

From this ingenious contrivance, we ought to date the origin of the present art of *Printing*, as practised throughout Europe; contradistinguished from the methods of the Chinese abroad, and the card-makers at home, which were the same art, only practised in a different place, or with a different view.

And of this, Schoeffer, or Scheffer, first servant, and afterwards partner, and son-in-law of Fust, at Mentz, above-mentioned, is pretty generally allowed the inventor: so that he was properly the first printer; and, in strictness, the bible, which was printed with moveable letters in 1450, was the first printed book; the next was Augustine de civitate Dei, then Tully's Offices, &c. about the year 1461.

But the art being yet in its infancy, there were some imperfections in the books they printed; among the rest was the want of capital letters: hence they left the places of the initial letters blank, and gave them to the illuminers to paint in gold, or azure: though, others say, this was done designedly, to enable them to pass off their books for manuscripts.

Some authors tell us, that Faust carrying a parcel of his bibles to Paris, and offering them to sale as MSS. the French, upon considering the number of books, and their exact conformity with one another, even to a point, and that the best book-writers could not be near so exact, concluded there was witchcraft in the case; and, by either actually indicting him as a conjurer, or threatening to do so, extorted the secret. And hence the origin of the popular story of Dr. Faust.

From Mentz, the art of *Printing* soon spread itself throughout a good part of Europe; Haerlem and Strasburg had it very early; which, as the current of authors represent it, occasioned their pretending to the honour of the invention.

From Haerlem it passed to Rome in 1467. and into England in 1468. by means of Tho. Bouchier, archbishop of Canterbury, who sent W. Turner, master of the robes, and W. Caxton, merchant, to Haerlem, to learn the art. These privately prevailing with Corseilles, an under workman, to come over, a press was set up at Oxford; and an edition of Rufinus on the creed was printed the same year in a broad octavo on paper.

From Oxford, Caxton brought it to London about the year 1470. In the same year it was carried to Venice, and to Paris, where Geising, Grantz, and Friburger, all Germans, invited thither by two doctors of the Sorbonne, set up a press in that learned house.

Hitherto there had been nothing printed but in Latin, and the vulgar tongues; and this first in Roman characters, then in Gothic, and at last in Italic. But in 1480. and, as some say, in 1476. the Italians cast a set of Greek types; and it was at Venice, or, as some say, at Milan or Florence, that the first Editions in that language appeared.

The Italians too have the honour of the first Hebrew editions, which were printed about the same time with the Greek, at Soudino, a little city in the duchy of Milan; under the direction of two Jewish rabbins, Joshua and Moses, whose works are dated in the year of the world 5240. answering to the year 1480. of the christian æra.

Towards the end of the 16th century, there appeared various editions of books in Syriac, Arabic, Persian, Armenian, Coptic, or Egyptian characters; some to gratify the curiosity of the learned, and others for the liturgic uses of the Christians of the Levant; these were printed chiefly at Paris; whither puncheons and matrices were sent from Constantinople by M. Savary, then ambassador at the Porte.

Out of Europe, the art of *Printing* has been carried into the three other quarters of the world: for Asia, we see impressions of books at Goa, and in the Philippines; at Lima, Boston, Mexico, &c. for America; and at Morocco for Africa.

The Turks, indeed, rigorously prohibit *Printing* throughout their empire, as imagining that the too free communication with books might occasion some change in religion or government; yet the Jews have several editions of their books printed at Constantinople, Thessalonica, &c.

Method of PRINTING.—The *Printing* letters, characters, or *types*, as they are sometimes called, we have already spoken of, under the articles **LETTER** and **CHARACTER**.

Of the method of forming and casting them, under the article **LETTER FOUNDRY**.

And of the art of engraving the puncheons, matrices, &c. in order thereto, under the articles **ENGRAVING**, **PUNCHEON**, **MATRICE**, &c.

The workmen employed in the art of *Printing* are of two kinds; *compositors*, who range and dispose the letters into words, lines, pages, &c. according to the copy delivered them by the author: And *pressmen*, who apply ink upon the same, and take off the impression. See **COMPOSITION**, &c.

Office of the compositor.—The types being cast, &c. are distributed, each kind by itself, among the divisions of two long wooden frames, an upper, and under one, called *cases*; each of which is divided into little cells, or boxes, of different sizes.

The boxes of the upper case are in number 98; and in these are disposed the capitals, small capitals, accented letters, &c.

In the cells of the lower case, which are fifty-four, are disposed the common running letters, with the points, comma's, spaces, quadrats, &c.

Each case is placed a little aslope, like a reading-desk; that the operator may reach the upper boxes the better, and be in less danger of mixing the letters by stretching his arm over them. See **CASE**.

The compositor's post is against the middle of the case, and he works standing, holding an instrument, usually made of iron, called the *composing-stick*, in one hand; with the other he takes the letters, points, comma's, &c. as he needs them, out of the boxes; ranges them on a slip of brass, called a *rule*, in his composing-stick; and, putting a space, to make a blank between each two words, forms one line after another, till the stick being full, he empties it out upon another instrument, called the *galley*; several of which ranged in a frame, called a *chase*, are ready for the press.

This short view of composing may need to be further illustrated and enlarged upon. — The *composing-stick*, then, (represented *tab. MISCELLANY, fig. 9.*) consists of a plate, or slip of iron, brass, wood, &c. more or less broad, and contrived so as to be made more or less long, according to the width of the page, and the number of lines to be composed in it.

From the right side of this plate arises a ledge *aa*, about half an inch high, running the whole length of the plate, and serving to sustain the letters, the sides of which are to rest against it; from the same plate likewise arise three other lesser pieces, *b* and *cc*, two of which, *cc*, are contrived to slide along it, that so the two pieces may be either approached or withdrawn at pleasure, to adjust the length of the line to the measure intended.

Add, that where marginal notes, references, &c. are required in a work, the two sliding pieces *cc* are opened in the composing-stick, to a proper distance from each other.

Ere the workman proceeds to compose, a rule, or thin slip of brass plate, cut to the length of the line, and of the same height as the letter, is placed in the composing-stick against the ledge thereof, for the letter to bear immediately against.

Things thus prepared, the compositor having the copy lying before him, and the stick in his left hand, with the right he picks up the letters, spaces, &c. and places them against the rule; while with the thumb of the left he presses them close to the upper screw, or check: and thus keeps them tight and steady; while the other hand is constantly employed in setting in more letters: the whole being performed with a degree of expedition and address, not easy to be imagined.

A line being thus composed, if it end with a word or syllable, and fill the measure, there needs no further care; otherwise more spaces are to be put between the several words to justify the lines, *i. e.* to make the measure quite full, so that every line may end even; and thus he proceeds to another line.

The spaces here used are a sort of blanks, of the like dimensions as the letters, but less high; and whose faces, therefore, when set, do not appear, nor give any impression. They are of several kinds, according to the dimensions of the whites or intervals to be made by them, *viz.* quadrats, to fill up a break at the end of a paragraph, or the like; *m* quadrats, which are square, and of the thickness of an *m*, serving to make the distance after a period, or between sentence and sentence; *n* quadrats, of the thickness of an *n*, to be placed after colons, semi-colons, and comma's; and thick or thin spaces, to be used between the words in justifying, as above.

For marginal notes, in the spaces reserved for them, between the two sliding-pieces of the composing-stick, are put little quadrated pieces of metal, called *quotations*; which are justified by other smaller pieces; a slip of scaleboard being placed from the top of the page to the bottom, to keep the note and text at a due distance.

The first line being thus completely justified, the compositor advances to the next; in order to which, he moves the brass rule from behind the former, and places it before it, and thus composes another line against it, after the same manner as the former: and thus he goes on till his stick be full, which he empties into the galley, after the manner following.

Taking the rule from behind the left line, he places it before it; and with his two middle fingers squeezes the lines in the stick close; his two fore-fingers at the same time being against the outside of the rule: thus he lifts them out of the stick, and clapping his two thumbs behind the first line, lifts them into the galley; taking care to disengage his two thumbs without breaking the lines.

The compositor having thus set the proper number of lines in the stick, *viz.* four, five, six, or more, and emptied them out into the galley; he again fills, and empties, as before, till a complete page be formed; remembering at the bottom of every page to set a line of quadrats, and at the end thereof the first word of the page ensuing, for a catch-word; and, if it be the first page of the sheet, one of the letters for a signature.

The galley is a flat wooden instrument, in form of a long square; of a length and breadth proportionable to that of the page: it consists of two parts, the upper, called the *floor*, whereby the pages of large volumes, when composed, are slid upon the stone; the other, which is the body of the galley, is ledged on three sides, to contain the floor; the inner ledge not to exceed half an inch in height, that the composed page rising above it by one half the height of the letter, may be tied up, or bound down, and removed without danger.

This galley is placed at the top of the case, and detained by two wooden pins from sliding down the boxes. See **GALLEY**.

The page, then, composed and ranged in the galley, he ties it up therein with a cord or packthread, and sets it by; and proceeds to the next, till the number of pages of the sheet be completed: which done, he carries them to the imposing or correcting stone, there to range them in order, in a chase; which they call *imposing*.

The chase is a rectangular iron frame of different dimensions, according to the size of the paper to be printed on, having two cross pieces of the same metal, called a *long* and *short cross*, mortised at each end, into the frame, so as to be taken out occasionally.

By the different situations of these crosses, the chase is fitted for different volumes; for quarto's and octavo's, one traverses the middle lengthwise, the other broadwise, so as to intersect in the centre; which is the most customary situation: for twelves and twenty-fours, the short cross is shifted nearer to one end of the chase. For folio's, the long cross is left intirely out, and the short one placed in the middle; and for broadsides, or sheets printed on one side only, both crosses are set aside.

To dress the chase, or range and fix the pages therein, they make use of a set of furniture, consisting of reglets, or slips of wood of different dimensions, and about half an inch high, that they may be lower than the letters: some of these are placed at the top of the pages, called *heads-sticks*; others between them, to form the inner margin, called *gutter-sticks*; others at the sides, called *sides-sticks*; and others at the bottom, called *foot-sticks*.

The pages, then, being placed in order on the stone, the chase is put over them, and the reglets applied between the letter and the chase, in the position above-mentioned; the whole is locked up by means of small pieces of wood, cut in the wedge-form, called *quoins*, which are driven with a mallet and shooting-stick, to a sufficient tightness.

Before the form be quite locked up, they press down the same, by passing a smooth piece of wood, called the *plainers*, over the letters, to make their surfaces stand flat and even; and, when locked up, they shake it, to see that nothing stir.

In this condition the work is called a *form*, containing more or fewer pages, according to the volume. See *FORM*.

As there are two forms required for every sheet, when both sides are to be printed, it is necessary they be exactly of the same length and breadth; i. e. the corresponding reglets, head-sticks, &c. are to be equal in both forms, that the pages may fall exactly on the back one of another, which is called *register*.

Here, then, properly ends the compositor's office; the form, thus finished being to be committed to the pressman.

Indeed, as it is impossible but there must be mistakes in the work, either through the oversight of the compositor, or by the casual transposition of the letters in the cases. After drawing off a proof, it is delivered to the corrector, who reading it over, and rectifying it by the copy, it is remanded to the former operator, to be corrected accordingly.—*For the characters used in correcting a sheet for the compositor, see CORRECTION.*

The compositor, then, unlocking the form upon the correcting-stone, by knocking out or loosening the quoins; and spreading his corrected proof so, as that the lines thereof range with the respective ones of the metal; by running his eye along both, he easily spies where corrections are to be made: according to which, he proceeds to pick out the faulty letters, points, &c. with a sharp-pointed steel bodkin, and puts others in their places.

Where the alterations are considerable, and particularly where insertions or omissions are to be made, there usually arises a necessity of over running; in order to which they must decompose, or return the lines back from the chase into the galley, and from the galley again into the composing-stick, to be new-modelled and rectified accordingly.

If, e. g. one or more words to be inserted in a line, cannot be got in by changing the spaces of the line for lesser ones; part of the line must be put back into the close of the preceding one, or forward into the beginning of the subsequent one, or both, till room is got. If the insertion be large, several lines will need to be over-run, either backward or forward, till a break is arrived at; when, if it be not got in, a line is to be drawn out; and to get in that line, the next pages, either backward or forward, must sometimes be over-run ere it can come in.

When an omission is to be made, the contrary course must be taken. If it be but little, the compositor takes it out, and drives out the remaining matter, by either enlarging his spaces, or bestowing the beginning of the following, or the close of the preceding line therein. If it be considerable, he may be obliged to over-run several pages ere it can be drawn out.

Pressman's office, or PRINTING properly so called.—To work off the form thus prepared and corrected by the compositor, there are three things required, paper, ink, and a press.

To fit the paper for use, it is to be first wetted or moistened, by dipping several sheets together in water: these are afterwards laid in a heap over one another; and to make them take the water equally, they are all pressed close down with a weight a-top. As to the degree of wetting, it must be according to the quality of the paper, and the size of the letter; small letters, and stiff paper, requiring most wetting.

A *PRINTING-HOUSE* is a place destined for *printing*, and fitted up for that purpose with presses, cases, and other furniture.

The most considerable *printing-houses* in the world are those of the Louvre and Vatican.—The first, begun under Francis I. was carried to its utmost perfection under Louis XIII. by the care of cardinal Richelieu; and removed into the galleries of the Louvre by Louis XIV.

The Vatican *printing-house*, called also the *apostolical printing-house*, because the pope's bulls, decrees, &c. are printed therein, was begun by Pius IV. and furnished with great magnificence by Sixtus V. See *VATICAN*.

Out of both these *printing-houses* have come forth very beautiful and splendid editions of the ancient authors. The Vatican was the first that printed books in the Arabic language.

The Clarendon *printing-house* at Oxford (so called, because built, in great measure, with the profits arising from the copy of lord Clarendon's history, which had been given to the university) promises well: it has furnished us with a very fine English bible, &c.

The *PRINTING ink* is of two kinds, black and red: the last occasionally used in title-pages, calendars, &c. the first for the body of books. The composition of each, though now rec-

koned no part of the printers business, but usually furnished them by other hands, is as follows:

For black ink: An hundred pounds of nut, or linseed oil, being reduced, by boiling, to the consistence of a syrup, is cleansed and purified by throwing into it two pounds of coarse bread, and about a dozen onions. They then boil thirty or thirty-five pounds of turpentine apart, till such time as they find, upon its cooling on paper, that it breaks clean, like glass, without pulverizing; for if it pulverize easily, it is a sign it is burnt. The oil and turpentine being thus prepared, the first is gently poured, half cold, into the latter; and the two stirred together with a stick till they be well mixed; after which, the composition, which is called the *varnish*, is set by, to be used occasionally.

Now, to proceed to make ink, they take a quantity of this mixture, and add to it a certain quantity of lamp-black; working it up with a kind of wooden mullet, or brayer, till the whole be incorporated, and reduced into a kind of pulp; which is the ink for use.

Where, note, that its thickness or strength is always to be proportioned to that of the paper, and the warmth of the weather; strong paper, and hot weather, requiring strong ink; and that the strength or weakness of the ink depends on the greater or less degree of coction of the varnish.

For red ink: They use the same materials as for black, excepting only that instead of lamp-black they add a proper quantity of vermilion. Some hold, that by mixing and incorporating the bigness of a nut of fish glue, or brandy, or the white of an egg with the ink, the vermilion acquires a greater lustre.

The ink is applied upon the forms by balls, which are a kind of wooden funnels, the cavities whereof are filled with wool covered with leather nailed to the wood. One of these the pressman takes in each hand, and applying them on the ink-block, to charge them with ink, he rubs them one against the other to distribute the ink equally; and, at last, smears over the form by beating or dabbing them several times over the whole face thereof: this leaves the form in a condition to be passed under the press, with the moistened paper laid thereon.

The *PRINTING press* (represented *tab. miscel. fig. 8.*) is a very complex machine: its two principal parts, each whereof consists of several others, are the *body* of the press, which serves to give the pinch or stroke for the impression; and the *carriage*, on which the form is laid to undergo the same. See *PRESS*.

The body consists of two strong cheeks *b b*, placed perpendicularly, and joined together by four cross pieces or planks. See *CHEEK*.

The first plank *e e*, called the *cap* of the press, is fixed, and serves to keep the two cheeks together at the due distance, at top: the second *d d*, called the *head*, is moveable; being sustained by two iron pins or *long bolts*, that pass the cap: in this plank is fixed a female screw or *worm*, with a *brass nut*, sustained by two *short bolts*, which keep it up: the third plank *e e*, called the *shelves*, serves to keep steady a part called the *hose*, in which the *spindle* (to be spoken of hereafter) is inclosed: the fourth plank *f f*, called the *winters*, is moveable; it bears the carriage, and sustains the effort of the press beneath, as the head does above; each giving way a little, the one upwards, the other downwards, to make the pull the easier.

The *spindle g g* is an upright piece of iron pointed with steel, of different dimensions; having a male screw, which goes into the female of the head about four inches. Through the eye *h* of this spindle, is rivetted the *bar*, by which the pressman works the press.

The lower part of the spindle passes through the shelves, being inclosed in a square wooden frame *i*, called the *hose*; and its point works into the plug, fixed in a brass pan supplied with oil; which pan is fixed to an iron plate let into the top of the platten. The pressman, then, by pulling or turning the bar fixed in the eye by an iron key, presses upon a square smooth piece of wood called the *platten*, and enables it to compress the form covered with the paper, tympan, and its blankets, which, in order hereto, are brought under the platten.

At each corner of the hose, there is an iron hook fastened to those at each corner of the platten, with cords or packthread, very exactly.

The *carriage l l l l*, which makes the second principal member of the press, is placed a foot below the platten, having its fore-part supported by a wooden prop *m*, called the *fore-stay*, while the other rests on the winter. On this carriage, which sustains the plank, are nailed two long iron bars, or *ribs*, *o o*; and on the plank are nailed short pieces of iron or steel *p p*, called *cramp-irons*, equally tempered with the ribs, and which flue upon them when the press is turned in or out.

Under the carriage is fixed a small piece of iron called the *spit*, with a double wheel in the middle, round which leather *girts* are fastened, nailed to each end of the plank. To the outside of the spit is fixed a handle, or rounce, by which the pressman turns the plank in or out at pleasure.

Upon the plank is a square wooden frame or *coffin q q*, wherein is inclosed a marble, or polished stone for the form to be laid on. To this coffin are fastened leather *flay girts*, one to each side; when being again fastened to the cheeks of the press, prevent the plank from running too far out, when drawn from

under the platten. On the fore-part of the plank is a gallows *rr*, which serves to sustain the tympan, when taken from off the form.

On the front of the coffin are three frames much alike, though serving for different purposes, *viz.* the two tympan and frisket: the tympan *st* are square, made of three slips of very thin wood, and at the top a slip of iron, still thinner, called a *head-band*: that called the *outward tympan* is fastened with iron joints to the coffin. They are both covered with parchment; and between the two are placed blankets, which serve to make the impression of the platten upon the surface of the letters more equable; as also to prevent the letters from being broken by the force of the press. The frisket *tt* is all of iron, very thin, fastened at top to the great or outward tympan, and sustained by a slip of wood hanging from the ceiling, when opened to take out the printed sheets, and put in others. It is also covered with parchment or paper, cut in the necessary places, that the sheet, which is between the great tympan and frisket, may receive the ink, and that nothing may hurt the margins. On the parchment of the great or outward tympan it is, that the blank sheet is laid to be printed.

To regulate the margins, and make the lines and pages answer each other when printed on the other side; in the middle of the wood, in the sides of this tympan, are two iron points, which make two holes in the sheet, to be placed on the same pins, when the sheet is returned for an impression on the other side, which is called the *reiteration*.

Every thing now about the tympan being prepared for printing, and the pressman having inked or beat his form now placed on the stone, he brings the tympan and frisket down from the gallows upon the form; and advancing the plank under the platten by means of the spit-handle, or rounce, gives two strokes or pulls with the bar; and with the same handle turned the contrary way, brings back the plank, to take out the printed sheet, and put in a fresh one; and this he repeats till he has taken off the full number of sheets the edition is to consist of.

One side of the sheet being thus printed, it is remanded to the press for the other; and is so disposed, as that the iron points pass through the holes already made in the sheet.

Sometimes it is required to cut the frisket afresh, where the second side is to be more or less full of printing than the first; as is frequently the case at the beginning and ending of books, &c.

The number of sheets of the edition being complete, and the form to be separated, to restore the letters into the cases, they first wash it in a boiling lye to take out the remains of the ink, scouring it with a brush, and then with fair water. This done, it is carried to a wooden frame to be unlocked, and the furniture, *i. e.* the flicks, &c. taken off to disengage it from the chafe. Then the compositor taking out several lines at once upon a little wooden ruler, he replaces each letter in its proper box, to be again used in the remainder of the impression; which last operation they call *distribution*.

Beside the several kinds of letters and characters above-mentioned, used in printing, they have likewise rules for blank lines, borders, and head and tail-pieces, accommodated to the several kinds of letters.

The rules for blank-lines are of brass, and are made exactly of the height of the letter; otherwise they will either hinder the neighbouring letters from printing, or will themselves be hindered by them. These the compositor occasionally cuts into proper lengths, as his work requires.

The borders are a kind of ornaments in form of long bars, serving for the divisions of books, chapters, &c. Their depth is proportioned to the letter, and their length adjusted to the page; for being composed of several moveable pieces, it is easy lengthening or shortening them.

The head and tail-pieces, cut either in wood or pewter, are compartments used at the beginnings and endings of books.

The initial letters are sometimes cut in wood, and figured; sometimes cast like the other characters.

For the convenience of the binding, the printers had early recourse to signatures, *i. e.* letters of the alphabet placed at the bottom of the sheet, which shew the order they are to be bound in; as well as whether the quires be complete.

The catch-words serve nearly the same purpose: these are the first words of each page, which are inserted at the bottom of the preceding pages. The number of the pages are equally serviceable to the reader and the binder, to guide to references, and to warrant the book duly bound and collated: some printers formerly put them at the bottoms of the pages; but custom has now carried it for the tops.

In the infancy of printing, they had likewise a register chartarum for the convenience of the binders: to draw this, at the end of each volume, they collected the signatures, and the first words of the four first sheets of each alphabet. To abridge it, they afterwards contented themselves to express the signatures, and how often each letter was repeated: but the register has been now long disused.

As to the faults which escape the corrector and compositor, they are usually noted in what we call *errata*. The ancient editions had no errata; but in lieu thereof they corrected the faults in each printed copy with a pen; which was easy enough

in those days, though impracticable now. In effect, we have anciently had printers who did not need an errata of above five articles in a volume of five hundred sheets: how different from some of the present set, who might make an errata of five hundred articles in a book of five sheets!

Chinese PRINTING.—There are three opinions as to the antiquity of the Chinese Printing, one fixing it 300 years before Christ; another 900 years after him; and a third carrying it still farther back, and making it coeval with that mighty empire; though it must be allowed the last is much the least probable of the three.

The manner of Printing we have already hinted to be very different from that which now obtains among the Europeans: it is true, it has some advantage over ours in correctness, and the beauty of the character; but in other respects it comes far short, the single advantage of moveable characters making more than amends for all that is urged against us by some zealous advocates for this oriental Printing.

Books are printed in China from wooden planks, or blocks, cut like those used in Printing of callico, paper, cards, &c. among us.

These blocks are made of a smooth, firm, close wood, and of the size of the leaf required. On the face-side they glue a paper, upon which some able penman draws out the several letters and characters, with a Chinese pen, which is a kind of pencil. This is the principal part of the work, and that whereon the success of the rest depends.

When finished, the block is put into the hands of a sculptor, or cutter in wood; who, following the several strokes of the writer with his gravers, and other sharp little instruments, makes them all appear in relief on the wood.

When the carving or cutting is finished, they moisten what remains of the paper, and rub it gently off.

The ink they use in Printing is the same with the common Chinese ink, wherewith they also write; and is made of lamp-black, mixed up with other ingredients.

Their press resembles our rolling-press, much more than the letter-press.

As to their paper, it is inferior to ours: it is made of the inner bark or rind of a kind of rushes, beat up with water into a pulp or paste, and formed in moulds, much like ours.

The advantages of the Chinese Printing consist in this, that they are not obliged to take off the whole edition at once, but print their books as they need them; that the blocks are easily retouched, and made to serve afresh; and that there needs no corrector of the press.

Its disadvantages are, that a large room will scarce hold all the blocks of a moderate volume; that the colour of the ink easily fades; and that the paper is apt to tear, and is subject to worms: whence it is that we see so few ancient books in China.

Rolling-press PRINTING is employed in taking off prints or impressions from copper-plates engraved or etched.

It differs, as we have before observed, from letter-printing; in that the marks and characters, whose impressions are to be taken, in the former case, are indented, or cut inwards; and in the latter, are in relief, or stand out.

This art is said to be as ancient as the year 1460. and to owe its origin to Finiguerra, a Florentine goldsmith, who casting a piece of engraven plate in melted brimstone, found the exact print of the engraving left in the cold brimstone, marked with black licked out of the strokes by the liquid sulphur.

Upon this he attempted to do the same on silver plates with wet paper, by rolling it smoothly with a roller; and this succeeded.

This novelty tempted Baccio Baldini, a goldsmith of the same city, to attempt the same, which he did with success; engraving several plates of Sandro Boticello's design, and Printing them off this new way: in which he was followed by Andrew Mantegna, then at Rome.

This knowledge getting into Flanders, Martin of Antwerp, a famous painter, grav'd abundance of plates of his own invention, and sent several prints into Italy, marked thus, *M. C.* After him Albert Durer appeared, and gave the world a vast number of prints both in wood and copper. About this time one Hugo de Carpi, an Italian painter, found out a way, by means of several plates of wood, to make prints resemble designs of chiaro scuro; and some years after, the invention of etching was discovered, which was soon after made use of by Parmeggiano.

The art was not used in England till the reign of king James I. when it was brought from Antwerp, by Speed.

The fabric of the rolling-press, and the composition of the ink used therein, with the manner of applying both in taking off prints, are as follow.

Structure of the rolling-press.—This machine, like the common press, may be divided into two parts; the body and carriage, analogous to those in the other.

The body consists of two cheeks of different dimensions, ordinarily about four feet high, a foot thick, and two feet apart; joined at top and bottom by cross pieces. The cheeks are placed perpendicularly on a wooden stand, or foot, horizontally placed, and sustaining the whole press.

From the foot likewise rise four other perpendicular pieces, joined by other cross or horizontal ones; which may be considered as the carriage of the press, as serving to sustain a smooth, even plank, which is about four feet long, two feet broad, and an inch thick; upon which the engraven plate is to be placed.

Into the cheeks go two wooden cylinders, or rollers, about six inches in diameter, borne up at each end by the cheeks; whose ends, which are lessened to about two inches diameter, and called *trunnions*, turn in the cheeks between two pieces of wood, in form of half-moons, lined with polished iron, to facilitate the motion.

The space in the half-moons, left vacant by the trunnion, is filled with paper, pasteboard, &c. that they may be raised and lowered at discretion; so as only to leave the space between them necessary for the passage of the plank, charged with the plate, paper, and blankets.

Lastly, to one of the trunnions of the upper roller is fastened a cross consisting of two levers, or pieces of wood, traversing each other. The arms of this cross serve in lieu of the handle of the common press; giving a motion to the upper roller, and that to the under one; by which means the plank is produced, or passed between them.

Preparation of the ink.—The ink used in rolling-press *Printing*, is a composition of black and oil mixed and boiled together in a due proportion.

The black is a fastitious matter, made of the stones of peaches and apricots, bones of sheep's feet, and ivory; all well burnt, beaten, sifted, and mixed together with spirit of wine, and sometimes only with water.

This black is usually brought hither ready prepared from Francfort on the Main; whence our printers call it *Francfort black*. See **BLACK**.

The oil wherewith they dilute this black, is nut-oil; which is boiled up differently, according to the different works it is to be used in.

They usually make three kinds, *thin*, *thick*, and *strong*; only differing in the degree of cotion: the strong is that used in the finest works, &c.

To make the ink, they pulverize the black very carefully, and pass it through a fine sieve; then mix it up on a marble with the proper oil, by means of a muller, after the same manner as the painters do their colours.

Method of PRINTING from copper plates.—The ink being prepared, they take a little quantity of it on a rubber, made of linen rags, strongly bound about one another; and therewith smear the whole face of the plate, as it lies on a grate, over a charcoal fire.

The plate sufficiently inked, they first wipe it coarsely over with a foul rag, then with the palm of the left hand, then with that of the right; and, to dry the hand, and forward the wiping, rub it from time to time on whiting.

In wiping the plate perfectly clean, yet without taking the ink out of the engraving, consists a great part of the address of the workman. The French printers use no whiting, as being detrimental to the colour of the ink; nor do they lay the plate on the grate to warm, till after inking and wiping it.

The plate thus prepared, is laid on a thick paper, fitted upon the plank of the press: over the plate is laid the paper, first moistened to receive the impression; and over the paper, two or three folds of blanketing, or other stuff.

Thus disposed, the arms of the cross are pulled; and by that means, the plate with its furniture passed through between the rollers; which pinching very strongly, yet equably, presses the moistened paper into the strokes of the engraving, whence it licks out the ink.

Some works require being passed twice through the press, others only once, according as the graving is more or less deep, or the greater or less degree of blackness the print is desired to have.

It must be observed, that the stronger and thicker the ink is, the stronger must the rollers pinch the plate: this tempts many of the workmen to use a thinner oil, in order to save labour; which proves very prejudicial to the impression.

The wetting of the paper ought to be done two or three days before *Printing* it, to render it the more supple and mellow: as the prints are drawn off, they are hung up to dry on lines, &c.

Lastly, after the number of prints desired have been wrought off from the plate, they rub it over with oil of olives, to prevent its rusting, and set it by against a new impression. If the strokes of the graving be perceived full of ink hardened therein, in the course of the *Printing*, they boil it well in a lye, ere the oil be applied.

PRIOR, before, something that is nearer the beginning, than another to which it is compared.

PRIOR is particularly used for a superior of a convent of monks, or the second person after the abbot.

Priors are either *claustral* or *conventual*.

Conventual PRIORS are the same as abbots; all the difference between them being in name; both having the same rights, and both alike being governors of monasteries.

Claustral PRIOR is the who governs the religious of an abbey, or *priors*, in *commendam*; so called, because he has superiority in the cloister or monastery.

His jurisdiction is wholly from the abbot; and ends with the abbot's death, unless he have been elected by the whole convent.

Conventual Priors are of two kinds, viz. *regular conventual Priors*, who govern religious living in community; and *secular or commendatory-conventual Priors*.

Conventual Priors are obliged to take up the priesthood within a year, or at most two, from the dates of their provision; in default whereof, their benefices are declared vacant.

Priors must be twenty-five years old, ere they can govern the convent; and twenty, if the convent be governed by another.

Grand PRIOR, is the superior of a large abbey, where several superiors are required; as in the abbeys of Cluny and Fecamp.

In the monastery of St. Denys, there were anciently five *Priors*; the first whereof was called the *grand Prior*.—In most monasteries there is also a *sub-prior*.—There are also *grand Priors* in the military orders; as in that of Malta, or St. John of Jerusalem, &c.

PRIORS aliens, were certain religious, born in France and Normandy, superiors of religious houses, erected for their country-folks here in England.

These, Henry V. deeming no good members for this land, suppressed; and their livings were afterwards given by Henry VI. to other monasteries, and houses of learning; but chiefly, as Stow observes, to the erecting of those two famous colleges, called the *king's colleges of Cambridge and Eaton*.

Arch PRIOR, see the article **ARCH prior**.

PRIORITY, **PRIORITAS**, the relation of something, considered as it is *before*, or *prior* to another, i. e. as it is nearer to the beginning, or the first. See **POSTERITY**.

The principal modes of *Priority* are five, viz. in respect of *time*; as when we say, that the Grecian empire was *prior* to the Roman; *nature*, as when we say one is *prior* to two; *order*, *dignity*, and *causality*: which are all summed up in the technical diction;

*Tempora, natura, prius ordine, dic & honore;
Effecto causam dicimus esse prius.*

PRIORITY, in law, denotes an antiquity of tenure, in comparison of another less ancient.

To *hold by Priority*, is to hold of one lord more anciently than of another; in respect whereof the tenant is said to *hold in Priority*. The lord of the *Priority* shall have the custody of the body. *Crompt. Jurisd.*

PRISAGE, **PRISAGIUM**, that share which belongs to the king, or admiral, out of such merchandizes as are taken at sea, as lawful prize: which is usually a tenth part. See **PRIZE**.

PRISAGE of wines, a custom in certain ports, whereby the king challenges out of every vessel laden with wine, containing twenty tuns, or upwards, two tuns of wine, the one before, the other behind the mast, at his own price; which is twenty shillings per tun.

The custom varies a little, in various places: at Boston, e. g. every bark laden with ten tuns of wine pays *Prisage*. The term is now grown into disuse; and in lieu of *Prisage*, the custom, says Cowel, is popularly called *butterage*; because it is the king's chief butler that receives it.

PRISCILLIANISTS, **PRISCILLIANISTÆ**, ancient heretics, who arose in Spain, or rather were derived thither from Egypt, towards the end of the fourth century.

The origin of this heresy is not well known; but it appears to have been brought into Spain by one Marcus of Memphis, who had for his disciple the rhetor Heliadius, under whom *Priscillian* was educated.

What their particular tenets were, is not easy to discover; but they are charged by their adversaries with indulging all kinds of secret filthiness, and nocturnal mixtures, under a religious notion.—Among their dogmata, this is said to have been one: *Jura, perjury, secretum prodere noli*.

They held, that souls are of the same nature and substance with God: they admitted all the books of scripture, but allegorized them into their own sense. *Forbes*.

Priscillian, their leader, was a man of great birth, fortune, parts, and learning: he was condemned with some bishops his adherents, in a council at Saragossa, and in another at Bourdeaux; but he appealed to the emperor Maximus, and had a hearing at Treves; where, being convicted of broaching novelties, he was condemned to death, with several of his followers.

PRIZE, or **PRIZE**, in navigation, a vessel taken at sea from the enemies of the state, or from pirates, by a man of war, or a merchant-man, having commission from the admiral.

Vessels are looked on as lawful *Prize*, if they fight under any other standard than that of the state from whom they have their commission; if they have no charter-party, invoice, or bill of lading aboard them; if they be laden with effects belonging to the king's enemies, or with contraband goods.

Those of the king's subjects recovered from the enemy, after having remained twenty-four hours in their hands, are also deemed lawful *Prize*.

Vessels that refuse to strike their sails, after having been summoned thereto by the king's ships, may be constrained to do it; and if they make resistance, and fight, they are lawful *Prize*.

PRIZE, in our statutes, is used for things taken of the subjects by the king's purveyors.

Privation signifies no more than the absence of the future form: thus every thing, according to Aristotle, is formed of this, that it was not that thing before; *e. gr.* a chick arises hence, that it was not a chick before it was generated; which is what the philosopher calls *Privation*.

Aristotle is very angry with the ancients, for not admitting *Privation* as a principle, and imputes it to their ignorance thereof. But it is an injustice to reproach them with ignorance of what it is impossible to be ignorant of; and it is an illusion to produce this poor principle of *Privation* as such a mighty mystery; there being nobody but supposes it a thing known, that a thing is not before it is made.

PRIVATIVE, in grammar, a particle, which, prefixed to a word, changes it into a contrary sense.

Thus, among the Greeks, the *α* is used as a *Privative*; as in *αθεος*, atheist, *ακεφαλος*, &c.—The Latins have their *Privative* in; as, *incurribilis*, *indeclinabilis*, &c.—The English, French, &c. on occasion, borrow both the Latin and Greek *Privatives*.

PRIVATIVE modes. See the article **MODE**.

PRIVATIVE quantity, in algebra, denotes a quantity less than nothing; called also a *negative quantity*; in opposition to affirmative or positive quantities.

Privative quantities are denoted by the character of subtraction—prefixed to them.

PRIVILEGE *, **PRIVILEGIUM**, in the general, any kind of right, prerogative, or advantage, attached to a certain person, condition, or employment, exclusive of others.

* The word is formed from the Latin *privata lex*.

PRIVILEGE, in law, is a particular right granted to a single person, place, community, or the like, whereby they are exempted from the rigour of the common laws.

Privilege is either *personal* or *real*:

Personal PRIVILEGE is that which is granted to any person either against or beyond the course of the common law.

Such, *e. gr.* is that of a member of parliament, who may not be arrested, nor any of his servants, during the sitting of parliament, nor for a certain time before and after.

Real PRIVILEGE is a franchise granted to a place.

Such as that granted to our universities, by which none who are members thereof may be called to Westminster-hall upon any contract made within their own precincts.

So also, a person belonging to the court of chancery cannot be sued in any other court, certain cafes excepted: and if he be, he may remove it by writ of *Privilege*.

It is an ancient *Privilege* for men to be exempted from arrests within the verge of the court, *i. e.* in or near the palace where the king is resident: because, in such cases, quarrels frequently happen; and the peace ought to be strictly kept there. See **PAX**.

In the laws of Hen. I. it is expressed, that peace ought to be maintained religiously and reverently within four miles of the king's doors towards the four quarters; and forty-nine acres, nine feet, nine palms, and nine barley-corns around. See **PEACE**.

Attachment of PRIVILEGE. See the article **ATTACHMENT**.

PRIVILEGE, in commerce, is a permission from a prince or magistrate, to make an sell a certain merchandise, or to engage in a certain commerce, either exclusively of others, or concurrently with them.

The first is called an *exclusive Privilege*; the latter, simply, a *Privilege*.

Exclusive Privileges are to be granted rarely, by reason of the hindrance they are of to trade; yet they are sometimes very just and reasonable, by way of reward for the invention of useful machines, manufactures, &c.

Exclusive Privileges for foreign commerce are usually granted on the following conditions:—That the commodities be brought from remote parts, where there is no going without running great risks: that the *Privilege* be only for a limited time: that the persons *privileged* be not allowed to monopolize, *i. e.* to raise and lower their commodities at pleasure; but that the sale and price be always proportionable to the expence, interests, &c. and that the *Privileges* assist the state, on occasion, with part of their gains.

PRIVILEGE for the impression of books, is properly exclusive; being a permission which an author, or bookseller, obtains under a prince's seal, to have alone the impression of a book, with a prohibition of all others to print, sell, or distribute the same, within a certain term of years, usually 14, under the clauses and penalties expressed therein.

These *Privileges* were unknown till the beginning of the 16th century, when they were introduced in France: the oldest is said to bear date in the year 1507, and to have been occasioned by some printers counterfeiting the works of others as soon as they appeared.

But people were yet at liberty to take or let them alone at pleasure, till the interests of religion, and the state, occasioned the restraining of this liberty.

In 1563, Charles IX. published a celebrated ordinance, forbidding any person, on pain of confiscation of body and goods, to print any letter, speech, &c. without permission.

The like has been since done in England; though, at present, *Privileges* are not only not required, but of the late act for securing the properties of books, seem needless.

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PRIVILEGES of the clergy. See the article **CLERGY**.

PRIVILEGE of the tabouret. See the article **TABOURET**.

PRIVILEGED debt. See the article **DEBT**.

PRIVITIES, the genital parts of either sex; or those immediately ministering to the business of generation. See **GENITALS**.

PRIVITY, an intimate freedom, or private familiarity between two persons.

The lawyers say, if there be lord and tenant, and the tenant hold of the lord by certain services; there is a *Privity* between them in respect of the tenure.

PRIUS.—*Nisi PRIUS*, in law. See **NISI**.

PRIVY, in law, a person who is partaker, or has an interest in an action or thing.

In this sense they say, *privies in blood*: every heir in tail is *Privy* to recover the land intailed.

In old law-books, *merchants Privy* are opposed to merchants strangers.

Coke mentions four kinds of *Privies*.—*Privies in blood*, as the heir to his father; *Privies in representation*, as executors and administrators to the deceased; *Privies in estate*, as he in reversion, and he in remainder; donor and donee; lessor and lessee; lastly, *Privy in tenure*, as the lord by escheat, *i. e.* when land escheats to the lord for want of heirs.

PRIVY council, a council of state, held by the king with his counsellors, to concert matters for the public service, and for the honour and safety of the realm.

The *Privy council* is, or ought to be, the primum mobile of the state, and that which gives the motion and direction to all the inferior parts. It is likewise a court of justice of great antiquity; the primitive and ordinary way of government in England being by the king and *Privy council*.

It has been frequently used by all our kings for determining controversies of great importance: the ordinary judges have sometimes declined giving judgment till they had consulted the king and *Privy council*; and the parliament have frequently referred matters of high moment to the same; as being by long experience better able to judge of, and by their secrecy and expedition, to transact, some state-affairs, than the lords and commons.

At present, the *Privy council* takes cognizance of few or no matters except such as may not be well determined by the known laws, and ordinary courts; such as matters of complaint, and sudden emergencies.

The oath of a *Privy counsellor* is, to the utmost of his power and discretion, truly and justly to counsel the king, and to keep secret the king's counsels.

Anciently, to strike in the house of a *Privy counsellor*, or elsewhere in his presence, was grievously punished: to conspire his death, is felony; and to effect it, is treason.

With the advice of this council, the king issues proclamations that bind the subject, provided they be not contrary to law.

In debates, the lowest delivers his opinion first, the king last; and thereby determines the matter.

A council is never held without the presence of a secretary of state.

The members of the *Privy council* in the year 1710. were in number 57; their officers, four clerks of the council, three clerks extraordinary, three clerks in the council-office, a keeper of the records, and two keepers of the council-chamber.

Lord president of the PRIVY council. See **PRESIDENT**.

PRIVY seal, a seal which the king uses, previously, to such grants, &c. as are afterwards to pass the great seal.

Yet the *Privy seal* is sometimes used in matters of less consequence, which do not require the great seal. See **SEAL**.

Lord PRIVY seal is the fifth great officer of the crown, through whose hands pass charters and grants of the king, and all pardons signed by him, before they come to the great seal: also matters of less moment, which do not pass the great seal, *v. gr.* for payments of money, &c.

He is a lord by office, and a member of the *Privy council*; he was anciently chief judge of the court of requests.

Clerks of the PRIVY seal. See the article **CLERK**.

PRIVY chamber. See the article **CHAMBER**.

PRIZE. See the article **PRIZE**.

PRO confesso. See the article **PRO-CONFESSO**.

PRO indiviso. See the article **PRO-INDIVISO**.

PROBABILISTS, a sect, or division, among the Romanists, who adhere to the doctrine of *probable opinions*; holding, that a man is not always obliged to take the more probable side, but may take the less probable, if it be but barely probable.

The Jesuits and Molinists are strenuous *Probabilists*. See **JESUIT**, &c.

Those who oppose this doctrine, and assert, that we are obliged, on pain of sinning, always to take the more probable side, are called *probabilianists*.

The Janfenists, and particularly the Port-royalists, are probabilianists.

PROBABILITY, in reasoning, *verisimilitude*; or an appearance of truth.

To define it philosophically, *Probability* is the appearance of the agreement or disagreement of two things by the interven-

tion of proofs, whose connection is not fixed or immutable, or is not perceived to be so; but is, or appears, for the most part, to be so: so as to suffice to induce the mind to judge the proposition to be true or false, rather than the contrary. That proposition, then, is *probable*, for which there are arguments and proofs to make it pass, or be received for true.

The entertainment the mind gives to this sort of propositions, is called *belief, assent, or opinion*.

Probability, then, being to supply the defect of our knowledge, is always conversant about propositions whereof we have no certainty, but only some inducements to receive them for true.

According to Aristotle, a proposition is *probable*, if it seem true to all or most people, and those the wiser and more reputable sort: But by *seem*, he means, what, after a close inquiry, shall seem to be true.

Of *Probability* there are various degrees, from the confines of certainty and demonstration, down through improbability and unlikeliness to the confines of impossibility; and also degrees of assent from certain knowledge, and, what is next to it, full assurance and confidence, quite down to conjecture, doubt, distrust, and disbelief.

The grounds of *Probability* are, in short, these two following; viz. the conformity of any thing with our own particular knowledge, experience, or observation, called *internal Probability*; and the testimony of others vouching their observation, or experience, called *external Probability*.

PROBABILITY, in poetry, denotes the appearance of truth in the fable or action of a poem.

There are four kinds of actions; for a thing may be either only true, or only probable; or true and probable at the same time; or neither the one nor the other.

These four kinds of actions are shared between four arts: history takes the first, still keeping to truth, without regard to *Probability*.

Epic and dramatic poetry have the second, and still prefer *Probability*, though false, to an *improbability*, though true: thus the death of Dido, who killed herself on her being deserted by Æneas, though false in itself, is a fitter subject for a poem, than the action of Samson, or the maid of Orleans.

Moral philosophy takes the third; and the fabulists, as Æsop, &c. the fourth.

Vossius adds, that the epopœia, in its nature and essence, uses truth and *Probability* like morality; yet in its certainty and expressions takes a liberty like that of Æsop: instances of each we have in the *Æneid*.

Poetical *Probability* may be so either in respect of the rules of theology, of morality, nature, reason, experience, or opinion. As to theology, there is scarce any thing but is probable, in respect hereof; because nothing is impossible to God. This is an expedient the poets have frequent recourse to, in order to bring things feigned contrary to the order of nature, within the bounds of *Probability*. See this considered under the article **MACHINE**.

As to *morality*, we have observed, it requires both truth and verisimilitude: an ancient poet was condemned on the theatre for a slip herein, viz. for making a person, whom he represented as an honest man, say, that *though his tongue swore, his mind did not*.

Seneca accuses Virgil of an offence against *natural Probability*, in saying, that the winds were pent up in caves; for, says that philosopher, wind being only air in motion, to suppose it at rest, is to destroy its nature. To which Vossius answers, that the poet only speaks of the natural origin of winds; which are produced in mountains by vapours, &c. pent there: just as we should say, the winds are inclosed in an *æolipyle*.

Virgil, likewise, committed an offence against *natural Probability*, by making Æneas find deer in Africa; because that country produces none.

Indeed these faults are excusable, because, as Aristotle finely observes, they are not faults in the poet's art, but they arise from his ignorance of something taught in the other arts.

However, care must be taken they be not too gross; there being some *Probabilities* of this kind, which Æsop himself could not dispense withal: he would never be forgiven, were he to represent a lion fearful, a hare daring, a fox stupid, &c.

Probability, in respect of *reason*, is frequently broken in upon by those who affect nothing but the *merveilleux*. Here Statius is a notorious criminal: Tydeus, being surprized in an ambuscade by fifty braves, who had vowed his death, kills forty-nine of them, and pardons the last.

Again, two young kings, whereof this same Tydeus was one, the other Polyneices, upon a quarrel, go together by the ears, and box it out; their swords all the while by their sides.

—*Scrutatur & intima vultus*

Una manus, proutusq; oculis cedentibus instat.

Scaliger accuses Homer of an offence against *experience*, in saying, that *Jupiter thundered and snowed at the same time*. This, the critic says, was never known; and yet have there been instances hereof even in our time.

But the principal and most important kind of *Probability*, is that in respect of *common opinion*. A thing is probable when it looks like truth; but sometimes it shall appear true to the peo-

ple, and false to the learned; and *vice versa*. When, then, the learned and the people are divided, to which side must the poet adhere? Suppose, for instance, the adventure of Penelope, the history of Medea, Helena, or the like: what Virgil and Homer have written of them, shall appear probable to the populace; yet the learned read the contrary in history; some authors having written, that Dido was chaste, and Medea innocent; that Penelope was divorced and banished by Ulysses for abusing his absence; and that Helena never saw Troy.

This point is soon decided: Homer and Virgil make no scruple of deviating from history, to improve their fables: and Horace does not send the poets to the truths of history; but either to fables already invented, or to common fame.

All which is confirmed by Aristotle; where he says, that a poet does not tell, like an historian, what kind of person Alcibiades was, nor what he really did or said on that or that occasion; but what he probably might have done or said. Add to this, that Aristotle approves of the fable of Oedipus and Iphigenia, though it can never be imagined the truth of those stories was believed by the learned in those days.

In effect, every one finds his account in this conduct: the people think they see truth; and the learned do really see truths, and more solid ones too, than those the people look for; and more certain than those of the history, which the poet neglects. The more understanding they are, the less will they desire these historical truths in a poem, which is intended for other and deeper ends. The truths they require, are moral and allegorical truths. The *Æneid* was not written to teach us the history of Dido, but to shew, under that name, the genius and conduct of the republic founded by her, and the source and series of its differences with Rome. This we see with pleasure; and these truths are more agreeable, more certain and notorious, than any the poet could take from a history so little known in his time.

To these kinds of *Probability* may be added another, which we call *accidental Probability*: it consists not in the using of several incidents, each probable apart; but in disposing them so as to hang probably together.

A man, e. g. may probably die of an apoplexy; but that this should happen just in the nick, when the poet wanted it for an untravelling, is highly *improbable*.

It is an offence against this kind of *Probability* to produce an incident all at once, and without any preparation, which yet needed one. Virgil is wonderfully exact in this point: Juno prepares the tempest raised in the first book; Venus in the same book prepares the amours of the fourth. The death of Dido in the end of the fourth, is prepared on the first day of marriage; Helenus in the third disposes the whole matter of the sixth; and in the sixth, the Sibyl predicts all the wars that follow.

PROBABLE opinion, a term long time controverted among the Romish casuists; usually defined an opinion founded on a grave motive, or an apparently good foundation, and which has authority enough on its side to persuade a wise disinterested person to assent to it.

Others define a *Probable opinion* to be that which being compared to the contrary opinion, becomes problematical, by a perfect equality of the reasons on each side; so that there is nothing in reason or nature to determine a man to this side rather than that.

But the Jesuits go still farther, and maintain, that to render an *opinion Probable*, it suffices, that it be either built on a reason of some consequence, or on the authority of some one grave doctor. With these qualifications it is allowable to follow it, even though it be less *Probable*, and less certain, than the contrary opinion: here it is that the venom of *probability* lies.—This doctrine is attacked with infinite address by M. Falchal in the *provincial letters*.

One of the twenty-four patriarchs of the Jesuits, Castro Palaio, asserts, that a judge, in a question of right, may give sentence according to a *Probable opinion*, against a more *Probable* one; and this, contrary to the judgment and persuasion of his own mind; *imo contra propriam opinionem*. Escobar, tr. 6. ex. 6. n. 45.

So Vazquez maintains, that it is lawful to follow the less *Probable* and less secure *opinion*, discarding the more *Probable*, and more secure one.

Lessius and Escobar, treating of the question, Whether a man may kill another for giving him a box on the ear? decide it to be a *probable opinion*, and speculatively true; though there may be some inconveniences in the practice, for which it would be as well to let it alone. *In praxi tutum & probabilem judicant—sed non facile admittendum*. Let. provinciales, p. 307, 308.

PROBANDA proprietate. See the article **PROPRIETATE**. **PROBATE**, of a will, or testament, in law, is the exhibiting and proving a will and testament, before the ecclesiastical judges delegated by the bishop, who is ordinary of the place where the party dies.

The ordinary is known by the quantity of goods the deceased hath out of the diocese wherein he departed; for if all his goods be in the same diocese, then the bishop of the diocese, or the archdeacon, according as their composition leads, has the *Probate* of the testament.—If the goods be dispersed in several dioceses, so that there be any sum of note, *bona notabilia*, as five pounds,

pounds, out of the diocese where the party lived; then is the archbishop of Canterbury the ordinary by *prerogative*.

This *Probate* may be made two ways; either in *common form*, or *per testes*.—The proof in *common form* is only by the oath of the executor, or party exhibiting the will, who swears upon his belief, that the will exhibited by him, is the last will and testament of the deceased.

The proof *per testes*, by witnesses, is, when over and besides his own oath, he also produces witnesses, or makes other proof to confirm, that it is the last will of the deceased; and this in the presence of such as may pretend some interest in the goods of the deceased; or at least in their absence, after they have been lawfully summoned to see such a will proved, if they think fit.

The latter course is commonly taken when there is fear of some strife, or dispute about the deceased's goods: for some hold, that a will proved in common form only, may be called in question any time within thirty years after.

Where a will disposes of lands and tenements of freehold, it is now frequently proved by witnesses in chancery.

PROBATICA piscina. See the article *PISCINA*.

PROBATION, in a monastic sense, a time of trial; or the year of novitiate, which a religious must pass in a convent to prove his virtue and vocation, and whether he can bear the severities of the rule.

The year of *Probation* commences from the day of novices taking the habit.

PROBATION, in the universities, denotes the examination and trial of a student who is about to take his degrees. See *DEGREE*.

PROBATIONER, in the presbyterian discipline, a person licensed by a presbytery to preach; which is usually done a year before he be ordained.

A student in divinity is not admitted *Probationer* till after several trials: the first, private, before a presbytery; the second, public, before a congregation, the presbytery being present.

The private trials are a homily and exegesis, i. e. a theological subject is given in to the presbytery in theses, and the candidate answers any objections started against it.

The public trials are a popular sermon, and an exercise and addition, i. e. a text is handled, half an hour, logically and critically; and half an hour more, practically.

If he acquit himself to the satisfaction of the presbytery, he signs the confession of faith, and owns the presbyterian government, &c. Upon which he receives a licence to preach.

PROBATOR, in law, an accuser, or approver; one who undertakes to prove a crime charged upon another: properly, an accomplice in the crime, who impeaches others.

PROBATUM est, q. d. it is proved; a term frequently subjoined to a receipt, for the cure of some disease.

PROBE, a surgeon's instrument, wherewith to found and examine the circumstances of wounds, ulcers, and other cavities.

PROBLEM*, **PROBLEMA**, in logic, a doubtful question; or a proposition that neither appears absolutely true, nor false; but which is probable on both sides, and may be asserted either in the negative or affirmative, with equal evidence.

* The word is originally Greek, *πρόβλημα*, signifying the same thing.

Thus, that the moon and planets are inhabited by animals in some respect like us, is a *Problem*: that the fixed stars are all suns, and each the centre of a several system of planets and comets, is a *Problem*. See *PLANET*, *STAR*, &c.

PROBLEM is also a proposition expressing some natural effect, proposed in order to a discovery of its apparent cause.—Such are the *Problems* of Aristotle.

A logical or dialectical *Problem*, say the schoolmen, consists of two parts; a subject, or subject-matter, about which the doubt is raised; and a predicate or attribute, which is the thing doubted whether it be true of the subject or not. See *SUBJECT* and *PREDICATE*.

There are four topical predicates, viz. *genus*, *definitio*, *privativum*, and *accidens*; whence arise four different kinds of dialectical *Problems*.

The first, when the thing attributed to the subject is in the relation of a genus: as, whether fire be an element or not?

The second, when the thing attributed has the effect of a definition: as, when it is asked, whether or no rhetoric be the art of speaking.

The third, when the attribute imports a propriety: as, whether it belong to justice to give every one their due? See *PROPER*.

The last is when the thing attributed is adventitious; as, whether justice is to be desired?

Problems, again, may be divided into those relating to things to be done, or avoided, called *ethical*; those relating to the knowledge of nature, called *physical*; those relating to spirits, called *metaphysical Problems*, &c.

PROBLEM, in geometry, denotes a proposition wherein some operation, or construction, is required; as, to divide a line, to make an angle, to draw a circle through three points not in a right line, &c.

Messieurs of the Port Royal define a *geometrical Problem*, a proposition given to be demonstrated, wherein something is required to be done; and what is done, to be proved to be the thing required.

A *Problem*, according to Wolfius, consists of three parts. The proposition, which expresses what is to be done.

The resolution, or solution, wherein the several steps, whereby the thing required is to be effected, are orderly rehearsed.

The demonstration, wherein is shewn, that by doing the several things prescribed in the resolution, the thing required is obtained.

Accordingly, the general tenor of all *Problems* is this: The things prescribed in the resolution being done, the thing required is done.

PROBLEM, in algebra, is a question or proposition which requires some unknown truth to be investigated or discovered; and the truth of the discovery demonstrated.

In this sense it is a *Problem*, to find a theorem. See *THEOREM* and *INVESTIGATION*.—Algebra is defined to be the art of resolving all *Problems* that are resolvable.

Kepler's Problem, in astronomy, is the determining of a planet's place from the time; thus called from the astronomer Kepler, who first proposed it.

The *Problem*, stated in form, stands thus: To find the position of a right line, which passing through one of the foci of an ellipsis, shall cut off an area described by its motion, which shall be in any given proportion to the whole area of the ellipsis.

The proposer knew no way of solving the *Problem* directly and geometrically; and therefore had recourse to an indirect method; for which he was taxed with an *αναισθησία*, or want of geometry; and his astronomy charged with not being geometrical. But the *Problem* has since been solved directly and geometrically several ways, by several authors; particularly Sir Isaac Newton, Dr. Keill, &c. See *PLANET* and *PLACE*.

Determinate Problem,

Limited Problem,

Linear Problem,

Local Problem,

Plain Problem,

Solid Problem,

Sur-solid Problem,

Unlimited Problem,

See

DETERMINATE.

LIMITED.

LINEAR.

LOCAL.

PLAIN.

SOLID.

SUR-SOLID.

UNLIMITED.

Delicacal Problem, in geometry, is the doubling of a cube. This *Problem* was so called from the people of Delos, who, upon consulting the oracle for a remedy against a plague they were then infected with, were answered, that the plague should cease, when Apollo's altar, which was in form of a cube, should be doubled.

This *Problem* coincides with that for finding two mean proportionals between two given lines; whence that also is called the *Delicacal Problem*.

PROBLEMATICAL resolution, in algebra, a method of solving difficult questions by certain rules, called *canons*.

PROBOSCIS*, in natural history, the trunk or snout of an elephant, and of some other animals.

* The word is Greek, *πρόβος*, where it has the same signification.

The *Proboscis* is a member issuing out of the middle of the forehead, serving instead of a hand; and having a little appendix fastened to the end thereof, in form of a finger.—By the *Proboscis* the she-elephant, it is said, sucks herself; and by the same conveys the milk to her young.

The *Proboscis*, Mr. Derham observes, is a member so admirably contrived, so curiously wrought, and with so great agility applied by that unweildy animal, that it may pass as a great instance of the creator's skill, &c.

All quadrupeds have the length of their neck equal to that of their feet, the elephant alone excepted; in whom the shortness of the neck is compensated by the length of the *Proboscis*.

The camelion has also a kind of trunk or *Proboscis*, which is its tongue; and which it darts nimbly out of its throat, as if it spat it; and draws it in again instantaneously. It serves, like the elephant's trunk, to lay hold on, and take in its food. See *CAMELEON*.

The microscope shews us a little trunk or *Proboscis* in flies and gnats, by means whereof they suck the blood of animals, or liquors, for their food.

PROCATARCTIC * *cause*, the original, primitive, or pre-existent cause, or occasion, of an effect.

* The word is Greek, *προκαταρκτησις*; formed from the verb *προκαταρκτηναι*, I pre exit, I go before.

Such, e. gr. is a disease which co-operates with some other disease, subsequent thereto.—Thus, anger, or heat of a climate, bring on such a disposition of the juices, as occasions a fever; where the ill disposition is the immediate cause, and the heat or anger, the *Procatarctic* cause.

PROCEDENDO, in law, a writ whereby a plea or cause, formerly called from an inferior court to the chancery, king's bench, or common pleas, by writ of privilege, habeas corpus, or certiorari, is released, and returned to the other court to be proceeded.

proceeded in; upon its appearing that the defendant has no cause of privilege, or that the matter comprised in the party's allegation is not well proved.

Non procedendo ad aliam ræge inconsulto. See *NON*.

PROCEDURE, *PROCEDURA* in law, the course of the several acts, expeditions, and instructions of a process, or lawsuit.

Procedure is either civil or criminal.—*Civil Procedure* is that where the estate alone is concerned: *criminal, or extraordinary Procedure*, is that where the person is prosecuted.

PROCEED, among merchants, that which arises from a thing.

—In which sense they say, *the net Proceed*.

PROCELSUMATICUS, *πρὸς ἐλσμάτιον*, in the ancient poetry, a foot consisting of four short syllables: as, *arictat*.

PROCESS, *PROCESSUS*, in law, is used for all the proceedings in any cause or action, real or personal, civil or criminal, from the original writ, to the end.

In France they carry on a formal *Process* against the memory of people killed in duels; or that have murdered themselves.—Pirates, when taken in the fact, are hanged without any *Process*; as are sometimes also robbers.

PROCESS is also used in a more restrained sense, for that by which a man is first called into any temporal court; this being the beginning, or principal part, and that by which the rest of the business is directed.

The difference between *Process* and *precept* or *warrant* of the justices, is this; that the precept or warrant is only to attach or convene the party, before any indictment or conviction, and may be made either in the name of the king, or the justice: but *Process* is always in the king's name, and usually after an indictment.

PROCESS by attainder. See the article *ATTAINER*.

PROCESS, in chymistry, the whole course of an operation, or experiment.

PROCESS, *PROCESSUS*, in anatomy, is a term of equal import with *apophysis*, *prominence*, *protuberance*, or *production*. See *Apophysis*, &c.

Process is particularly applied to certain eminences of the bones, and other parts; distinguished by peculiar names, expressing their place, form, or the like.

Such are the *processus peritonæi*, *processus vermiciformes*, *processus papillares*, *cilares*, &c.

PROCESSUS aliformis,
PROCESSUS cornicularis, } See { **ALIFORMIS**.
PROCESSUS typhnoides, } { **CORNICULARIS**.
 } { **PYRENOIDS**.

PROCESSION, *PROCESSIO*, in theology, a term used for the manner wherein the Holy Spirit is conceived to issue from the Father and the Son, in the mystery of the Trinity.

The Greeks and Latins are not agreed about the *Procession* of the Holy Spirit.

PROCESSION also denotes a ceremony in the Romish church, consisting in a formal march of the clergy in their robes, and the people after them, putting up prayers, singing hymns, &c. and in this manner making a visit to some church, or other holy place.

There are general *Processions* of all the people in jubilees, and the same often in public calamities.—The *Processions* of the holy sacrament are very solemn.—They have also *Processions*, frequently, around the church, at the salutations, &c. in the mass. Anciently, among us, there were, in each parish, customary *Processions* of the parish priest, and the patron of the church, with the chief flag, or holy banner, attended by the other parishioners, each ascension-week; to take a circuit round the limits of the parish, and pray for a blessing on the fruits of the earth.—Of which custom there still remains a shadow in that annual perambulation, still called *processioning*; though the order and devotion of the ancient *Processions* be almost lost.

PROCESSUS continuando, a writ for the continuance of a *process*, after the death of the chief justice, or other justices in the commission of oyer and terminer. *Reg. orig.* 128.

Re. v. do & PROCESSUS mittendis.

PROCHEIN *any*, *PROXIMUS amicus*, in law, the nearest friend, or person next a-kin, to a child in nonage; and who, in that respect, is allowed in law to deal and negotiate for him, to manage his affairs, to see him redressed of any wrong, and to be his guardian, if he hold land in socage. See *GUARDIAN*.

By *prochein any* is commonly understood the guardian in socage: though, in propriety, it is he who appears in court for an infant who sues any action, and aids the infant in pursuit thereof.—For, to sue, an infant is not allowed to make an attorney; but the court will admit his *prochein any*, next friend, as plaintiff; or his guardian, as defendant.

PROCIDENTIA, or *PROLAPSUS ani*, in medicine, is when, upon a discharge by stool, the intestinum rectum is protruded so far, as that it cannot be drawn back again into the body; or when drawn back, falls out again.

This is sometimes a chronic disease, especially when it arises from a palsy: its causes are a relaxation of the fibres of the rectum, or of the sphincter muscle; either from the adhesion of the alvus, or from a diarrhoea, dysentery, or tenesmus.

It is very difficultly cured, when attended with hæmorrhoids: The principal cure is by astringents.—External assistance is also

required to reduce the fallen gut; which, if it be not soon done is apt to turnify and mortify, by the contact of the air.

It is subject to relapse after reduction in children, especially upon violent crying; and is difficult to keep up, in case of a diarrhoea. See *Supplement article PROCIDENTIA ani*.

PROCIDENTIA uteri, the descent, or falling down of the womb, caused by a relaxation of the ligaments which should hold it in its place.

If the uterus fall into the vagina, so that its orifice may be either perceived with the finger within, or by the eye just without, the labia vulvæ; it is called a *bearing down* of the womb.—If it fall quite down, so as to hang pendulous without the labia, but so as that no more of the inside than the orifice is seen, it is called a *prolapsus*, or *Procidentia*.—If falling thus low, it be turned inside out, and hang like a fleshy bag, with a rugged unequal surface, it is called a *perverisio uteri*.

These disorders may proceed from violent motions, vehement coughing, sneezing, and the fluor albus. They appear most frequent in women with child, from the weight pressing and bearing hard upon the uterus; but especially if the fœtus be dead, lie in a wrong posture, or be violently extracted.

After replacing the part, restringents both inwardly and by injection are here used; such as obtain in diarrhoea's, hæmorrhoids, the gonorrhœa simplex, &c.

PROCIDENTIA, or *PROLAPSUS, vulvæ*, the descent or relaxation of the vulva.

PROCLAMATION*, *PROCLAMATIO*, an instrument dispatched by the king, with the advice of his privy-council, whereby the people are advertised of something which his majesty thinks fit for them to know; and whereby they are sometimes required to do, or not to do, certain things.

* The word is of Latin origin, formed from *proclamare*, *palam & valde clamare*.

Proclamations have the force of laws; but then they are supposed to be consistent with the laws already in being; otherwise they are superfluous.

PROCLAMATION is also used for a solemn denunciation, or declaration of war or peace.

PROCLAMATION also denotes the act of notifying to the people the accession of a prince to the crown. See *ACCESSION*.

The *Proclamation* does not invest the prince with the regal authority; it supposes him already invested therewith, and only gives notice thereof to the people.

PROCLAMATION of a fine, is a notice openly and solemnly given thereof in the court of common pleas where it passed, and at all the assizes in the county, held within one year after the ingrossing it. See *FINE*.

These *Proclamations*, at the assizes, are made on transcripts of the fine, sent by justices of the common pleas to the justices of the assize, and of the peace.

PROCLAMATION, in a monastic sense, is the accusation of a friar or brother, by another brother, in open chapter, and in presence of the superior and community, for some external crime he has seen him commit.

PROCONDYLUS, *πρὸς ὀνύχον*, an appellation given to the first joint of each finger. See *CONDYLUS* and *FINGER*.

PRO-CONFESSO, in law.—When, upon a bill exhibited in chancery, the defendant appears, and is in contempt for not answering, and in custody: upon an *habeas corpus* (which is granted by order) to bring him to the bar, the court assigns him a day to answer; which being expired, and no answer put in, a second *habeas corpus* is granted, and a farther day assigned; by which day, if he answer not, the bill, upon the plaintiff's motion, shall be taken *pro-confesso*, or as allowed, unless cause be shewn by a day, which the court usually gives.

For want of such cause shewed, upon motion, the substance of the plaintiff's bill shall be decreed, as if it had been confessed by the defendant's answer: or, after a fourth insufficient answer made to the bill, the matter of fact not sufficiently answered unto, shall be taken *pro-confesso*.

PROCONSUL, a Roman magistrate, sent to govern a province with a consular authority.

The *Proconsuls* were appointed out of the body of the senate; and ordinarily, as the year of any one's consulate expired, he was sent *Proconsul* into some province.

The *Proconsuls* had the same honours, &c. with the consuls, themselves; except that they had only six lictors and fasces before them.

The *Proconsuls* did not ordinarily hear and determine processes in person, but had that office performed by their assessors, or other judges, constituted or delegated by them.

As the *Proconsuls* had the direction both of justice, of war, and of the revenues; they had their several lieutenants in each capacity: these were called *legati*, and were ordinarily nominated by the senate.

The *proconsular* function only held a year. The charges of their journey backwards and forwards, were borne by the public, and were called *viaticum*.

After the partition of the provinces between Augustus and the people, those who presided over the provinces of the people were called especially *Proconsuls*.

PROCONSUL, in our ancient law-books, is sometimes used for a justice in eye, or justice errant. See *JUSTICE*.

PROCREATION, *PROCREATIO*, the action of begetting and bringing forth children.

PROCTOR, *PROCURATOR*, a person commissioned to act as proxy, or delegate, in behalf of another. See *PROCURATOR*.

PROCTOR, *procurator*, in the civil law, is an officer appointed to appear in court, and manage the causes of parties who will make use of his procurator.

Anciently every body was obliged to appear in person; and when the affair happened to be drawn out to a great length, they were allowed to create a *proctor*, or proxy, in his cause. But this was a favour only granted for a certain time; till towards the middle of the 16th century, when it was decreed, that all procurators should hold till revoked.

PROCTORS of the commons, are persons skilled in the civil and ecclesiastical laws, who exhibit their proxies, and make themselves parties for their clients, to draw up acts and pleadings, produce witnesses, prepare causes for sentences, and attend the advocates with the proceedings.

They are thirty-four in number; are admitted by the archbishop's fiat; and wear black robes, and hoods lined with white furs.

PROCTORS of the clergy, are deputies, or representatives, chosen by the clergy of each diocese, two for each; and by the cathedral and collegiate churches, one for each; to sit in the lower house of convocation.

PROCTORS in the university, are two officers, chosen from among the students, to see good orders, and exercises daily performed there.

PROCUMBENT leaves, in botany, such leaves of plants as lie flat, or trailing on the ground.

PROCURATION, or *PROCURACY*, an act, or instrument, whereby a person is empowered to treat, transact, receive, &c. in another's name, as if he himself were actually present.

When a man treats in behalf of another, the first thing is to examine his *procurator*, or *procuracy*.

Procurator is now little used in this sense, except in the case of a person who collects the fruits of a benefice for another.

PROCURATION, in the canon law, is used for the repast or entertainment anciently given to church-officers or ordinaries, who came to visit in churches or monasteries, whether they were bishops, archdeacons, or visitors.

Procurator was due to the pope's legates, and even to popes themselves, when they came into France; and the charge was comprized in the bulls then granted.

Complaints were frequently made to the pope, of the excessive charges of the *Procurations* of bishops and archdeacons, upon which they were prohibited by several councils and bulls.

That of Clement IV. mentioned in the Monasticon, is very express; wherein that pope tells us, complaint had been made, that the archdeacon of Richmond, visiting the diocese, travelled with one hundred and three horses, twenty-one dogs, and three hawks; and did so grievously oppress a religious house with that vast equipage, that he caused the monks to spend in an hour as much as would have maintained them a long time.

PROCURATION is now used for a sum of money paid yearly by parish-priests to the bishop, or archdeacon, in lieu of this entertainment, towards defraying the charge of their visitation. See *VISITATION*.

PROCURATOR, *PROCTOR*, or *PROXY*, a person who has a charge or office committed to him, to act in behalf of another.

Thus the *proxies* of the lords in parliament, in our law-books, are called *procurators*.

The word is also used for a vicar, or lieutenant.—Thus in Petrus Blefenfis, we read of a *Procurator regni*.

Those who manage causes in Doctors Commons, are also called *Procurators*, or *proctors*.

The bishops are sometimes called *procuratores ecclesiarum*, and the representatives sent by the clergy to convocation, *procuratores cleri*.

In our statutes, a person who gathers the fruits of a benefice for another, is particularly called a *Procurator*; and the instrument empowering him to receive the same, is term'd a *procuracy*.

PROCURATOR is also a kind of magistrate in several cities of Italy, who takes care of the public interests.—There are *Procurators* of St. Mark, at Venice, at Genoa, &c.

Originally there was but one *Procurator* of St. Mark at Venice: In 1442, the number was augmented to nine, when the senate made a decree, appointing, that for the future none should be admitted to the dignity but after the death of some of the nine. But in the necessities of the republic, the number was afterwards enlarged to forty; though of these there are only nine that bear the title of *Procurators*, and whose place is regularly filled. They are administrators of the church of St. Mark, and of the revenues attached thereto, the patrons of orphans, and the executors of testaments.

This office receives more lustre from the merit of those who discharge it, than from its authority.—They are clothed in black, or violet, with dual sleeves.

PROCURATOR monasterii, anciently, was the advocate of a religious house, who was to solicit the interest, and plead the causes of the society. See *ADVOCATE* and *ADVOCUE*.

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PROCURATORES ecclesie parochialis, are the church-wardens, whose office is to act as *proxies* and representatives of the church.

PROCYON, in astronomy, a fixed star of the second magnitude in canis minor. See *CANIS minor*, and *CANICULAR*.

PRODES homines, *q. d.* wife or discreet men, in our ancient customs, a title given to the barons, and other military tenants, who are called to the king's council, and were to give advice according to the best of their prudence, and knowledge.

PRODICTATOR, among the Romans, a magistrate who had the power, and did the office of a dictator.

The Romans sometimes created a *Prodicator*, in cases where they could not have a dictator. Fabius Maximus was *Prodicator*.

PRODROMUS, *προδρομος*, literally denotes a forerunner, a harbinger.—Hence,

PRODROMUS morbus, among physicians, is used for a lesser disease which precedes or foreruns a greater.

Thus a strainings of the breast is a *Prodromus* of a consumption, &c. a vertigo is sometimes a *Prodromus* of an apoplexy.

PRODUCE.—*NET PRODUCE*. See the article *NET produce*.

PRODUCING, in geometry, denotes the continuing a right line, or drawing it out farther, till it have any assigned length.

PRODUCT, in arithmetic and geometry, the factum of two numbers; or the quantity arising from, or produced by, the multiplication of two or more numbers, lines, &c. into one another.

Thus, if 6 be multiplied by 8, the *Product* is 48.

In lines it is always (and sometimes in numbers) called the *rectangle* between the two lines, multiplied by one another.

PRODUCTION, in anatomy, a continuation, or process. See *PROCESS*.

PROEDRUS, *προεδρος*, in antiquity. See *EPISTATES*.

PROEM, *PROPEMIUM*, a term anciently used for *preface*. See *PREFACE*.

PROEMPTOSIS, in astronomy, that which makes the new moons appear a day later, by means of the lunar equation, than they would do without that equation.

PROFANATION, in religion, the doing of something which is disrespectful to holy or sacred things.

PROFANE, a term used in opposition to *holy*, *sacred*.

Except churches, and church-yards, all places are esteemed *profane*.—By the canon law, a sacred chalice, or cup, becomes *profane*, by giving it a blow with an hammer.

PROFANE is also applied in general to all persons who have not the sacred character, and all things which do not belong to the service of religion.

In this sense, Xenophon, Seneca, &c. are *profane* authors.—

The Heathen priests, pontiffs, &c. also pass with us for *profane*.

PROFECTITIOUS. See *ADVENTITIOUS*.

PROFER, in law, the time appointed for the accounts of sheffiffs, and other officers, to be given into the exchequer; which, by stat. 51. Hen. 3. is to be twice in the year.

* The word is formed of the French *proferer*, to produce.

PROFER is also used for an offer, or endeavour to proceed in an action by a person concerned so to do.

Trinity-term shall begin the monday next after Trinity-sunday, whenever it shall happen to fall, for the keeping of the effoins, *Profers*, returns, and other ceremonies heretofore in use. *Stat. an. 32. Hen. 8.*

PROFER the half mark. See the article *HALF mark*.

PROFESSED monk, or *nun*, one who having made the vow, is admitted of a religious order.

In this sense the word is used in opposition to *novice*. See *NOVICE* and *RELIGIOUS*.

PROFESSIO viduitatis. See the article *VIDUITATIS*.

PROFESSION, *PROFESSIO*, in a monastic sense, the entering into a religious order; or an action whereby a person offers himself to God, by a vow of observing three things, *viz.* obedience, chastity, and poverty, which he promises irrevocably to maintain.

This is called *sanctae religionis professio*, and the person a *religious professed*.

Persons are not admitted to make *Profession* till after a year of probation.

PROFESSOR, in the universities, a person who teaches, or lectures publicly, some art or science, in a chair established for that purpose.

The *Professors* in foreign universities teach the arts, and have their classes of pupils; those in our universities only read public lectures in term-time.

Of *Professors* we have a great number, some denominated from the arts they profess, as *casuistical Professor*, *Hebrew Professor*, *physic Professor*, *divinity Professor*, &c.

Others from those who founded the *professorship*, or assigned a revenue for the support of the *Professor*; as the *Savilian Professors* of astronomy and geometry, the *Lucasian Professor* of mathematics, *Margaret Professor* of divinity, &c.

Regius PROFESSORS. See the article *REGIUS*.

PROFICISCENDUM. — *Capias conductos ad proficiscendum.*
See **CAPIAS**.

PROFILE, in architecture, the figure, or draught of a building, fortification, or the like, wherein are expressed the several heights, widths, and thickneses, such as they would appear, were the building cut down perpendicularly from the roof to the foundation.

Whence the *Profile* is also called the *section*, sometimes the *orthographical section*; and by Vitruvius also, the *sciagraphy*.

Profile, in this sense, amounts to the same with *elevation*; and stands opposed to a *plan*, or *icnography*.

PROFILE is also used for the contour, or out-line of a figure, building, member of architecture, or the like; as a bale, a cornich, &c.

Hence *profiling* is sometimes used for designing, or describing the member with rule, compass, &c.

PROFILE, in sculpture and painting. — A head, a portrait, &c. are said to be in *Profile*, when they are represented side-ways, or in a side-view.

As, when in a portrait there is but one side of the face, one eye, one cheek, &c. shewn, and nothing of the other. — On almost all medals, the faces are represented in *Profile*.

PROFITS, *pernor of*. See the article **PERNOR**.

PROFLUVIUM, in medicine, any kind of flux, or liquid evacuation. Whence

PROFLUVIUM ventris, flux of the belly, denotes a diarrhoea. See **DIARRHOEA**.

PROFUNDUS. See **MUSCLE**.

PROGNOSTIC*, in medicine, a judgment of the event either of a state of health, or of a disease: as, whether it shall end in life, or death; be long, or short; mild, or malignant, &c. taken from certain symptoms thereof.

* The word comes from the Greek *προγνωστικος*, fore-knowledge: whence also *επιπρογνωστικος*, a prognostic sign.

In all continued fevers, Morton tells us, a strong equable pulse is a good *Prognostic*, and always presages well, whatever other threatening symptoms attend it; on the contrary, a quick, feeble, intermitting pulse is a *Prognostic* of death, how much sower the other symptoms may flatter.

Hippocrates observes, that all predictions and *Prognostics* of acute diseases are very fallacious; Diemerbroeck, however, adds, that in the plague of Nimeguen, sixth day crises were constantly found fatal *Prognostics*; also to be infected about the new, or full moon; faintings in the beginning of the disease, and palpitations of the heart, were found deadly *Prognostics*; on the contrary, a pleurisy, and suppression of stool, were good *Prognostics*.

The *prognosis* is a part of semeiology. See **SEMEIOLOGY**.

PROGNOSTICS of the weather. See the article **WEATHER**.

PROGRAMMA, anciently denoted a letter sealed with the king's seal.

PROGRAMMA is also a college term, signifying a billet, or advertisement posted up, or given into the hand by way of invitation to an oration, or other college ceremony, containing the argument, or so much as is necessary for the understanding thereof. — *Programma's* are sent to invite people to assist at declamations, dramatic performances, &c.

PROGRESSION, **PROGRESSIO**, an orderly advancing, or going forward, in the same manner, course, tenor, &c.

PROGRESSION, in mathematics, is either *arithmetical*, or *geometrical*.

Arithmetical PROGRESSION is a series of quantities equidistant from each other; i. e. either increasing or decreasing by the same common interval or difference. See **SERIES**.

Thus 3, 6, 9, 12, 15, 18, &c. make an *arithmetical Progression*; because increasing, or differing equally by 3: Thus also 25, 20, 15, 10, and 5, are in *arithmetical Progression*, decreasing by a common difference, 5.

In every *arithmetical Progression*, whether increasing or decreasing, the sum of the first and last term is equal to the sum of any two intermediate terms equidistant from the extremes; as also, if the number of terms be uneven, to the double of the middle term. — For Instance:

$$\begin{array}{ccccccc} 3, & 6, & 9, & 12, & 15, & 18, & 21 \\ & & & 12, & 9, & 6, & 3 \\ \hline & & & 24, & 24, & 24, & 24 \end{array}$$

Hence 1°. we find the sum of any *arithmetical Progression* by multiplying the sum of the first and last term by half the number of terms.

2°. Having therefore the first term, the difference, and the number of terms given; the sum of the *Progression* is had by multiplying the first term by the number of terms, and to the product adding the product arising from the difference multiplied into the semi-difference of the number of terms from the square of that same number.

Thus, suppose the first term 3, the number of terms 7, and the difference 3; the product of 3 and 7 = 21 being added to the product 63, of the difference 3 multiplied into the semi-difference of the number of terms 7, from the square thereof 49, = 21, gives 84, the sum of the *Progression*.

3°. The number of terms lessened by one, being multiplied by the common difference, and the first term added to the product, the sum is the last term. Thus in the *Progression* of 52 places, where the difference is 3, and the first term 5; 51 being multiplied by 3, produces 153, to which adding 5, the sum 158 is the last term required.

4°. If the *Progression* begin with 0, the sum of all the terms is equal to half the product of the last term multiplied by the number of terms.

Whence it follows, that the sum of a *Progression* beginning from 0, is subduple the sum of so many terms, all equal to the greatest.

5°. In an *arithmetical Progression*, as the difference of the sum of the first and last term from double the sum of the *Progression*, is to the difference of the first term from the last; so is the sum of the first and last terms to the *progressional* difference.

Geometrical PROGRESSION, is a series of quantities increasing or decreasing in the same ratio or proportion; or it is a series of quantities that are continually proportional.

Thus 1, 2, 4, 8, 16, 32, 64, &c. make a *geometrical Progression*; or 729, 243, 81, 27, 9, 3, 1.

1°. In every *geometrical Progression*, the product of the two extreme terms is equal to the product of two intermediate terms equidistant from the extremes; as also, if the number of terms be uneven, to the square of the middle term. — For example:

$$\begin{array}{ccccccc} 3, & 6, & 12, & 24, & 48, & 96 \\ & & & 12, & 6, & 3 \\ \hline & & & 288, & 288, & 288 \end{array}$$

2°. If the difference of the first and last term of *geometrical Progression* be divided by a number less than the denominator of the ratio, i. e. than the quotient of a greater term divided by a less; the quotient will be the sum of all the terms except the greatest: Hence, by adding the greatest sum, we have the sum of the whole *Progression*.

Thus, in a *Progression* of 5 terms, beginning with 3, and the denominator being likewise 3, the greatest term will be 243. If then the difference of the first and last term 240, be divided by 2, a number less by 1 than the denominator; the quotient 120, added to 243, gives 363, the sum of the *Progression*.

Hence 3°. the first or least term of a *Progression*, is to the sum of the *Progression*, as the denominator lessened by 1, to its power likewise lessened by 1; the exponent of which power is equal to the number of terms.

Thus, supposing the first term 1, the denominator 2, and the number of terms 8; the sum will be 255.

4°. Hence also the difference between the last term and the sum is to the difference between the first term and the sum, as unity to the denominator: Wherefore, if the difference between the first term and the sum, be divided by the difference between the sum and the last term, the quotient is the denominator.

Arch of PROGRESSION. See the article **ARCH**.

PROHIBITED goods, in commerce, such commodities as are not allowed to be either imported or exported. See **CONTRA-BAND**.

PROHIBITO de vasto directa parti, is a writ judicial, directed to the tenant, prohibiting him from making waste upon the land in controversy, during the suit. — It is sometimes also directed to the sheriff.

PROHIBITION, **PROHIBITIO**, the act of forbidding, or inhibiting any thing.

It is the *Prohibition* of the law that makes the sin: A testator frequently bequeaths things with a *Prohibition* to alienate.

PROHIBITION, in common law, denotes a writ issued out of the chancery, the king's-bench, or common-pleas, to forbid some other court, either spiritual or secular, to proceed in a cause there depending; upon suggestion, that the cognizance thereof belongeth not to that court.

It is now usually taken for that writ which lieth for one, who is impleaded in the court Christian, for a cause belonging to the temporal jurisdiction, or the cognizance of the king's courts; whereby, as well the party and his council, as the judge himself, and the register, are forbid to proceed any farther in that cause.

PROJECTILE, or **PROJECT**, in mechanics, a heavy body, which being put into a violent motion by an external force impressed thereon, is dismissed from the agent, and left to pursue its course.

Such *e. gr.* is a stone thrown out of the hand or a sling, an arrow from a bow, a bullet from a gun, &c.

The cause of the continuation of the motion of **PROJECTILES**, or what it is determines them to persist in motion, after the first cause ceases to act, has puzzled the philosophers. See **MOTION** and **COMMUNICATION**.

The Peripatetics account for it from the air, which being violently agitated by the motion of the projecting cause, *e. gr.* the hand and sling, and forced to follow the *Projectile*, while accelerated therein, does, upon the dismissal of the *Projectile*, press

prefs after it, and protrude it forward, to prevent a vacuum.

The moderns account for the motion of *Projectiles* on a much more rational and easy principle; it being, in effect, a natural consequence from one of the great laws of nature; viz. That all bodies being indifferent as to motion or rest, will necessarily continue the state they are put into, except so far as they are hindered, and forced to change it by some new cause.

Thus a *project* put in motion must continue to move eternally on in the same right line, and with the same velocity; were it to meet with no resistance from the medium, nor had any force of gravity to encounter.

The doctrine of the motion of *Projectiles* is the foundation of all gunnery.

Laws of the motion of PROJECTILES.—1. If a heavy body be projected perpendicularly, it will continue to ascend or descend perpendicularly: because both the projecting and the gravitating force are found in the same line of direction.

2. If a heavy body be projected horizontally, it will, in its motion, describe a parabola; the medium being supposed void of resistance.

For the body is equally impelled by the impressed force, according to the right line AR, (*tab. MECHANICS, fig. 46*) and by the force of gravity according to the right line AC, perpendicular thereto. While then the body by the action of the impressed force is arrived in Q; by the force of gravity it will be arrived in QM; and, therefore will be found in M. But the motion in the direction AR will still be uniform (see MOTION); and, therefore, the spaces QA and qA are as the times; and the spaces QM and qm, are likewise as the squares of the times. Therefore, $AQ^2 : Aq^2 :: QM : qm$. That is, $PM : pm :: AP : ap$.

The course or path therefore, AMm, of a heavy body projected horizontally, is a parabola. See PARABOLA.

Two hundred years ago, the philosophers took the line described by a body projected horizontally, e.g. a bullet out of a cannon, while the force of the powder exceeded the weight of the bullet considerably, to be a right line; after which it became a curve.

N. Tartaglia was the first who perceived the mistake, and maintained the path of the bullet to be a crooked line, throughout its whole extent; but it was Galileo who first determined the precise curve which the bullet described; and shewed the path of the bullet, projected horizontally from an eminence, to be a parabola; the vertex whereof is the point where the bullet quits the cannon.

3. If a heavy body be projected obliquely, either upwards or downwards, in a medium void of resistance; it will likewise describe a parabola.

Hence, 1^o. the parameter of the diameter of the parabola AS (*fig. 47*), is a third proportional to the space through which the body descends in any given time, and the celerity, which is defined by the space passed over in the same time; i. e. to AP and AQ.—2^o. Since the space described by a body falling perpendicularly in one minute, is 15 $\frac{1}{2}$ Paris feet in a second; the parameter of the diameter of the parabola to be described is found, if the square of the space passed over by the *Projectile* with the impressed force in a second, be divided by 15 $\frac{1}{2}$.—3^o. If then the velocity of the *Projectiles* be the same, the spaces described in the same time by the force impressed, are equal; consequently the parameter of the parabola's passed over by the compound motion, is the same.—4^o. If from the parameter of the diameter be subtracted quadruple the altitude of AP, the remainder is the parameter of the axis; the fourth part whereof is the distance of the vertex of the axis from the focus of the parabola. Hence the celerity of the *Projectile* being given, the parabola described by the *Projectile* may be laid down on paper.—5^o. The line of direction of the *Projectile* AR is a tangent to the parabola in A.

Sir Isaac Newton shews, in his *principia*, that the line a *Projectile* describes, approaches nearer to an hyperbola than a parabola.

4. A *Projectile* in equal times describes portions of its parabolic path, as AM, A_m, which are subtended by equal spaces of the horizon AT, T_t; i. e. in equal times it passes over equal horizontal spaces.

5. The quantity or amplitude of the path AB, i. e. the range of the *Projectile*, is to the parameter of the diameter AS, as the sine of the angle of elevation RAB to its secant.

Hence, 1. The semiparameter is to the amplitude of the path AB, as the whole sine to the sine of double the angle of elevation.—2. If then the celerity of two *Projectiles* be the same, the parameter is the same. Wherefore, since the semiparameter of the path, in the one case, is to the amplitude, as the whole sine to the sine of double the angle of elevation; and the semiparameter of the path in the other case is to the amplitude, as the whole sine to the sine of double the angle of elevation: we may say farther, as the amplitude is to the sine of the angle of double the elevation in the one case, so is the amplitude to the sine of the angle of double the elevation in the other case. The amplitudes therefore, or magnitudes of the paths, are as the sines of double the angles of elevation; the velocity of the *Projectile* remaining the same.

6. The celerity of the *Projectile* being the same, the amplitude AB is greatest, i. e. the range of the *Projectile* is greatest, at an

angle of elevation of 45^o; and the amplitudes or ranges, at angles of elevation equally distant from 45^o, are equal.

This is found by experiment; and is likewise demonstrable thus: Since the ratio of the sine of double the angle of elevation to the amplitude is always the same, while the celerity of the *Projectile* remains the same; as the sine of double the angle of elevation increases, the amplitude will increase. Wherefore, since the sine of double the angle of elevation of 45^o is radius, or the largest sine; the amplitude, or range in that elevation, must be the greatest. Again, since the sines of angles equidistant from right angles; e.g. 80^o and 100^o are the same; and the double angles must be equidistant from a right angle, if the simple ones be so; the amplitudes or ranges at elevations equidistant from 45^o, must be equal.

Hence, since as the whole sine is to the sine of double the angle of elevation; so is the semiparameter to the amplitude; and the whole sine is equal to double the sine of the angle of elevation, if that be 45^o: Under the angle of elevation 45^o, the amplitude is equal to the semiparameter.

7. The greatest range or amplitude being given; to determine the amplitude or range under any other given angle of elevation; the celerity remaining the same. Say thus: As the whole sine is to the sine of double the angle of any other elevation; so is the greatest amplitude or range, to the amplitude required.

Thus, suppose the greatest range of a mortar at 45^o, to be 6000 paces, and the length of the range at 30^o, required; it will be found 5196 paces.

8. The velocity of a *Projectile* being given, to find its greatest range or amplitude. Since the celerity of the *Projectile* is given in the space it will pass over by the impressed force; e.g. in one second; there is nothing required but to find the parameter of the path (by *corol. 2. of the 3d law*); for half of this is the amplitude or range required.

Suppose, e.g. the celerity of the *Projectile* such as that in one second it will run over 1000 feet, or 12000 inches: If then 144000000 be divided by 181, the quotient will give the parameter of the path 795580 inches, or 66298 feet. The range or amplitude required, therefore, is 33149. Any object, therefore, found within this extent, may be struck by the *Projectile*.

9. The greatest range or amplitude being given; to find the velocity of the *Projectile*, or the horizontal space, it will pass over in a second. Since double the greatest amplitude is the parameter of the path; between double the greatest amplitude, and the space passed over in a second by a body falling perpendicularly, viz. 181 Paris inches, find a mean proportional; for this will be the space described by the *Projectile* in the given second.

Thus, if the greatest amplitude be 1000 feet, or 12000 inches, the space required will be $\sqrt{(12000.181)} = 120$ feet and 4 inches.

10. To determine the greatest altitude to which a body obliquely projected will rise. The rule is; bisect the amplitude AB in t, and from the point t erect a perpendicular tm; this tm will be the greatest altitude to which the body projected, according to the direction AR, will arise.

11. The range or amplitude AB, and the angle of elevation BAR, being given; to determine the greatest altitude of the *Projectile*. If AR be taken for the whole sine, BR will be the sine, and AB the co-sine of the angle of elevation BAR: Wherefore say, As the co-sine of the angle of elevation is to the sine of the same; so is the amplitude AB to a fourth number, which will be BR; the fourth part whereof is the greatest altitude required.

Hence, since from the given velocity of a *Projectile*, its greatest range or amplitude, and thence its range under any other angle, is found; the velocity being given, the greatest altitude of the *Projectile* is likewise found.

12. The altitude of the range tm is to the eighth part of the parameter, as the versed sine of double the angle of elevation to the whole sine.

Hence, 1. Since, as the whole sine is to the versed sine of double the angle of elevation in one case; so is the eighth part of the parameter to the altitude of the range: And as the whole sine is to the versed sine of double the angle of elevation in any other case; so is the eighth part of the parameter to the altitude: but the velocity remaining the same, the parameter, in different angles of elevation, will likewise be the same: The altitudes of the ranges under different angles of elevations are as the versed sines of double their angles.—2. Hence also, the velocities remaining the same, the altitudes of the ranges are in a duplicate ratio of the sines of double the angles of elevation.

13. The horizontal distance of any mark or object, together with its height above, or depth beneath the horizon, being given; to find the angle of elevation required to hit the said object.

Wolffius gives us the following theorem, the result of a regular investigation: Suppose the parameter of the diameter AS=a; $Am=b$, $AIm=c$, the whole sine=t. Then, as c is to $\sqrt{(a^2 - b^2 - c^2)}$ so is the whole sine t, to the tangent of the angle of elevation required RAB.

Dr. Halley gives the following easy and compendious geometrical construction of the problem; which he likewise deduces from an analytical investigation.

Having the right angle LDA, (*fig. 48*.) make DA, DF, the greatest

greatest range, DG the horizontal distance, and DB , DC , the perpendicular height of the object; draw GB , and make DE equal thereto. Then with the radius AC , and centre E , sweep an arch, which, if the thing be possible, will intersect the line AD in H ; and the line DH being laid both ways from F , will give the points K and L ; to which draw the lines GL , GK .

Here the angles LGD , KGD , are the elevations required for hitting the object B .—But note, that if B be below the horizon, its descent $DC = DB$, must be laid from A , so as to have $AC = AD + DC$. Note likewise, that if in descents, DH be greater than FD , and so K fall below D ; the angle KGD shall be the depression below the horizon.

It may be here observed, that the elevation sought constantly bisects the angle between the perpendicular and the object. This the author was not aware of, when he gave the first solution of the problem; but upon discovering it, he observes, that nothing can be more compendious, or bid fairer for the perfection of the art of gunnery; since it is here as easy to shoot with a mortar at any object in any situation, as if it were on the level; nothing more being required but to lay the piece so as to pass in the middle line between the zenith and the object, and giving it the due charge. See MORTAR.

14. The times of the projections or casts under different angles of elevation, the velocity remaining the same, are as the sines of the angles of elevation.

15. The velocity of a Projectile, together with the angle of elevation RAB , being given (fig. 47.); to find the range or amplitude AB , and the altitude of the range tm , and describe the path AmB . To the horizontal line AB erect a perpendicular AD , which is to be the altitude whence the Projectile falling, might acquire the given velocity: on AD describe a semi-circle AQD , cutting the line of direction AR in Q ; through Q draw Cm parallel to AB , and make $CQ = Qm$. From the point m let fall a perpendicular mt to AB : lastly, through the vertex M describe the parabola AmB .

Here AmB is the path sought, $4CQ$ its amplitude or range, tm the altitude of the range, and $4CD$ the parameter.

Hence, 1°. The velocity of a Projectile being given, the amplitudes and altitudes of all the possible ranges are given at the same time. For drawing EA , we have under the angle of elevation EAB , the altitude AI , and the amplitude $4IE$: Under the angle of elevation FAB , the altitude AH , the amplitude $4HF$. 2°. Since AB is perpendicular to AD , it is a tangent to the circle in A : hence the angle ADQ is equal to the angle of elevation RAB ; consequently AIM is double the angle of elevation; and therefore CQ , the fourth part of the amplitude, is the right sine; AC the altitude of the range, the versed sine of double the angle of elevation.

16. The altitude tm of a cast, or its amplitude AB , together with the angle of elevation RAB , being given; to find the velocity wherewith the Projectile first moved, that is, the altitude AD , in falling from whence it would acquire the like velocity. Since $AC = tm$ is the versed sine, $CQ = \frac{1}{4}AB$, the right sine of double the angle of elevation AIQ ; to the versed sine of double the angle of elevation, find the whole sine, and the height of the cast. Or to the right sine of double the angle of elevation, the whole sine, and the fourth part of the radius IQ or IA , the double whereof AD is the altitude required.

PROJECTING table. See the article TABLE.

PROJECTION, in mechanics, the action of giving a projectile its motion. See PROJECTILE.

If the direction of the force whereby the projectile is put in motion, be perpendicular to the horizon, the Projection is said to be perpendicular; if parallel to the apparent horizon, it is said to be a horizontal Projection; if it make an oblique angle with the horizon, the Projection is oblique.

The angle ARB , (tab. mechan. fig. 47.) which the line of direction AR makes with the horizontal line AB , is called the angle of elevation of the projectile.

PROJECTION, in perspective, denotes the appearance or representation of an object on the perspective plane. See PLANE.

The Projection, e. gr. of a point, as A , (tab. perspect. fig. 1.) is a point a , through which the optic ray OA passes from the objective point through the plane to the eye; or it is the point a , wherein the plane cuts the optic ray.

And hence is easily conceived what is meant by the Projection of a line, a plane, or a solid.

PROJECTION of the sphere, in plano, is a representation of the several points or places of the surface of the sphere, and of the circles described thereon, or of any assigned parts thereof, such as they appear to the eye situate at a given distance, upon a transparent plane placed between the eye and the sphere.

For the laws of this Projection, see PERSPECTIVE; the Projection of the sphere being only a particular case of perspective.

The principal use of the Projection of the sphere is in the construction of planispheres, and particularly maps and charts, which are said to be of this or that Projection, according to the several situations of the eye, and the perspective plane with regard to the meridians, parallels, and other points and places to be represented.

The most usual Projection of maps of the world is that on the plane of the meridian, which exhibits a right sphere; the first

meridian being the horizon: The next is that on the plane of the equator, wherein the pole is in the centre, and the meridians the radii of a circle, &c. This represents a parallel sphere.

See the application of the doctrine of the Projection of the sphere, in the construction of the various kinds of maps, under the article MAP.

The Projection of the sphere is usually divided into orthographic, and stereographic, to which may be added gnomonic.

Orthographic PROJECTION is that wherein the superficies of the sphere is drawn on a plane, cutting it in the middle; the eye being placed at an infinite distance vertically to one of the hemispheres.

Laws of the orthographic PROJECTION. — 1. The rays by which the eye at an infinite distance perceives any object, are parallel.

2. A right line perpendicular to the plane of the Projection is projected into a point, where that right line cuts the plane of the Projection.

3. A right line, as AB , or CD , (tab. perspect. fig. 17.) not perpendicular, but either parallel or oblique to the plane of the Projection, is projected into a right line, as EF , or GH , and is always comprehended between the extreme perpendiculars AF , and BE .

4. The Projection of the right line AB is the greatest, when AB is parallel to the plane of the Projection.

5. Hence it is evident, that a line parallel to the plane of the Projection, is projected into a right line equal to itself; but if it be oblique to the plane of the Projection, it is projected into one which is less.

6. A plane surface, as $ABCD$, (fig. 18.) at right angles to the plane of the Projection, is projected into that right line; e. gr. AB , in which it cuts the plane of the Projection.

Hence it is evident, that the circle $BCAD$, standing at right angles to the plane of the Projection, which passes through its centre, is projected into that diameter AB , in which it cuts the plane of the Projection.

It is likewise evident, that any arch, as cc , is projected into oo equal to Ca , Cb , which is the right sine of that arch; and the complementary arch cA is projected into oA , the versed sine of the same arch c .

7. A circle parallel to the plane of the Projection is projected into a circle equal to itself; and a circle oblique to the plane of the Projection, is projected into an ellipse.

Stereographic PROJECTION, is that wherein the surface and circles of the sphere are drawn upon the plane of a great circle, the eye being in the pole of that circle.

Properties of the stereographic PROJECTION. — 1. In this Projection, a right circle is projected into a line of half tangents.

2. The representation of a right circle, perpendicularly opposed to the eye, will be a circle in the plane of the Projection.

3. The representation of a circle placed oblique to the eye, will be a circle in the plane of the Projection.

4. If a great circle be to be projected upon the plane of another great circle, its centre will lie in the line of measures, distant from the centre of the primitive by the tangent of its elevation above the plane of the primitive.

5. If a lesser circle, whose poles lie in the plane of the Projection, were to be projected; the centre of its representation would be in the line of measures, distant from the centre of the primitive, by the secant of the lesser circles distance from its pole, and its semidiameter or radius be equal to the tangent of that distance.

6. If a lesser circle were to be projected, whose poles lie not in the plane of the Projection, its diameter in the Projection, if it falls on each side of the pole of the primitive, will be equal to the sum of the half tangents of its greatest and nearest distance from the pole of the primitive, set each way from the centre of the primitive in the line of measures.

7. If the lesser circle to be projected, fall intirely on one side of the pole of the Projection, and do not encompass it; then will its diameter be equal to the difference of the half tangents of its greatest and nearest distance from the pole of the primitive, set off from the centre of the primitive one; and the same way in the line of measures.

8. In the stereographic Projection, the angles made by the circles of the surface of the sphere, are equal to the angles made by their representatives in the plane of the Projection.

Gnomonic PROJECTION of the sphere. See GNOMONIC PROJECTION.

Mercator's PROJECTION. See the article MERCATOR.

PROJECTION of globes, &c. See the article GLOBE, &c.

Polar PROJECTION. See the article POLAR.

PROJECTION of shadows. See the article SHADOW.

PROJECTION, in alchymy, the casting of a certain imaginary powder, called powder of Projection, into a crucible, or other vessel, full of some prepared metal, or other matter, which is to be hereby presently transmuted into gold.

Powder of PROJECTION, or of the philosopher's stone, is a powder supposed to have the virtue of changing any quantity of an imperfect metal, as copper or lead, into a more perfect one, as silver or gold, by the admixture of a little quantity thereof.

The mark to which the alchymists direct all their endeavours, is to find the powder of Projection; which every one of them has been within an ace of, an hundred times.

For the characters, properties, virtues, &c. of this powder, see PHILOSOPHER'S stone.

PROJECTION in building. See PROJECTURE.

PROJECTIVE dialing, a manner of drawing, by a method of projection, the true hour-lines, furniture of dials, &c. on any kind of surface whatsoever, without any regard had to the situation of those surfaces, either as to declination, reclination, or inclination. See DIALING.

PROJECTURE, in architecture, the out-jetting, or prominence, which the mouldings and members have, beyond the plane or naked of the wall, column, &c. See NAKED, COLUMN, &c.

These the Greeks call *ephoræ*, the Italians *sparti*, the French *saillies*, our workmen frequently *saillings over*, and the Latins *projecula*, from *projicio*, I cast forward; whence the English *Projecture*.

Vitruvius gives it as a general rule, that all the *projecting* members in buildings have their *projectures* equal to their heights: but this is not to be understood of the particular members, or mouldings, as dentils, corona's, the fascia of architraves, or the abacus of the Tuscan and Doric capital, &c. but only of the *projectures* of intire cornices, &c.

The great point of building, according to some modern architects, consists in knowing how to vary the proportions of *projectures*, &c. agreeably to the circumstances of the building. Thus, say they, the nearness and remoteness, making a difference in the view, requires different *projectures*; but it is evident the ancients had no such intention.

The *Projecture* of the base and cornice of pedestals, M. Perault observes, is greater in the antique than the modern buildings by one third; which seems to follow, in good measure, from the ancients proportioning this *Projecture* to the height of the pedestals; whereas the moderns make the *Projecture* the same in all the orders, though the height of the pedestal be very different.

The reason of this change, which the moderns have made of the antique, the same author refers to a view to the appearance of solidity.

PRO-INDIVISO, in law, a possession or occupation of lands or tenements, belonging to two or more persons, whereof none can say which is his several portion, each having the whole, &c. as co-parceners before partition.

PROKING, see FISHING.

PROLABIA, *fore-lips*; a term in anatomy for that part of the labia or lips which jets out.

PROLATE, in geometry, an epithet applied to a spheroid produced by the revolution of a semi-ellipsis about its longer diameter.

If the solid be formed by the revolution of a semi-ellipsis about its shorter diameter, it is called an *oblate spheroid*; of which figure is the earth we inhabit, and, perhaps, all the planets too; having their equatorial diameter longer than their polar.

PROLATION, in music, the act of shaking, or making several inflections of the voice, on the same syllable.

PROLEGOMENA*, in philology, certain preparatory observations, or discourses prefixed to a book, &c. containing something necessary for the reader to be apprized of, to enable him the better to understand the book, to enter deeper into a science, &c.

* The word is Greek, *προλογισμοι*, formed of *προλογος*, I preface, or speak before.

The generality of arts and sciences require some previous instructions, some *prolegomena*.

PROLEPSIS, *προληψις*, a figure in rhetoric, by which we anticipate, or prevent what might be objected by the adversary.

Thus: *It may perhaps be objected, &c.—You will ask, &c.* But some man will say, how are the dead raised, or with what body do they come? Thou fool, that which thou sowest, &c. Where the objection is turned into an argument against the adversary, as in the last instance, it is called *antistrophe*, or *inversio*.—Where it is rejected as unsufferably absurd, it is called *Apodixis*.

PROLEPTIC, *προληπτικος*, denotes a periodical disease, which anticipates, or whose paroxysm returns sooner and sooner every time; as is frequently the case in agues, &c.

PROLIFIC, in medicine, something that has the qualities necessary for generating. See FECUNDITY.

Some physicians pretend to distinguish whether or no the seed be *Prolific*.

PROLIXITY, in discourse, the fault of entering into too minute a detail; of being too long, precise, and circumstantial, to a degree of tediousness.

Prolixity is the vice opposite to conciseness and laconism.—*Prolixity* is a fault commonly charged on Guicciardini, Gassendus, &c.—Formal harangues at the head of an army, and deliberations, of nauseous *Prolixity*, formerly so frequent, are now disused in all the better histories.

PROLOCUTOR of the convocation, the speaker, or chairman of that assembly.

The archbishop of Canterbury is, by his office, president, or chairman of the upper house of convocation.—The *Prolocutor* of the lower is an officer chosen by the members the first day of their meeting, and is to be approved of by the higher.

It is by the *Prolocutor* their affairs, debates, &c. are to be directed; and their resolutions, messages, &c. delivered to the higher house: by him all things propounded to the house are read, suffrages are collected, &c.

PROLOGUE*, PROLOGUS, in dramatic poetry, a discourse addressed to the audience before the drama or play begins.

* The word is formed from the Greek, *προλογος*, *prologium*, fore-speech, formed of *προ*, and *λογος*, *sermo*.

The original intention of the *Prologue* was to advertise the audience of the subject of the piece, and to prepare them to enter more easily into the action; and sometimes to make an apology for the poet.

This last article seems to have almost excluded the two former in the English drama; and to be in sole possession of the *Prologue*.

The *Prologue* is of a much more ancient standing than the epilogue.—The French have left off the use of *Prologues*; those few they now-and-then make have nothing in them of the genuine *Prologue*, as bearing no relation to the subject, but being mere flourishes or haughties in praise of the king, &c.

In the ancient theatre, the *prologus* was properly the actor who rehearsed the *Prologue*: the *prologus* was esteemed one of the dramatic personæ, and never appeared in the piece in any other character; so that the learned are surprised to find Mercury in Plautus's *Amphitryo*, speaking the *Prologue*, and yet acting a considerable part in the play afterwards.

The *Prologue*, therefore, among them, was a part of the piece; indeed, not an essential, but an accessory part;—with us, the *Prologue* is no part at all; but something intirely distinct and separate: with them the drama was opened with the appearance of the *Prologue*; with us it is not opened till after the *prologus* is retired: with us therefore the curtain is kept close till after the *Prologue*; with them it must have been withdrawn before.

Hence proceeds a still more considerable difference in the practice of the *Prologue*: for with us the *prologus* speaks in his real or personal character; it is Mr. Booth or Mrs. Oldfield speaks, not Cato or Andromache: with them the *Prologue* spoke in his dramatic character, not as Turpius or Attilius, but as *prologus*.

With us, he always directs his speech to the audience, considered as in a play-house; to pit, box, and gallery: with them, he ought, in propriety, to have spoken as to a chorus of bystanders, or persons to be present at the real action: but this being in good measure inconsistent with the design of the *Prologue*; their persons spoke in their dramatic capacity to the audience in its personal capacity; which was an irregularity that either the good fortune, or the good sense of the moderns, have freed them from.

They had three kinds of *Prologues*; the first *invocatio*, wherein the poet delivered the argument of the piece; the second *expositio*, wherein the poet recommended himself or his piece to the people; the third *anaphora*, wherein objections were obviated, &c.

PROLONGED face. See the article FACE.

PROLUSION, PROLUSIO, in literature, a term applied to certain pieces, or compositions, made previously to others, by way of prelude or exercise.

Diomedes calls the culex of Virgil, and his other opusculæ, *prolusions*; because written before the great ones.—The *prolusions* of Strada are very ingenious pieces. The famous M. Huet, bishop of Avranches, had all Strada's *prolusions* by heart.

PROMETHEUS, in the ancient astronomy, was the name of a constellation of the northern hemisphere, now called *Hercules*, or *Engonasis*.

PROMISE, in law, is when, upon a valuable consideration, a man binds himself, by his word, to do or perform such an act as is agreed on with another.

PROMONTORY, in geography, a high point of land, or rock, projecting out into the sea;—the extremity of which to the sea-ward is usually called a *cape*, or *headland*.

PROMOTERS, PROMOTORES, in law, those persons, who in popular and penal actions, do prosecute offenders in their name and the king's; and are intitled to part of the fines and penalties for their pains.

These, among the Romans, were called *quadruplatores*, or *delatores*; in English also, *informers*.

Sir Tho. Smith observes, that *Promoters* belong chiefly to the exchequer, and king's-bench. My lord Coke calls them, *turbidum hominum genus*, 3 Inst.

PROMPT payment, ready money. See PAYMENT.

In many cases there is a discount for *prompt payment*.

PROMPTER, in the drama, an officer posted behind the scenes, whose business is to watch attentively the actors speaking on the stage, in order to suggest and put them forward when at a stand, to correct them when amiss, &c. in their parts.

PROMULGATED, PROMULGED, PROMULGATUS, something published, or proclaimed.

In this sense we say, the Jewish law was *promulgated* by Moses: the *promulgation* of the new law was chiefly effected by the apostles and disciples.

PRONAOS, *προναος*, in the ancient architecture, a porch to a church, palace, or other spacious building.

PRONATION, among anatomists. The radius of the arm has two kinds of motions, the one called *Pronation*, the other supination.

Pronation * is, that whereby the palm of the hand is turned downwards; the opposite motion hereto is called *supination*, whereby the back of the hand is downwards.

* The word is formed from the Latin *pronus*, prone, that which lies on the fore-side, or with the face downwards.

M. Winslow has lately advanced, that the *Pronation* and supination of the hand are not effected solely by the motion of the radius; but that the cubitus in most cases contributes equally thereto; and that both these bones usually move at the same time. *Vid. mem. acad. R. scienc. an. 1729. p. 36.*

There are peculiar muscles whereby the *Pronation* is effected, called *pronators*.—The radius has also two other muscles, called *supinators*, which have an opposite effect. See **SUPINATOR**.

PRONATORS, **PRONATORES**, in anatomy, two muscles of the radius, which serve to turn the palm of the hand downwards.

They are distinguished by the names of *rotundus* and *quadratus*.

PRONATOR radii quadratus, or *brevis*, rises broad and fleshy, from the lower and inner part of the ulna; and passing transversely over the ligament that joins the radius to the ulna, is inserted into the superior and external part of the radius: which it helps to pull inwardly; together with the

PRONATOR radii rotundus, or *teres*, a muscle which rises fleshy, from the internal extuberance of the os humeri, where those bending the carpus and fingers do arise; and firmly adhering to the flexor carpi radialis, descends obliquely downwards to its fleshy insertion a little above the radius, in the middle externally: its use is to move the radius and palm inwards. See *tab. anat. (myol.) fig. 1. n. 27. fig. 2. n. 15.*

PRONOUN, **PRONOMEN**, in grammar, a part of speech used in lieu of a noun or name.

Whence the denomination, from *pro*, and *nomen*, q. d. *for-noun*, or *name*.

As it would have been disagreeable to have been always repeating the same name, there are words invented in all languages, called *pronouns*, to save the necessity thereof, and to stand in the place of names; as, *I, thou, he*, &c.

As nouns are the marks or signs of things, *pronouns* are the signs of nouns.—Father Buffier, however, shews, that *pronouns* are real nouns or names: and that all the difference between what the grammarians call nouns, and *pronouns*, is, that the former are more particular, and the latter more general.

They are called *pronouns*, because used in the place of particular nouns. Indeed sometimes they do not fill the place of nouns intirely, but need other words to assist them, to express the object spoken of: such, e. gr. are *who, whoever*, &c. which do not express any determinate object whereof a thing may be affirmed, unless accompanied with another word, especially a verb: As, *Whoever labours, deserves a reward.*

These father Buffier calls *incomplete pronouns*, to distinguish them from those which express an object completely; as, *I, thou, he*, &c.

The grammarians ordinarily distinguish *pronouns* into four classes, with regard to their different signification, formation, &c. viz. *pronouns personal, relative, possessive, and demonstrative*; to which may be added, *indeterminate pronouns*.

Personal PRONOUNS are those used in lieu of names of particular persons: such are, *I, thou, he, we, ye, they*.

PRONOUNS relative, which Buffier calls *modificative*, or *determinative*, are those placed after nouns, with which they have such affinity, that without them they signify nothing: such are, *qui, who, that*, &c.

PRONOUNS possessive are those which express what each possesses, or what belongs to him; as, *mine, thine, his*, &c.

These are pure adjectives, and only differ from the rest by the relation they bear to *pronouns*, whence they are derived, and by some particular inflections, which they have in some languages.

PRONOUNS demonstrative, those which serve to indicate or point out the subject spoken of; as, *this, those*, &c.

PRONOUNS indefinite, are those which express their subject indeterminately; as *whoever, any*, &c.—These coincide with what F. Buffier calls *incomplete pronouns*.

Pronouns are likewise divided into *substantive* and *adjective*.—To the first belong, *I, thou, he*: to the second, *my, mine, who, what*, &c.

Pronouns may also be considered in two states; the first, or foregoing state, as *I, we*; the second, or following one, as *me, us*.

PRONOUNCING, **PRONUNCIATION**, in painting, the marking and expressing the parts of all kinds of bodies with that degree of force necessary to make them more or less distinct and conspicuous.

Thus the painters, in speaking of a piece, say, these or these parts are well *pronounced*; which is a metaphorical way of speaking; as when we say, that a man who talks well has a fine *pronunciation*.

PRONUNCIATION, **PRONUNTIATIO**, in grammar, the

manner of articulating, or founding the words of a language, represented to the eye by writing and orthography.

From the definition it would seem, that the *pronunciation* were only the image of the orthography: but as we pronounce before we write, and only write to express what we pronounce, it is more just to lay down the *pronunciation* as the rule and model of orthography.

Pronunciation makes much the most difficult article of a written grammar: in effect, a book only expressing itself to the eyes in a matter that wholly concerns the ears; the case seems next akin to that of teaching the blind to distinguish colours.

Hence it is, that there is no part so defective in the grammars as that of the *pronunciation*; for the writer has frequently no term whereby to give the reader an idea of the sound he would express; for want of a proper term, therefore, he frequently substitutes a vitious or precarious one.

Thus the French grammarians frequently tell us, that the vowels *a, e, i*, &c. are pronounced in French the same as in Latin; never considering, that there is not any known and determinate *pronunciation* of the Latin; but each nation, now, pronounces the Roman characters in the Latin, the same as it pronounces those same characters in its own language: thus the Latin *cæcus* is pronounced by the English, *sekus*; and by the Italians, *techeoui*, &c.

Hence it appears, that the relation between sounds and characters, as well as between things and words, is purely arbitrary and national.

Indeed, Plato seems of a contrary opinion, and will have a natural relation between words and the things they express, as there is a natural relation between the signs made by mutes, and the things they would intimate: so that, according to Plato, to every several word there must be a several motion of the mouth relative to the action expressed by the word.

Whether or no there might be such a thing in the primitive language, we dare not undertake to say; but it is certain such a relation would require a facility of contortions in the mouth, to which we are strangers.

To give a just and precise idea of the *pronunciation* of a language, it seems necessary to fix, as nearly as possible, all the several sounds employed in the *pronunciation* of that language: this Mr. Lodwick has done in his attempt towards an universal alphabet, where he enumerates forty-three several simple sounds (some of them, indeed, strangers to the English language); and F. Buffier, who gives thirty-three several sounds in the French tongue, twenty-nine in the Italian, thirty in the German, twenty-two in the Spanish, and twenty-four in the English.

The French language is clogged with a difficulty in *pronunciation*, from which most others are free; and it consists in this, that most of their words have two different *pronunciations*; the one in common prose, the other in verse.

In prose, e. gr. they omit the *pronunciation* of the final *i* in the plural of nouns, and of the *t* in the third person of the plural of verbs, and of several other final consonants; but in verse they pronounce all.

Thus, in *à quoi bon reveiller mes muses endormies?* the final *s* of *musés* is pronounced: and in *mille & mille douceurs y semblent attachés*, the *t* of *semblent* is to be pronounced.

Add to this, that in prose they soften the sound of a great many words, pronouncing *croire* for *croire*; but in poetry the genuine *pronunciation* is retained.

PRONUNCIATION is also used for the fifth and last part of rhetoric, which consists in regulating and varying the voice and gesture agreeably to the matter and words; so as more effectually to persuade and touch the hearers.

The *pronunciation* is of such importance, that Demosthenes called it the first, the second, and the third part of eloquence.

Quintilian defines the *pronunciation*, *voxis, & cultus, & corporis moderatio cum venustate*; a decent, agreeable manner of managing the voice, gesture, and action of the whole body.

Cicero somewhere calls it *quædam corporis eloquentia*, a certain eloquence of the body; and in another place, *sermo corporis*, the language or speech of the body.

Pronunciation is the same with what we otherwise call *action*.—Some writers, particularly Mr. Henley, confound it with *elocution*, which is a very different thing. That author, when he styles himself *restorer of the ancient elocution*, means of the ancient *pronunciation*.

There are three things which come under the *pronunciation*; the memory, voice, and gesture. See each under its proper article.

Augustus, to avoid being balked by his memory, and at the same time save the trouble of getting off by heart, used to harangue from a writing; as we are told by Dio and Suetonius.

PRONUNCIATION, in painting. See the article **PRONOUNCING**. **PROOF**, **PROBATIO**, in arithmetic, an operation whereby the truth and justness of a calculation is examined and ascertained.

The proper proof is always by the contrary rule: thus subtraction is the *proof* of addition, and multiplication of division; and

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and *vice versa*.—The *Proof* of multiplication by 9 or by 7 is precarious.

There would need no *Proofs* in arithmetic, were it not that a man is liable to make mistakes; for all the rules and operations being built on demonstration, it is thence we are assured of their truth and certitude.

The *Proof*, then, does not confirm the rule, but only shews us whether or no we have applied it right.

PROOF, in law, logic, &c. denotes the mediums, or arguments, used to evince the truth of any thing.

By the French law, a *literal Proof*, or *Proof in writing*, called also *dead Proof*; *probatio mortua*, is preferable to a testimonial, or *Proof viva voce*, by witnesses.—The ordinance de Moulins excludes all *Proof* by witnesses for loans of above 1000 livres.

The *Proof* of crimes was anciently effected among our ancestors divers ways, *viz.* by duel or combat, fire, water, &c.

The *Proof* by red-hot iron was very frequent: the accused, to purge himself, was here obliged to make an oath, as he touched the iron. The formula, ceremonies, prayers, &c. made on this occasion, are still extant in the notes at the end of the capitularies of Charlemaign.

This custom was abrogated by the emperor Frederic; but it still obtains in Mingrelia; as we are told by Lamberti, in his relation inserted in Thevenot's voyages.

If they cannot have *Proof* of a crime, a cross is laid at the bottom of a caldron full of boiling water, out of which the accused is obliged to fetch it with his naked hand and arm: this done, the arm is put up in a bag, tied, and sealed, and three days after opened; when, if there be no marks of the burn or scald, the accused is declared innocent.

In the kingdom of Siam, to have *Proof* of a crime, the party is obliged to wash his hands in boiling oil, or to walk on burning coals; from either of which he must come out untouched to be reputed innocent.

Sometimes they oblige the two contending parties to plunge under water; and he who stays there longest, gains the cause; and sometimes to swallow a grain of rice, prepared and charmed by their doctors: he who is able to swallow it, is declared innocent, and carried home in triumph; and the accuser punished.—This looks like an imitation of what was done among the Jews to have *Proof* of adultery.

The *Proof* by combat is likewise said to subsist among the Mingrelians.

PROPAGATION, **PROPAGATIO**, the act of multiplying the kind, or of producing the like in the way of natural generation.

Some plants are only propagated by sowing, as wheat, poppies, &c. The reason is, that the stem in these plants withers and dies away, and consequently is incapable of being planted; and as to the root, the whole force and virtue thereof passes up into the ear, or spica, which being the useful part of the plant, exhausts the whole.

Some kinds of plants are propagated by the roots, as the anemones, &c. In which case there is a considerable stock of femoral or spermatic virtue still reserved in the root, so as to be in a condition for shooting new fibres upon any favourable occasion.

Sometimes a branch lopped off, and set in the ground, shall shoot into a new plant; as we see in the willow, vine, poplar, &c. and sometimes a truncheon shall do the same. In this case, the plants being of a very porous texture, readily imbibe nourishment, and take root.—This method of *Propagation* is particularly remarkable in the vine, any part of which, put any how in the ground, will become a plant. The little chips of elm are said to do the same.

When a branch, or arm of a vine, shoots too great a length, or withers towards the extreme, or grows too small to feed its grapes, it is usual to cut pieces of it off, and put them in the ground, which readily grow into thriving plants.

Nay, sometimes to bring up young plants, and make them grow and advance the faster, especially lemon, orange, and citron trees, they pass a branch or shoot of an old tree, without cutting it off, through an aperture of a vessel filled with good earth; upon which, the pores opening by the moisture and warmth, roots presently burst forth, which, being furnished with food both from the earth and the parent plant, grow at a great rate, and are soon in a condition to be separated from the parent, and shift for themselves. Lastly, plants are sometimes also propagated by bulbs.

PROPER, **PROPRIUM**, something naturally and essentially belonging to any being.

The school-philosophers, after Porphyry, distinguish four kinds of *Propriety*, or modes of *propriety*, which are expressed in the following verse.—*Est medicus, biper, canescens, visibilisque*.

The first, called **PROPRIUM PRIMO MODO**, is what agrees to a single species, but not to all the individuals: this they call *soli, sed non omni*.—As, to be a geometrician, a physician, a divine, &c. which are things *proper* to man; but not to all men.

The second, **PROPRIUM SECUNDO MODO**, is what agrees to the whole species, but agrees likewise to another; which they call

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omni, sed non soli.—Thus, to have two feet is *proper* to a man, but is likewise *proper* to a bird.

The third, **PROPRIUM TERTIO MODO**, is that which agrees to a single species, but not at all times; *omni & soli, sed non semper*.

—As, to grow grey, according to Porphyry, is *proper* to a man, but it is to an old man.

The last, and highest, **PROPRIUM QUARTO MODO**, is that which alone agrees to one kind, to all the individuals thereof, and at all times; *omni, soli, & semper*.—Thus, the faculty of laughing is *proper* to man, of neighing to horses, &c. And it is this that Porphyry calls the *true proper*.

The first three species are only accidents of the fifth vulgar predicable, to which they directly belong.

The fourth is an universal agreeing to every individual, or subject of predication of any species, in such manner as to be always found absolutely in the species alone, but not at every determinate time: thus man alone is naturally risible; not that he is always laughing, but that he has the faculty of laughing at all times.

PROPER, in respect of words, denotes their immediate and peculiar signification, or that directly and peculiarly attached to them.

In which sense the word stands opposed to *figurative* and *metaphorical*.

PROPER is also used in a moral sense, to denote something that is usually found in things: as, their particular or specific virtues, &c.

In which sense we say, magnanimity is the *proper* virtue of heroes.

PROPER is also used for the natural qualities necessary to succeed in a thing.

In which sense we say, people of a hot vigorous temperament are *proper* for the army; the cold and phlegmatic are *proper* for study. The Romans became less *proper* for war, in proportion as they grew more learned and polite.

PROPER, in grammar, is also applied to nouns or names, which are distinguished into *proper* and appellative.

Man is the appellative, Peter the *proper* name.

The *proper* name among Christians is that imposed at baptism.

See **NAME** and **BAPTISM**.

PROPER FRACTION is such an one whose numerator is less than its denominator.

Such is $\frac{3}{5}$, or $\frac{1}{2}$, which is really less than unity; and therefore, *properly* speaking, is a fraction. See **FRACTION**.

PROPER, in the civil jurisprudence, is used in opposition to *acquired*, for an inheritance derived by direct or collateral succession.

By the French laws, a testator can only dispose of one fifth of his *proper* effects; the paternal relations inherit the paternal *propria*, and the maternal the maternal ones: so that *propria* always return to the line whence they proceed.

The origin of the law, which fixes this difference between *proper* goods and acquets, is not known; neither the Greeks nor Romans having ever made any such distinction.

Indeed it seems founded on this principle of natural equity, that men are usually desirous to preserve and attach to their family the goods which they have received from their forefathers, and to transmit them to those descending from the same stock.

PROPER sometimes also stands as a reduplicative, serving to mark or design a thing more expressly and formally.

In this sense we say, Jesus Christ came to redeem the world in his *proper* person. The king did such and such a thing of his own *proper* motion.

PROPER MOTION. See the article **MOTION**.

PROPER OBJECTS. See the article **OBJECT**.

PROPERTY, or **PROPRIETY**, **PROPRIETAS**, that which constitutes or denominates a thing *proper*; or it is a particular virtue or quality, which nature has bestowed on something, exclusive of all others.

Thus colour is a *Property* of light; extension, figure, divisibility, and impenetrability, are *Properties* of body. Every day discovers new *Properties* in the loadstone.

PROPERTY, or **PROPRIETY**, in law, denotes *dominion*, or the highest right a man can have to a thing; and such as no-ways depends on any other man's courtesy.

In this sense, none in our kingdom have the *Property* of any lands or tenements, except the king, in right of his crown; all other lands being of the nature of fee, and held of the king either mediately or immediately.

Property or *Propriety*, however, is used for that right in lands or tenements, which common persons have; importing as much as *utile dominium*, though not *directum*.

There are three manners of right or *Property*, *viz.* *Property* absolute, *Property* qualified, and *Property* possessory. Incumbents have not the *Propriety* of benefices, they have only the enjoyment thereof. The monks have a long time disputed whether they had the *Propriety* of the bread they eat, or only the use?

One may give the *Propriety* of an estate, yet reserve the usufruct; in which case, by the death of the usufructuary, the usufruct is consolidated to the *Propriety*.

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PROPHETCY, *προφητεία*, a prediction, made by divine inspiration.

A late author observes, that the Christians have this in common with the Pagans, that they equally build their religions upon *Prophecy and divination*.

He adds, That divination was an art learnt by the Romans in schools, or under discipline; as the Jews did *prophesying* in the schools and colleges of the prophets.

In these schools, as the learned Dodwell observes, the candidates for *Prophecy* were taught the rules of divination practised by the Heathens; who were in possession of the art long before them. It is added, that the gift of *Prophecy* was not an occasional thing, but a constant and standing matter of fact; and some think they have discovered an establishment of an order of prophets in the old testament, in analogy to the Heathen diviners.

This is certain, from many passages of scripture, that there were great numbers of prophets among them, who not only exercised their talents in matters of government and religion, but even in the discovery of lost goods, and in telling of fortunes.

One of the greatest difficulties in christianity turns upon the manner of completion of the scripture *Prophecies*. In the prophets of the old testament are frequent predictions of the Messiah; which the writers of the new frequently urge to the Jews and Heathens as fulfilled in Jesus Christ; and on this principle evince the truth of his mission: but these texts thus urged from the old, in the new testament, are sometimes not to be now found in the old; and at other times are not urged in the new in the literal and obvious sense which they seem to bear in the old; whence most of the Christian commentators, divines, and critics, ancient and modern, judge them to be applied in a secondary, typical, allegorical, or mystical sense.

Thus, *ex. gr.* St. Matthew, after an account of the conception of the Virgin, and the birth of Jesus, says, "All this was done, that it might be fulfilled which was spoken by the prophet, saying, Behold, a virgin shall be with child, and shall bring forth a son, and they shall call his name Emanuel." But the words, as they stand in Isaiah, whence they are supposed to be taken, do, in their obvious and literal sense, relate to a young woman who was to bring forth a child in the days of Ahaz; as appears from the context, and as is owned by Grotius, Huetius, Castilio, Carcellaeus, Episcopius, Hammond, Simon, le Clerc, Lamy, &c.

This *Prophecy* then not being fulfilled in Jesus, in the primary, literal, or obvious sense of the words, is supposed, like the other *Prophecies* cited by the apostles, to be fulfilled in a secondary, typical, or allegorical sense, *i. e.* this *Prophecy*, which was first literally fulfilled by the birth of the prophet's son in the time of Ahaz, was again fulfilled by the birth of Jesus, as being an event of the same kind, and intended to be signified either by the prophet, or by God, who directed the prophet's speech.

Grotius observes this to be the case in most, if not all the *Prophecies* and citations quoted from the old in the new testament; and Dodwell, with Sir John Marshall, refer even the famous *Prophecy* in Daniel, about the seventy weeks, to the time of Antiochus Epiphanes; shewing, that the expressions taken thence by Christ, and urged by him as predicting the destruction of Jerusalem by the Romans, have only in a secondary sense a respect to that destruction.

And even that famous *Prophecy* in the Pentateuch, "A prophet will the Lord God raise up unto thee, like unto me; to him shall ye hearken;" which St. Luke refers to as spoken of Jesus Christ, is, by Simon, Grotius, Stillingfleet, &c. understood to signify, in its immediate sense, a promise of a succession of prophets.

It is allowed then, the apostles applied the *Prophecies* which they quote from the old testament, in a typical sense; but unhappily the rules whereby they quoted them are lost. Dr. Stanhope laments the loss of the Jewish traditions or rules for interpreting scripture received among the rabbins, and followed by the apostles. But this loss, Surenhusius, Hebrew professor at Amsterdam, thinks he has retrieved from the Jewish talmud, and the ancient Jewish commentaries; and has accordingly published to the world the rules whereby the apostles quoted the old testament.

But the truth is, these rules are too precarious, strained, and unnatural, to gain much credit. See **QUOTATION**.

Mr. Whiston condemns all allegorical explanation of the *Prophecies* of the old testament cited in the new, as weak, enthusiastic, &c. and adds, that if a double sense of the *Prophecies* be allowed, and there be no other method of shewing their completion, than by applying them secondarily and typically to our Lord, after having been in their first and primary intention long ago fulfilled in the times of the old testament, we lose all the real advantages of the ancient *Prophecies*, as to the proofs of Christianity.

He therefore sets up a new scheme in opposition thereto: he owns, that taking the present text of the old testament for genuine, it is impossible to expound the apostles citations of the *Prophecies* of the old testament, on any other than the allegorical foundation; and therefore, to solve the difficulty, he is forced to have recourse to a supposition contrary to the sense of all Christian writers before him, *viz.* that the text of the old

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testament has been greatly corrupted since the apostolical age by the Jews.

His hypothesis is, that the apostles made their quotations out of the old testament rightly and truly from the Septuagint version, which in their time was in vulgar use, and exactly agreed with the Hebrew original; and that, as they made exact quotations, so they argued justly and logically from the obvious and literal sense of the said quotations, as they then stood in the old testament: but that since their times, both the Hebrew and Septuagint copies of the old testament have been so greatly corrupted, and so many apparent disorders and dislocations introduced therein, as to occasion many remarkable differences and inconsistencies between the old and new testament in respect to the words and sense of those quotations. See **SEPTUAGINT**, &c.

As to the manner wherein these corruptions were introduced, he says, the Jews in the second century greatly corrupted and altered both the Hebrew and Septuagint, especially in the *Prophecies* cited by the apostles, to make their reasoning appear inconclusive: that in the third century, they put into Origen's hand one of these corrupted copies of the Septuagint; which Origen mistaking for genuine, inserted in his Hexapla, and thus brought into the church a corrupted copy of the Septuagint; and that in the end of the fourth century, the Jews put into the hands of the Christians, who till then had been almost universally ignorant of the Hebrew, a corrupted copy of the Hebrew old testament.

The disagreement then between the old and new testament, in respect to the said quotations, he contends, has no place between the genuine text of the old testament, (now no where existing) but only between the present corrupted text of the old and new testament: and therefore, to justify the reasonings of the apostles, he proposes to restore the text of the old testament, as it stood before the days of Origen, and as it stood in the days of the apostles: from which text thus restored, he doubts not it will evidently appear, that the apostles cited exactly, and argued justly and logically from the old testament.

But this scheme of accomplishing *Prophecies* labours under difficulties at least as great as the allegorical scheme. Its foundation is incredible, and its superstructure, from first to last, precarious. In effect, it is inconceivable that the old testament should be so corrupted; and it may even be made appear, that the Hebrew and Septuagint disagreed in the times of the apostles: add to this, that the means whereby he proposes to restore the true text, will never answer that end; nor has he himself, from all the means he is yet possessed of, been able to restore one prophetic citation, so as to make that seem literally, which before only seemed allegorically applied.

PROPHET*, *ΠΡΟΦΗΤΑ*, *προφῆτης*, a person inspired by God with the knowledge of future events; and commissioned to declare his laws, his will, &c. to the world.

* The word is derived from the Greek *προ*, and *φῆμι*, said; of *φῆμι*, I say; whence also the Latins derive their *satus*, spoken.

Among the canonical books are those of sixteen *Prophets*; four of which are denominated the *greater Prophets*, *viz.* Isaiah, Jeremiah, Ezekiel, and Daniel; so called from the length or extent of their writings, which exceed those of the others, *viz.* Hosea, Joel, Amos, Obadiah, Jonas, Micha, Nahum, Habakkuk, Haggai, Zachariah, and Malachi; who are called the *lesser Prophets*, from the shortness of their writings.

The Jews only reckon three *greater Prophets*; Daniel they exclude, as no more to be ranked among the *Prophets* than David: not but that both the one and the other foretold many important things; but because their manner of life differed from that of the other *Prophets*, David being a king, and Daniel a peer.

In the Greek church, the *lesser Prophets* are placed in order before the great ones; apparently because many of the *lesser Prophets* are more ancient than the greater.

Among the Greeks too, Daniel is ranked among the *lesser Prophets*.—In the 48th chapter of Ecclesiasticus, Isaiah is particularly called the *great Prophet*; both on account of the great things he foretold, and the magnificent manner wherein he did it.

Spinosa says, the several *Prophets* prophesied according to their respective humours; Jeremiah, *e. gr.* melancholy and dejected with the miseries of life, prophesied nothing but misfortunes.

Dacier observes, that among the ancients the name *poet* is sometimes given to *Prophets*; as that of *Prophet* is at other times given to *poets*.

PROPHETICAL types. See the article **TYPE**.

PROPHYLACTICE, *προφυλακτικῆ*, that part of the art of medicine, which directs the preventing or preserving from diseases.

PROPHETIATION, in religion, a sacrifice offered to God to assuage his wrath, and render him propitious.

Among the Jews there were both ordinary and public sacrifices, as holocausts, &c. offered by way of forgiving; and extraordinary ones offered by particular persons guilty of any crime, by way of *Propitiation*.

If it were a crime of ignorance, they offered a lamb or a kid; if done wittingly, they offered a sheep: for the poor, a pair of turtles was enjoined as a *Propitiation*.

The Romish church believe the mass to be a sacrifice of *Propitiation*.

pitiation for the living and the dead. The reformed churches allow of no *Propitiation*, but that one offered by Jesus Christ on the cross.

PROPIATION also gives the name to a solemn feast among the Jews, celebrated on the tenth of the month Tisri, which is their seventh month, and answers to our September.

It was instituted to preserve the memory of the pardon proclaimed to their forefathers by Moses on the part of God; who thereby remitted the punishment due for their worship of the golden calf.

PROPIIATORY, among the Jews, was the cover or lid of the ark of the covenant; which was lined both within and without-side with plates of gold; inasmuch that there was no wood to be seen.

Some even take it to have been one piece of massive gold. The cherubims spread their wings over the *Propitiatory*.

This *Propitiatory* was a type or figure of Christ, whom St. Paul calls the *Propitiatory* obtained from all ages.

PROPLASM, *PROPLASMA*, *προπλασμα*, is sometimes used for a mould, wherein any metal or soft matter, which will afterwards grow hard, is cast.

PROPLASTICE, *προπλαστικη*, the art of making moulds, for casting things in.

PROPOLIS, *προπολις*, a thick yellow odorous substance, smelling like storax, nearly akin to wax; wherewith the bees stop up the holes and crannies of their hives, to keep out the cold air, &c.

The *Propolis* is a friable matter, by some esteemed sovereign in diseases of the nerves. It is also used to make holes in abscesses; and being heated on the fire, its vapour is received for inveterate coughs.

PROPORTION, **PROPORTIO**, in arithmetic, the identity or similitude of two ratio's.

Hence quantities that have the same ratio between them, are said to be *proportional*; e.g. if A be to B, as C to D; or 8 be to 4, as 30 to 15; A, B, C, D, and 8, 4, 30, and 15, are said to be in *Proportion*, or are simply called *Proportionals*.

Proportion is frequently confounded with ratio; yet have the two, in reality, very different ideas, which ought by all means to be distinguished.

Ratio is, properly, that relation or habitude of two things, which determines the quantity of one from the quantity of another, without the intervention of any third: thus we say, the ratio of 5 and 10 is 2; the ratio of 12 and 24 is 2.

Proportion is the sameness or likeness of two such relations: thus, the relations between 5 and 10, and 12 and 24, being the same, or equal; the four terms are said to be in *Proportion*. Hence ratio exists between two numbers; but *Proportion* requires at least three.

Proportion, in fine, is the habitude or relation of two ratio's, when compared together; as ratio is of two quantities.

Proportion again is frequently confounded with *progression*. In effect, the two often coincide; the difference between them only consisting in this, that *progression* is a particular species of *Proportion*, wherein the second of the three terms is a mean *proportional* between the other two, or has the same ratio to the third, which the first has to the second.

Add to this, that *Proportion* is confined to three terms, but *progression* goes on to infinity (so that *progression* is a series or continuation of *Proportions*); and that in four terms, 3, 6, 12, 24, *Proportion* is only between the two couples 3 and 6, and 12 and 24; but *progression* is between all the four terms.

Proportion is said to be *continual*, when the consequent of the first ratio is the same with the antecedent of the second; as, if 3 be to 6, as 6 to 12.

The *Proportion* is said to be *discrete*, or interrupted, when the consequent of the first ratio differs from the antecedent of the second; as, if 3 be to 6, as 4 to 8.

Proportion, again, is either said to be *arithmetical*, or *geometrical*; as the ratio's are.

ARITHMETICAL PROPORTION is the equality of two or more arithmetical ratio's, or the equality of difference between three or more several quantities.

Thus, 1, 2, 3, and 2, 5, 8, 11, 14, are in *arithmetical Proportion*; because there is the same difference betwixt the numbers compared, which are 1 to 2, and 2 to 3; or 2 to 5, and 5 to 8.

If every term have the same ratio to the next, as the first has to the second; the terms are said to be in *continual arithmetical Proportion*; as 5, 7, 9, 12, 15.

If the ratio between any two terms differ from that of any others; the terms are said to be in *arithmetical Proportion discrete*, or interrupted; as where 2 : 5 :: 6 : 9, the ratio's of 5 and 6 being different from that of 2 and 5.

A series of more than four terms in *arithmetical Proportion*, from an arithmetical progression. See **PROGRESSION**.

1. If three numbers be in *arithmetical Proportion*, the sum of the extremes is equal to double the middle term: thus, in 3, 7, 11; the sum of 3 and 11 is equal to twice 7; viz. 14.

Hence we have a rule for finding a mean *arithmetical proportional* between two given numbers; half the sum of the two being the mean required: thus, half the sum of 11 and 3, viz. 14, is 7.

2. If four numbers be in *arithmetical Proportion*, the sum of the extremes is equal to the sum of the middle terms: thus, in 2 : 3 : 4 : 5; the sum of 5 and 2 is equal to the sum of 3 and 4, viz. 7.

Hence, four terms in *arithmetical Proportion* are still proportional, if taken inversely, 5 : 4 : 3 : 2; or alternately, thus; 2 : 4 : 3 : 5; or inversely and alternately, thus, 5 : 3 : 4 : 2.

3. If two numbers in *arithmetical Proportion* be added to other two, the less to the less, &c. their difference is in a duplicate ratio, i.e. double that of the respective parts added: thus, if to 3 : 5 be added 7 : 9, the sums are 10 : 14; whose difference 4, is double the difference of 3 : 5, or 7 : 9. And if to this sum you add other two, the difference of the last sum will be triple the sum of the first two, and so on.

If two *arithmetical proportionals* be subtracted from two others in the same ratio, the less from the less, &c. the arithmetical ratio of the remainder is 0. Thus, from 9 : 7 taking 5 : 3, the remainders are 4, 4.

Hence, if *arithmetical proportionals* be multiplied by the same number, the difference of their products will contain the first difference as oft as the multiplier contains unity: thus, 3 : 5, multiplied by 4, produce 12, 20, whose difference 8 is equal to 4 times 2, the difference of 3 and 5.

4. If two numbers in *arithmetical Proportion* be added to, or multiplied by, other two in another ratio of the same kind, less by less, &c. the sums are in a ratio which is the sum of the ratio's added or multiplied: thus 2 : 4 and 3 : 9 being added, the sums are 5 : 13, whose difference is 8, the sum of 2 and 6, the differences of the numbers given.

GEOMETRICAL PROPORTION is the quality of two geometrical ratio's, or comparisons of two couples of quantities.

Thus 4 : 8 :: 12 : 24, are in *geometrical Proportion*; the ratio of 4 and 8 being equal to that of 12 and 24; and 9, 3, 1, are contained as oft in 8, as 12 is in 24. Again, 9, 3, 1, are in *geometrical Proportion*, 9 being triple of 3, as 3 is of 1.

If, in a series of terms, there be the same ratio between every two terms, that there is between the first and second; they are said to be *continual geometrical proportionals*: as 1 : 2 : 4 : 8.

If any two terms have a different ratio from that of the first and second, they are said to be in a *disjunct*, or interrupted *geometrical Proportion*; as are 2 : 4 : 3 : 6; where 2 is to 4, as 3 to 6; but not so as 4 to 3.

A series or progression of more than four *geometrical proportionals* is called a *geometrical progression*.

1. If three quantities be in *continual geometrical Proportion*, the product of the two extremes is equal to the square of the middle term: thus, in 6 : 12 :: 12 : 24, the product of 6 and 24 is equal to the square of 12, viz. 144. Hence we have a rule,

2. To find a mean *geometrical proportional* between two numbers, e.g. 8 and 72.

Multiply one of the numbers by the other, and from the product 576, extract the square root 24; this will be the mean required.

3. To find a fourth proportional to the three given numbers, e.g. 3, 12, 5; or a third proportional to two given numbers.

Multiply the second 12 into the third 5, in the first case; and in the latter, multiply the second into itself: divide the product by the first 3, the quotient 20 is the fourth *proportional* sought in the one, or the third in the other.

The solution of this problem is what we popularly call the *rule of Proportion*, or the *golden rule*, or *rule of three*. See **RULE**.

4. If four numbers be in *geometrical Proportion*, the product of the extremes is equal to the product of the two middle terms: thus, in 2 : 5 :: 4 : 10, the product of 10 and 2 is equal to that of 5 and 4, viz. 20. Hence,

5. If four numbers represented $a : b :: c : d$ be either in *arithmetical*, or *geometrical Proportion*; they will also be in the same, if taken inversely, viz. $d : c :: b : a$; or alternately; as $a : c :: b : d$; or alternately and inversely, as $d : b :: c : a$.

6. If the two terms of a geometrical ratio be added to, or subtracted from, other two in the same ratio, the less to or from the less, &c. the sums or differences are in the same ratio: thus in 6 : 3 : 10 : 5, where the common ratio is 2; 6 added to 10, makes 16, as 3 to 5 makes 8; and 16 : 8 is in the same ratio as 6 : 3, or 10 : 5. Again, 16 being to 8, as 6 to 3, their differences 10 and 5 are in the same ratio.

The reverse of which proposition is likewise true; viz. if to or from any two numbers be added or subtracted other two, if their sums or differences be in the same geometrical ratio as the first two, the numbers added or subtracted are in the same ratio. Hence,

7. If the antecedents, or the consequents, of two equal geometrical ratio's, 3 : 6, and 12 : 24, be divided by the same 3; in the former case, the quotients 1 and 4 will have the same ratio's to the consequents, viz. 1 : 6 :: 24; and in the latter, the antecedents the same ratio to the quotients, viz. 3 : 1 :: 12 : 4.

8. If the antecedents or consequents of similar ratio's, 2 : 6, and 3 : 9, be multiplied by the same quantity 6; in the former case the facts 12 and 18 have the same ratio to the consequents, viz. 12 : 6 :: 18 : 9; and in the latter, the antecedents have the same ratio to the products, viz. 2 : 6 :: 3 : 9.

9. If in a *geometrical Proportion* $3 : 6 :: 12 : 24$, the antecedents be multiplied or divided by the same number 2; or divided by the same number 3; in the former case, the facta; in the latter, the quotients will be in the same *Proportion*, viz. $6 : 18 :: 24 : 72$, and $1 : 3 :: 4 : 12$.

10. If in a *Proportion* $4 : 2 :: 10 : 5$, the antecedent of the first ratio be to its consequent, as the antecedent of the second to its consequent; then by composition, as the sum of the antecedent and consequent of the first ratio is to the antecedent or consequent of the first, so is the sum of the antecedent and consequent of the second to the antecedent or consequent of the second, viz. $6 : 2 :: 15 : 5$, or $6 : 4 :: 15 : 10$.

11. If in a *Proportion* $6 : 4 :: 15 : 10$, as the antecedent of the first ratio is to its consequent, so is the antecedent of the other to its consequent; then, by division, as the difference of the terms of the first ratio is to its antecedent or consequent, so is the difference of the terms of the second ratio to its antecedent or consequent, viz. $2 : 4 :: 5 : 10$; or $2 : 6 :: 5 : 15$.

12. If in a *Proportion* $4 : 2 :: 6 : 3$, as the antecedent of the first ratio is to its consequent, so is the antecedent of the second to its consequent; and as the consequent of the first is to another number 8, so is the consequent of the second to another number 12; viz. $2 : 8 :: 3 : 12$; then will the antecedent of the first be to 8, as the antecedent of the second to 12; viz. $4 : 8 :: 6 : 12$.

13. If in a *Proportion* $8 : 4 :: 12 : 6$, as the antecedent of the first ratio is to its consequent, so is the antecedent of the second to its consequent; and as the consequent of the first is to another number 16, so is another number 3 to the antecedent of the second; viz. $4 : 16 :: 12 : 3$; then will the antecedent of the first be to 16, as 3 to the consequent of the second; viz. $8 : 16 :: 3 : 6$.

14. Suppose any four proportional quantities, viz. $3 : 6 :: 12 : 24$, and any other four proportional quantities $1 : 3 :: 9 : 27$; if you multiply the several terms of the latter into those of the former, the products will likewise be *proportional*, viz. $3 : 18 :: 108 : 648$.

15. If there be several quantities continually *proportional*, A, B, C, D, &c. the first A is to the third C, in a duplicate ratio; to the fourth D, in a triplicate ratio, &c. of the first A to the second B.

16. If there be three numbers in continual *Proportion*, the difference of the first and second will be a mean *proportional* between the difference of the first and second term, and the difference of the second and third, and the first term.

Harmonical or musical Proportion is a third kind of proportion formed out of the other two, thus: of three numbers, if the first be to the third as the difference of the first and second to the difference of the second and third; the three numbers are in *harmonical Proportion*.

Thus $2 : 3 : 6$ are harmonical, because $2 : 6 :: 1 : 3$. So also four numbers are harmonical, when the first is to the fourth, as the difference of the first and second to the difference of the third and fourth.

Thus $24 : 16 :: 12 : 9$ are harmonical, because $24 : 9 :: 8 : 3$. By continuing the *proportional* terms in the first case, there arises an *harmonical progression*, or series.

1. If three or four numbers in *harmonical Proportion* be multiplied or divided by the same number; the products, or quotients, will also be in *harmonical Proportion*: thus, if 6, 8, 12, which are harmonical, be divided by 2, the quotients 3, 4, 6, are also harmonical; and reciprocally their products by 2; viz. 6, 8, 12.

2. To find an *harmonical mean* between two numbers given: Divide double the product of the two numbers by their sum, the quotient is the mean required; thus, suppose 3 and 6 the extremes, the product of these is 18, which doubled, gives 36; this divided by 9 (the sum of 3 and 6) gives the quotient 4. Whence $3 : 4 : 6$ are harmonical.

3. To find a third *harmonical proportional* to two numbers given.

Call one of them the first term, and the other the second; multiply them together, and divide the product by the number remaining after the second is subtracted from double the first; the quotient is a third *harmonical proportional*: thus, suppose the given terms 3, 4, their product 12 divided by 2, (the remainder after 4 is taken from 6, the double of the first) the quotient is 6, the *harmonical third sought*.

4. To find a fourth *harmonical Proportion* to three terms given: Multiply the first into the third, and divide the product by the number remaining after the middle or second is subtracted from double the first; the quotient is a third *harmonical proportional*: thus, supposing the numbers 9 : 12 : 16; a fourth will be found by the rule to be 24.

5. If there be four numbers disposed in order, whereof one extreme and the two middle terms are in *arithmetical Proportion*; and the same middle terms with the other extreme, are in *harmonical Proportion*; the four are in *geometrical Proportion*: as here, $2 : 3 :: 4 : 6$, which are geometrical; whereof $2 : 3 : 4$ are arithmetical, and $3 : 4 : 6$ harmonical.

6. If betwixt any two numbers you put an *arithmetical mean*, and also an *harmonical one*, the four will be in *geometrical Proportion*: thus, betwixt 2 and 6, an *arithmetical mean* is 4, and an *harmonical one* 3; and the four $2 : 3 :: 4 : 6$ are geometrical.

We have this notable difference between the three kinds of *Proportion*; that from any given number we can raise a continued arithmetical series increasing in *infinitum*, but not decreasing; the *harmonical* is decreasable in *infinitum*, but not increasable; the *geometrical* is both.

Contra-harmonical Proportion is that relation of three terms, wherein the difference of the first and second is to the difference of the second and third, as the third to the first.

Thus, 3, 5, 6, are numbers in *contra-harmonical Proportion*, because $2 : 1 :: 6 : 3$.

To find a mean in *contra-harmonical Proportion* between two numbers: divide the sum of the two squared by the sum of the roots, the quotient is the mean required: thus, the sum of the squares of 3 and 6, viz. 45, divided by 9, the sum of the roots, gives 5.

Extreme and mean PROPORTION,	} See	EXTREME.
Inordinate PROPORTION,		INORDINATE.
Reciprocal PROPORTION,		RECIPROCAL.
PROPORTION of equality,		EQUALITY.
COMPOSITION of PROPORTION,		COMPOSITION.
RULE of PROPORTION,		RULE.
TERMS of PROPORTION,		TERM.

PROPORTION is also used for the relation between unequal things of the same kind, whereby their several parts correspond to each other with an equal augmentation or diminution.

Thus, in reducing a figure into little, or in enlarging it, care is taken to observe an equal diminution, or enlargement, through all its parts; so that if one line, *e. gr.* be contracted by one third of its length; all the rest shall be contracted in the same *Proportion*.

The making of reductions of this kind is the great use of the *proportional compasses*.

PROPORTION, in law. See *PRO RATA* and *ONERANDA*.

PROPORTION, in architecture, denotes the just magnitude of the members of each part of a building, and the relation of the several parts to the whole; *e. gr.* of the dimensions of a column, &c. with regard to the ordonnance of the whole building.

One of the greatest differences among architects, M. Perrault observes, is in the *Proportions* of the heights of entablatures with respect to the thickness of the columns, to which they are always to be accommodated. See *ENTABLATURE*.

In effect, there is scarce any work, either of the ancients or moderns, wherein this *Proportion* is not different; some entablatures are even nearly twice as high as others:—yet it is certain, this *Proportion* ought of all others to be most regulated; none being of greater importance, as there is none wherein a defect is sooner spied, nor any wherein it is more shocking.

PROPORTION is likewise understood of the magnitudes of the members of architecture, statues, or the like, with regard to the distance whence they are to be viewed.

The most celebrated architects are much divided in their opinions on this subject: some will have it, that the parts ought to be enlarged in *Proportion* to their elevation; and others, that they ought to remain in their natural dimensions. See *STATUE*.

PROPORTION, in painting, is the just magnitude of the several members of a figure, a groupe, &c. with regard to one another, to the whole figure, the groupe, and the intire piece.

Proportion makes one of the most important articles in the art of painting, the principal subject it is employed in being the human body; for which reason, the curious in that art will not be displeased with the following scheme of the rules and laws thereof.

By the way, let it be observed, 1. That to measure and set off *Proportions*, they either divide the module into twelve parts, and subdivide each of these into four; or else they divide the face into three lengths of the nose, subdividing each length into twelve; or, lastly, divide the whole face into three, and subdivide each of those into four: which last method is what we shall here follow.

2. That the multiplicity of little measures are to be studiously avoided, because they confound, and because they require great skill in osteology to hit justly.

3. That in measuring there be a regard had to the relieve, or juttings out of figures.

Rules of PROPORTION in painting.—In the *Proportions* of a human figure, regard is had to the age, sex, and quality.

As to age; we consider the stages thereof, infancy, youth, and manhood. For the first, at three years of age, we count five lengths of the face from top to toe; viz. from the tip of the head to the bottom of the belly, three; thence to the foot, two; breadth about the shoulders, one face, one eighth; and in the place of the hips, one face.

At four years, the height is six faces; viz. from the top of the head to the bottom of the belly, three faces; thence to the sole of the foot, three faces; the breadth about the shoulders, one face; about the haunches, one face.

At five years, the height is six faces $\frac{1}{2}$; abated, the lower being shorter.

In youth at twelve years, we have two *Proportions*; the one from nature, which gives nine faces for the height; for the breadth about

about the shoulders, two faces; about the haunches, one face $\frac{1}{2}$. The other from the antique statues, as that of Laocoon, &c. which give the height, ten faces $\frac{1}{2}$; the breadth from one shoulder to another, one face $\frac{2}{3}$; at the haunches $1\frac{1}{3}$; at the place of the muscle called *vastus externus*, 2; at the thigh 1; the knee, $\frac{2}{3}$ and $\frac{1}{2}$, a subdivision; and at the ankles, $\frac{1}{2}$.

In the state of manhood, when the proportions are arrived at perfection, we reckon the height ten faces: the first, from the top of the head to the nostril; the second, to the hole in the neck between the clavicles; the third, to the pit of the stomach, called *cartilago ensiformis*; the fourth, to the navel; the fifth, to the pyramidal muscles; thence to the knee, $2\frac{2}{3}$; and as much to the sole of the foot.—The extent of the arms is the same with the height, viz. from the tip of the long finger to the joint of the wrist, one face; thence to the elbow, $1\frac{1}{2}$; thence to the juncture of the shoulders, $1\frac{1}{3}$; thence to the hole in the neck, $1\frac{1}{2}$; in all, five heads; which, with the five of the other arm, gives ten: the thickness of the arms to be adjusted by the quality or character.

As to the breadth of the figure seen frontwise, the width of the shoulders across the deltoides is 2 faces $\frac{2}{3}$; breadth of the pectoral muscle, to the juncture of the arm, 2. About the haunches, where the obliqui externi are, $1\frac{1}{3}$, and the subdivisions. The thighs, at the biggest place, 1. The knee, $\frac{1}{2}$, three subdivisions $\frac{1}{2}$. The leg, at the thickest, $\frac{3}{4}$, and one subdivision. The extreme of the ankle, $\frac{1}{2}$, one subdivision. The feet, $\frac{2}{3}$, and one half a subdivision. Their length, 1 face $\frac{1}{2}$, one subdivision.

Others, measuring by the length of the whole head, make only eight heads in height and breadth; thus: The head, one; thence to the bottom of the breasts, one; thence to the navel, one; thence to the yard, one; thence to the middle of the thigh, one; thence to the lower parts of the knee, one; thence to the small of the leg, one; thence to the bottom of the foot, one.

The breadth thus: From the end of the long finger to the wrist, one; thence to the bend of the arm, one; thence to the bottom of the shoulder, one; thence over to the other shoulder, two; thence to the end of the other long finger, three.

To these general Proportions may be added others, which usually obtain; as, that the hand is to be of the length of the face; the thumb the length of the nose; and the great toe the same: the two nipples, and the hole in the neck, make a just equilateral triangle: the space between the eyes is the breadth of an eye; the breadth of the thigh, at the thickest, is double that of the thickest part of the leg, and treble that of the smallest: from the top of the head to the nose, the same as from the top of the nose to the chin. The distance from the chin to the throat-pit, is the breadth of the throat; the distance of the centre of the eye to the eye-brow, the same as the prominence of the nostrils, and the space between them and the upper lip: the length of the fore-finger the same as the space thence to the wrist; the space from the tip of the fore-finger to the wrist, the length of the face.

For the sex: The Proportions of man and woman differ in height, in that the woman has a longer neck; the parts at the breasts, and the lower parts of the belly, bigger by half a part; which makes the space from the breast to the navel less by one part; and the thigh shorter by a third part.

As to breadth, a woman has her breasts and shoulders narrower, and her haunches larger; and thighs, at the place of their articulation, larger; arms and legs thicker, feet straighter; and because women are more flat and fleshy, their muscles are less seen, and therefore the contours are more smooth and even.

Young maids have little heads, long necks, low or down shoulders, slender bodies, haunches big, legs and thighs long, feet little.

Young men have the neck thicker than women, the shoulders and breasts larger, the belly and haunches narrower, legs and thighs slenderer, and feet larger.

As to the quality of subjects, we are either to follow simple nature, or fine and agreeable nature, or to chuse nature, or exceed it. In following simple nature, in common and country subjects, men of dull wit, and a moist temperament, are to be of an heavier and rougher Proportion, the muscles appearing but little distinguished, the head big, neck short, shoulders high, stomach little, knees and thighs thick, and feet large.

In nature, as fine and agreeable, for serious histories, &c. the figures of the heroes to be well shaped, the haunches high and upright, the joints well knit, little and compact, and free from flesh and fat.

Military men are to have the head little, neck thick and nervous, shoulders large and high, body and paps elevated, haunches and belly little, thighs muscly, principal muscles raised up and knit together at the heads; the legs smooth, feet slender, soles hollow.

Nature is sometimes to be selected, i. e. made up of parts from various good originals, to form extraordinary and perfect figures for great and heroic subjects, as in Roman histories; giving, thus, a character of force sufficient to execute actions agreeable to the descriptions of the poets, &c. make.

Lastly, sometimes nature is to be exceeded, as in represen-

tations of fabulous deities, of heroes and giants: in these the great pieces, which serve to form the body, are to be set out in measures agreeable to the height; only diversifying them by their bigness.

In the rule of Proportions, it is to be observed, that there is a difference in the contours of some parts, when put in different postures: thus, when the arm is bent, it is larger than when straight; and the same is true of the foot and knee, as is shewn by Leonardo da Vinci.

Rule of PROPORTION, in arithmetic, a rule whereby we find a fourth proportional to three numbers given.

This is popularly called the golden rule, and sometime the rule of three. See RULE of Three.

Compass of PROPORTION, a name by which the French, and after them some English authors, call the sector. — See its construction and use under the article SECTOR.

PROPORTIONAL, relating to proportion. Thus we say proportional compasses, parts, scales, spirals, &c. See COMPASSES, &c.

PROPORTIONALS, in geometry, are quantities, either linear or numeral, which bear the same ratio, or relation to each other.

Thus, if 3, 6, 12, be Proportionals, then will 3 : 6 :: 6 : 12.

To find a fourth PROPORTIONAL to three given lines, AB, AC, and BD, (tab. geom. fig. 62.) draw an angle FAG at pleasure; from A set off the first of the lines to B; from A, the second, to C; and from B, to D, the third: draw BC; and in D made an angle equal to ABC: then is CE the fourth Proportional sought; and AB : AC :: BD : CE.

If a third Proportional be required to two given lines, AB and AC; make BD equal to AC, i. e. let AC be repeated twice: then AB : AC :: AC : CE.

To find a mean Proportional between two given lines, AB and BE, (fig. 63.) join the two given lines into one continued right line, and bisect it in C. From C, with the interval of AC, describe a semicircle ADE; and from B erect a perpendicular BD; this is the mean Proportional sought; and AB : BD :: BD : BE.

The geometricians have been these two thousand years in search of a method, for finding two mean Proportionals. See MEAN.

The ancients performed it mechanically, by the mesolabe described by Eutochius; and many of them attempted to give the demonstration; some by the solid loci, as Menecmus; others by the plain loci, as Nicomedes, Diocles, and, in our times, Viety; and others by implicit motions, as Plato, Archytas, Pappus, and Sporus; others tentatively, by the description of circles, as Hero and Apollonius, &c. but all in vain.

To find a mean Proportional between two numbers: Half the sum of the two given numbers is an arithmetical mean Proportional, and the square root of their product a geometrical mean Proportional. See PROPORTION arithmetical and geometrical.

To find a mean harmonical Proportional. See PROPORTION harmonical.

PROPORTIONALS, in grammar. See NUMERALS.

PROPORTIONAL compasses, an instrument for the ready drawing of lines and figures, in any given ratio to other lines or figures. — See their construction and use under the article COMPASSES.

PROPORTIONAL part. See the article PART.

PROPORTIONAL scales, called also logarithmical scales, are the artificial numbers or logarithms, placed on lines, for the ease and advantage of multiplying, dividing, &c. by means of compasses, or of sliding-rules.

They are, in effect, only so many lines of numbers, as they are called by Gunter, but made single, double, triple, or quadruple; beyond which they seldom go. See GUNTER'S scale, &c.

PROPORTIONAL spirals. See the article SPIRAL.

PROPORTIONALITY, a term used by Gregory de St. Vincent, for the proportion that is between the exponents of four ratios.

PROPORTUM, or PURPORT, in our law-books, the intention or meaning of any thing.—Secundum propositum dissi chiographi inter eos confidit.

PROPOSITION, PROPOSITIO, in logic, part of an argument, wherein some quality, either negative or positive, is attributed to a subject.

Chauvin defines Proposition, a complete, consistent sentence, indicating or expressing something either true or false, without ambiguity: As, Xanthippe is a bad wife.—If an ass fly, he must have wings.

Others, more philosophically, define Proposition, a speech uttered or produced, to signify some judgment of the mind.

A Proposition consists of two terms; the one, that whereof we affirm or deny, called the subject; the other, the thing affirmed or denied, called the attribute or predicate.

These two are either joined, or separated, by the intervention of some copula or disjunctive.

Thus in the Proposition, God is just; the subject, God, is joined with the attribute, just, by the verb substantiva, is.

The schoolmen call the two terms the matter, and the copula the form of the Proposition.

Now, as terms may be either singular, or common and universal, if the subject of a *Proposition* be a common term, taken in all its extent, the *Proposition* is called *universal*: as, *Every atheist is blind*.

If the common term be only taken in an indeterminate part of its extent, the *Proposition* is called *particular*: as, *Some atheists are wicked*.

If the subject of the *Proposition* be singular, the *Proposition* is called *singular*: as, *George is king of England*.

Those *Propositions* which have only one subject, and one attribute, are called *simple*; — those that have several subjects, or attributes, are called *compound*.

A syllogism consists of three *Propositions*, major, minor, and conclusion.—An enthymeme, of two.

The schoolmen make several other species and divisions of *Propositions*; as, a

PROPOSITION de primo adjacente, where the subject and predicate are both included under the verb: such are, *veni, vidi, vici*.

PROPOSITION de secundo adjacente is, where either the subject or predicate is taken in the verb: as, *I love*,—or, *I write*.

PROPOSITION de tertio adjacente is, where both the subject and predicate are express, and stand distinct from the verb: as, *The king is just*.

This *Proposition* is the rule or standard of all the other; so that whatever *Proposition* can be reduced thereto, is legitimate; and what cannot, is not.

Propositions, again, are divided into three classes: the first regarding the matter; the second, the form; the third, the thought.

Those of the first class are subdivided into *finite* and *infinite*, *direct* and *indirect*, *single* and *manifold*.

Finite or *definite PROPOSITION* is that which declares something determinate on a subject; as, *Man is bipede*.—The wind is not visible.

Infinite or *indefinite PROPOSITION* is that where either one or both of the terms are infinite, or have a negative prefixed to them: as, *Non homo est albus*—*Homo est non albus*.

Direct PROPOSITION is that wherein a higher or more general thing is predicated of a lower and more particular: as, *Man is an animal*.

Others will have it that, wherein the subject stands as a matter receiving, and the predicate as a form received: as, *Peter is learned*.

Indirect PROPOSITION, according to some, is that wherein an inferior is predicated of a higher: as, *An animal is man*.—

According to others, it is that wherein the subject stands as the form, and the predicate as the matter: as, *Every rational is man*.

Simple PROPOSITION is such, either simply, or by conjunction.—It is simply such, when it affirms or denies one thing of one other thing: as, *The sun shines*.—By conjunction, when several *Propositions* are joined and coupled together. Thus, *The sun shines, and it is day*, are two *Propositions*, which conjoined, make this one, *If the sun shines, it is day*.

Of such *conjoined Propositions* there are divers kinds, viz. *hypothetical*, *disjunctive*, *copulative*, &c.

Hypothetical PROPOSITION is that consisting of several simple ones, affected with some conditional one: as, *If the sun be set, it is night*.

Disjunctive PROPOSITION is that consisting of several, affected with a disjunctive copula: as, *It is either day, or night*.

Copulative PROPOSITION is that consisting of several affected with a conjunction copulative: as, *Peter does not stand, and sit*.

Some add *discrete* or *adversative PROPOSITION*: as, *He is rich, but covetous*.

Compound PROPOSITION is that where one or both the terms excite several ideas in the mind: as, *A man is body and soul, and both together*; or, *a foundation, walls, and roof, are a house*.

Manifold PROPOSITION is that consisting of several subjects; as, *Peter and Paul preached*; or of several predicates; as, *Simon reads and walks*, or both, as, *Peter and Paul preach and pray*.

In respect of form, *Propositions* are divided into *affirmative* and *negative*, *true* and *false*, *pure*, and *modal*.

Affirmative PROPOSITION is that whose attribute is joined to the subject; as, *God is a spirit*.

Negative PROPOSITION is that whose attribute is separated from the subject; as, *Man is not a stone*.

True PROPOSITION is that which declares a thing to be what it really is; or not to be what it is not.

False PROPOSITION is that which signifies a thing to be what it is not; or not to be what it is.

The truth of a *Proposition*, therefore, depends on the connecting of the subject with the attribute, which is done by that act of the mind, called *judgment*.

PROPOSITIONS are said to be *pure*, when they imply or involve nothing besides their matter and form: as, *Man is rational*.

Modal PROPOSITION is that which, beside the pure matter and form, involves some mode, or manner of disposition: as, *It is necessary man be rational*.

Hence such *Proposition* is said to consist of a mode, and a diction; the mode denotes some circumstance which affects the *Propo-*

sition; as, *It is necessary*: the diction is the rest of the *Proposition*, that man be rational.

There are four of these modes very famous, viz. *necessary*, *possible*, *impossible*, and *contingent*. Others produce other modes, as *true*, *false*, *certain*, *uncertain*, *probable*, &c.

To modal *Propositions*, the philosophers refer *exclusive*, *exceptive*, and *restrictive PROPOSITIONS*; all which are denoted by a common name, *expansible Propositions*, because requiring some explanation to make them clearly understood.

Exclusive PROPOSITION is that denoted by a sign, or character of exclusion: as, *only*, *solely*, *alone*; as, *God alone is eternal*; which is expounded thus, *God is eternal, and no other being beside him is so*: *Peter only plays*; which we expound, *Peter plays, and does nothing else*.

Every *exclusive PROPOSITION* is expounded by two *Propositions*, one of which is affirmed, and the other denied.

Exceptive PROPOSITION is that denoted by an exceptive sign; as, *beside*, *unless*, &c.—Thus, *Every animal, beside man, is irrational*.

Every *exceptive PROPOSITION* is to be resolved, or expounded by three *Propositions*; as that, e. g. above-mentioned, by these: *Every animal that is not man is irrational*: *every man is an animal*: *no man is irrational*.

Restrictive, or *limitative PROPOSITION*, is that affected with a restrictive sign; as, *according to*, *so far as*, *considered as*, *quatenus*, &c. Thus, *man, quatenus an animal, perceives*.

Complex PROPOSITION, } See the { *COMPLEX*,
Reduplicative PROPOSITIONS, } articles { *REDUPLICATIVE*,
Relative PROPOSITION, } *RELATIVE*,
Reduction of PROPOSITIONS. } *REDUCTION*.

PROPOSITION, in mathematics, is either some truth advanced, and shewn to be such by demonstration; or some operation proposed, and its solution shewn.

If the *Proposition* be deduced from several theoretical definitions compared together, as this; A parallelogram is double of a triangle, standing on the same base, and of the same altitude: it is called a *theorem*.

If it be deduced from a praxis or series of operations, it is called a *problem*: as, to find a third proportional to two given quantities.

Indeed, in strictness, the *Proposition* is only part of a theorem, viz. that which shews what agrees to such a thing under such conditions, and what not: in which sense it is distinguished from the *demonstration*, which shews the reasons why the understanding conceives that to agree to it.

Again, strictly speaking, the *Proposition* is only a member of a problem, viz. that which shews what is required to be done: in which sense it is distinguished from the *solution*, which rehearses the several things to be done in order to effect what is required; and from the *demonstration*, which proves, that by doing the things enjoined in the solution, the thing required in the *Proposition* is truly done.

PROPOSITION, in poetry, denotes the first part of an epic poem, wherein the author proposes, or lays down, briefly and in general, what he has to lay in the course of his work.

The *Proposition*, F. Boffu observes, is to contain the bare matter of the poem, i. e. the action, and the persons that are to execute it, both human and divine.

This is what we have both in the *Iliad*, the *Odysee*, and the *Æneid*. The action proposed in the *Iliad*, is the wrath of Achilles; that of the *Odysee*, the return of Ulysses; and that of the *Æneid*, the translation of the Trojan empire into Italy.

The same author observes, that the divine persons are named in all the three *Propositions*, Homer, e. g. declares, that what happens in the *Iliad*, is by the will of Jupiter; and that Apollo was the cause of the quarrel between Agamemnon and Achilles: the same poet says, it was Apollo prevented the return of Ulysses's companions; and Virgil mentions the destinies, the will of the gods, and the anger of Juno.—But they all three dwell chiefly on the person of the hero, as if he were the matter of the poem.

Yet there is some difference, in this respect, in the three poems; in that Achilles is named in the *Iliad*; but Ulysses and Æneas are not: they are only pointed at, and that in such general terms, as if it were supposed they were known before.

This practice seems to fall in with the first intention of the poet; who is to feign an action without names, and who, as Aristotle says, does not relate the action of Achilles, nor Ulysses, nor Æneas, nor any particular person, but of an universal, general, and allegorical person.

Add to this, that the character which the poet is to give his hero, and his whole work, is expressed in the *Proposition*, both by Homer and Virgil.

The whole *Iliad* is anger and violence; it is Achilles's character, and it is what the poem commences with: *Meno andro*. The *Odysee* presents us in the first verse with the prudence, dissimulation, and address, which make the character of Ulysses, and the business of the poem: *Andra poteros*. And we see the piety and mildness of Æneas in the beginning of the Latin poem: *Insignem pietate virum*.

As to the manner of the *Proposition*, Horace contents himself to prescribe modesty and simplicity; not to promise much, nor raise great expectations in the reader. *Do not begin*, says he, *like that wretched poet, who set out with*, *Fortunam Priami* cantabo,

PRO

cantabo, & nobile bellum. *How much better is that of Homer, Dic mihi, musa, virum ! &c. He does not spend all his fire at once, and leave nothing but smoke : from this feeble beginning, you shall soon see him rise to the wonders of Antiphates, Scylla, Charybdis, and Polypheme.*

The same modesty we find in the *proposition* of the *Æneid* : if that of the *Iliad* be a little more furious, it is, perhaps, in conformity to the character of the poem, which is a series of violences and extravagances.

Add, that if the poet be to speak with modesty of his hero ; much more is he to do so of himself : thus Virgil only says, *I sing the action of Æneas.* Homer begs his muse to *say* or to *sing*. How far does Claudian swerve from these examples ?

— *Audaci promere cantu*

Mens congesta jubet ; gressus remouete, profani :

Tam furor humanos nostra de pectore sensus

Expulsi, & totum spirant præcordia Phœbum.

A short poem, e. gr. an ode, &c. wherein the violent strain could be pursued to the end, might admit of such a pompous beginning. Thus we find Horace begin an ode much after the manner of Claudian :

Odi profanum vulgus, & arceo —

— Carmina non prius

Audita Mularum sacerdos

Virginibus purisque canto.

But the length of an epic poem quite excludes all pompous *propositions*.

There is scarce any fault we have yet observed a *proposition* liable to, but there is an instance of in the *proposition* of Statius's *Achilleid* : he bids his muse *rehearse the deeds of the magnanimous son of Æacus, who was formidable even to the Thunderer.* He adds, *That he has worthily discharged a former undertaking ; and that Theseus esteems him a second Amphion.*

Magnanimum Æacidem, formidatamque Tonanti

Pregniem, & patrio vitæ tam succedere cælo,

Divæ, refer. —

Tu modo, si veteres digno deplevimus hausta,

Da fontes mihi, Phœbe, novos, &c.

PROPRÆFECT, **PROPRÆFECTUS**, among the Romans, the præfect's lieutenant ; or an officer whom the præfect of the pretorium commissioned to do any part of his duty in his place.

In Gruter, p. CCCLXX. the third inscription mentions *propræfects* of the pretorium under Gratian, in the city of Rome, and the neighbouring parts.

PROPRETOR, or **PROPRETOR**, a Roman magistrate, who having discharged the office of pretor at home, was sent into a province to command there with his former pretorial authority.

PROPRETOR was also an appellation given to those, who, without having been pretors at Rome, were sent extraordinarily into the provinces, to administer justice with the authority of pretors.

PROPRETOR is also a denomination given by some to those sent by the emperors into the provinces, which, upon partition in Augustus's time, fell to their lot : as the name *proconsul* was given to those sent into the provinces that fell to the people's share.

PROPRIETARY monks, were such as had reserved goods and effects to themselves, notwithstanding their formal renunciation of all at the time of their profession.

They are frequently mentioned in the *Monast. Anglic. &c.* and were to be very severely dealt withal ; to be excommunicated, deprived of burial, &c. — Monachi proprietarii excommunicantur ab abbatis, & si in morte proprietarii inventus fuerit, ecclesiastica caret sepultura, &c. Addit. ad Matt. Par.

PROPRIETATE probanda is a writ to the sheriff to inquire of the property of goods distrained, when a defendant claims a property upon a replevin sued.

Where a property is proved by the defendant, a replegiari property lies not.

PROPRIETATIS elixir. See the article **ELIXIR**.

PROPRIETOR, or **PROPRIETARY**, he who has the property or propriety of any thing.

PROPRIETOR, in law, is strictly such an one as has or possesses any thing as his own in the utmost degree : *Quæ nullius arbitrio est obnoxia.*

The term was formerly applied in a particular manner to him who had the fruits of a benefice to himself and his successors ; as in ancient time abbots and priors had.

PROPRIETY, in grammar, is where the direct and immediate signification of a word agrees to the thing it is applied to.

In which sense *propriety* is used in opposition to a figurative or remote signification.

PROPYLÆUM*, the porch of a temple, or great hall.

* The word is Greek, *προπύλαιον*, which signifies the same.

Hence *propylæum* is also used figuratively in matters of learning, for an introduction, apparatus, or prodromus to some greater work. — In this sense we say, the *propylæum* of the Jesuits at Antwerp, &c.

PROQUESTOR, **PROQUESTOR**, the questor's lieutenant, or a person who discharged the office of questor in his stead.

PRO

The word is chiefly applied to an officer appointed by the governor of a province to discharge the questure after the decease of the questor, till the senate and people should send a new one.

PRORÆ *ei*, in anatomy, a bone of the cranium, called also *or occipitis*.

PRO RATA, in commerce, a term sometimes used among merchants, for *in proportion*.

Thus, when in speaking of any undertaking they say, Each person must reap the profit ; or sustain the loss, *pro rata* to his interest ; it is meant, each shall gain or lose, in proportion to the sum he put in stock.

PRO RATA portionis, in law. See **ONERANDO pro rata portionis**.

PROROGANDA assisa. See the article **ASSISA**.

PROROGATION, **PROROGATIO**, the act of prolonging, adjourning, or putting off to another time.

The difference between a *prorogation* and an *adjournment* of parliament is, that by *prorogation* the session is ended ; and such bills as passed in either house, or both houses, and had not the royal assent, must at the next assembly begin again ; for that every session of parliament is, in law, a several parliament : whereas, if the parliament be only *adjourned*, there is no new session ; and, consequently, all things continue in the same state they were in before the adjournment. See **ADJOURNMENT**. — But this difference between *prorogation* and *adjournment* is of no long standing : anciently they were used as synonymous.

Proregetur curia de hora in horam, quousque placitum terminetur. MS. de LL.

To *prorogue* the parliament, the king goes in person, with his crown on his head, and sends the black rod for the house of commons to attend him at the bar of the house of lords ; where, after giving an answer to each bill signified to him, he makes a speech ; and the lord chancellor, by command, signifies the parliament to be *prorogued*.

The *proroguing* of the lower house of convocation is a power vested in the archbishop with the consent of the suffragans. See *Life of Queen Anne*, p. 87.

PROSAIC numbers. See the article **NUMBER**.

PROSENIUM, in the ancient theatre, was an eminence whereon the actors performed their parts.

The *prosenium* answered to our stage. — It consisted of two parts among the Greeks ; one particularly so called, where the actors performed : the other was the *logeion*, where the singers and the mimics acted their parts. — Among the Romans, the *prosenium* and *pulpitum* were the same thing.

PROSCRIPTION, **PROSCRIPTIO**, a publication made in the name of the chief or leader of a party, whereby he promises a reward to any one who shall bring him the head of one of his enemies.

Sylla and Maria by turns *proscribed* each other's adherents. — Under the triumvirate, a great part of the best and bravest of the Romans fell by *proscription*.

The term took its rise from the practice of writing down a list of the persons names, and posting it in public ; from *pro*, and *scribo*, I write.

PROSE*, **PROSA**, the natural language of mankind, loose, and unconfined by poetical measures, rhymes, &c. — In which sense it stands opposed to *verse*.

* The word comes from the Latin *prosa*, which some will have derived from the Hebrew *paras*, which signifies *expendit* : others deduce it from the Latin *prosa*, of *prosum*, going forwards ; by way of opposition to *versus*, or turning backwards, as is necessary in writing verse.

Though *prose* have its connections, which sustain it, and a structure which renders it numerous ; it ought still to appear free : its character consists in running easy and unrestrained. Poets very rarely have the talent of *prose* : the habit of wearing chains sits fast upon them, even when the chains are off.

St. Evremont compares *prose* writers to foot-travellers, who walk with less noise, but more security, than the cavaliers.

PROSECUTOR, in law, is he that pursues a cause in another's name.

PROSELYTE*, **PROSELYTUS**, a new convert to the faith. See **CONVERT**.

* The word is pure Greek, *προσηλυτης*, which, in Latin, signifies *advena* ; in English, *stranger*, or one arrived out of another country.

The term was much used in the primitive church. — The Jews too had their *proselytes*, who from Gentiles embraced Judaism.

PROSODY*, **PROSODIA**, that part of grammar, which teaches and directs the pronunciation and manner of rehearsal ; marks the accents, and distinguishes the long and short syllables.

* The word is formed from the Greek *προσῳδία*, compounded of *πρῶτον*, and *ᾠδή*, *cantus*, singing.

Prosody is properly that branch of grammar which relates to syllables ; treating of their true pronunciation in respect of accent, and time or quantity.

The English *prosody* turns chiefly on two things : *numbers*, that is, a certain number of feet or syllables. See **NUMBERS** : — and *rhyme*, or a similitude of sound between the last syllables of words.

PRO

The Greek and Roman *profodies* were unacquainted with rhyme; but in lieu thereof had something to make their verse harmonious without, viz. quantity.

PROSONOMASIA, *προσωνομασία*, a figure in rhetoric, whereby allusion is made to the likeness of a found in several names or words; much the same with *paronomasia*, or *agnomination*.

PROSOPOPEIA*, *προσωποποιία*, in rhetoric, a figure, whereby we make persons that are absent, or dead, or even things which are inanimate, as cities, &c. to speak.

* The word is formed from the Greek, *προσωπον*, person, and *ποιω*, I make, or sign.

The poets, in their fictions, make frequent use of the *prosopepeia*; as also do the orators, in their painting of violent passions, which seem to transport, and make them forget themselves.

There are two kinds of *prosopepeia*'s; the one direct, the other indirect.—For an instance of the latter: 'Just gods, protectors of the innocent, permit the order of nature to be interrupted for one moment, and let this carcass resume the use of speech, &c.'

Instances of the former are found every-where among the orators and poets: that which follows is a very beautiful one, found by way of epitaph on a tomb-stone: the dead wife addresses her surviving husband thus:

Immatura perī: sed tu felicior, annos

Vive tuos, conjux optime, vive meos.

PROSPECT.

PROSPECTIVE glass, } See } **PERSPECTIVE**.

PROSPHYRIS, see **ADHESION**.

PROSTATE, *πρόστας*, in anatomy, two white, spongy, glandulous bodies, situate at the root of the penis, or just below the neck of the bladder, and about the size of walnuts.—See *tab. anat. (splanch.) fig. 8. litt. pp. fig. 15. lit. cc.*

Authors ascribe two kinds of substance to the *prostate*, the one of which is glandulous, the other spongy, or porous; this last seems nothing but a congeries of minute vessels and cells, through the middle of which pass the vesiculae feminales, without any communication therewith.

The *prostate* have excretory ducts of their own, pretty numerous: De Graaf does not remember to have known them fewer than ten in the *prostate* of a man; in dogs they are sometimes an hundred, each of which discharges itself into the urethra, some above, some below the caput gallinaceum; each having its proper caruncle.

Out of these there issues a whitish, slimy humour, secreted in the glandular part of the *prostate*, and conveyed into the cavity of the urethra.

The use of this humour is to line and lubricate the cavity of the urethra, and prevent it from being annoyed with the acrimony of the urine in its passage through it; and to serve as a vehicle to the seed, in the time of ejaculation.

Some take it for a third kind of seed, but without much reason. Boerhaave thinks it may serve to nourish the animalcule during the first moments after coition.—This humour, he adds, remains after castration, but it is not prolific.

The same author, from the memoirs of the French academy, makes the *prostate* to consist of an aggregate of twelve glands, each of which terminates by its excretory duct in a little bag, into which it discharges its humour. These twelve bags open by as many excretory ducts into the cavity of the urethra, so as to encompass the exit of the vesiculae; whence the seed and the humour of the *prostate* are the more accurately mixed.

PROSTHAPHÆRESIS*, in astronomy, the difference between the true and mean motion, or true and mean place, of a planet; called also *equation of the orbit*, or *of the centre*, and simply the *equation*.

* The word is formed from the Greek *πρόστας*, ante, super; and *ἀφαιρέσις*, ablatio.

Prosthaphæresis amounts to the difference between the mean and equated anomaly.

Thus, suppose the circle ALMPNR (*tab. astron. fig. 51.*) the orbit of the earth, surrounded by the ecliptic γ , ω , ϕ , &c. and suppose S the sun, and the earth in R, the mean anomaly will be the arch APR, or casting away the semicircle, the arch PR, or the angle PCR; and the true anomaly, rejecting the semicircle, will be PSR, which is equal to PCR and CRS: if then to the mean anomaly, we add the angle CRS, we shall have the true anomaly PSR, and the earth's place, in the ecliptic.

And here the angle CLS, or CRS, is called the *prosthaphæresis* or *equation*; by reason it is sometimes to be added, and sometimes to be subtracted from the mean motion, that we may have the true motion or place of the earth.

PROSTHESIS, *προσθεσις*, in grammar, a species of metaplasm; being the prefixing of some letter or syllable at the beginning of a word:—As in *gnavus*, pro *navus*.

This is also called *aposition*.

PROSTHESIS, among surgeons, is the filling up of what was before wanting, by the apposition of new matter. Such, e. gr. is the filling up of fistulous ulcers with new flesh.

PRO

PROSTYLE*, *προστυλός*, in the ancient Greek architecture, a range of columns in the front of a temple.

* The word is formed from the Greek *πρόσ*, before, and *στυλός*, column.

PROSYLLOGISM, **PROSYLLOGISMUS**, is used by some school-writers, for a reason or argument produced to strengthen or confirm one of the premises of a syllogism.

Others define *prosyllogism*, an argument composed of two syllogisms, so disposed, as that the conclusion of the former is the major or minor of the latter.—e. gr. Every rational is rifible: but every man is rational, therefore every man is rifible; but no ass is rifible, therefore no ass is a man.

The major, or the second syllogism, may be omitted or understood; and some even contend that it ought to be so: so that on their principle, a *prosyllogism*, or redundant syllogism, is when two syllogisms are so contained in five propositions, as that the conclusion of the former is the major or minor of the latter.

PROTASIS*, *πρότασις*, in the ancient drama, the first part of a comic or tragic piece; wherein the several persons of the play are shewn, their characters and manners intimated, and the action, which is to make the subject of the piece, proposed, and entered upon.

* The word is formed from the Greek *πρότιναι*, porrigere, I bold forth.

The ancient *protasis* might go about as far as our two first acts. See ACT.—Where the *protasis* ended, the epitalis commenced.

PROTATICUS, *πρότατικός*, in the ancient drama, a person who never appeared but in the *protasis*, or first part of the play; as Sofia in Terence's *Andria*, &c.

PROTECTION, **PROTECTIO**, the shelter, defence, authority, and aid, employed by any one in behalf of the helpless or unhappy.

Active protection supposes power, interest, favour, &c. in the person that protects.—*Passive protection*, on the contrary, implies necessity, weakness, and dependence, in the person protected.

PROTECTION is also used for a privilege belonging to ambassadors, members of parliament, &c. whereby they and their domestic are secured from arrests, &c.

PROTECTION is sometimes also understood of the person of the protector. Such a cardinal has the *protection* of France.—The *protection* of Spain is become vacant by the death of such a cardinal.

PROTECTION, in law, in its general sense, denotes that benefit and safety which every subject, denizen or alien, specially secured, hath by the laws.

PROTECTION, in a more special sense, is used for an exemption, or immunity, given by the king to a person, to secure him against suits in law, or other vexations, upon reasonable causes moving him thereunto, and for a certain time.

Of this, Fitzherbert makes two kinds: the first he calls a *protection*, cum *clausula volumus*; whereof he mentions four cases:—1°. A *protection*, quia *profecturus*, for him that is to pass over-sea in the king's service.—2°. A *protection*, quia *moraturus*, for him who is already abroad in the king's service; as an ambassador, &c.—3°. A *protection* for the king's debtor, that he be not sued or attached, till the king be paid his debt.—4°. A *protection* for a person in the king's service beyond sea, or in the marches of Scotland.

The second form of *protection* is cum *clausula nolumus*, which is most commonly granted to a spiritual company, for their immunity from having their cattle taken by the king's ministers.—But this may be also granted to a single person, either spiritual or temporal.

Protection extends not to pleas of dower, quare impedit, assize of novel disseisin, darcin presentment, attainrs, nor pleas before justices in eyre.

PROTECTOR, a person who undertakes to shelter and defend the weak, helpless, or distressed.

God, and the magistrate, are the *protectors* of the widow and orphan.—Among the heathens, Minerva was esteemed the *protectors* of arts.

Every catholic nation, and every religious order, has a *protector* residing at the court of Rome, who is a cardinal, and is called the *cardinal protector*.

PROTECTOR is sometimes also used for a regent of a kingdom, made choice of to govern it during the minority of a prince.—Cromwell assumed the title and quality of *lord protector* of the commonwealth of England.

PROTEST, in law, is used for a caution, or call of witness, or an open affirmation, that a person does either not at all, or but conditionally, yield his consent to any act; or to the proceeding of any judge in a court, wherein his jurisdiction is doubtful; or to answer upon his oath farther than by law he is bound.

Any of the lords in parliament have a right to *protest* their dissent to any bill passed by a majority; which *protest* is entered in form.—This privilege is said not to be very ancient: the commons have no right to *protest*.

PROTEST,

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PROTEST, in commerce, is a summons made by a notary public to a merchant, banker, or the like, to accept or discharge a bill of exchange drawn on him, after his having refused either to accept or pay the same.

It is called a *protest*, because containing a protestation, that the party will return the bill, and even take up money at interest; and charge all costs, damages, carriage and re carriage, on the refuser.

There are two kinds of *protests*; the one for want of acceptance, the other for want of payment.

The first is to be made by the bearer of the bill at the time of presenting it, in case the person, on whom it is drawn, refuse to accept it for the time, or the sum there expressed.—The latter is made as the bill falls due, whether it have been accepted or not.

The bearers of bills of exchange, that have been accepted, or which become payable at a certain day, are obliged to have them either paid or *protested* within three days after due, on the penalty of answering for the omission: and it must be observed, that if the third day happen to be a holy-day, the *protest* is to be made on the eve thereof.

At Paris and Hambourg, the *protest* is to be made within ten days: at Venice, where all bills are paid in banco, the *protest* for want of payment is to be made within six days; but then the bank is supposed open, otherwise no *protest* to be made: at Rome *protests* for want of payment are to be made within fifteen days: at Leghorn, Milan, and Bologna, there is no time fixed: at Amsterdam, they are to be made within five days: at Venice, on the third day.

The negotiators of some places, as those of Rome, Mr Savary observes, do not look on themselves as obliged to *protest* in default of payment; but this opinion is contrary to universal custom, and natural reason; since, till after *protestation*, they have no remedy or resource against the drawer or indorser, nor any title to be reimbursed.

M. Ricard adds, that bills of exchange drawn from Amsterdam, or Antwerp, or Spain, are to be *protested* in default of payment within fourteen days after they fall due; after which time the bearer stands the risk and chance of the non-*protested* bill, not the drawer or indorser, in case the party happens to fail after the said fourteenth day. See *BILL of exchange*.

PROTESTANT, a name first given in Germany to those who adhered to the doctrine of Luther; because in 1529, they *protested* against a decree of the emperor Charles V. and the diet of Spire; and declared, that they appealed to a general council.

The name has been since also given to those who adhere to the sentiments of Calvin, and is now become a common denomination for all those of the reformed churches.

Great endeavours have been made to unite the Lutheran *protestants* with the Calvinists; but hitherto in vain.

PROTESTATION, a solemn declaration made by some judiciary act or proceeding, against an oppression, violence, or injustice; or against the legality of a sentence, judgment, decree, or other proceeding; importing, that the party is determined to oppose it at the proper time, &c. See **PROTEST**.

Protestation is defined by justice Walth, a defence or safeguard to the party that makes it, from being concluded by the act he is about to do; so that issue cannot be joined upon it.

Protestation is defined by Plowden, a form of pleading, when one does not either directly affirm or deny any thing alleged by another, or which he himself alleges. Plowd. fol. 276.

PROTHESIS, a little altar in the Greek churches, whereon a ceremony is performed, called by the same name *προthesis*.

On this altar the priest, with the other ministers, prepares every thing necessary to the celebration of mass, viz. the bread, wine, &c.—After which they go in procession from this to the great altar, to begin mass, carrying with them the species thus prepared.

PROTHONOTARY, **PROTONOTARIUS**, **PROTONOTARY**, a term properly signifying *first notary*; and which was anciently the title of the principal notaries of the emperors of Constantinople.

With us, *prothonotary*, called also *preignotary*, is used for an officer in the courts of king's-bench and common-pleas; the latter whereof has three, the former one. See **COURT**, &c.

PROTHONOTARY of the king's-bench records all actions civil sued in that court; as the clerk of the crown-office doth all criminal causes.

PROTHONOTARIES of the common-pleas enter and enroll all declarations, pleadings, affidavits, judgments, and actions: they also make out all judicial writs; as the venire facias, after issue joined; habeas corpus, for bringing in of the jury; distringas jurator, writs of execution and seisin, of superseatas, of privilege, &c. they enroll all recognizances acknowledged in that court, all common recoveries; make exemplifications of records, &c.

PROTHONOTARY, or **PROTONOTARY**, is also an officer in the

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court of Rome, who has a degree of pre-eminence over the other notaries.

There is a college of twelve *prothonotaries*, called *participantes*, because partaking in the fees of the expeditions in chancery.

They are ranked among the number of prelates, and wear the violet rochet, the hat, &c. They assist at all grand ceremonies, and have a place in the pope's chapel.

Their office is to dispatch the acts in grand causes, which the simple apostolical notaries dispatch in lesser causes: they may create apostolical notaries and doctors, to officiate out of the city.

Those out of the college have none of the privileges of the others, except the habit.

The *prothonotaries* were first established at Rome by pope Clement I. with design to write the lives of the martyrs.

PROTHYRIS, in the ancient architecture, is sometimes used for a quoins, or corner of a wall; otherwise called *ancus*. Sometimes also for a cross beam, or over-thwart rafter.

PROTHYRIS is also used by Vignola for a particular sort of key of an arch, an instance of which we have in his Ionic order, consisting of a roll of water-leaves, between two reglets and two fillets, crowned with a Doric cymatium; its figure being much like that of a modillion.

PROTHYRUM, *πρόθυρον*, a porch at the outward door of an house, or portal.

PROTO*, a word used in composition with divers terms in our language, to express a relation of priority; as in *proto-martyr*, *proto-type*, &c.

* It is formed of the Greek *πρῶτος*, *primus*, first.

PROTOCOLLUM, *πρωτοκόλλου*, a term used in the ancient jurisprudence, for the first leaf of a book, wherein was the mark of the paper or parchment.

It was even sometimes used for the mark itself; which was usually in the margin, but sometimes at the top of the page.

The xlvth novel of Justinian forbids cutting the *protocollum* of charters, which shew the year wherein the paper or parchment were made, and the officer commissioned for the delivery of them; by means whereof frauds were frequently detected.

PROTOCOLLUM was also used for the first minute, draught, or summary, of an act to be passed; which the notary drew up in short, in little table-books, to be afterwards enlarged at leisure.

PROTO-FORESTARIUS was he whom our ancient kings made chief of Windsor-forest, to take cognizance of all causes of death or mayhem there; after the manner of a lord chief justice in eyre.

PROTO-MARTYR*, the *first martyr*, or witness, who suffered death in testimony of the truth; as Abel in the old testament, and St. Stephen in the new.

* The word is compounded of *πρῶτος*, *first*, and *μαρτυρ*, *witness*.

PROTONOTARY. See **PROTHONOTARY**.

PROTOPLAST, **PROTOPLASTUS**, a title sometimes given to our first father Adam: from the Greek *πρωτοπλαστής*, *q. d.* first formed.

PROTOTYPE, *πρωτότυπον*, the original or model, whereby a thing is formed.

It is chiefly used for the patterns of things to be engraven, moulded, or cast.

PROTOTYPON, *πρωτοτυπον*, in grammar, is sometimes used for a primitive or original word. See **PRIMITIVE**.

PROTRACTING, or **PROTRACTION**, in surveying, the act of plotting, or laying down the dimensions taken in the field, by means of a *protractor*, &c.

Protracting makes one half of surveying. See **SURVEYING**.

PROTRACTING pin, a mathematical instrument; or rather, an appendage of an instrument called a *protractor*.

The *protracting pin* is a fine needle, fitted into a handle, used to prick off degrees and minutes from the limb of the *protractor*. See **PROTRACTOR**.

PROTRACTOR, a name of an instrument used in surgery, to draw out any foreign or disagreable bodies from a wound or ulcer; in like manner as the forceps.

PROTRACTOR is also an instrument used in surveying; whereby the angles taken in the field with a theodolite, circumferentor, or the like, are plotted or laid down on paper.

This *protractor* consists of a semicircular limb BAG (*tab. SURVEYING, fig. 29.*) of brass, silver, horn, or the like, divided into 180°, and subtended by a diameter BA; in the middle whereof is a little notch or lip, *a*, called the *centre of the protractor*.

On the limb of the *protractor* are sometimes also placed numbers, denoting the angles at the centres of regular polygons; thus, against the number 5, denoting the sides of a pentagon, is found 72, the angle at the centre of a pentagon.

Use of the PROTRACTOR.—1. To lay down an angle of any given quantity, or number of degrees. Suppose, *e. gr.* an angle of 50° with the line AOB, required on the point *a*. Lay the centre of the *protractor* on the given point, and the diameter of the *protractor* on the given line. Make a mark against the given degree 50, on the limb of the *protractor*; through which from the given point, draw a line *ap*: this gives the angle required.

2. To find the quantity of a given angle: e. gr. the angle $p \circ A$. Lay the centre of the *protractor* on the point of the angle \circ , and the diameter on the line. The degree of the limb cut by the other line $\circ p$ viz. 50, is the number of degrees of the angle required.

3. To inscribe any given regular polygon, e. gr. a pentagon in a circle. Lay the centre and diameter of the *protractor* on the centre and diameter of the circle; and make a dot against the number of degrees of the angle at the centre, viz. 72: Through this dot, and the centre of the circle, draw a line cutting the circumference of the circle. To the point of intersection, from the point where the diameter cuts the circumference, draw a right line: this line will be a side of the pentagon, which being taken in the compasses, and set off as often as it will go in the circumference, will give points, which being connected by lines, will form the pentagon required. See POLYGON.

4. To describe any regular polygon, e. gr. an octagon on a given line. Subtract the angle at the centre, which the *protractor* gives 45° from 180° , the remainder 135 degrees is the angle included between two sides of the octagon; one half whereof is $67\frac{1}{2}^\circ$. Applying then the diameter of the *protractor* over the given line, with the centre over one extreme; make a dot against $67\frac{1}{2}^\circ$, to which from the centre draw a line. Apply the *protractor* to the other end of the line, so as the centre be over the extreme, and there set off another angle of $67\frac{1}{2}^\circ$. From the point where the two lines thus drawn intersect as a centre, describe a circle with the interval of the given line. The given line will be one side of the octagon, which being set off as often as it will go in the circumference thus drawn, will give points, which being connected, will form the octagon required.

PROTRACTOR improved, is an instrument much like the former, only furnished with a little more apparatus, whereby we are enabled to set off an angle to a minute; which is impracticable in the other.

The chief addition is an index fitted on the centre, and moveable thereon, so as to play freely and steadily over the limb. Beyond the limb the index is divided, on both edges, into 60 equal parts of the portions of circles, intercepted by two other right lines drawn from the centre; so as each makes an angle of one degree with lines drawn to the assumed points from the centre.

To set off an angle of any number of degrees and minutes with this *protractor*. Move the index, so that one of the lines drawn on the limb, from one of the fore-mentioned points, may fall upon the number of degrees given; and prick off as many of the equal parts on the proper edge of the index, as there are minutes given: thus, drawing a line from the centre to that point so pricked off, you have an angle with the diameter of the *protractor*, of the proposed number of degrees and minutes.

Indeed, it may be of good use to lay down an angle to a minute, when we are able to take it to a minute: but till we have other-guise needles, and juster theodolites, than are yet made, the old *protractor* may serve very well.

PROTUBERANCE, **PROTUBERANTIA**, in anatomy, denotes any eminence, whether natural or preternatural, that projects, or advances out beyond the rest.

The orbicular protuberances of the third ventricle of the brain are called *nodes*; and the apophyses of the orbicular protuberances are called *testes*.

The annular protuberance is a process of the medulla oblongata, in form of a ring; whence its name, first given it by Willis. See MEDULLA oblongata and ANSULAR.

PROVEDITOR, **PROVEDITOUR**, or **PROVEDITORE**, an officer in several parts of Italy, particularly at Venice.

There are various kinds of *proveditors* in Venice: as *proveditor of the commons*, who is nearly the same with *edile* among the Romans, consul in Languedoc, and *cicchevis* in other cities.—Of these *proveditors* there are three.

The *proveditores alle ragioni vecchie, alla biave, alla giustizia*, &c. have the direction of matters relating to policy throughout the signory.

PROVEDITOR general of the sea, is an officer whose authority extends over the whole fleet, when the captain-general is absent.—He has, particularly, the disposal of the cash, and pays the seamen and the soldiers.

The captain-general and *proveditor* are mutually spies over one another: though the *proveditor* be inferior to the general, yet is the power so divided, that one has authority without strength, the other strength without authority.

PROVEND*, or **PROVENDER**, is properly a sort of vessel containing the measure of grains daily given to a horse, or other beast of labour, for his subsistence.

* Some derive the word from the Latin *proelenda*, or *prebend*.

Hence, *provender* is also become a general name for all food of cattle.—In monasteries, when the religious go to meals, they are said to go to *provend*.

PROVER, in law, *prolator*, an approver, or person who, confessing felony, appeals, or accuses another of the same. He is thus called, because he must prove what he alleges in his appeal; which proof is either by battle, or by the country, at his election who is appealed.

39 *Edw. 3. coram rege, rot. 97. Suff.* a man became an *approver*, and appealed five, who all joined battle with him, and he overcame them all: four of them were accordingly hanged, and the fifth pleaded he was a clerk. The *prover* was pardoned.

PROVERB, **PROVERBIUM**, is defined by Camden, a concise witty and wise speech, grounded upon long experience, and containing, for the most part, some useful caveat.

Such are, A clove mouth catches no flies.—An high building, a low foundation.—A carrion kite will never be a good hawk;—A short horse is soon curried.—A man may love his house well, though he hide not on the ridge.—A false knave needs no broker.—Better to spare at brim than at bottom, &c.

PROVIDENCE, **PROVIDENTIA**, the conduct and direction of the several parts of the universe, by a superior, intelligent being.

The notion of a *providence* is very ancient, even in the heathen theology: we find Thales mentions it.—It is founded on this supposition, That the creator has not so fixed and ascertained the laws of nature, nor so connected the chain of second causes, as to leave the world to itself; but that he still preserves the reins in his own hands, and occasionally intervenes, alters, restraints, inforces, suspends, &c. those laws by a particular *providence*.

Some use the word *providence* in a more general sense, signifying by it, that power or action whereby the several parts of the creation are ordinarily directed.

Thus, Damascenus defines *providence* to be that divine will, whereby all things are ordered and directed to the proper end.—Which notion of *providence* supposes no laws at all fixed by the author of nature at the creation; but that he reserved it at large to be governed by himself occasionally.

The ancients called *providence* by the names of *fate*, *fortune*, *nature*, *destiny*, *necessity*, &c.

The ancient Egyptians seem to have been the first who had the notion of a divine *providence*. Arnobius observes they reasoned thus:—“*Providence* is so essential to a prince, that without it he cannot be, nor even be called, a prince; and the more august a prince is, the more perfect ought his *providence* to be. Since then God is the greatest and most august of all princes, to him must belong the most perfect *providence*.”

The Epicureans deny any divine *providence*, as thinking it inconsistent with the ease and repose of the divine nature to meddle at all with human affairs.

Others deny the existence of a *providence* from the seemingly unjust distribution of good and evil, which appear to fall indiscriminately on the just and unjust.

Simplicius argues thus for a *providence*: If God do not look to the affairs of the world, it is either because he cannot, or will not: but the first is absurd; since to govern cannot be difficult, where to create was easy: and the latter is both absurd and blasphemous. See GOD.

PROVIDENTIAE*, in old law-books, were provisions of meat and drink.

* *Providentia vini ante adventum suum in cellaria erat centum doliis.* Knighton, anno 1354.

PROVINCE*, **PROVINCIA**, among the Romans, was a country conquered by them, without the bounds of Italy; governed by a deputy or lieutenant, and having peculiar laws and privileges.

* Nicod derives the word *a procul vivendo*, living afar off; but it is better deduced from *pro* and *vincio*, I overcome.

Of these countries that part of France next the Alps was one, and it still retains the name *Provence*.

PROVINCE is now chiefly used for a canton or division of a kingdom or commonwealth, comprehending several cities, towns, &c. all under the same government, and usually distinguished by the extent either of the civil or ecclesiastical jurisdiction.

The *provinces* were anciently dutchies, counties, &c. which have been since all re-united under the same chief.

The church distinguishes its *provinces* by archbishopricks, each containing a certain number of bishopricks.

In this sense England is divided into two *provinces*, Canterbury and York.

The monks make particular divisions of *provinces*, according to the antiquity and number of convents in each.

The United *Provinces* are the seven northern *provinces* of the Low-countries, who, revolting from the Spanish dominion, made a firm and perpetual alliance, offensive and defensive, at Utrecht, in the year 1579.

PROVINCIAL, **PROVINCIALIS**, something relating to a *province*.

Thus we say, a *provincial council* or *synod*, &c. See **SYNOD** and **COUNCIL**.

PROVINCIAL, in the monastic sense, denotes a person who has the direction and superintendency of the several convents of a *province*, according to the division established in that order.

The general of the order has several *provinces* under him; the *provincial* several priors, abbots, &c.

PROVINE, **PROVIN**, a branch of a vine laid in the ground to take root.

PROVISION, **PROVISIO**, any thing got or procured, as necessary for the subsistence of life.

PROVISION, in traffick, is sometimes used for the wages due to a factor. See **FACTORAGE**.

Commissary of PROVISIONS. See the article **COMMISSARY**.
Park of PROVISIONS. See the article **PARK**.

PROVISION, in the canon law, the title or instrument by virtue whereof an incumbent holds, or is provided of a benefice, bishoprick, or the like.

Ordinary collators give *Provisions* in case of vacancy by death, pure and simple demission and permutation. See **COLLATION**.

The court of Rome grants *Provisions* by resignation, devolution, and prevention.

PROVISIONS by prevention are also called *gratia expellative*, and *mandata de providendo*; of the great abuse whereof throughout England frequent complaint was made in our ancient statutes, and a remedy was provided for the same by the statute of premunire.

Provisions of small benefices, in the court of Rome, are only simple signatures, which are, as it were, minutes of the bull; because the bulls themselves dispatched on parchment would be too expensive. The signature is no more than the petition of the impetrant answered by the pope in these words, *Concessum uti petitur in presentia D. N. pape*, wrote in the hand of the prelate who presides over the signature.

Extraordinary *Provisions* are signed by the pope himself, in these words, *fat ut petitur*, with the first letter of his name.

PROVISIO, in law, a condition inserted in a deed, upon the observance whereof the validity of the deed depends.

PROVISIO, in judicial matters, is where the plaintiff desists from prosecuting an action, by bringing it to trial in due time; in which case, the defendant may take out a venire facias to the sheriff, having it in these words, *Provisio quod*, &c. to the end that, if the plaintiff take out any writ to that purpose, the sheriff shall summon but one jury upon them both.—In which case it is called *going to trial by proviso*.

Casu PROVISIO. See the article **CASU**.

PROVISIO is also a sea-term.—A ship is said to moor a *Provisio*, when she has an anchor out, and also a hawser ashore; and so is moored with her head to the shore with two cables at least.

PROVISOR is generally taken for him who hath the care of providing things necessary; in which sense it coincides with *purveyor*.

PROVISOR *monasterii* is used for the steward or treasurer of a religious house.

PROVISOR*, in our statutes, also denotes a person who sued to the court of Rome for a *provisio*, or expectative grace. See **PROVISION** and **PREMUNIRE**.

* *Provisores dicuntur, qui vel episcopatum, vel ecclesiasticam aliam dignitatem in Romana curia sibi ambulant de futuro, quod ex gratia expectationis nuncupant, quia usque dum vacaret expectandum esset.* Spelm.

PROVOCATIVE, in physic, a medicine which strengthens nature, and stimulates or incites to venery. Such are cantharides, satyrion, &c.

PROVOST, **PRÆPOSITUS**, an officer, whereof there are divers kinds; civil, military, &c.

PROVOST of the city, or of the merchants, is the chief municipal magistrate in several considerable trading cities, particularly Edinburgh, Paris, and Lyons; much the same with the *mayor* in other places.

The *Provost* presides at the city-courts, and, together with the sheriffs, or bailiffs, decides all differences relating to trade and merchandize; he takes cognizance of the affairs of officers of policy of the city with regard to their functions; of the delinquencies of merchants, commissioners, and factors; inspects the ports, rivers, duties, imposts, &c.

Authors attribute the institution of *Provost of the merchants* of Paris to Philip Auguste. Du Haillan refers its epocha to the year 1190.

The *Provost* of Edinburgh has the title of *lord*: the bailiffs are his deputies. He calls conventions of the boroughs by his own missives.

PROVOST, or **PREVOT royal**, also denotes a sort of inferior judge established throughout France, for the taking cognizance of all civil, personal, real, and mixt causes, among the people; but without any jurisdiction in the causes of nobles.

These in the Bourbonnois, Auvergne, &c. are called *châtelains*; in Normandy, *vicomptes*; in Languedoc and Provence, *viguers*.

Grand PROVOST of France, or of the household, has jurisdiction in the king's house, and over the officers therein; he looks to the policy and regulation thereof, the rates of provisions following the court, &c.—He was anciently called *roi des ribauds*.

Grand PROVOST of the constable, a judge of the sword, who manages processes against the soldiers in the army, who have committed any crime.

He has four lieutenants distributed throughout the armies, called

Provosts of the army; and particularly *Provosts* in the several regiments.

PROVOST marshal of an army is an officer appointed to seize and secure deserters, and all other criminals.

The *Provost marshal* is to go often abroad round the army to hinder the soldiers from pillaging: it is his office to indict offenders, and to see the sentence passed upon them executed.

He likewise regulates the weights and measures, and the price of all provisions, &c. in the army.—For the discharge of his office, he has a lieutenant, a clerk, and a troop of *Provosts* or marshals men on horseback; as also an executioner.

There is also a *Provost marshal* in the navy, who hath charge of the prisoners taken at sea.

The French have a *Provost general of the marines*, who is to prosecute the marines when guilty of any crime, and to make report thereof to the council of war; besides a *marine Provost* in every vessel, who is a kind of goaler, and takes the prisoners into his care, and keeps the vessel clean.

PROVOSTS of the marshals are a kind of lieutenants of the marshals of France, established for the security of the country against rogues, vagabonds, and deserters.

They take cognizance of royal causes; which, for this reason, are called *prevotal causes*: such are all crimes committed by strollers, or people without any fixed abode; robberies on the high-way, infraction of safeguard, burnings, &c. They pronounce *en dernier ressort*, or without appeal.

There are 180 seats of these *Provosts* in France: their chief jurisdiction regards highwaymen, foot-pads, house-breakers, &c. They correspond to the officers established by Augustus and Tiberius, called, as Cujas tells us, *latrunculares*, to shew that their office was to pursue thieves.

PROVOST of the mint is a particular judge instituted for the apprehending and prosecuting of false coiners.

PROW*, **PRORA**, in navigation, denotes the head or forepart of a ship, being that which is opposite to the *poop* or stern.

* The word is formed from the Latin *prora*, which signifies the same thing.

In the front hereof is the beak that cuts the water to make way for the vessel.

The *Prow* is lower than the *poop*, and contains fewer stories or decks. On the beak is usually some figure or hieroglyphic, which often gives name to the vessel.

PROW, in strictness, is only that part of the fore-castle which is aloof, and not in the hold, particularly that part between the chafe and the loof.

The ancients represented beaks of birds in the *Prows* of their ships, whence they were called *rostra*.

PROXENETA*, or **PROXENETES**, a kind of broker or agent, who transacts between two persons. See **BROKER** and **AGENT**.

* The word is Greek, *προξενος*, *q. d. conciliator*, or *pararius*, reconciler or mediator. The Latins give them a more honourable appellation, calling them *interpreters*.

The term *Proxenetæ* is chiefly applied to those who negotiate offices, marriages, &c.

The Roman law grants the *proxenetæ* an action for recovery of their hire or wages.

These made a kind of office or college in Rome: to them the fathers addressed themselves, to sound and examine the inclinations of the young men they intended for their daughters.

A commentator on the Digest accounts it a great defect in the modern policy, that there are not now any of these *proxenetæ* or match-makers established by public authority.

PROXIMITY, **PROXIMITAS**, denotes the relation of nearness either in respect of place, or blood, or alliance.

PROXY, **PROCURATOR**, a deputy, or person who officiates in the room of another.

Princes are usually married by *proxies* or representatives.

PROXY, **PROCURACY**, among civilians, also denotes a commission given to a proctor by a client to manage a cause in his behalf. See **PROCTOR**.

PRUINA, in physiology, *hoar-frost*, a concretion of the dew made by the violence of the external cold.

PRUNELLA, a name given by some physicians to a driness of the tongue and throat, happening in continued fevers, especially acute ones, accompanied with a heat and redness of the throat, and a scurf covering the tongue; sometimes whitish, and sometimes blackish.

Some also give the name *Prunella* to the quinzey, and others to the apthæ. *Prunella* is also the name of a plant called in English *selfheal*. See **SUPPLEMENT**, article **PRUNELLA**.

PRUNELLÆ sal, in pharmacy, is a preparation of purified salt-petre; called also *lapis prunellæ*, and *crystal mineral*.

It is prepared by separating and absorbing some of the more volatile parts of the salt-petre, which is done by burning upon it, when melted in a crucible over the fire, about a thirtieth part of its weight of flower of brimstone.

It is given to cool and provoke urine in fevers and quinziez; though some think, that salt-petre, purified three or four times, would be a better medicine.

The *sal Prunellæ* is said to be frequently adulterated with alum; and that the deceit is known by its whiteness and glittering.

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PRUNES*, *PRUNA*, are plums dried and baked in an oven, or in the sun.

* The word comes from the Latin, *prunum*, plum.

The *Prunes* chiefly used among us are black and large, brought from Bourdeaux : great quantities are used by the English and Dutch.—The pulp of *Prunes* is esteemed laxative.

PRUNIFEROUS *trees*, or *shrubs*, the *plum-bearing kind*, are those whose fruit is pretty large and soft, with a stone in the middle.

In this kind, the flower adheres to the bottom of the base of the fruit.

PRUNING, in gardening and agriculture, the operation of lopping or cutting off the superfluous branches of trees ; either to dispose them to bear better, to grow higher, or to appear more regular.

Pruning is one of the most important branches of the gardeners province, and that whereon the thriving or barrenness of his fruit-trees, as well as the form and regularity of his garden, in great measure depends.

It is sometimes practised purely for the trimming or adjusting of trees to the eye, by taking away irregular branches ; as in box, holly, yew, &c.

Sometimes to make the stem grow fairer, and rise higher, by taking off all the large branches arising out of it, and thus sending the sap, which would otherwise be expended by them, to the top of the tree, to nourish and prolong the same.

But its more ordinary use is to render the tree more fertile, and to mend its fruit, by retrenching such useless branches as might impoverish the trunk, and consume the juice necessary to nourish the branches that bear.

Pruning is an annual operation ; the amputation is usually made sloping, sometimes stump-wise. Its best season is about the end of February, though it may be begun as soon as the leaves are off, viz. in November, and continued to the time when fresh leaves come on, viz. in April.

As the gardener has usually three kinds of trees to manage, viz. some too weak, others too strong, and others in a just plight, he will find *Pruning* work through all that space ; it being proper to *prune* some sooner, and some later. The weaker and more languishing a tree is, the sooner it ought to be *pruned*, to ease it of its offensive branches ; and the more vigorous the tree is, the longer may the *Pruning* be deferred.

For PRUNING a tree of the first year, i. e. a tree planted the year before : if it have only shot one fine branch from the middle of the stem, it must be cut to that branch, and the branch shortened to four or five eyes or buds ; the effect of which is, that the next year there will be at least two fine branches opposite to each other.

If the tree produce two fine branches well-placed, with weak ones among them, all required is to shorten them equally, to the compass of five or six inches in length ; care, however, being taken, that the two last eyes or buds of the extremes of the branches thus shortened, look on the right and left to the two bare sides, that each may bring forth at least two new ones, and the four be so well-placed, that they may be all preserved. If one of the two branches be much lower than the other, or both on one side, or the like, only one is to be preserved : and that the fittest to begin a fine figure ; the other is to be cut off so close, as that it may never be able to produce thick ones in the same place.—If a tree have put forth three or four branches, all in the extremity, or a little beneath, they must be all *pruned* by the same laws as the two above-mentioned : if they be equally thick, they are to be used alike ; if some of them be smaller than the rest, they must only be *pruned* with a prospect of getting a single branch each, taking care to have it on that side which shall be found empty ; in order to which they should be shortened to an eye or bud that looks on that side ; and the same care is to be taken in the larger, in order to begin to fill up the better : if these fine branches shoot a little below the extremity, it is but shortening the stem to them : on the contrary, if the branches be most of them ill ones, two at least, if possible, are to be preserved, and *pruned* in the same manner as the two fine ones above. Good weak branches are to be carefully preserved for fruit ; only cutting them a little at the extremity, when they appear too weak for their length, not failing to take away all the sapless branches.—If the tree have produced five, six, or seven branches, it is sufficient to preserve three or four of the best ; the rest are to be cut quite off, at least if they be thick ; for if they be weak, i. e. fit for fruit branches, they should be kept till they have performed what they are capable of doing ; and if among the great ones there happen to be many small ones, two or three of the best only are to be preserved, pinching off the ends of the longest.

PRUNING of a tree of the second year.—If, having put out two fine wood-branches, and one or two small ones, for fruit the first year, the sap have altered its course in the second year, from the thick branches to the small ones, so that the small become wood, and the large fruit-branches, the productions of the former must be quite cut off to the mother-branch, and those of the latter used as fruit-branches.—If a tree, from the first year's *Pruning*, have produced four or five branches, or more, it must needs be very vigorous ; for which reason

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it may be sometimes advisable to preserve those branches, even though they be not necessary to the figure of the tree, but only to consume part of the sap, which might otherwise be prejudicial to the fruit-branches. These superfluous branches may be left long, without much ill consequence ; but those essential to the beauty of the tree, must be all *pruned* a little longer than those of the preceding year, i. e. about two, or at most three eyes, or a good foot. This is making an advantage of the figure of the tree, which, without this, would not yield fruit in a long time, the redundant sap converting all the eyes into wood-branches, which, with a more spare diet, would have been fruit-branches. In these vigorous trees, some branches cut stump-wise are to be left on, and even some thick ones, though of false wood, especially where there are any necessary to the form of the tree, to employ the excess of sap, and prevent its doing mischief. Still more to assuage its violence, it may be necessary to preserve many long, good, weak branches, when placed so as to occasion no confusion ; and even on the thick branches, a good number of outlets for the sap to range in.—Be it a general rule rather to spare the lower branches, and cut off the higher, than the contrary : by this means the tree spreads more easily to the bottom of the wall.

PRUNING of a tree of the third year.—In a tree that has been planted three years, and *pruned* twice, if it be vigorous, as many old branches as possible are to be preserved, especially for fruit : if it be weak, it must be eased of the burden of old branches, as well those for fruit as wood. It must likewise be cut short, to enable it to shoot out new ones ; which if it cannot do with vigour, let it be pulled up, and a new one, with fresh earth, planted in its place.

In all *Pruning*, provision is to be made for branches to proceed from those now under the *pruning-knife*, to prepare such as may be proper for the form ; with this assurance, that when the high branch is taken down from over the lower, this latter being reinforced with the sap that would have gone to the former, will certainly produce more branches, than it would have done without such reinforcement.

General rules of PRUNING fruit-trees.—1. The more the branches shoot horizontally, the apter and better disposed the tree is to bear fruit ; consequently the more upright the branches, the more inclined is the tree to increase in wood, and the less to bear fruit.

Hence, ever take care to keep the middle of a tree from wood or thick branches ; and as those increase and grow upon you, cut them out intirely ; for there is no danger but the place will be soon filled with better and more fruitful wood.

In dwarfs you are to *prune* all open, and clear of wood, leaving none but horizontal branches : and in wall-trees, if you do but furnish your walls with horizontal branches, nature will provide for the middle. Chuse therefore such shoots as are not vigorous, to furnish bearing branches.

2. Take care the tree be not left over-full of wood, not even of bearing branches ; as is frequently seen in the management of peaches, nectarines, and cherries.

Nature cannot supply them all with juice enough ; whence none will be supplied well : the consequence of which is, that either the blossoms will fall off, or the fruit will dwindle. It is certain, a multitude of branches crowding on one another, produce neither so good, nor so much fruit as where there is a convenient space, beside the disagreeable effect of crossing one another.

3. All strong and vigorous branches are to be left longer on the same tree than weak and feeble ones ; consequently the branches of a sickly tree must be *pruned* shorter, and left fewer in number than those of a strong healthy tree.

4. All branches shooting directly forward from trees that grow against a wall, are to be *pruned* close to the branch whence they spring, &c.

5. When a branch well-placed either against a wall, or in a dwarf, has shot some false wood, neither fit for the figure nor the fruit, *prune* it off within the thickness of a crown piece, or slopingly ; though this is best *pinched* off in the beginning of summer.

6. Cut off all branches arising from hard knobs, whereon pear-stalks grow ; or from short straight branches like spurs.

7. If a tree, in its first years, have produced branches of moderate vigour, and afterwards puts forth strong ones, well-placed, though of false wood ; the latter may be used as the foundation of the figure, and the other kept a time for bearing fruit.

8. When an old tree shoots stronger branches towards the bottom than the top, and the top is in ill case ; cut it off, and form a new figure from the lower ones. If the top be vigorous, cut off the lower ones, unless well-placed.

9. The order of nature in the production of shoots and branches, is, that a branch is always less than that out of which it shoots : if this order be inverted, use them as false wood.

10. Regard is to be always had to the effects of former *Pruning*, in order to correct its defects, or continue its beauties.

11. In vigorous trees, the weaker branches are the fruit-bearers. In weak trees, the stronger chiefly ; therefore, in the latter, *prune* off the feeble and small.

12. In vigorous trees, three good branches may put forth at one eye or bud : in which case the two side branches are generally

nerally to be preserved, and the middlemost cut off in May or June.

13. It is difficult to strengthen a weak branch without cutting off others above it: sometimes it can scarce be done without cutting off the end of the branch it shoots out of.

14. The *Pruning* of vigorous peach-trees is to be deferred till they are ready to blossom, the better to know which branches are likely to bear fruit.

15. Fruit-buds next the ends of branches are commonly thicker and better fed than others. In weak trees, therefore, it may be best to *prune* them early, that the sap may not waste itself in such parts as are to be retrenched.

16. The farther a weak branch is from the trunk, the less nourishment it receives; and therefore the more it is to be shortened: but thick branches, the more distant they are from the heart, the more they receive; and they are therefore to be removed, that the vigour may extend itself to the middle or lower part.

17. A branch for wood must never be *pruned* without especial occasion; as where it annoys others.

18. If an old well-liking tree be disordered with false wood, through ill *Pruning*, or want of *Pruning*; take it lower, by cutting off a branch or two yearly, till it be sufficiently reduced. Some trees put forth so vigorously, that they cannot be reduced to compass in one year; but must be allowed to extend themselves, otherwise they will produce false wood.

19. All trees have a predominant branch or two, if not more; yet the more equally the vigour is divided, the better: where it runs much on one side, it is faulty.

20. The buds of all stone-fruit frequently form themselves the same year in which the branch they grow on is formed: the same holds of pears and apples; though it is, generally, at least two or three years ere the latter come to perfection.

21. All shoots that are put forth in autumn, are to be *pruned* off, as naught: the same may be said of all sapless branches.

22. When a tree puts forth much stronger shoots on one side than on the other, a great part of the strong ones must be cut off close to the body, or some of them stump-wipe.

23. In all trees less length is to be allowed the weak than the strong branches.

24. Upper branches are to be cut off close to others, that they may heal over: lower branches are to be cut sloping, or at a little distance, that new ones may grow out of them.

25. If a young crooked tree produce a fine branch beneath the crook, cut the head off close to the branch.

26. Though five, six, or seven inches, be the ordinary lengths wood-branches are left at; yet must this be varied on occasion of the vigour or weakness of the tree, thickness or smallness of the branch, the fullness or vacuity of the place, &c.

27. Be careful not to prune many thick branches standing over weak ones; left the sap, which fed the larger, flow so plentifully into the less, as to occasion them to put forth much ill wood and suckers.

28. Branches shot from the ends of others are usually good wood; sometimes it happens otherwise, and then they must be *pruned*.

As to the grand yearly *Prunings*:—Fruit-branches being of short continuance, and perishing the first year wherein they produce fruit, are to be cut off, unless they put forth shoots for blossoms the succeeding year. In the second *Pruning*, about the middle of May, where the fruit is so close as to be like to obstruct each other, some of them and their branches are to be taken off, as must also the multitude of young shoots that cause confusion. Branches more luxuriant than others are to be cut clear off. To preserve old trees, they must be disburdened by leaving few branches for wood on them, and those to be shortened to five or six inches; and very few weak ones, and none dry, and nigh wasted.

PRUNING of forest or timber trees.—For large trees, it is best not to prune them at all; yet if there be an absolute necessity for it, avoid taking off large boughs as much as possible; and observe the following rules.

1. If the bough be small, cut it smooth and close, that the bark may soon cover it; and cut it sloping, that the water may run off.

2. If the branch be large, and the tree old, cut it off at three or four foot from the stem, or where any young shoots are found issuing out of it.

3. Boughs growing upright, are not to be cut cross over, but sloping upwards. In boughs leaning from the head, the slope is to be on the lower side.

4. If the tree grow crooked, cut it off at the crook, sloping upwards; and nurse up one of the most promising shoots for a new item. Indeed, in trees that have great piths, as the ash, walnut, &c. we must be cautious of cutting off the heads.

5. If the tree grow top-heavy, its head must be lightened; and that rather by thinning the boughs that grow out of the main branches, than by cutting off the main branches themselves. But if you would have them spring up high, it is best done by rubbing off the buds, as they put out in the spring, and throwing up the side-shoots.

6. If the side-boughs still break out, and the top be able to sustain itself, give the boughs that put forth in spring a *Pruning* after Midsummer; cutting them close. This will cause the bark to cover and kill them, so as never to shoot out again;

and this is the only method to make a tree grow with a fine, frait, handsome body. See Supplement, article PRUNING.

PRUNING of vines. See the article VINE.

PRURITUS, a painful, and yet pleasurable kind of sensation of the skin, popularly called *itching*; which is supposed to arise hence, that the extremities of the capillary veins being obstructed, cannot take up the redundant blood of the limbs, to carry it back again to the heart; whence, as there is a fresh stock of blood continually sent into the part by the incessant pulsation of the heart, the fibres become preternaturally stretched or distended.—And hence the usually titillating sense of itching.

PRYTANEUM, *Πρυτανειον*, in antiquity, a considerable building in Athens, where the council of *prytanes* assembled, and where those who had rendered any signal services to the commonwealth, were maintained at the public expence.

PRYTANIS, or **PRYTANES**, in antiquity, the first magistrate in most of the cities of Greece.

At Athens there were fifty *prytanes*; at Corinth there was but one, who was the same with what the *archon* was at Athens.

The *Prytanes* of Athens were the senators who composed the grand council that governed the state; and corresponded to what we now call, the *states general of the United Provinces*.

Fifty of these were chose each year out of each tribe; and to these were nominated fifty more, to supply the places of the former, in case of death or male-administration.

The tribes took the government by turns, each after other, for the space of thirty-five days.—This was an establishment of Solon. Scaliger is mistaken, when he says the tribes took their turns every day.

All the fifty *Prytanes* of the tribe did not govern together during those five weeks; but in companies, ten at a time, chosen by lot; seven days each company: after which another tribe came into play, and had its five weeks after the same manner.

PSALM, *Ψαλμς*, a divine song, or hymn.

* The word is formed from the Greek *ψαλλω*, I sing.

The denomination *Psalms* is now appropriated to the cl. *Psalms* of David; and the name *canticle*, or *song*, is given to other pieces of the same kind, composed by other prophets and patriarchs.

The ancients, as is observed by St. Augustin, made this difference between a *canticle* or *song*, and a *Psalms*, that the former was sung solitarily, or by the voice alone, but the latter accompanied with a musical instrument.

The *Psalms*, in the ancient editions, are divided into five books; nor is David's name found at the head of more than seventy-three of them; though some, and among the rest, St. Augustin and St. Chrysostom, attribute all the hundred and fifty to him without exception.

The Jews, however, were always of another opinion; and it is certain there are some few, at least, that are not his.—St. Jerom observes, among the number, several that were composed a long time after David. Du Pin adds, that it is difficult to ascertain the authors; all we know of the book is, that it is a collection of songs compiled by Elders.

Gradual Psalms were those anciently sung on the steps of the temple.—The *penitential Psalms* were not formerly the same with those now called by that name.

PSALMODY, *Ψαλμωδία*, the art of singing psalms.

PSALTER, *Ψαλτηριον*, the book or collection of psalms, ascribed to David.

There are a multitude of editions of the *Psalter*.—Augustin Justinian, a Dominican, and bishop of Nebo, published a *polygot Psalter* at Genoa 1516. And Contarinus published the *Psalter* in Hebrew, Greek, Chaldee, and Arabic, with Latin notes and glosses.

PSALTER is also used among religious for a large chaplet or rosary, consisting of 150 beads; the number of the psalms in the *Psalter*.

St. Dominic is said to have been the inventor of this *Psalter*. See ROSARY.

PSALTERY, **PSALTERION**, also denotes a musical instrument much in use among the ancient Hebrews, who called it *nebel*.

We know but little of the precise form of the ancient *Psaltery*: that now in use is a flat instrument, in form of a trapezium, or a triangle truncated at top.

It is strung with thirteen wire chords, set to unison or octave, and mounted on two bridges on the two sides.—It is struck with a *plestrum* or little iron rod, or sometimes with a crooked stick; whence it is usually ranked among the instruments of percussion.

Its chest, or body, is like that of a spinet. It has its name a *psallendo*; some call it *nablam*, or *nablum*.

Papias also gives the name *Psaltery* to a kind of flute, used in churches, to accompany the singing; called in Latin, *sambucus*.

PSAMMISMUS, *Ψαμμις*, in medicine, a term sometimes used for a bath of dry and warm sand, to set the feet of diopical persons upon.

* The word is formed from the Greek *ψαμμος*, sand.

PSATYRIANS, **PSATYRIANI**, a sect of Arians, who in the council of Antioch, held in the year 360, maintained, that the Son was not like the Father, as to will; that he was taken from nothing, or made of nothing; and that in God, generation was not to be distinguished from creation. See ARIAN.

PSEUDO,

PSEUDO*, a term, or particle, used in the composition of divers Latin and English words; in the sense of *false* or *spurious*.

* The word is formed from the Greek ψευδς, *hyc*, falsehood, of ψευδς, *deceptio*, *falso*, I deceive.

We say a *pseudo-martyr*, *q. d.* a false witness; *pseudo-prophet*, *pseudo-apostle*, *pseudo-christ*, &c.

PSEUDO-DIPTERE, ψευδοδιπτερες, in the ancient architecture, a temple with eight columns in front, and a single row of columns all around.

The word signifies *false* or *imperfect diptere*; and is used to distinguish this from the *diptere*; which had two rows of columns all around.

PSEUDONYMUS*, ψευδωνυμος, a name given by the critics to those authors who publish books under false or feigned names.—As the name *cryptonymus* is given to those who publish under secret and disguised names; and *anonymous*, to those who publish without any names at all.

* The word is formed from the Greek ψευδς, *hyc*; and ονομα, *name*.

The apostolical constitutions, the greater epistles of St. Ignatius, &c., are usually supposed to be *pseudonymous*.

PSEUDO-STELLA, in astronomy, any kind of meteor or phenomenon, appearing in the heavens, and resembling a star.

PSILOTHRON*, ψιλοθρονς, in medicine, *depilatory*; an external form of medicine proper to take off the hair.

* The word is formed from the Greek ψιλς, *deglabro*, I make bald, or bare; and θρονς, *hair*.

Such are strong lixiviums, quick-lime, ants eggs, sandarac, opiment, and arsenic.

PSOAS magnus, or *lumbaris*, in anatomy, a round, hard, fleshy, muscle, which arises from the internal side of the transverse processes of the vertebrae of the loins, within the abdomen; and descending upon part of the internal side of the ilium, is inserted into the lower part of the little trochanter.—It is the first of the flexors of the thigh. See **FLEXOR** and **THIGH**.

PSOAS parvus, arises fleshy from the inside of the upper vertebrae of the loins, and hath a thin and broad tendon, which embraces the *Psoas magnus*; and which is inserted into the os inominatum, where the os pubis and ilium join together.—This, tho' ordinarily reckoned among the muscles of the thigh, properly belongs to the lower venter.

PSORA, ψωρα, in medicine, a cutaneous disease, called by the Latins, *scabies*; by the English, *itch*.

The *Psora* is described by Celsus as a reddish hardness and roughness of the skin, from an eruption of pustules thereon; some drier, other moister; and oozing out a sanious matter, which occasions a continual *pruritus*, or itching.

These eruptions are most frequent about the junctures of the limbs, and between the fingers: in some they spread over the whole body; in others they soon cease; and in some they return at certain seasons of the year.

In youth, this disease frequently prevents others, or cures them.—But it sometimes degenerates into a leprosy.

The dry is much more quickly cured than the moist, which arises from a disorder in the humours or viscera. Willis derives the disease from a sharp, saline humour, occasioning an itching.

Some of the later physicians will have it to consist in a number of little animals preying on the skin: and hence, they say, it is that it becomes so very contagious.—Willis observes, that in this respect it is second to no other disease but the plague, which many conjecture to arise in like manner from animalcules.

For the cure, Borelli recommends anointing with black soap, to poor people, &c. But the soap to be soon washed off, lest it excoriate the skin. Where the disease is inveterate, recourse is had to salivation. See **Supplement**, article **PSORA**.

PSORICA, ψωρικα, medicines good against the itch, scabs, and other cutaneous eruptions, especially those of the eye-lids.

PSOROPHTHALMIA*, ψωροφθαλμια, a scurfy eruption of the eye-brows, attended with a pruritus, or itching of the part.

* The word is formed from ψωρα, *itch*; and οφθαλμια, *eye*.

PSYCHOLOGY*, ψυχολογια, the doctrine of the soul. See **SOUL**.

* The word is formed from the Greek ψυχη, *soul*; and λογος, *discourse*.

Anthropology, or the science which considers man, consists of two parts: the first treating of the body, and the parts belonging thereto, called *anatomy*; and the second of the soul, called *psychology*.

PSYCHOMANCY*, a kind of magic, or divination, performed by raising the souls of persons deceased.

* The word is formed of ψυχη, *soul*; and μαντια, *divination*.

PSYCHROMETER*, an instrument for measuring the degree of coldness of the air; more usually called a *thermometer*. See **THERMOMETER**.

* The word is formed from the Greek ψυχρος, *cold*; and μετρος, *measure*.

PTARMICA*, πταρμικα, medicines proper to promote sneezing; more usually called *errhines* and *sternutatories*. *Ptarmica* is also used as the name of a genus of plants. See **Supplement**, article **PTARMICA**.

* The word is formed of the Greek πτασθαι, *sternutamentum*, sneezing.

PTERYGIUM*, πτερυγιον, in medicine, a disease of the eye, much of the same nature with what the Latins call *unguis*, nail; and sometimes, though improperly, *pannus*, web. See **UNGUIS** and **PANNUS**.

* The word is formed by diminution from the Greek πτερυξ, *ala*, a wing; *q. d.* a little wing.

The cure is much the same as that of the *ophthalmia*.

PTERYGIUM is also the name given to a *whitiloe*, when seated at the root of the nail. See **PANARIS**.

PTERYGOIDES*, πτερυγοειδης, in anatomy, two apophyses of the os sphenoides; so called from their resembling the wings of a bat. See **SPHENOIDES**.

* From the Greek πτερυξ, *pteryges*, wing, and ειδος, *form*.

PTERYGOIDEUS internus, is a muscle of the jaw, which arises from the internal part of the *pterygoides* process, and descends to be inserted into the inferior part of the internal side of the lower jaw, near its angle.—When it acts, it draws the jaw to one side.

PTERYGOIDEUS externus, is a muscle which arises from the external part of the same process, and goes backward to be inserted between the condyloid process, and the corone, on the inside of the lower jaw. This pulls the lower jaw forwards, and makes it shoot beyond the upper.

PTEROPHORI, πτεροφοροι, in antiquity, a name given to such of the Roman couriers as brought tidings of any declaration of war, a battle lost, or any mishap befallen the Roman armies.

They were so called, because they bore wings on the points of their pikes: from the Greek πτερυξ, wing, and φορεω, I bear.

PTERYGOPHARYNGÆI, a pair of muscles arising from the process *pterygoideus*, where the tendon of the *pterygostaphylinus* is reflected.—Some fleshy fibres of them do likewise arise from the upper jaw-bone, behind the farthest grinder, and some from the sides of the tongue, and os hyoides.

From all these places the fleshy fibres pass semicircularly, and meet with those of the opposite side in the middle line on the back side of the pharynx externally.

In the inner surface of the fauces is another order of fleshy fibres, decussating each other at acute angles.—They arise both from the sides of the uvula, and from the root of the cartilage; and descend obliquely to their insertions in the glandulous membrane of the pharynx.

This muscle serves both to constrict the pharynx, and to compress the tonsils, and force out the mucus; whence its use in hawking.

The various originations of the several parts of this muscle have caused its being generally divided into several muscles.—Thus Valsalva calls that part springing from the tongue, the *glossopharyngeus*; that immediately below it, the *hyopharyngeus*.—Hence, in like manner, come the *cephalopharyngeus*, *sphenopharyngeus*, &c.

PTERYGOSTAPHYLINUS*, in anatomy, the internal muscle of the uvula; called by Valsalva, *novus tubæ musculus*; as being unknown to the ancient anatomists.

* The word is formed from the Greek πτερυξ, wing, and σταφυλη, *uvula*.

It arises fleshy near the sphenostaphylinus, from the os petrosum, where the tube from the palate enters that near an acute process of the sphenoides; and ascending to the process *pterygoideus*, becomes a broad flat tendon, which expands itself on the fore-part of the uvula.

Some of the tendinous fibres ascend to the lower edge of the os palati, others descend down the sides of the fauces; the middle series either unites with those of the other side, or is lost in two fleshy bodies that compose the uvula.

This muscle, with its partner, draws the uvula upwards and forwards, and also raises the amygdalæ.

PTISAN, ΠΤΙΣΑΝΑ, πτισαν, in medicine, a cooling potion, usually made of barley boiled in water, and sweetened with liquorice, &c.

To these are sometimes added the roots of quich-grass, and sometimes fena, to render it laxative.—Most of the decoctions of physicians are called *Ptisani*. Feverish patients are prohibited wine, &c. and reduced to *Ptisani*.

PTOLEMAIC system, or *hypothesis*, that order or disposition of the heavens and heavenly bodies, wherein the earth is supposed to be at rest, in the centre, and the heavens to revolve round it, from east to west, carrying with them the sun, planets, and fixed stars, each in their respective spheres.

This hypothesis took its name from Ptolemy, the great Alexandrian astronomer, because maintained and illustrated by him: not that it was his invention, for it was much older, as having been held by Aristotle, Hipparchus, &c. See it further illustrated under the article **SYSTEM**.

PTOLEMAIC sphere. See the article **SPHERE**.

PTOLEMAITES, a branch of the ancient Gnostics, so called from their leader Ptolemy, a man of considerable learning.

who improved greatly on the system of the Gnostics his predecessors, and enlarged it with a number of notions and visions of his own.

St. Epiphanius is very full on the subject of the *Ptolemaïtes*, and produces a letter of Ptolemy to Flora, wherein that heretic lays down his doctrine.—He maintained, that in the law of Moses there were three things to be considered, inasmuch as it did not all come from the same hand; but part of it, said he, from God, part of it from Moses, and part of it from neither of them, but from the pure traditions of the ancient doctors: on which last part it was that he founded his dreams.

PTYALISM*, **PTYALISMUS**, in medicine, a *spitting*; or a discharge of saliva by the glands of the mouth; whether it amount to an absolute salivation, or not.

* The word is Greek *πτυαλισμός*, formed from *πτυω*, *spuo*, *exspuo*, I spit.

PUBERTY, **PUBERTAS**, in the civil law, a natural majority, or the age wherein a person is allowed to contract marriage. See **MAJORITY**, &c.

Boys arrive at *Puberty* at fourteen years of age, maids at twelve.—Full *Puberty* is accounted at eighteen.

PUBES, a term used for the external parts of the *puenda*, or parts of generation, in both sexes.

This, from the age of *puberty*, is supposed to be covered, more or less, with hair; whence the name.

PUBIS or, or **PECTINIS**, in anatomy, a bone of the hip, situate in the fore and middle part of the trunk, and making the lower and inner part of the os innominatum. See *tab. anat.* (Splanch.) *fig. 1. lit. y.* (Osteol.) *fig. 3. n. 18. fig. 7. n. 19. fig. 12. lit. d.*

It is joined to the other part by a cartilage, thicker, but looser in women than in men; in the former whereof, the *os Pubis* recedes, or gives a little in time of travel, to make way for the fetus.

It has a large foramen, which makes room for the passage of two muscles of the thigh, besides a sinus, whereby the crural veins and arteries pass to the thighs.—See *tab. anat.* (Osteol.) *fig. 3. lit. S.*

PUBLIC buildings. See the article **BUILDING**.

PUBLIC road. See the article **ROAD**.

PUBLIC notary. See **NOTARY public**.

PUBLICAN, **PUBLICANUS**, among the Romans, a person who farmed the imposts, taxes, and public revenues.

The appellation appears to have been odious to the Jews, &c. apparently, because of the exactions of this sort of people.

PUBLICANS was also a name given to the *Arnoldists* and *Albigenses*.

PUBLICANDIS—*Regula de PUBLICANDIS*. See **RULE**.

PUBLICATION, **PUBLICATIO**, the act of promulgating, or making a thing known to the world.

By the canons, *Publication* is to be made of the banns of marriage three times before the ceremony can be solemnized; without especial licence to the contrary. See **MARRIAGE**.

PUCELLAGE, **PUCELLAGIUM**, in an ancient manuscript written **PUELLAGIUM**, denotes the state of virginity, or maidenhead. See **VIRGINITY**.

PUDENDUM denotes a thing to be ashamed of. Hence, *Pudendum virile* signifies the penis, and *Pudendum muliebre*, the cunus. See **GENITAL**.

PUDICA planta. See **SENSITIVE plant**.

PUERI alimentarii. See the article **ALIMENTARIJ**.

PUERILE style. See the article **STYLE**.

PUERILITY, in discourse, is by Longinus defined to be a thought, which, by being too far fetched, becomes flat and infipid.—*Puerility*, he adds, is the common fault of those who affect to say nothing but what is brilliant and extraordinary.

PUERORUM episcopus. See the article **EPISCOPUS**.

PUGIL*, among physicians, &c. a measure of flowers, seeds, or the like matters, containing so much as may be taken up between the thumb and two fore-fingers.

* The word comes from the Latin, *pugillus*, little hand.

The *Pugil* is esteemed the eighth part of the manipule or handful; though some confound *Pugil* with *manipulus*, and use it for a handful.—The French frequently call it *pincée*, a pinch.

PUISNE*, **PUNY**, in law, a younger-born; or a child born after another.

* The word is pure French, in which language it bears the same signification.

Puisne is not only applied to the second, third, fourth, &c. with regard to the first; but to the third with regard to the second, &c.—The last of all is called absolutely *cadet*.

In the like sense we say a *Puisne judge*, a *Puisne counsellor*. See **JUDGE** and **JUSTICE**.

PUKING, a cant word for a nausea, or disposition to vomit. See **NAUSEA** and **VOMITING**.

PUL, in commerce, a general name which the Persians give to all the copper-moneys current in that empire; particularly the *kahesqui* and *semi-kahesqui*.

Olearius, who was at Ispahan in 1637, in the retinue of the ambassador of Holstein, assures us, That each city in Persia has its several copper-money, marked with its particular badge, which is only current in that district, and is changed every year.—At the beginning of each year, which is at the vernal

equinox, all the old money is cried down, and the new appears in its place.

Both the emperor and the state find their interest in this frequent change: the first, in that he only gives at the rate of 17 *d.* sterling per pound for copper; yet delivers it out coined in *kahesqui* and *semi-kahesqui* at above 2 *s.* per pound: the second, in that the copper-money is by this means less abundant, being reduced each year to nearly the same quantity.

The same author adds, that at the time when he was in Persia, the *kahesqui* at Ispahan were struck with the image of a lion, at Schamachia with a devil, at Katchan with a cock, and at Kilan with a fish.

PULLEY, in mechanics, one of the five mechanical powers; consisting of a little wheel, or rundle, having a chanel around it, and turning on an axis; serving, by means of a rope which slides in its chanel, for the raising of weights.

The Latins call it *trochlea*; and the seamen, when fitted with a rope, a *tackle*.—An assemblage of several *Pulleys* is called a *polyfaston*.

The moveable wheel or rundle, is called the *sheave* or *shiver*; the axis on which it turns, the *gudgeon*; and the fixed piece of wood or iron, into which it is put, the *block*.

Doltrine of the PULLEY.—1^o. If a power *P*, (*tab. MECHANICS, fig. 49.*) sustain a weight *Q*, by means of a single *Pulley* *AB*, in such manner as that the line of direction of each is a tangent to the periphery of the rundle; the weight and the power are equal.

Hence, a single *Pulley*, if the lines of direction of the power and the weight be tangents to the periphery, neither assists nor impedes the power, but only changes its direction.

The use of the *Pulley*, therefore, is, when the vertical direction of a power is to be changed into an horizontal one; or an ascending direction into a descending one; and on the contrary.

This is found a good provision for the safety of the workmen employed in drawing with the *Pulley*.—For suppose a large weight *EFG* required to be raised to a great height by workmen pulling a rope *AB*: if now the rope should chance to break, the workmens heads underneath would be in immediate danger; but if by means of the *Pulley* *B*, the vertical direction *AB* be changed into an horizontal one *BC*, there is no danger from a breaking of the rope.

This change of direction by means of a *Pulley* has this further advantage; that if any power can exert more force in one direction than another, we are here able to employ it in its greatest force.

Thus, *e. gr.* an horse cannot draw in a vertical direction, but draws with all its advantage in an horizontal one. By changing the vertical draught, therefore, into an horizontal one, an horse becomes qualified to raise a weight.

But the grand use of the *Pulley* is, where several of them are combined; thus forming what Vitruvius, and others after him, call *polyfasta*; the advantages whereof are, that the machine takes up but little room, is easily removed, and raises a very great weight with a very moderate force.

2^o. If a power applied in *E*, (*fig. 50.*) according to the line of direction *BE*, which is a tangent to the *Pulley* in *B*, and parallel to the rope *AD*, sustain the weight *F* suspended from the centre of the *Pulley* *C*; the power is subduple of the weight.

3^o. The effect of *polyfasta* is founded on the following theorem:—If a power applied in *B*, (*fig. 51.*) sustain (by means of a *polyfaston*) a weight *F*, so as all the ropes *AB, HI, GF, EL, CD*, are parallel to each other; the power will be to the weight as unity to the number of ropes, *H, I, G, F, E, L, C, D*, drawn by the weight *F*; and therefore as unity to the number of *Pulleys*, higher and lower, taken together.

Hence the number of *Pulleys* and the power being given, it is easy to find the weight that will be sustained thereby: or, the number of *Pulleys* and weight to be sustained, being given, the power is found: or, the weight and power being given, the number of *Pulleys* the *polyfaston* is to consist of, is found.

4^o. If a power move a weight by means of several *Pulleys*; the space passed over by the power will be to the space passed over by the weight, as the weight to the power.

Hence, the smaller the force that sustains a weight by means of *Pulleys* is, the slower is the weight raised: so that what is saved in force, is spent in time.

PULMO, in anatomy. See **LUNGS**.

PULMO marinus, *sea-lungs*, among naturalists, a light spongy body, of a shining colour, like crystal, intermixed with blue, and usually of a figure resembling the human lungs: whence its name.—It is also called *urtica marina*, or the sea-nettle.

It swims on the surface of the water, and is popularly reputed to preface a storm.—It is commonly supposed to be only a viscous excrement of the sea, hardened by the sun: but Sir Robert Sibbald and Dr. Merret rank it among the zoophytes.

It shines in the night-time, and communicates its luminous property to a stick rubbed therewith. Being applied to the skin, it raises an itching, and takes off the hair. See *Supplement, article URTICA MARINA*.

PULMONARY vessels, in anatomy, are those which carry the blood from the heart to the lungs, and back again from the lungs to the heart.

These are two in number, viz. the *Pulmonary artery* and *vein*.

The *PULMONARY artery*, which the ancients called *vena arteriosa*, the *arterial vein*, is, in reality, an artery, and is composed, like the rest, of several tunics.—It arises from the right ventricle of the heart, and divides into two large branches; which subdividing into several smaller, diffuse themselves throughout the whole substance of the lungs.—See *tab. anat. (Angiol.) fig. 8. lit. dd. &c. bb. fig. 12. lit. I.*

PULMONARY vein, which the ancients called *arteria venosa*, the *venous artery*, consists of four membranes like the other veins. It arises in the lungs from an infinity of little branches, which uniting in one trunk, open into the left ventricle of the heart.—See *tab. anat. (Angiol.) fig. 9. lit. a. b. c. d. d. d.* See also *HEART*.

For the office of these vessels, see *CIRCULATION*.
Mr. Cowper gives us an instance of a polypus in the *pulmonary vein*. See *POLYPUS*.

PULMONARY consumption, or consumption of the lungs, is what we properly call a *phthisis*. See *PHTHISIS* and *CONSUMPTION*.

PULMONUM anima. See the article *ANIMA*.

PULP, *PULPA*, in fruits, the *flesh*; or that soft and succulent part between the rind and the nucleus or seed.

The *Pulp* of a tree or plant, is the *parenchyma*, which grows and swells by means of a juice, at first very coarse and disagreeable; at length sweeter and more delicate.

PULP, in pharmacy, denotes the soft part of fruits, roots, or other bodies, extracted by infusion or boiling, and passed through a sieve.

PULP, in medicine, denotes the fattest, fullest, and most solid part of the flesh.

Some people apply the word particularly to the upper part of the belly, because fleshy; and because it is here that they feel animals*, to examine whether they be fat.

* This part the Latin call *pulpa*, from *pulpare*, to feel, handle.

*PULPIT**, *PULPITUM*, a term now restrained to an elevation, or apartment in a church, whence sermons are delivered.

* Some authors derive the word from *publium*, because people are there exposed to open view.

PULPITUM, among the Romans, was a part of the theatre, called also *proscenium*, or what we now call the *stage*, whereon the actors trod.

Though some say it was properly an eminence on the stage for the music, or a suggestion whence declamations, &c. were spoken.

The French use the word *Pulpit*, *Pupitre*, for a reading desk in a church, library, or the like: those large ones in churches they properly call *lutrins*.

PULSATION, *PULSATIO*, in medicine, the motion of the pulse, or the beating of an artery. See *PULSE*.

PULSE, *PULSUS*, in the animal economy, denotes the beating or throbbing of the heart and arteries.

The *Pulse* is that reciprocal motion of the heart and arteries, whereby the warm blood, thrown out of the left ventricle of the heart, is so impelled into the arteries, to be by them distributed throughout the body, as to be perceivable by the finger.

The pulsation of the arteries arises from that of the heart; and has, like it, a systole and diastole; the systole of the one corresponding to the diastole of the other.

Galen tells us, that Hippocrates was the first who observed the motion of the *Pulse*.—M. Homberg mentions a case of a woman in Paris, who had a *Pulse* in the veins, perfectly like that we commonly observe in the arteries. He adds, that he is the first author that ever mentioned such a thing.

The *Pulse* is thus accounted for.—When the left ventricle of the heart contracts, and throws its blood into the great artery; the blood in that artery is not only thrust forward towards the extremities, but the channel of the artery is likewise dilated; because fluids, when they are pressed, press again towards all sides, and their pressure is always perpendicular to the sides of the containing vessels: but the coats of the artery, by any small impetus, may be distended; therefore, upon the contraction of the heart, the blood from the left ventricle will not only press the blood in the artery forwards, but both together will distend the sides of the artery: and thus is a motion of dilatation effected.

And when the impetus of the blood against the sides of the artery ceases, that is, when the left ventricle ceases to contract, then the spiral fibres of the artery, by their natural elasticity, return again to their former state, and contract the channel of the artery, till it is again dilated by the systole of the heart: so that here is a motion of dilatation and contraction effected.

The distense or dilatation of the artery is called its *Pulse*, and the time of the spiral fibres returning to their natural state, is the distance between two *Pulses*.

This *Pulse* is in all the arteries of the body at the same time: for while the blood is thrust out of the heart into the aorta, that artery being full, the blood must be propelled in all the arteries at the same time; and because the arteries are conical, and the blood moves from the basis of the cone to the apex, therefore the blood is continually pressing against the sides of the vessels; and consequently, every point of the artery must be

dilated, at the same time that the blood is thrown out of the left ventricle of the heart; and as soon as the elasticity of the spiral fibres can overcome the impetus of the blood, the arteries are again contracted.

Thus, two causes operating alternately, the heart and fibres of the arteries keep the blood in a continual motion.

The observation of the *Pulse* is of the utmost importance to a physician; both as it discovers the state of the heart, the first mover in the animal frame; and as it shews the nature, quantity and motion of the blood, that universal humour whereon all the rest depend; and as it indicates the condition of the artery, the primary vessel of the whole body.

A *strong Pulse*, then, denotes, 1. A great muscular force of the contracting heart; and, consequently, the strength of the contracting cause; i. e. 2. A brisk and copious influx of the nervous juice into the villi of the heart. 3. Plenty of blood. 4. A laudable secretion and circulation of humours.

A *strong Pulse*, therefore, is a good presage, if it be alike throughout the whole body. Indeed it is frequently fallacious in apoplectic, and some other diseases, where the passage between the heart and the brain is free; and in other parts, especially the viscera, are obstructed.

A *weak Pulse* denotes the contrary of the former; though this sometimes deceives, particularly in fat people.

A *hard Pulse* signifies, 1. That the membrane of the artery is drier than ordinary; and therefore, 2. Obstructions in the minute vessels, whereof the membranes of the artery are woven. 3. That the arteries are full: but, 4. That their capillary extremities are obstructed with an inflammatory viscosity. 5. That the blood is very dense and compact: hence, 6. That the circulations, secretions and excretions are depraved.

A *soft Pulse* denotes the contrary to all these; yet is very fallacious in an acute peripneumonia.

A *slow Pulse* denotes, 1. That the contractions of the heart are slow; and therefore, 2. A slowness of the influxes of the nervous juice from the brain into the villi of the heart. 3. That the blood has circulated a great number of times. 4. That all the humours circulate easily through their vessels. Indeed, if the *Pulse* be thus from weakness, it is an ill sign.

A *quick Pulse* denotes the contrary to all these; as acrimonies, spirits agitated, fevers, and phrensy.

An *equable Pulse* denotes a constant tenor of the vital functions; an uneven one the contrary.

An *intermitting Pulse* shews life in a slippery situation.

An *intermitting Pulse* is either owing to a fault in the nervous juice, which flows unequally into the heart; or in the vessel which transmits the blood and humours, or to the humours themselves.

The cause of this disorder is various, as convulsions, polypus's, cacochymia's, inflammations, want of blood, bony or cartilaginous arteries, &c.

A strong, equable, and, at the same time, slow *Pulse*, is of all others the best. A strong and great, or strong and slow *Pulse*, together, are good. A weak, small, hard, unequal intermitting, quick *Pulse*, is of all others the worst.

Yet in all these things, regard must be had to the nature of the particular artery, the age, sex, temperament, affections of the mind, the fix non-naturals, habit of body, season, country, &c. all which have an influence on the *Pulse*.

A diminution or total suspension of the *Pulse*, is reducible either to a *lipothymia*, where it fails to such degree, as that there is scarce strength left to sustain the body.

Or to a *lipopesshia*, when it is attended with a sensible diminution of the natural heat.

Or to a *syncope*, when the heart fails, so as the heat, motions, senses and all, are almost destroyed.

Or, lastly, to an *apoplexia*, where those are all absolutely destroyed as to sense, and death itself seems in possession.

PULSE is also used for the stroke with which any medium is affected by the motion of light, sound, &c. through it.

Sir Isaac Newton demonstrates, *lib. 2. prop. 48. Princip.* That the velocities of the *Pulses* in an elastic fluid medium (whose elasticity is proportionable to its density) are in a ratio compounded of half the ratio of the elastic force directly, and half the ratio of the density inversely: so that in a medium whose elasticity is equal to its density, all *Pulses* will be equally swift.

PULSE legumen, in botany, is a term applied to those grains or seeds which are gathered with the hand: in contradistinction to corns, &c. which are reaped or mowed.

Pulse is the seed of the leguminous species of plants. The word is primarily understood of grains that grow in pods; as beans, peas, vetches, &c. but it is by some also used by extension for artichokes, asparagus, and other kitchen herbs and roots.

*PULSION** *trusio*, the act of driving or impelling a thing forwards. See *TRUSION*.

* The word comes from *pello*, I drive.

*PULTURA**, in our old law-books, denotes a previous demand or examination:—on account of the monks, who before they were admitted into the monasteries, *pulsabant ad fores*, knocked at the doors for several days.—*Et volo ut sint quieti*

PUM

de omnibus causis, & querelis, & placitis ballivorum & præpositorum hundredi, & a pultura serjanorum, i. e. from the examination of serjants; & de reuwarda forfarum, i. e. the visitation of the forests.

* The word is formed from the Latin *pulsare*, to knock, to ask.

PULVERIZATION, PULVERIZATIO, the art of *pulverizing*, or reducing a dry body into a fine powder.

This is performed, in friable bodies, by pounding or beating in a mortar; but to *pulverize* malleable ones, other methods must be taken.

To *pulverize* lead, or tin, the method is this: Rub a round wooden box all over the inside with chalk; pour a little of the melted metal nimbly into the box, when, shutting the lid, and shaking the box briskly, the metal will be reduced into powder.

PULVINATED, PULVINATUS, in the ancient architecture, a term applied to a freeze, which swells, or bulges out, in manner of a pillow, *pulvinus*: whence the name.

PULVIS fulminans, or the thundering powder. See **FULMINARIS**.

PULVIS patrum, the Jesuits powder. See **CORTÈX**.

PUMICE stone, PUMEX, a kind of spongy stone, very porous and friable.

Naturalists are not agreed about the nature and origin of *Pumice*.—Some look on it as a fragment of rock half-burnt and calcined, cast up in eruptions of volcanoes, particularly *Ætna* and *Vesuvius*, into the sea; and which, by being there washed in the salt-water, lays aside the black colour that the impression of the subterranean fires had given it, and becomes whitish, or sometimes only greyish, according as it has floated more or less in the sea.

Dr. Woodward considers *Pumice* as only a sort of slag or cinder; and affirms, it is only found either where forges of metals have anciently been, or near some volcano, or burning mountain.

Other authors will have the *Pumice* to rise from the bottom of the sea; whence they suppose it detached by subterranean fires: and hence account both for its lightness and porosity, and its saline taste; alledging, in confirmation hereof, that *Pumice* is frequently found in parts of the sea far remote from all volcanoes; and adding, that several parts of the Archipelago are frequently found covered with it, all at once, after a few inward shakes and heavings of the bottom of the sea.

Pumice makes a very considerable article in commerce, and is much used in the arts and manufactures, to polish and smooth several works. See **POLISHING**, &c.

Its pieces are of several sizes: the parchment-makers and marblers use the largest and lightest;—the carriers the heaviest and flattest;—pewterers the smallest.

Pliny observes, that the ancients made considerable use of *Pumice* in medicine; but it is out of the present practice. See **Supplement**, article **PUMEX**.

PUMMEL. See the article **POMMEL**.

PUMP, ANTIA, in hydraulics, a machine formed on the model of a syringe, for the raising of water.

Vitruvius ascribes the first invention of pumps to Ctesibius the Athenian; whence the Latins call it *machina Ctesibiana*, or *organum Ctesibium*.

Pumps are distinguished into several kinds, with regard to the several manners of their acting.—As the

Common, sometimes called the *sucking Pump*, which acts by the pressure of the air, and by which water is raised out of a lower into a higher place, not exceeding thirty-two feet.—Its structure and action may be conceived from what follows:

1. A hollow cylinder, or barrel, *ABCD*, (*tab. hydrostat. fig. 27.*) is provided of any solid matter, usually wood, and erected perpendicularly in a spring, or other source of water; the lower base of the cylinder being first fitted with a valve *I*, which opens upwards.

2. A piston or embolus, called the *sucker*, *E K*, furnished with a valve *L*, which likewise opens upwards, is let down the cylinder; and for the more easy working upwards and downwards, is furnished with a lever, or handle, as *G H*. Now, the embolus *E L*, being drawn up from *I* to *L*, will leave the space *L I* void of air, at least in a great measure so: the pressure, therefore, of the air on the surface of the stagnant water prevailing, will, by the laws of hydrostatics, lift up the valve *I*, and raise it to fill the cavity *L I*.

If, then, the embolus be again let down, the lower valve being now fast closed with the weight of the incumbent water, upon pressing the piston, the water must open the upper valve, and get into the embolus, by which it is raised up and discharged out at the spout *H*.

Thus is the embolus alternately raised and depressed, &c. See the theory of the Pump more accurately laid down under the article **SYRINGE**.

The *forcing Pump*, which acts by mere impulse or protrusion, and raises water to any height at pleasure.—Its structure is as follows:—1. A cylinder *A B*, (*fig. 28.*) is divided by a diaphragm, or transverse piece, *C D*, fitted with a valve *E*, opening upwards; and thus immersed in water.

2. An embolus *F*, furnished with a valve *G*, is so fitted to an iron rod *I H*, moveable on a hinge at each, as that it

PUN

may be conveniently raised and depressed by the hand applied in *K*.

Now, upon depressing the embolus *F*, the water will open the valve *G*, and thus ascend into the cavity of the cylinder *BC*: but upon raising it again, the valve *G* is shut, so that there is no passage for it that way: the valve *E* therefore becomes opened, and the water mounts through it; and, by repeating the agitation of the embolus, is at length driven out through the spout *M*.

The great difficulty of rectifying this *Pump*, when it happens to be out of order, on account of the chief seat of action's being under water, makes people decline the use of it when they can do well without it, notwithstanding its advantage of raising the water to any given height.

Ctesibius's Pump, the first and finest of all the kinds, acts both by suction and pulsion.—Its structure and action are as follow:—

1. A brass cylinder *ABCD*, (*fig. 29.*) furnished with a valve in *L*, is placed in the water. 2. In this is fitted the embolus *M K*, made of green wood, which will not swell in the water, and adjusted to the aperture of the cylinder with a covering of leather; but without any valve. In *H* is fitted on another tube *N H*, with a valve that opens upwards in *I*.

Now, the embolus *E K* being raised, the water opens the valve in *L*, and rises into the cavity of the cylinder:—and when the same embolus is again depressed, the valve *I* is opened, and the water driven up through the tube *N H*.

This is the *Pump* used among the ancients, and that from which both the others are deduced.—Sir S. Morland has endeavoured to increase its force by lessening the friction; which he has done to good effect, inasmuch as to make it work without almost any friction at all.

PUMPS used in ships are of several kinds: as the *Chain Pump*, used by the English in large vessels, this is a double *Pump*, one of which rises as the other falls: this yields a great quantity of water, works easily, and is easily mended; but it takes up a great deal of room, and makes a disagreeable noise. —See *tab. ship. fig. 2. n. 59.*

Bare PUMPS are small ones, made of cane, or a piece of wood bored through, used in lieu of cocks, &c. to *Pump* beer or water out of the casks.

Bur PUMPS, called also *bilge Pumps*, are chiefly used by the Dutch, who have them by their ships-sides. In the *c* is a long staff, with a bur at the end like a gunner's sponge, to *Pump* up the bilge water. See **BILGE**.

Air Pump, in pneumatics, is a machine, by means whereof the air is emptied out of vessels, and a sort of vacuum produced therein.—For the invention, structure and use of this *Pump*, see **AIR Pump**.

PUN, or **PUNN**, a *lusus verborum*, the wit whereof depends on a resemblance between the sounds or syllables of two words, which have different, and, perhaps, contrary significations. Such are,—*Cane de cane, cane*.—*Far male male male*.—*Lex Dei, lux dei*.—All houses are ale-houses.---The holy state of matrimony, is become matter of money.—Some mens paradise is a pair of dice.—Was it so in the time of Noah? Ah no.—*L'ordre tiré du désordre, ou désordre ordonné*, is the title of a French book.

Puns, when they come easily, and are very ingenious, poignant, and apposite, are allowed of in conversation, letters, epigrams, madrigals, and the like compositions; but they are absolutely banished out of the grave, serious, and sublime, by reason they weaken its force, and diminish its beauty, which consists in something great and elevated. The Greeks and Romans, it is true, sometimes indulged themselves the practice, and used *Puns* as ornaments in the most serious discourses: but the most severe and philosophical genius of our age is by no means satisfied with such an outside of wit.—Devices, symbols, rebuses, motto's, &c. are their proper sphere, where they shine to most advantage.

PUNCH, an instrument of iron or steel, used in several arts, for the piercing or stamping holes in plates of metals, &c. being so contrived, as not only to perforate, but to cut out and take away the piece: whence the French call it, *emporte-pièce*, *p. d.* take-off-piece.

The *Punch* is a principal instrument of the metal-button-makers, waler-makers, patch-makers, shoe-makers, &c. --- The *Punch* of the makers of plate-buttons serves to cut and parcel out the plates of gold and silver wherewith they cover their moulds.---It is large, round, four or five inches high, the bottom hollow for about half an inch, well steeled, and the edge very sharp.

To use it, they extend the plate of metal on a leaden table or block, and with a pretty heavy hammer strike the head of the *Punch*, &c. See **BUTTON-making**.

PUNCH horse, in the manege, is a well-set, well-knit horse, short-backed and thick-shouldered, with a broad neck, and well lined with flesh.

PUNCH is also a name of a sort of compound drink frequent in England, and particularly about the maritime parts thereof; though little known elsewhere.

Its basis is spring-water, which being rendered cooler, brisker, and more acid, with lemon-juice, and sweetened again to the palate with fine sugar, makes what they call *sherbet*; to which

a pro-

a proper quantity of a spirituous liquor, as brandy, rum, or arack, being superadded, the liquor commences *Punch*. Several authors condemn the use of *Punch*, as prejudicial to the brain and nervous system.—Dr. Cheyne insists, that there is but one wholesome ingredient in it, which some now begin to leave out, viz. the mere water.

The proportions of the ingredients are various; usually the brandy and water are in equal quantities.—Some, instead of lemon-juice, use lime-juice, which makes what they call *Punch royal*, this is found less liable to affect the head, as well as more grateful to the stomach.

Some also make *milk Punch*, by adding near as much milk to the sherbet as there is water, which tempers the acrimony of the lemon.—Others prefer *tea Punch*, made of green tea instead of water, and drank hot.

Lastly, What they call *Punch for chamber-maids* is made without any water, of lime-juice, sharpened with a little orange and lemon-juice; twice as much white-wine as lime-juice, and four times as much brandy, with sugar.

PUNCHEON. See the article **PUNCHION**.

PUNCHION, or **PUNCHION**, in building. See the article **PUNCHION**.

PUNCHION, or **PUNCHEON**, a little block, or piece of steel, on one end whereof is some figure, letter, or mark, engraven either in creux, or in relief; impressions whereof are taken on metal, or some other matter, by striking it with a hammer on the end not engraven.

There are various kinds of these *Punchions* used in the mechanical arts.—Such, for instance, are those of the gold-smiths, cutlers, pewterers, &c.

PUNCHION, in coining, is a piece of iron steeled, whereon the engraver has cut, in relief, the several figures, arms, effigy, inscription, &c. that are to be in the matrices wherewith the species are to be marked.

Minters distinguish three kinds of *Punchions*, according to the three kinds of matrices to be made; that of the effigy, that of the cross or arms, and that of the legend or inscription.

The first includes the whole portrait in relief.—The second are small, each only containing a piece of the cross or arms, v. gr. a fleur-de-lis, a harp, a coronet, &c. by the assemblage of all which the entire matrix is formed.—The *Punchions* of the legend only contain each one letter, and serve equally for the legend on the effigy-side, and the cross-side. See **COINING**.

For the manner of engraving, tempering, and stamping these *Punchions*, to form the matrices, see **ENGRAVING on steel**, **MATRICE**, &c.

PUNCHIONS, in printing, are those used in stamping the matrices, wherein the types of printing characters are cast. See **letter FOUNDRY**.

PUNCHION is also used for several iron tools of various sizes and figures, used by the engravers in creux on metals.—Seal-gravers particularly use a great number, for the several pieces of arms, &c. to be engraven;—and many stamp the whole seal from a single *Punchion*.

PUNCHION is also a common name for all the iron instruments used by stone-cutters, sculptors, lock-smiths, &c. for the cutting, incising, or piercing their several matters. Those of sculptors and statuaries serve for the repairing statues, when taken out of the moulds.

The lock-smiths use the greatest variety of *Punchions*; some for piercing hot, others for piercing cold; some flat, some square, some round, others oval; each to pierce holes of its respective figure in the several parts of locks.

PUNCHION, or **PUNCHIN**, in carpentry, is a piece of timber placed upright between two posts, whose bearing is too great, serving, together with them, to sustain some large weight.

The *Punchion* is usually lower and slighter than either prick-posts or principal posts, and is joined by a brace, or the like, of iron. See **POST**.—Those on each side of a door are called *door Punchions*.

PUNCHION is also a piece of timber raised upright under the ridge of a building, wherein the little forces, &c. are joined.—Vitruvius calls the *Punchion*, *column*.

PUNCHION is also used for the arbour or principal part of a machine, whereon it turns vertically: as that of a crane, &c. See **CRANE**.

PUNCHION is also a measure for liquids, containing a hoghead and $\frac{1}{2}$, or 84 gallons, or $\frac{1}{4}$ of a tun.

The Paris *Punchion* is the same with their demi-queue: at Rouen it is three bushels, &c.

PUNCTA lachrymalia. See the article **LACHRYMALIA**.

PUNCTATED hyperbola, in the higher geometry, an hyperbola whose oval conjugate is infinitely small, i. e. a point.

PUNCTION, or **PUNCTURE**, in chirurgery, an aperture made in the lower belly, in dropsical persons, to discharge the water; called also *paracentesis*.

PUNCTUATION, in grammar, the art of pointing; or of dividing a discourse into periods, and members of periods, by points expressing the pauses to be made in the reading thereof.

The points used herein are four, viz. the period, colon, semi-colon, and comma. See the particular use of each under its proper article.

Punctuation is a modern art: the ancients were intirely unacquainted with the use of our comma's, colons, &c. and wrote not only without any distinction of members and periods, but also without distinction of words; which custom, Lilius observes, continued till the hundred and fourth olympiad; during which time the sense alone divided the discourse.

There is much more difficulty in pointing, than people are generally aware of.—In effect, there is scarce any thing in the province of the grammarians so little fixed and ascertained as this. The rules usually laid down are impertinent, dark, and deficient; and the practice, at present, is perfectly capricious, authors varying not only from one another, but from themselves too.

Indeed F. Buffier, and since him Mr. Ward, have done something towards a fixed and precise system of pointing, from the reason and analogy of things. Their doctrine the reader will find under the articles **COMMA**, **COLON**, &c.

In the general, we shall only here observe, that the comma is to distinguish nouns from nouns, verbs from verbs, and such other parts of a period as are not necessarily joined together.

—The semi-colon serves to suspend and sustain the period when too long:—the colon, to add some new, supernumerary reason, or consequence, to what is already said:—and the period, to close the sense and construction, and to release the voice.

PUNCTUM, in geometry, &c. See the article **POINT**.

In the schools they have their

PUNCTUM terminans, which is the indivisible extreme of a line, beyond which no part of the line extends.

PUNCTUM continuans, an indivisible magnitude between contiguous points of a line, whereby they are connected, and from whence arises a continuity.

PUNCTUM initians, an indivisible point, from which the line begins.

PUNCTUM formatum, or **generatum**, in conics, is a point determined by the intersection of a right line drawn through the vertex of a cone to a point in the plane of the base that constitutes the conic section. See **CONE** and **CONIC**.

PUNCTUM ex comparatione denotes either of the foci of an ellipsis and hyperbola; thus called by Apollonius, because the rectangles under the segment of the transverse diameter in the ellipsis, and under that and the distance between the vertex and the focus in the hyperbola, are equal to one fourth part of what he calls the figure thereof.

PUNCTUM lineans, in geometry, is a term used by some authors for that point of the generating circle of a cycloid, or epicycloid, which in the genesis produces any part of the cycloidal line.

PUNCTUM saliens, in anatomy, the first rudiments of the heart, in the formation of the foetus, where a throbbing motion is perceived.

This is easily observed with a microscope in a brood-egg, wherein, after conception, we see a little speck or cloud; in the middle whereof is a spot that appears to beat, or leap a considerable time, before the foetus be formed for hatching.

PUNCTUM lachrymale, in anatomy, a little hole in the edge of each eye-lid, opening into a bag called *glandula lachrymalis*.

PUNCTURE, **PUNCTURA**, in chirurgery, &c. any wound made by a pointed instrument.

In phlebotomy, people are sometimes brought in danger of the loss of a limb, and even of life, by the *puncture of a tendon*.

—The patient here does not immediately feel any pain; but about twelve hours after the operation, complains thereof; not in the puncture itself, but in the parts tending towards the arm-pit.—The wounded part then swells to the size of a filbert, and disills an aqueous humour, or ichor, which is the chief diagnostic of the *punctura tendinis*. See **TENDON**.

PUND-BRECH*, or **POUND-BREACH**, denotes the illegal taking of cattle out of the pound; either by breaking the pound, picking the lock, or otherwise.

* The word is compounded of the Saxon, *pund*, pound, and *brech*, fracture, breaking.

—*Si pund-brech fiat in curia regis, plena wyta fit: alibi quinque manco.* Leg. Hen. 1. See **POUND**.

PUNISHMENT, a penalty imposed upon the commission of some crime or offence against the laws.

It is essential to the nature of a law, that it import or decree a *Punishment* to the transgressors thereof.

The forms and manners of *Punishment* are various in various countries and ages, and for various crimes; as treason, felony, adultery, parricide, &c.

Among the Romans, the pecuniary *Punishments* were the *multa* and *confiscatio*.—The corporal *Punishments* were *capitis diminutio*, *aque* & *ignis interdictio*, *proscriptio*, *deportatio*, *relegatio*, *furca*, *crux*, *carcer*, *culeus*, *equuleus*, *scala gemonia*, *damnatio ad gladium*, *ad metallum*, *flagellatio*, *talio*, &c. which see described under their respective articles.

Among us, the principal civil *Punishments* are fines, imprisonment, the stocks, pillory, burning in the hand, whipping, ducking-stool, hanging, beheading, quartering, burning, transportation, &c.

The ecclesiastical *Punishments* are censures, suspensions, deprivation, &c.

sight, degradations, excommunications, anathema's, penances, &c. The military punishments are, being shot, running the gantlope, riding the wooden horse, the bilboet, &c.—Among the Turks, &c. impaling, bastinado's on the soles of the feet, &c. obtain. See EMPALEMENT, &c.

PUNITORY interest, in the civil law, such interest of money as is due for delay of payment, breach of promise, &c.

PUNN. See the article **PUN**.

PUPIL, **PUPILLUS**, in the civil law, a boy or girl not yet arrived at the age of puberty, i. e. under fourteen years of age the boy, and under twelve the girl.

While a minor remained under the direction of a tutor, he was called a *Pupil*; after puberty, a curator being assigned him, he ceased to be called a *Pupil*.

A tutor is obliged to pay interest for what monies of his *Pupil* lie idle and unemployed.—A tutor is allowed to do any thing for his *pupil*, but nothing against him.

PUPIL is also used by way of extension in universities, &c. in the sense of *alumnus*, for a youth under the education or discipline of any one.

PUPIL, **PUPILLA**, in anatomy, denotes a little aperture in the middle of the uvea and iris of the eye, through which the rays of light pass to the crystalline, in order to be painted on the retina, and cause vision.

It is observed, that as we are forced to use various apertures to our optic glasses, so nature has made a like provision in the eyes of animals, whereby to shut out too much, and admit sufficient light, by the changes in the aperture of the *pupil*.

The structure of the uvea and iris is such, as that by their aperture the *Pupil* is contractible and dilatate at pleasure, so as to accommodate itself to objects, and to admit more or fewer rays, as the object, being either more vivid and near, or more obscure and remote, requires more or less light:—it being a constant law, that the more luminous the object, the smaller the *Pupil*; and again, the nearer the object, the smaller the *Pupil*, and *vice versa*.

This Alteration of the *Pupil* is effected by certain muscular fibres on the outside of the uvea, which arrive from nerves detached hither from the scleroticæ.—These fibres proceeding straight from their origin towards the centre, terminate in the obicular limb or verge of the *Pupil*, which consists of orbicular fibres, whereby the figure and space of the *Pupil* are defined.—The first, or longitudinal fibres, dilate the aperture of the *pupilla*; the latter, or orbicular ones, constrict it.

Some authors, however, attribute the motions of the *Pupilla* to the ligamentum ciliare; and others think, that both this, and the fibres of the uvea, concur herein.—Dr. Derham adds, that while the *Pupil* opens and shuts, the ligamentum ciliare dilates or compresses the crystalline, and brings it nigher to, or farther from the retina, as the object is more or less remote. The figure of the *Pupil* in various animals is wonderfully adapted to their various circumstances and occasions: in some, e. gr. in man, it is round, that form being fittest for the position of our eyes, and the various use we make of them in all directions.

In others it is elliptical or oblong: in some of which, e. gr. the horse, sheep, ox, &c. the ellipsis is transverse, and the fissure large, to enable them to see laterally, and even with a little light; and thereby both to gather their food the better in the night, and to avoid dangers on either side.—In others, e. gr. the cat, the ellipsis is erect, and is also capable of opening very wide, and shutting very close; by means of the latter of which states, that animal can exclude all, but, as it were, a single ray of light, and so avoid all the inconveniencies of the bright sun; and by the former it can take in all the faintest rays, and thus avoid the inconveniencies of the night. An incomparable provision for these animals, which are to watch and way-lay their prey both by day and night, to see upwards and downwards, to climb, &c. See **EYE**.

PUPILLARITY, or **PUPILLAGE**, the state of a pupil; in opposition to *puberty*.

PURA elemosyna, **PURE alms**, denotes a tenure whereby the churchmen hold lands in Scotland, somewhat on the footing of the primitive clergy.

PURA hasta. See the article **HASTA**.

PURBECK stone. See the article **STONE**.

PURCELAIN. See the article **PORCELAIN**.

PURCHASE, in law, the acquisition of goods, lands, tenements, or the like, by means of money, in contradistinction to those obtained by descent, or hereditary right.

PURCHASE, in the sea language, has the same signification with *draw in*, at land.—Thus, they say, *The capstan purchases apace*, i. e. draws in the cable apace: and when they cannot draw or hale any thing in with the tackle, they say, *The tackle will not purchase*.

PURE, something free from any admixture of foreign or heterogeneous matters.

PURE fire. See the article **FIRE**.

PURE hyperbola, in conics, is an hyperbola without any oval, node, spike, or conjugate point. See **CURVE**.

PURE mathematics. See the article **MATHEMATICS**.

PURE proposition, } See the articles { **PROPOSITION**,

PURE quadratics, } **QUADRATIC**,

PURE refractions, } **REFRACTION**.

PURFLEW, a term in heraldry, expressing ermines, peans, or any of the furs, when they compose a bordure round a coat of arms.

Thus they say, he beareth gules a bordure, *purflew*, *vairy*: meaning that the bordure is *vairy*.

PURGATION, **PURGATIO**, the act of *purging*, scowring, or purifying a thing, by separating and carrying off any impurities found therein.

PURGATION, in pharmacy, is the cleansing of a medicine by retrenching its superfluities; as taking the wood and seeds out of cassia, and the stones out of dates, tamarinds, and other fruits.

PURGATION is also used in chymistry, for several preparations of metals and minerals, intended to clear them of their impurities; more usually called *purification* and *refining*.

The ordinary *Purgation* of Mercury is performed by passing it through a chamois skin. See **MERCURY**.—Gold is *purged* by the coppel, cementation, &c. See **GOLD**, **COPEL**, &c.—

Purgation in other metals is performed by repeated fusion, &c. See **METAL**, **FUSION**, &c.

PURGATION cathartica, in medicine, is an excretory motion, arising from a quick and orderly contraction of the fleshy fibres of the stomach and intestines; whereby the chyle, corrupted humours and excrements lodged therein, are ejected farther and farther, and at length quite excluded the body by stool.

Purgation is one of the principal species of *evacuation*. See **E-VACUATION**.—For the means and manner wherein it is effected, see **PURGATIVE**.

PURGATION, in law, is the clearing one's self of a crime, whereof of publicly suspected or accused before a judge, called also *judicium Dei*.

Of these *Purgations* there was anciently much use in England, especially touching matters of felony charged on clerks; and there is something of them still retained in the ecclesiastical court in suspicion of incontinency, &c.

Purgation is either *canonical* or *vulgar*.

Canonical PURGATION is that prescribed in the canon law, the form whereof obtaining in the spiritual court, is, that the party shall take his oath he is clear of the fact objected; and bring to many of his honest neighbours, not above twelve, as the court shall assign him, to swear, on their consciences, that they believe he swears truly.

Vulgar PURGATION, being the most ancient manner, was by fire, or water, or combat; used by infidels, and by christians too, till abolished by the canon law.

Combat, though now disused, may yet be still practised by the laws of the realm in cases where evidence is wanting, and where the defendant rather chules combat than any other trial.

Terris bonis, &c. *redhabendis post PURGATIONEM*. See **TERRIS**.

PURGATION, in tragedy, is a term which Aristotle uses for the effect of tragedy on the mind.

That philosopher observes, that tragedy, by means of the terror and compassion which it excites, *purges* passions out of the soul.

Indeed, Corneille adds, that tragedy frequently creates passions, instead of *purging* them; so that he takes Aristotle's *Purgation* to be no more than a chimera. See **TRAGEDY**.

Menstrual PURGATIONS, the catamenia or menies of women.

See **MENSES**.

PURGATIVE, or **PURGING medicine**, a medicament which evacuates the impurities of the body by stool; called also *cathartica*.

Purgatives are divided, with regard to their effect, into *gentle*, *moderate*, and *violent*.—*Gentle Purgatives* are such as operate very mildly, as tamarinds, cassia, manna, rhubarb, sena, and most of the mineral waters.

The moderate purge somewhat more briskly, as jalap, scammony, &c.—The *violent* operate excessively, as colocintida, heliobore, luncæia, &c.

Purgatives are, again, divided, with regard to the humour they evacuate, into *phlegmagogues*, *cholagogues*, *melinagogues*, and *hydragogues*; each whereof see under its proper article.

The modern physicians reject this division; and shew the operation of all *purgatives* to be alike.

Purgatives make one of the most important articles in medicine.—Their effect is produced by vellicating and irritating the nervous fibres of the stomach and intestines, and thereby urging them to an expulsion.

An idea of the manner of their operation is thus given by Dr. Cheyne.—A *purgative* medicine being received into the stomach by the mouth, its particles do there vellicate or stimulate the fibres of the stomach, and thereby increase the digestive faculty, i. e. they bring the muscular fibres of the stomach, and the muscles of the abdomen and diaphragma, into more frequent contractions than ordinary, till the medicine is admitted into the intestines; the fibres and glands whereof being more

sensible than those of the stomach, (whose parts, by the frequent rough contacts of one against another, and of the gross bodies often thrown into it, are, as it were, deadened) it easily moves and brings them into frequent forcible contractions, whereby these glands are squeezed, and so emit a fluid matter, which lubricates the passages, and which mixing with the feculent matter of the intestines, (which is rendered fluid by the same active and stimulating quality of the purgative medicine) renders it more fluid; by which, and by the uncommon contractions of the intestines, it passes more easily and plentifully into the intestinum rectum, and is thence ejected by stool.

Thus do gentle purges act, and only cleanse the intestines, few of their particles entering in by the lacteal veins so as to affect the blood.—But in violent Purgatives the stimulating particles are mixed with the blood, and produce there, many times, very great effects, by occasioning unnatural fermentations, by separating the natural cohesions of the fluids of the body; and they do also, by vellicating the spiral fibres of the veins and arteries, bring those into more forcible contractions, and thereby accelerate the motion of the blood:—all which may have sometimes a good, but sometimes a bad effect.

As to the effects of Purgatives on animal bodies, Dr. Quincy adds, that every irritation of the intestines either quickens the peristaltic motion in its natural direction, or occasions some little inversions of it.—Now, in both cases, any matters that but slightly adhere to the coats, or inner membranes, will be loosened, and shook off, and carried forward with the other contents; and they will also be more agitated, and thus rendered more fluid.

Hence is manifest, how a purging medicine hastens and increases the discharges by stool; but the same manner of operation also carries its effects much farther, in proportion to the force of the stimulus: for where it is great, all the appendices of the bowels, and even all the viscera in the abdomen, will, by a consent of parts, be pulled or twitched so as to affect their respective juices in the same manner as the intestines themselves do their contents.—The consequence of which must be, that a great deal will be drained back into the intestines, and made a part of what they discharge.—And when we consider the vast number of glands in the intestines, with the outlets of those viscera opening thereunto, and particularly of the liver and pancreas, it will be no wonder, that vast quantities, especially in full constitutions, may be carried off by one purge.

As to those Purgatives distinguished by the names of *cholagogues*, *hydragogues*, *phlegmagogues*, on a supposition of an elective quality therein, they may be accounted for upon more intelligible principles: For when the discharges by stool discover an over-proportion of any particular humours, it is always to be supposed there was a redundancy of such an humour, whose discharge any irritation would have occasioned. Thus, in proportion to the proximity of some humours in the intestinal tube, and the disposition of the passages to convey them that way, do they require greater or lesser vibrations or shakes of the fibres to fetch them out.

For this reason, the brisker cathartics, which vellicate the membranes most of all, pump out, as it were, from all the mesenteric glands and neighbouring parts, their contents, which, because they abound so much with lymphatics, and viscid watry humours, make the discharges thin and watry.

Those which act in a somewhat lower degree, yet irritate enough to deteige and draw out a great deal of mucous and viscid matter, which sometimes by lodgment and want of due motion, changing into various colours, occasions the different names of *Phlegm* or *Choler*: as the former therefore pass for hydragogues, so do the latter for purgers of phlegm and choler. But there is another principle besides that of a stimulus, whereby a purging medicine is enabled to answer its intention, viz. by fusing the humours, and rendering them more fluid than before, whereby they are better fitted to pass off by their proper excretories.—Those which consist of very subtle and active parts are not so sensible in the larger passages, because of the great quantities of matter, which lay too great a load upon them, and make them unheeded; but when they are got into the blood in any considerable number, they divide and fuse those cohesions which obstruct or move heavily along the capillaries, and scour the glands; inasmuch that every pulsation throws something through the intestinal glands, which goes away by stool, that the reflux blood had washed away and brought back from all parts of the body.

Of this kind are all those cathartics which are said to purge the joints, and are prescribed in rheumatisms, and arthritic pains, as the radix turpethi, and all the aloetics.—And this is the reason why purging medicines of this sort are so easily changed into the most efficacious alteratives; for an alterative is a cathartic in a lower degree, or of a more remiss operation. Whatever brings such particles to a secretory office, which are fitted for its passage, oftener, either by accelerating the blood's motion, or breaking it into more particles of that particular size and disposition, will increase the secretion. According, therefore, to the difference of the parts where such

secretions are enlarged, as the glands of the intestines, kidneys, or skin, are the medicines, which are the instruments therein, called either *cathartics*, *diurtics*, or *diaphoretics*.

Quincy has made some improvements in the doctrine of purging medicines, their nature, manner of action, effects, and analogy with other medicines; with the circumstances of their preparation, management, &c. in a discourse inserted in the *Philosoph. Transact.* The substance of which we cannot do better than here subjoin.

In order hereto, it is to be premised, 1. That all those parts of an animal body which are vascular, or through which any fluid passes from the intestines to the minutest fibre, are the seat of the operation of medicines.

2. That this whole course of circulation, or animal motion, is naturally distinguished into three different stages, by the different capacities of the vessels, and motions of their contents, each having its proper outlet; and that these are the seat of the three concoctions so often mentioned by physical writers: the first being the stomach and bowels, and having the anus for its emunctory: the second all that space within the blood's motion, so far as it retains its red colour, having the kidneys; and the third, all beyond that circuit, having the skin for an excretory organ.

3. That every medicine which causes evacuation, is, in some sense, a *Purge*.

4. That every *Purge* operates either as a dissolvent, by fusing the juices, and increasing the quantity fit for expulsion; or as a stimulus, by accelerating their motions so as to bring the matter fit for expulsion oftener to the secretory out-let; or both. These postulates are only premised, in order to prove this grand proposition, that a change in the bulks, figures, and motions of the component particles of a purging medicine, will change the seat of its operation, and fit it for exertion in the larger or smaller vessels, as those mechanical affections are intended, or remitted.

For illustration hereof, it may be convenient to attend to the common way of making a *Purge* operate, more or less, than it otherwise would do.

Substances, then, which are gross and heavy, as those consisting chiefly of saline and earthy particles, such as tartar, manna, and the like, when reduced smaller by triture, or by repeated solutions, operate more gently; but when actuated by acids, or any way made to expose their angles more plentifully to the membranes, they become rougher, and sooner take effect.

Resinous medicines, as scammony, gamboge, jalap, and most vegetable productions, are more violent, and operate sooner, when they are more tenacious and adhesive, as in their extracts; but are gentler, when divided by hard brittle substances, such as salt of tartar, sugar, &c.

Medicines, which have in their composition sulphur and salt, are more or less rough and speedy in their operation, in proportion to their greater or lesser participation of the saline ingredient, and the alperity of its angles.—Of this kind are most minerals, and their preparations: it may be sufficient to instance in the management of antimony and mercury; the first of these is by chymical analysis known to be a composition of a subtle sulphur and salt; and the more the saline part is set loose by preparation, and opening the sulphur, as it is commonly termed, the speedier, and with the greater vehemence, will it operate; whereas, in its more imperfect preparations, when the salts are closely wrapped up in their native sulphur, it will hardly work at all, till it reaches the farthest stages of circulation.

Mercury *per se* is little used as a medicine; and its first preparation, which makes it into a sublimate, so loads it with saline spiculæ, that it amounts even to a poison; but the more those spiculæ are broken by triture, sublimation, &c. the milder doth it operate: and if to the comminution of its points be added a sulphur subtle enough to join it, it may be reduced to so mild a medicine, as not to be felt but in the last stage of operation.

This short view may be sufficient to shew, 1. That it is the too great alperity and motion in a medicine, that will not suffer it to pass the stomach, without irritating it into such convulsions, as will throw it up again by vomit.

2. That a farther comminution, and smoothing its figure, will gain it admittance into the bowels, and cause it to operate, as a proper *Purgative*, by stool.

3. That a yet farther remission of these properties will convey it into the blood, and allow it there to promote evacuation by urine.

And, lastly, that a still farther comminution will pass it into the minutest canals, where, by the same properties, only in a lower degree, it will cause sweat, or increase perspiration. Hence it appears, that the more subtle medicines operate in the capillaries, and smallest fibres, by the same mechanism that the more gross ones do in the common stream of the blood, when they go off by urine; or as the grossest of all do in the greater passages, when they promote evacuation by stool.

Hence it is evident, that the skill of preparing and administering of medicines consists in proportioning their manifest and known properties to the capacity and circumstances of the part they are to operate in; and to intend or remit their mechanical affections,

affections, as they are sooner or later to take place in the greater or smaller vessels.

Of the first class, or gentle purging medicines, there are few that can be reduced small enough to go beyond the larger passages, and none of them are worth the pains they require, to fit them farther than for diuretics; besides, their natural disposition to attract, and join with the serous part of the blood, whenever they get into that stage of motion, runs them off by the kidneys, before they can undergo comminution enough to get farther: but if by frequent repetitions of such medicines, and an uncommon laxity of the passages, any parts are passed into the habit, their grossness fouls the delicate strainers, which are destined for their expulsion; and they lodge upon the glands and capillaries in such manner, as to induce intermittents; which are observable in many persons, after a long use of cream of tartar, the common cathartic salts, and the purging waters, especially at the latter end of the summer, when the heat of the preceding season has debilitated the solids, and left them under too great a relaxation.

Among the refinous purges, there are many very powerful ones; but where their operation is desired in the viscera, blood, and remoter parts, they must be extremely divided; and this we find spirituous menstrua must best do, by taking up the most subtle parts only, and carrying them into the very small passages, where they operate chiefly by fusion; because the softness of such substances cannot enable them, hardly in any degree, to act as stimuli, farther, at least, than ordinary detergents. And thus we find that aloe, the chief of this tribe, goes farthest into the habit, and continues longest before it operates, when managed with a spirituous menstruum, as in the tinctura sacra. The rad. turpethi, and colocynth likewise, with all other vegetable kind, that will yield to a spirituous liquor, may, by that means, be carried into the farthest scenes of animal action; where they will prove efficacious medicines in cases, which, with other management, they would never be able to reach: and on this account it must undoubtedly have been, that we frequently meet, in practical writers, with many materials of this sort mentioned as alterants; the colocynth particularly by Helmont: for all medicines which operate in the farthest passages, they commonly include under that general appellation. But the most efficacious purges, and those which require the most skill in the managing, are procured from the mineral kingdom; these abound in solidity beyond any other materials, and therefore where-ever they are brought into action, they necessarily excel in the quantity of impulse: many of these therefore want not only the utmost comminution to carry them into the farther scenes of operation, but also some restraint of their aperities and motions, to fit them for many intentions.—Thus sublimate is not only to be much sweetened, that is, smoothed in its points, to make it a safe purge in the larger vessels; but if it be intended to go farther than the blood, and those glands, which in that circuit it is most apt to be lodged upon when it salivates, it must not only be rendered very fine, but also be covered with such substances as weaken its points, and make it pass into the last subdivisions of the constitution. To this purpose, the common practice wisely contrives in distempers, which, according to the course of circulation, lie most remote, to wrap up the basis of this medicine in sulphurs, and such-like substances, as follow it into its last division, without giving it any aperities to make it act as a stimulus. Thus, for all cutaneous foulnesses, and habitual taints, the cinnabar, the ethiops, and all of that sortment, are in readiness; and that ordinary sulphur will cover and deaden the efficacies of mercurial preparations, so that they shall not operate, but in such parts only, and in certain circumstances, is demonstrable in ordinary salivations, which are to be lowered by sulphureous medicines.

Medicines from such minerals where a salt and sulphur are united by nature, as they are in some mercurials by art, as antimony, the native cinnabar, steel, &c. are manageable only upon the same principles; and the more they are designed to be carried into the habit, the more are they to be restrained by their natural or adventitious sulphurs: steel, when opened by, and joined with, the points of acid liquors, operates the sooner, and will sometimes prove even emetic; but when it is covered with an additional sulphur, it will go farther, and answer intentions much more remote; as is manifest in the common preparations of steel with tartar or vinegar, and with sulphur.

This way of reasoning on these occasions seems the more just, from considering the texture of those substances, which by a natural preparation are fitted for operation in the minutest part of an animal body; such as those of the aromatic kind, all which, more or less, according to their greater or lesser degree of subtilty and smoothness, promote a diaphoresis: for these consist of exquisitely fine salts, covered with a most subtle sulphur, as is demonstrable by chymical analysis; and the common sal volatile oleosum is an admirable contrivance upon the same foundation, where a very volatile animal salt is covered with a most exalted vegetable oil; whereby it is fitted to pass into the minutest fibres, and make, as it were, a part of the animal spirits themselves.

And here it may not be amiss to observe, that all animal salts are very volatile, or easily rendered so; but when bare and naked, just as the fire draws them out, with a mixture also of its

own particles in their composition, they are too pungent to be felt without painful sensations; and when softened with a fine portion of somewhat of an opposite texture, which is smooth and yielding, they become most efficacious and safe sudorifics. On these considerations it likewise ceases, to be a wonder, why the subtle salts of cantharides are more sensibly injurious to the bladder than to any other parts, and why camphire prevents those injuries; for the exquisite smallness of those spiculae makes them imperceptible but in the most minute canals, into which the fibres composing the membranes of the bladder are known to be divided; and camphire blunts their irritations, because its extreme subtilty enables it to follow them into those meanders, and there to sheathe their aperities.

To this purpose is very remarkable what many now commonly practice in guarding even mercurials against their stimulating properties, and sending them into the finest passages to operate by fusion, and the bare force of impulse: for not only calomel and the mercurius dulcis may be restrained from manifest operation in the wider passages, and the glands about the mouth; but even the mineral turbit, which of itself, in a small dose, will operate powerfully by vomit and stool, will not, when mixed with camphor, be so much felt in those respects; but will go into the farthest circuit of motion, and promote the cutaneous discharge in a more efficacious manner, than any medicine of less specific gravity.—In this management, the camphor is to be mixed but a very little while before taking, otherwise it has not the effect; which appears to proceed from its great volatility, which makes it in a great measure exhale while it stands mixed in the medicine.

As to the doses of *Purgatives*, Dr. Cockburn attempts to determine them on the following suppositions.—1^o That no part of them operate but in the blood.—2^o That they operate there, by changing the blood, and other circulating fluids derived from it. From which postulate he concludes, that in the same constitution of blood, the dose required to produce the like effects, must be proportionable to the blood's quantity; so that where a certain dose is required to alter one pound of blood, for instance, to a certain degree, there will be required a double dose to alter two pounds to the same degree, and a triple dose to three pounds, &c. And universally, if the quantity of blood *b* require the dose *d*, the quantity *m b* requires the dose *m d*. For as *b : d :: m b : m d*.

PURGATORY, PURGATORIUM, in the Romish church, a place where the just are supposed to suffer the pains due to their sins, for which they have not satisfied in this world.

It is by the mercy of God, the indulgences of the church, and the prayers of the faithful, that people are supposed to be delivered out of *Purgatory*.

In Ireland is a place called *St. Patrick's Purgatory*, where, as the legend has it, at the prayers of *St. Patrick*, bishop of the place, there was made a visible representation of the pains which the wicked undergo after death, in order to deter sinners, &c.

PURGE, in medicine, a term frequently used for a dose of some purgative medicine.

Butler's PURGING ale. See *ALE*.

PURIFICATION, in chymistry, &c. the act of *purifying* or refining natural bodies; or of separating the feces and impurities therefrom.

For the methods of *purifying* metals, gold, silver, iron, copper, tin, &c. See *METAL, GOLD, SILVER*, &c.

For the *Purification* of semi-metals, minerals, and other matters, as antimony, sulphur, camphor, salt-petre, &c. See *ANTIMONY, SULPHUR, CAMPHOR*, &c.

PURIFICATION, in matters of religion, denotes an offering made the priest by women rising out of childbed, ere they be re-admitted into the church.

By the law of Moses, a woman, after bringing forth a male child, was unclean forty days; after a female, eighty days: during which time she was not to touch any thing holy, nor to go near the temple; but was to continue within doors, separate from all company and commerce of others.

This term expired, she was to present herself at the temple, and at the door of the tabernacle to offer a lamb, as a holocaust, and a pigeon or turtle, which the priest taking, offered to God, and prayed for her, that she might be purified.

This ceremony, which consisted of two things, a holocaust, and a sacrifice of expiation, was called טהרה טהרה, *purificatio, purgatio*.

The holy virgin, though, according to the fathers, exempt from the terms of the law, yet complied therewith; and at the time prescribed went to the temple, and accomplished the law: in commemoration whereof, the church yearly solemnizes the feast of the purification of the virgin, on the 2d of February; called also the *feast of candlesmas*.

The *Feast of the PURIFICATION* seems to be very ancient. It is ordinarily said to have been instituted in the time of Justinian, in the year 542. and this, on occasion of a mortality which that year dispeopled almost the whole city of Constantinople. Yet there are some who imagine it to have been observed before, though in another manner, and on a different day, from that fixed by Justinian, viz. between the circumcision and epiphany.—The same day is the presentation of our Saviour in the temple.

PURIM*, a solemn feast held among the Jews on the 14th of March, in memory of their deliverance from the conspiracy of Haman by Esther. See **ESTHER**.

* The word is Hebrew, פורים *q. d. lots*.

PURITANS, a term anciently used for the Calvinists of Great Britain, from their professing to follow the pure word of God, in opposition to all traditions, human constitutions, and other authorities. See **CALVINISM**.

PURLIEU. See the article **PURLUE**.

PURLINS, in building, those pieces of timber that lie across the rafters on the inside, to keep them from sinking in the middle of their length.

By the act of parliament for rebuilding London, it is provided, That all *Purlins* from fifteen foot six inches to eighteen foot six inches long, be in their square nine inches and eight inches.—And all in length from eighteen foot six inches to twenty-one foot six inches, be in their square twelve inches and nine inches.

PURLUE*, **PURLIEU**, or **POURALLEE**, is all that ground near any forest, which being added to the ancient forest by our kings, was, by perambulation granted by some of their successors, severed again from the same, and made *purlieu*, i. e. pure and free from the laws and obedience of the forest.

* The word is formed from the French *pur*, pure, and *lieu*, place.

A *Purlieu*, or *Pourallee*, is defined a circuit of ground adjoining to the forest, and circumscribed with immoveable boundaries, known only by matter of record; which compels of ground was once forest, and afterwards was disafforested by the perambulations made for severing the new forest from the old.

Purlieu or *Pourallee* commenced after the manner following;—King Henry I. at his accession to the crown in 1154, took so much delight in the forests of this kingdom, that, not being contented with those he found here, though many and large, he began to enlarge divers of them, and to afforest the lands of his subjects near adjoining to the same.

His successors Richard I. and Henry II. far from retrenching or restoring any thing, made still further incroachments: and thus did the lands continue till the 17th year of king John; at which time the grievance being grown notorious, and generally felt by all degrees of people, divers noblemen and gentlemen besought the king to grant, that they might have all those new afforestations, made by his predecessors aforesaid and by himself, disafforested again; and the king, after much solicitation, was at length prevailed on to subscribe and seal such articles concerning the liberties of the forest, as they then demanded; being for the most part such as are now contained in the charter of the forest.

Hereupon choice was made of divers noblemen, &c. to the number of twenty-five, who were sworn, with others their assistants, to see the said liberties, so granted and confirmed by the king, to be in every point observed.

But before any thing was done to the purpose, king John died; and king Henry III. succeeding, fresh solicitations were made to him; who for the better accomplishing of the said disafforestation, ordered inquisitions to be taken by substantial juries for severing all the new forests from the old: upon which two commissioners were sent to take those inquisitions; in virtue whereof, many great woods and lands were not only disafforested, but were improved to arable land by the owners thereof. After this charter was made and confirmed, some of these new afforestations were perambulated, and proper inquisitions taken, and the certainty was determined by matter of record, which were the old, and which the new: though it appears, that the greatest part of the new afforestations were still remaining during the life of king Henry III.

Under Edward I. fresh petitions and solicitations being set on foot, three bishops, three earls, and three barons were at length appointed to see those perambulations performed and continued; who caused them to be made accordingly, and inquisitions to be taken thereupon, and returned into the court of chancery; and all those that were ancient forest, to be meered, and bounded with irremovable boundaries, to be known by matter of record for ever.

Those woods and lands that had been newly afforested, the king likewise caused to be separated from the old, and to be returned into the chancery by marks, meeres, and bounds to be known, in like manner, by matter of record for ever.

Thus it appears how the *Purlieu*, or *Pourallee*, had their first beginning; for all such woods and lands as were afforested by Henry II. Richard I. or king John, and by perambulations severed from the ancient forests, were, and yet are called *Pourallees*, *q. d.* woods and lands severed from the old forests, and disafforested by perambulations; *Pourallee* being the same as *perambulation* in Latin.

But notwithstanding such new afforestations were disafforested by perambulation, whereby the same became *Pourallee* or *Purlieu*, yet they were not thereby so disafforested as to every man, but that they do in some sense continue forest still, as to others.—For by the words of *charta de foresta*, if the king has afforested any woods or lands of his subjects, to the damage of the proprietors, they should forthwith be disafforested again;

that is, only as to those persons whose woods and lands they were; who, as the proper owners thereof, might sell and cut down their woods at their own pleasure, without any licence from the king; as also convert their meadows and pastures into tillage, or otherwise improve their ground to the best advantage. So also they might hunt, and chase the wild beasts of the forest towards the same, &c. But no other person might claim such benefit of hunting in the *Pourallee*, beside the proper owner of the soil thereof, who is left at liberty to suffer the *Pourallee* to remain forest full; as some, in effect, have thought most expedient, because hereby intitled to the benefit of the common within the forest, which otherwise they were excluded from. Hence, if the beasts chance to wander out of the forest into the *Pourallee*, the king hath a property to them still, against every man, but the owner of the ground wherein they are, who hath a special property in them, *ratione soli*; yet so as he may only take them by hunting, or chasing with his grey-hounds or dogs, without any forestalling or foreletting them in their course again towards the forest.

Beside what hitherto has been said of the difference between forest and *Purlieu*, or *Pourallee*, there is this farther diversity, that all the woods and lands within the regard of the forest, are absolutely within the bondage or charge of the forest, as well in respect of the owners thereof, as of any other person; for no one may cut down his own woods, or improve his own lands, within the regard of the forest, without licence from the king, or his chief justice in eyre of the forest.—Neither shall any person hunt, chase, or molest the wild beasts of the forest in his own ground, within the regard of the forest, without licence or warrant from the king, or his chief justice of the forest, to do so.

But those whose grounds are within the *Pourallees*, are not subject to these restrictions.—Yet a man not the woods and lands in the *Pourallees* absolutely freed from the bondage of the forest in respect of the wild beasts having their haunts therein, when they happen to stray out of the forest; but as they were once absolutely forest, to they are still conditionally so.

PURLUE man, or **PURLIEU** man, or **POURALLEE** man, is one who has land within the *Purlieu*, and is allowed or qualified to hunt or course within the same, though under certain restrictions.

By stat. 13 Ric. II. he who may lawfully hunt in any *Pourallee*, ought to have woods or lands of freehold within the *Pourallee*, to the yearly value of 40 s.—By stat. Jac. I. he ought to have lands of inheritance of the yearly value of 10 l. or lands of freehold of the yearly value of 30 l. or have goods worth 200 l. or be the son of a knight, or baron, or person of a higher degree, or son and heir apparent of an esquire.—But by a later act, Car. II. no man may keep grey-hounds within the *Pourallees*, or elsewhere within England or Wales, unless he have a free warrant, or be lord of a manor, or such a freeholder as is seized in his own right, or in right of his wife, of lands, tenements, or hereditaments, of the clear yearly value of 40 l. over and above all charges and reprises of such estate of inheritance; or of lands, tenements, or hereditaments, in his own right, or in right of his wife, for term of life or lives, of the yearly value of 80 l. over and above all charges and reprises, or that is worth in goods or chattels 400 l.

The *Pourallee*, or *Purlieu*, then, is said to be for him that is so qualified: others, not qualified, and therefore not *purlieu-men*, yet having land in the *Pourallee*, may, if they find any wild beasts of the forest in their own grounds within the *Pourallee*, chase them therout with little dogs, but not with grey-hounds or other dogs.

Nor is the *purlieu-man* left at large to hunt at his own discretion, but he is tied down to several rules: as,

1. That he always begin his chase in his own ground; and that though he find such wild beasts in his own *Pourallee*, and in respect thereof, hath a property in them, *ratione soli*, against all persons but the king; yet such his property is only on this condition, that he can slay them with his dogs in chase, without forestalling them, before they can recover the forest.—If they be within the list of the forest, before the dogs fasten on them, they are the king's, or other owner of the forest.

But if the *purlieu-man* first make his chase in his own freehold, he may pursue the same through every man's ground, within the *Pourallee*, and his dogs fasten on a wild beast, before he can get within the bounds of the forest, and the beast draw the dogs into the forest, and is there slain by them; here the *pourallee-man* shall not enter into the forest, nor take the beast to killed, because his course was irregular from the beginning, as he could claim no property in the beast, *ratione soli*.

3. A *pourallee-man* may hunt in his own *Pourallee*, with no more company than his own servants; neither may he appoint, license, or warrant any other person, except his servants, to hunt by his commandment in his *Pourallee*.

4. Every *pourallee-man* is forbidden by the laws of the forest, to hunt in his own grounds within the *Pourallee*, every day, or oftner than three days in any one week, Sunday excepted.

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5. Nor is any man to disturb, or make a course after any deer found in his *pourallee*, within forty days after the king hath made a general hunting in the forest adjoining thereto; because then the wild beasts of the forest come not into the *pourallees* of their own accord; but as they are forced into the same by the hunters, with clamours and blowing of horns: so that they fly thither for refuge.

6. No man shall hunt within seven miles of the borders of the forest, or in his own *pourallee*, within forty days next before the king hath issued out his proclamation, declaring his royal will and pleasure to make a general hunting in that forest. Inasmuch as the *pourallees* were once, and in some sense still are, forest, it was necessary to have officers to attend, and take on them the charge of the preservation of the game that may happen to wander out of the forest, into the *pourallees*; since otherwise the laws of the *pourallees* could not be executed, but the forest it self would soon be destroyed by the *pourallee* men.

For this reason rangers were first appointed, who, though not officers in the forest, yet appertain thereto; for all officers in the forest have charge of the vert and venison of the forest; but a ranger hath no charge of vert, but only of venison coming out of the forest into the *pourallees*, his place of charge; from whence his office is to conduct the same back again into the forest.

This officer is appointed by the king, or his chief justice in eyre, and is made by patent, with a fee commonly of 20, 30, or 40*l.* or more, by the year, payable out of the exchequer, as also certain fee-deer, both red and fallow, to be taken annually, at proper seasons, out of the forest.

The substance of his oath is, to recharge, and with his hounds drive back, the wild beasts of the forest, as often as they range out of the same into his *pourallee*; to prevent all unlawful hunting and hunters of wild beasts of venery and chase, as well within the *pourallees*, as within the forest; and to prevent those and other offences, at the next court of attachments or swaimote, which shall first happen.

Rangers, it is to be observed, belong only to such *pourallees* as were once the woods and lands of the subject, and were afterwards disafforested again, and so became *pourallees*. Hence, as there are some forests in England, which never had any enlargement by new afforestations, and therefore have no *pourallees* at this day; there can be no rangers belonging to them.

PURPLE, PURPURA, πορφυρα, a red colour, bordering on violet; now dyed chiefly with cochineal.

Purple was much esteemed among the ancients; especially the *Tyrian Purple*, which underwent more dyes than the rest, and which was almost peculiar to the emperors and kings. Yet this *Purple* did not exceed that now in use; the chief reasons why the ancient *Purple* dye has been disused, are, that the later is both cheaper and finer.

The ancient *Purple* was tinged or given with the blood or juice of a precious turbinate testaceous sea-fish, called by the Greeks *πορφυρα*, and by the Latins *purpura*; whereof we have descriptions in several authors, and shells in most of the cabinets of the curious.

In the seas of the Spanish West-Indies about Nicoya, is found a shell-fish, which perfectly resembles the ancient *purpura*, and in all probability is the very same: this fish, Gage tells us, usually lives seven years; it hides itself a little before the dog-days, and continues to disappear for 300 days running.

They are gathered plentifully in the spring, and by rubbing one against another, they yield a kind of saliva or thick glair, resembling soft wax: but the *Purple* dye is in the throat of the fish; and the finest part is lodged in a little white vein;—the rest of the body is of no use.—He adds, that the chief riches of Nicoya consist in this fish. Cloth of Segovia, dyed with it, is sold for twenty crowns the ell; and none but the greatest Spanish lords use it.

Besides the Indian *Purple* fishes, we have others much nearer home. In the *Philosoph. Transact.* we have an account of *Purple* fish discovered in 1686, by Mr. W. Cole, on the coasts of Somersetshire, South-Wales, &c. where it is found in great abundance.

The modern *Purple* fish, M. Reaumur observes, is a kind of buccinum, a name given by the ancients to all fishes whose shell bears any resemblance to a hunting-horn; and it appears from Pliny, that part of the ancient *Purple* was taken from this kind of shell-fish: so that this may be esteemed a recovery of what had been supposed entirely lost.

The method of obtaining the colour, the author describes thus:—The shell, which is very hard, being broken, (with the mouth of the fish downwards, so as not to crush the body) and the broken pieces being picked off, there appears a white vein lying transversely in a little furrow or cleft next the head of the fish.

In this vein is the *Purple* matter lodged; some of which being laid on linen, appears at first of a light green colour; and if exposed to the sun, soon changes into a deep green, and in a few minutes into a sea-green, and in a few more into a blue; thence it soon becomes of a *purplish* red, and in an hour more of a deep *purple* red.

And here the sun's action terminates; but by washing in sealding water and soap, and drying it, the colour ripens to a most bright

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and beautiful crimson, which will bear washing admirably without the addition of any styptic.

The fish, he observes, is good food; and adds, that there are several kinds of it differing in size and shell, and also in the colour of the tinging liquor.—There are some found on the coasts of Poitou.

M. Reaumur has also discovered another very different kind of *Purple*.—This is produced in oval grains about a quarter of an inch long, full of a white liquor bordering on yellow, which cover certain stones or sands, about which the buccina of Poitou usually assemble.

By the experiments M. Reaumur has made, it appears that these grains are neither the eggs of the buccinum, nor the seeds of any sea-plants, nor any rising plants, but the eggs of some other unknown fish.

These grains being bruised on a white linen, at first only tinge it yellow, and that insensibly; but in three or four minutes they give it a very beautiful *Purple* red, provided the linen be exposed to the open air; for the air of a room, even though the windows be open, will not do.—This colour fades however a little by repeated washings.

M. Reaumur concludes from some experiments he made, that the effect of the air on the liquor does not consist in its taking away any particles thereof, nor in giving it any new ones, but only in its agitating it, and changing the arrangement of the parts that compose it.—He adds, that the liquor of the buccinum, and that of the grains, seem to be nearly of the same nature; except that the latter is more watry, and only saline; whereas the other is hot and pungent.

The Caribbee Islands have likewise their *Purple* fish.—This is called *burgan*, being of the size of the end of the finger, and resembling our periwinkles: its shell is of a brownish azure, its flesh white, its intestines of a very bright red, the colour whereof appears through the body; and it is this that dyes the froth, which it casts forth when taken, and which is at first of a violet hue, bordering on blue.

To oblige them to yield the greater quantity of froth, they lay them on a plate, and shake and beat them against one another; upon which the plate is immediately covered with the froth, which is received on a linen cloth, and becomes *Purple* in proportion as it dries.

F. Labat observes, that if this be the real *Tyrian Purple*, the secret of preparing and fixing it is lost; this colour being found to dwindle and dissipate, in proportion as the linen dyed with it is washed.

The same author gives us the description of another *Purple* dye produced by a tree growing in the Antilles.—The juice of this tree, when cut standing, is of a blood-red, and communicates the same colour to cloths; though, like the former, it loses much in often washing.

PURPLE, in medicine.—The *Purple fever*, *febris purpurea*, is a kind of plague, or a malignant fever discovering itself in eruptions on the skin like the bites of bugs or fleas, or like grains of millet, or the small pox; whence it is sometimes also called the *spotted* and *miliary* fever.

The eruptions are red, orange, violet, azure, livid, or black; and when they rise in great quantity, it is esteemed a good sign.—Sometimes they spread to a great extent, like erysipelas, according to the quality of the poison.

PURPRESTURE, in our ancient law-book. See **POURPRESTURE**.

PURPRISUM*, of the French *pourpris*, denotes a clove, or inclosure.—also the whole compass or extent of a manor or place.

*—*Deiura et man purpurum de K. kelum, et domus mea, et melandrum, et pratu, &c.* Cuncta Walter Episc. Pontif. de Kithelam.

PURPURE, POURPRE, or PURPLE, in heraldry, according to some, is one of the five colours of armories, mixed or compounded of gules and azure bordering on violet; and according to others, of a little black and much red colour.

It is by the Heralds supposed a symbol of temperance, liberality, dignity, authority, faith, and piety.—Most authors in heraldry, as Favyn, Geliot, Monet, and Menestrier, do not allow *Purple* for a colour, in regard it is not simple, but composed of a mixture of other colours.—They rather esteem it a kind of intermediate tincture, sometimes metal, and sometimes colour: hence the Spaniards call it *una mixtion*: so that one cannot lay it on metal and colour without falsifying the arms.

Add, that many take the *Purple*, as it is accounted, on many ancient bearings, by which some of the moderns would evince the regularity and legitimacy of this colour in armory, to be no other than silver tarnished.

Spelman, however, in his *Aspilogia*, allows *Purple* the preference before all other colours, as having been an ensign of royalty for many ages; yet even he allows it to have been excluded by the ancient heralds as only an imperfect colour.

It is represented in engraving by diagonal lines drawn from the sinister chief to the dexter base point.—*Vid. tab. herald. fig. 81.* In the coats of noblemen it is called *amethyst*, and in those of princes, *mercury*.

PURPURATI, in our ancient historians, denote the sons of emperors and kings. Neubrig, lib. 3. cap. 4. Malmib. lib. 3.

PURREL, anno 35. Eliz. cap. 10. a list ordained to be made at the ends of kerseys, to prevent deceit in diminishing their length.

PURSE, a manner of accounting; or, as some call it, a species of money of account, much used in the Levant; particularly at Constantinople.

The *Purse* consists of about 500 dollars, or 120 pounds sterling. It is so called, because all the grand signior's treasure in the seraglio is kept in leather bags of this value.

This method of accounting the Turks derive from the Greeks, and they from the Romans; the emperors whereof brought it to Constantinople, as appears from a letter of Constantine to Cecilian bishop of Carthage, quoted by Eusebius and Nicephorus, wherein is this passage:—"Being resolved to give something for the support of the ministers of the catholic religion throughout the provinces of Africa, Numidia, and Mauritania; I have written to Vefus, treasurer-general of Africa; and given him orders to pay you three thousand *foles*," i. e. *Purses*: for, as M. Fleury observes, we may call that *Purse* which the Latins called *folius*, which was a sum of 250 silver denarii, amounting to about seven pounds sixteen shillings, of our money.

PURSER, an officer aboard a man of war, who receives her victuals from the victualler, and is to take care that it be in good condition, and well laid up, and stowed.

He is also to keep a list of the men and boys belonging to the ship, and to set down exactly the day of each man's admittance into pay; that the pay-master or treasurer of the navy may issue out his disbursements, and pay off the men according to the *Purser's* book.

PURSIVENESS, or **PURSYNESS**, among farriers, *thickness of wind*, a name common to all those diseases in horses which arise from obstructions in the passages of the lungs.

Pursiveness, sometimes also called *broken wind*, may proceed from an ulcer, or some inward wasting of the lungs, wherein the small vessels are worn or abraded by the sharpness or acrimony of the common discharges.

The like disorder may also arise from a stagnation, hindering the air from penetrating so as to lift up the lungs in the act of respiration; or from some tough and mucilaginous matter separated from the branches of the wind pipe.

The ulcerations are coll, furrows, and other diseases not thoroughly cured off.—*Pursive* disorders may also arise from unwholesome food, bad air, and hard riding when a horse is full. The signs are commonly a heaving and beating of the flanks; a wheezing and rattling. Sometimes the kernels about the throat will swell, and there will be a glandulous running at the nose, which is the utmost stage of the disease, and usually reputed desperate.

PURSUIVANT. See the article **POURSUIVANT**.

PURVEYANCE. See the article **POURVEYANCE**.

PURVEYOR. See the article **POURVEYOR**.

PURVIEW*, a term frequently used by Sir Edward Coke for the body of an act of parliament, or that part which begins with *Be it enacted*, &c. as contradistinguished from the *preamble*.

* The word comes from the French *pour veu*, a gift, grant, provision, &c.

The statute of 3 Hen. 7. runs upon a *preamble* and a *purview*. 12 Rep.

PURULENT, **PURULENTUS**, in medicine, something mixed with, or partaking of, pus or matter.

Phthiric people frequently spit a *Purulent* matter.—In a dysentery, the stools are *Purulent*: when there is an ulcer in the reins or bladder, the urine is *Purulent*.

PUS*, in medicine, a putrid matter, white and thick, formed of blood corrupted in a wound or ulcer, and issuing out of the lip, thereof.

* The word is Latin, *pus*, literally denoting foot, &c. formed of the Greek *πύον*, which signifies the same.

Wounds are always to be kept open while they suppurate, i. e. while they generate *pus*; for fear of shutting up the wolf in the sheep-fold.

PUSTULE, **PUSTULA**, a little pimple, or eruption, on the skin, full of pus; especially arising in the small and great pox. See **EXANTHEMA**.

PUTAGE*, **PUTAGIUM**, in our old law-books, denotes whoredom or fornication on the part of the woman.

* The word is formed from the French *pute*, where; *putagium*, a. d. *putum agere*—*Quod enim generaliter solum dicit, putagium, hec tamen non admittit, ubi intelligitur esse a putagio matris: quia si vis legitime est, quam nuptie demonstrant.* Glanv. lib. 7. cap. 12.

PUTANISM, **PUTANISMO**, an Italian term, naturalized by some English writers, signifying *whoredom*, or the life or condition of a courtesan.

The word we borrow immediately from the French, *putanisme*, and thence from the Italian, *putana*, whore; of *putta*, girl.

PUTATIVE, *suppositive*, something reputed to be what it really is not.

The word is seldom used but in the phrase *putative father*.—Thus we say Joseph was the *putative father* of Jesus Christ.

PULLOGS, or **PULLOCKS**, in building, short pieces of timber, about seven feet long, used in building scaffolds.—They lean right angle to the wall, with one of their end bearing upon it, and the other upon the shoulders or poles which lie parallel to the face of the wall of the building.

PUTREFACTION, or **PUTRIFACTION**, in physics, a flow of corruption produced in natural bodies, generally by the moisture of the air, or some other ambient fluid, which penetrating the pores, and being agitated therein, dissolves and sets at liberty some of the more subtil parts, particularly the salts and oils; and thus loosens and dislocates the compages, quite changes the texture, and sometimes even the figure of the mixt.

How much the air contributes to *Putrefaction*, is evident hence, that bodies buried deep under earth, or in water out of any reach of air, shall remain for ages intire; which yet being exposed to the open air, shall soon rot and moulder away.

The like appears from succulent fruits, and other vegetable matters, which, for all their aptness to *putrefy*, will remain a long time unchanged in *vacuo*.

The perpetual oscillations of the elastic fluid as air contained or shut up in the pores of a body, may be conceived sufficient to induce this alteration in its form and texture; yet should it rather seem, that the water or vapour matter wherewith the proper air is impregnated, is the more immediate agent. Hence Acosta observes, that in Peru, and others have observed the same in Egypt, where it very rarely rains, every thing will continue a long time uncorrupted; unless we should rather ascribe this effect to the abundance of nitrous salt in the air of those places, which is known to resist *Putrefaction*.

In effect, all *Putrefactions*, both of animal and vegetable bodies, are affirmed by the learned Boerhaave to be performed by means of water alone: Take (says he) a pound of fresh flesh, and keep it in a heat like that of our body, and in a few days the *Putrefaction* will be completed; but if you first drain out or exhale all the watry part from the same in some chymical vessel; though the salt and oil remain, the flesh will harden like a stone, and may be kept for ages without *Putrefaction*.—Though when thus hardened, water poured on it, or even the common dew, will soon fit it a *putrefying*.

By such means, bread, flesh, or the like foods, may be preserved for many ages; provided regard be had to the place: hence it is, that in dry countries, as Egypt, dead carcases never *putrefy*, but dry and harden uncorrupted; as we see also in the mummies found buried under the sand.

Even human blood, which naturally is so prone to *Putrefaction*, if you deprive it of its watry part, may be kept for fifty years. Goat's blood we actually find kept so long in the shops, without corrupting; though, if you dissolve it in water, and expose it to a gentle warmth, it still *putrefies* immediately.

PUTREFACTION, in chymistry, denotes a spontaneous kind of operation, whereby vegetable or other substances, in virtue of their own heat and moisture, are dissolved, and as turned into substances of a higher, *s. gr.* of an animal nature.

Process of vegetable PUTREFACTION.—Throw together any of the tender, green, and succulent parts of recent vegetables, whether acid or alkaline, in a large heap, in the warm open air, and press them down with an additional weight, if their own be inconsiderable; and the middle part of the heap will in a little time spontaneously conceive a small degree of heat, and pass successively through the other degrees, till it arrive at a state of ebullition, and be perfectly *putrefied*.

In the space of three days, from the first putting them together, they will yield a heat, perceivable by the hand, equal to that of a human body in a healthy state; by the fifth the heat will be too great for the hand to bear without pain; and, lastly, by the sixth, seventh, or eighth day, the juices will generally appear ready to boil, and sometimes the matter will even flame and burn away.

By this spontaneous operation, the vegetable acquires an abominably putrid, ferrocaceous, or cadaverous taste and odour; and turns intirely into one soft, similar, pulv. mass, or crassamentum, greatly resembling fetid human excrements in the scent, and *putrefied* flesh in the taste.

If now this fetid matter, thus obtained, be directly, whilst it remains in its fetid state, committed to a glass retort, and distilled with proper degrees of fire, there will come over, 1. A water impregnated with an urinous spirit, perfectly like that obtainable from animal subjects, and separable by a fresh distillation slowly made in a tall glass, into elementary water, and a large quantity of pure, white, volatile, dry, alkaline salt, not to be distinguished from animal salts. 2. A volatile, alkaline, oily salt, that shoots into globes. 3. An exceedingly volatile and thick fixed oil, both which are intirely like those of animals. And, lastly, the remainder being calcined in an open fire, affords not the least particle of fixed salt: just as if the subject had really been of the animal, and not of the vegetable kingdom.

This process is truly universal, and holds equally in all kinds of vegetables, though ever so different in their nature and virtue. Experiments have been made in the coldest and most succulent or watry plants, such as purslain, forel, &c. as well as with the hottest or most acrimonious, such as the spurge, &c. and it was always found to succeed; but that the sooner, as the vegetable employed contained the greater quantity of oil: though with the same phenomena.

It will likewise succeed with dry vegetables, provided they be moistened with water before they are thrown into heaps: and thus we sometimes see, that stacks of hay will spontaneously take fire, and burn away; especially if the hay was not well dried in the making.

It is surprising to consider, that by this means the difference between vegetables may be entirely taken away, and the whole kingdom thereof reduced to the same common nature; so that wormwood and tansey, for instance, or sorrel and scurvygrass, shall appear as one and the same thing; and this thing appear no otherwise than like *putrefied flesh*.

Though sorrel be famed for its power of preserving the animal fluids uncorrupted whilst they are circulating in the body, and scordium for its embalming virtue, as continuing them in a state of incorruption after death; yet even these plants are themselves thus easily corrupted and changed into such a kind of *putrefied flesh*, as it is their virtue to prevent.

This Boerhaave considers as a general law of nature, wisely established to produce wonderful changes in the world, and to prevent the inaction and decrease of matter in our globe; this active principle or medium giving an easy and reciprocal transition of vegetable into animal substances, and of animal into vegetable.

Hence we are given to understand the nature and uses of *Putrefaction*, with its difference from *fermentation*, both in regard of the subject, cause, and effect.—Vegetables alone, are the subject of fermentation; but both vegetables and animals of *Putrefaction*. Fermentation also requires, that its subject be first reduced to the form of a liquid, or at least made capable of floating in one, before it can obtain; whereas *Putrefaction* only succeeds when its subject is half dry, or barely moist: which is the reason why must, put up in a wooden vessel, does not *putrefy*; whilst the grapes from which it was expressed, being thrown in heaps, would presently conceive heat, and run into a state of *Putrefaction*.

We see also, that vegetable *Putrefaction* is begun and promoted with heat, and finished with coction, which requires a degree of heat much greater than that excited by fermentation, as being capable of causing an ebullition in the plant, and even of turning it into flame: as, indeed, the immediate cause of fermentation is the motion of the air intercepted between the fluid and viscous parts of the fermenting liquor; but the cause of *Putrefaction* is fire itself, collected or included within the *putrefying* subject.

Again, the effects of fermentation are the production of flowers or yeast, the conversion of the saline part of the fermenting body into tartar, or an acrimonious, acid, and fixed kind of salt, and of oils, into an inflammable spirit retaining something of the nature of the vegetable; but *Putrefaction* makes all the acid salts volatile and alkaline; renders the oils not spirituous, but abominably fetid; utterly destroys what makes the specific difference between one subject and another; and converts them wholly into a soft pulpy mass, of an animal nature, without the least signs of any fixed salt, though the recent vegetable would, by calcination at the first, have afforded a large proportion of it. *Putrefaction*, in fine, makes nearly the same kind of alteration in the whole subject, as it would undergo by passing through a sound animal body, suffering all the actions thereof, and being at length turned into the form of excrement.

This operation may let us a little into the nature of animal digestion, or the change which the aliment suffers in the human body.—For the change our vegetable foods undergo in the body, being such as brings them to be of the same nature, and to afford the same principles with the change induced by *Putrefaction*, is a presumption, that digestion is nothing else; at least, it apparently comes nearer thereto, than to fermentation.

PUTRID, **PUTRIDUS**, something rotten or putrefied. See **PUTREFACTION**.

Thus we say, *putrid* flesh:—a *putrid* humour:—*putrid* limbs, i. e. mortified ones, are to be cut off.

PUTRID fever is a kind of fever, wherein the humours, or part of them, have so little of their circulatory motion, that they fall into an intestine one, and putrefy.

This is frequently the case after great evacuations, or excessive heat; where there is such a scarcity of spirits, that the solids do not vibrate sufficiently to keep the fluids in their due velocity.—In these cases the pulse is low, and the flesh cooler than natural at first.

PUTRID ulcer. See the article **ULCER**.

PUTTY sometimes denotes powder of calcined tin, used in polishing, and giving the last gloss to works of iron and steel.

PUTTY is also used to denote *spodium*. See **SPODIUM**.

PUTTY, in its popular sense, denotes a kind of paste compounded of whiting and linseed-oil beaten together to the consistence of a tough dough:—used by glaziers for fastening the squares of glass in sash windows, &c. and by painters, to stop up the crevices and clefts in timber and wainscot, to prevent the wet from getting in, and ruining the work.

PUTURA, a custom claimed by the keepers of forests, and sometimes by balliffs of hundred, to take man's meat, horse's meat, and dog's meat, of the tenants and inhabitants, gratis, within the perambulation of the itself, hundred, &c.

* *Johannes clamat unam potaram in privato de Penesprohem, qui est quodam certa abbatie de Epsheim pro se & monasterio, ius & jurisdictionis sui, per unum diem & duas noctes, de terra spectantis in tres possessiones, viz. de vicinialibus, et de vicinialibus, & vicinialibus, vel vicinialibus predictis indicit. —Pactum apud Prælon 17 Edw. 3.*

This custom within the liberty of Knaresburg was long since turned into the payment of four pence, *pro putura*.

The land subject to this service, is called *terra puturata*. The learned Somner has erred in his exposition of this word.

PYANEPSIA, *πυανησία*, in antiquity, a feast celebrated by the Athenians in the month *pyanephion*, which, according to the generality of the critics, corresponded to our September.

Plutarch refers the institution of this feast to Theseus, who, at his arrival from Crete, made a kind of sacrifice to Apollo of all the provisions remaining in his vessel; putting them all into a kettle, boiling them together, and eating them with his six companions; which custom was afterwards continued.—The scholiast of Aristophanes says, this was done to acquit himself of a vow he made to Apollo in a tempest.

M. Baudeh. writes the word *pyanephia*; and takes it to be a feast instituted in memory of Theseus's return after killing the Minotaur.

The Greeks vary as to the origin and signification of the word *pyanephion*, whence the feast is denominated.—Harpocration calls it *pyanephia*; he adds, that others call it *panephia*, because then the fruits all appear to the eye.—Hetychius writes *Pyanephia*; and derives it from *πυαν*, bean, and *εφε*, coquo: because in this feast the Athenians gathered their beans, and made a kind of broth of them.

PYCNOTYLE*, *πυκνόςτυλος*, in the ancient architecture, a building where the columns stand very close to one another; one diameter and a half of the column being only allowed for the intercolumniation.

* The word is formed from the Greek *πυκνός*, close, dense, and *τύλος*, column.

The *Pycnostyle* is the smallest of all the intercolumniations mentioned by Vitruvius.—Some make it the same with *stylos*; others distinguish the latter, by its allowing half a module more in the Corinthian intercolumniation.

The *Pycnostyle*, Mr. Evelyn observes, chiefly belonged to the composite order, and was used before the most magnificent buildings; as at present in the peristyle of St. Peter's at Rome, consisting of near 300 columns, and such as yet remain of the ancients among the late discovered ruins of Palmyra.

PYCNOTICS*, *πυκνωτικά*, or medicines of an aqueous nature, which have the faculty of cooling and condensing, or thickening the humours.

* The word in its original Greek, *πυκνωτικός*, signifies something that has the power of thickening.

Perlain, the nenuphar or water-lily, solanum, &c. are ranked among *pycnotics*.

PYGME, *πυγμα*, the length or extent between the elbow and extremity of the hand, the fist being shut; called also a *cubit*.

PYGMY*, *πυγμαίους*, a dwarf, or person of exceeding small stature, not exceeding a cubit in height.

* The word is formed of the Greek, *πυγμα*, cubit. See **CUBIT**.

The appellation is given among the ancients to a fabulous nation, said to have inhabited Thrace, who generated and brought forth young at five years of age, and were old at eight; famous for the bloody war they waged with the cranes.

PYLING the ground for foundations. See **FOUNDATION** and **PALLIFICATION**.

PYLORUS* in anatomy, the right and lower orifice of the stomach, whereby it discharges itself into the intestines. See *tab. anat. (Splanchn.) fig. 2. lit. c. e.* See also **STOMACH** and **INTESTINES**.

* The word is Greek, *πύλωρ*, where it primarily signifies janitor, or door-keeper.

The *Pylorus* is situate on the right side of the stomach, and passes by an oblique ascent to the duodenum, to prevent the too precipitate passage of the aliment out of the stomach.

For this end it is likewise furnished with an extraordinary series of fibres, to constrict it more than any other part: these running round it, serve as a kind of sphincter, which is opened by the contraction of the stomach, and the appulse of the chyle.

At the bottom of the *Pylorus* is a large cavity, which Willis calls *antrum pylori*, he conceives its use to be, to keep the food first digested, till the latter taken into the stomach be digested; though, if what Wharton observes be true, viz. that there are lacteals in the bottom of the stomach, such a provision should seem unnecessary.

PYONY water. See the article **WATER**.

PYRAMID, *πυραμς*, in geometry, a solid standing on a square, triangular, or polygonal basis, and terminating, at top, in a point; or a body whose base is a regular rectilinear figure, and whose sides are plain triangles; their several vertices meeting together in one point.

Euclid defines it a solid figure, consisting of several triangles, whole

whose bases are all in the same plane, and have one common vertex.

Wolffius defines it a solid, bounded by as many triangles, ADC, DCB, and ADB, terminating in one point D; as the base ABC has sides. *Tab. geomet. fig. 78.*

The Pyramid is said to be triangular, quadrangular, quinangular, &c. according as the base is triangular, quadrangular, &c. —The Pyramid may be called a square, triangular, &c. cone; or the cone, a round Pyramid.

Properties of the PYRAMID.—1. All Pyramids and cones standing on the same base, and having the same altitude, are demonstrated to be equal.

2. A triangular Pyramid is the third part of a prism, standing on the same base, and of the same altitude.

3. Hence, since every multangular may be divided into triangles; every Pyramid is the third part of a prism, standing on the same basis, and of the same altitude.

4. If a Pyramid be cut by a plane, *a b c*, parallel to its base ABC; the former plane or base will be similar to the latter.

5. All Pyramids, prisms, cylinders, &c. are in a ratio compounded of their bases and altitudes: the bases, therefore, being equal, they are in proportion to their altitudes; and the altitudes being equal, they are in proportion to their bases.

6. Pyramids, prisms, cylinders, cones, and other similar bodies, are in a triplicate ratio of their homologous sides.

7. Equal Pyramids, &c. reciprocate their bases and altitudes, *i. e.* the altitude of the one is to that of the other, as the base of the one to that of the other, &c.

8. A sphere is equal to a Pyramid, whose base is equal to the surface, and its height to the radius of the sphere.

To measure the surface and solidity of a PYRAMID.—Find the solidity of a prism, that has the same base with the given Pyramid.—And divide this by three; the quotient will be the solidity of the Pyramid.

Suppose, *v. gr.* the solidity of the prism be found 67010328, the solidity of the Pyramid will be thus found 22336770.

The surface of a Pyramid is had, by finding the areas both of the base ABC, and of the lateral triangles ACD, CBD, BDA. See TRIANGLE. The sum of these is the area of the Pyramid.

The external surface of a right Pyramid, standing on a regular polygonal base, is equal to the altitude of one of the triangles which compose it, multiplied by the whole circumference of the base of the Pyramid.

To describe a PYRAMID on a plane—1. Draw the base, *v. gr.* the triangle ABC (if the Pyramid required be triangular); so as that the side AB, supposed to be turned behind, be not expressed. 2. On AC and CB, construct the triangles ADC, and CDB, meeting in any assumed or determined point, *v. gr.* D; and draw AD, CD, BD: then will ADBC be a triangular Pyramid.

To construct a PYRAMID of past-board, &c.—Suppose, *v. gr.* a triangular Pyramid required. 1. With the radius AB, describe an arch BE, (*fig. 79.*) and thereto apply three equal chords, BC, CD, and DE. 2. On CD construct an equilateral triangle DFC; and draw the right lines AD and AC. This past-board, &c. being cut off by the contour of the figure, what remains within will turn up into a Pyramid.

Truncated PYRAMID. See the article TRUNCATED.

Frustum of a PYRAMID. See the article FRUSTUM.

PYRAMID*, in architecture, denotes a solid massive edifice, which, from a square, triangular, or other base, rises diminishing to a point or vertex.

* Some derive the word from *πυρ*, a heat, and *αψαυ*, colligo; pretending, that the first Pyramids were built by the patriarch Joseph for granaries. —But Villalpanda, with much better reason, derives the word from *πυρ*, fire; because of their ending in a point like flame.

When they are very narrow at bottom, *i. e.* their base very small, they are called *obelisks*, and *needles*.

Pyramids are sometimes erected to preserve the memory of singular events, and sometimes to transmit to posterity the glory and magnificence of princes; but as they are the symbol of immortality, they are more commonly used as funeral monuments.

Such is that of Cestius at Rome; and those other celebrated ones of Egypt, as famous for the hugeness of their size, as their antiquity.

These last are all square in their bases; and it is a thing that has been frequently proposed, to establish a fixed measure from them, to be thereby transmitted to posterity.—See their descriptions, measures, &c. in Tlevenot, Pietro della Valle, Graves, &c.

Among the Egyptians, the Pyramid is said to have been a symbol of human life; the beginning whereof is represented by the base, and the end by the apex: on which account it was, that they used to erect them on sepulchres. Herodotus.

Scenography of a PYRAMID. See the article SCENOGRAPHY.

Optic PYRAMID. See the article OPTIC Pyramid.

PYRAMIDAL fountain. See the article FOUNTAIN.

PYRAMIDAL mirrors. See the article MIRROR.

PYRAMIDAL numbers are the sums of polygonal numbers, collected after the same manner as the polygonal numbers themselves

are extracted from arithmetical progressions. See POLYGONAL number, &c.

These are particularly called *first Pyramids*.—The sums of first Pyramids are called *second Pyramids*.—And the sums of those third Pyramids, and so on ad infinitum. Particularly, those arising from triangular numbers are called *prime triangular Pyramids*; those arising from pentagonal numbers are called *prime pentagonal Pyramids*, &c.

From the manner of summing up pentagonal numbers it appears evidently, how the prime Pyramidal numbers are found;

$(a-2)n' + 3n' - (a-5)n$,
viz. $\frac{(a-2)n' + 3n' - (a-5)n}{6}$ expresses all the prime

Pyramidals.

PYRAMIDALE corpus, in anatomy, a plexus of blood-vessels on the back of the testicles, thus called from its form: and from its structure also called *corpus varicosum* and *pampiniforme*.

It consists of innumerable little veins, communicating with each other, and forming a kind of net-work; which, at length uniting, terminate in one vein, by which the blood is conveyed into them all.

The origin of this plexus is from the spermatic veins, which, a little above the testicles, split into several branches; which again uniting several times form the *corpus Pyramidale*.

PYRAMIDALES papillæ. See the article PAPILLÆ Pyramidales.

PYRAMIDALIS, in anatomy, denotes a small muscle of the abdomen, lying in the lower part of the rectus.—It has its name from its figure, and its origin from the margin of the os pubis, with a pretty broad fleshy head, whence it grows gradually narrower, till it end in a small round tendon in the linea alba; sometimes almost at the navel.—See *tab. anat.* (Myol.) *fig. 1. n. 46. fig. 2. n. 31.*

This muscle is sometimes single, sometimes it has its fellow, and in some subjects they are both wanting.

PYRAMIDOID, called also *parabolic spindle*, a solid figure formed by the revolution of a semi-parabola round one of its ordinates.

According to the method of indivisibles, this may be conceived to consist of an infinite series of circles, whose diameters are all parallel to the axis of the revolving parabola.

The *parabolic spindle* is equal to $\frac{2}{3}$ of its circumscribing cylinder.

PYRATE. See the article PIRATE.

PYRENOIDES*, *proceffus*, in anatomy, a process of the second vertebra of the neck; called also *odontoides* and *denticiformis*, or the tooth-like process.

* The word is Greek, *πυρηνόειδος*, formed of *πυρην*, nucleus, kernel or berry, and *ειδος*, figure.

PYRETHRUM, *pellitory of Spain*, an acrid medicinal root, brought from Tunis and Italy; of an hot, discutient quality: used as an alexipharmic and plegmagogue; as also to assuage the tooth-ach, and sometimes in the composition of vinegar.

It is of a moderate length, of the thickness of the little finger, greyish without, whitish within, and of a sharp burning taste. It is pretended it took its name from Pyrrhus king of Epirus; but there is no great occasion for having recourse to such a mystery, its burning quality being sufficient to give it the name *Pyrethrum*, from the Greek, *πυρ*, fire.—It must be chosen new, dry, sound, and hard to break, &c.

It is called a salivary root, because, being held in the mouth, its pungency promotes the evacuation of saliva.

PYRETICS*, medicines good against fevers.

* The word is formed from the Greek *πυρετικός*, fever, of *πυρ*, fire.

PYRIFORMIS, in anatomy, a muscle of the thigh, receiving its name from its figure, which resembles that of a pear.—It is also called *iliacus externus*, from its situation.—See *tab. anat.* (Myol.) *fig. 7. n. 21, 22.*

Its beginning is round and fleshy, from the inferior and internal part of the os sacrum, where it reflects the pelvis of the abdomen; and descending obliquely along the great sinus of the os ilium, above the acute process of the ischium, and joining with the glutæus medius, is inserted by a round tendon into the superior part of the root of the great trochanter.—This moves the os femoris somewhat upwards, and turns it outwards.

PYRITES*, in physiology, a sulphurous inflammable kind of stone or mineral, composed of an acid salt, incorporated with an oily or bituminous matter.

* The word is Greek, *πυρρῆς*, *g. d.* firestone, formed of *πυρ*, fire; a denomination given it on account of its inflammability, which is such, that by collision with steel it will yield sparks of fire.

Pyrites bears a near affinity to marcasite, with which the generality of authors confound it.—Dr. Woodward makes this distinction between the two, that *Pyrites* is restrained to the nodules, or those pieces found lodged in strata of another kind; and marcasite to those composing whole strata.—Add, that the marcasite frequently contains arsenic, which the *Pyrites* does rarely, if ever.

Pyrites has always a metalline part in it, and sometimes a cretaceous or ochreous part.—In proportion as either of these prevails, the body yields sulphur, alum, or vitriol.

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The metal in *Pyrites* is most frequently iron; sometimes there is copper in it, and sometimes a little gold or silver, but never lead or tin.

Dr. Slare tells us of a heap of *Pyrites* consisting of two or three hundred tons, which being covered up from the air five or six months, took fire, and burnt for a week. Some of it looked like melted metal, others like red-hot stones. He adds, that it emitted a most noisome smoke.

Dr. Lister attributes thunder, earthquakes, &c. to the sulphurous and inflammable breath of the *Pyrites*. See Supplement, article PYRIETS.

PYRITES is applied by some authors to the marcasitic ores of all metals; the names whereof are varied according to the metals they partake of.

Thus *chrystitis* is that of gold; *argyritis* that of silver; *sideritis* that of iron; *chalcitis* that of copper; and *molybditis* that of lead, &c.

PYROBOLGY. See the article PYROTECHNIA.

PYROENUS *, is a term sometimes used for rectified spirit of wine; thus called because made by fire, or rather because rendered of a fiery nature.

* The word is of Greek composition, formed of πυρ, fire, and οίνος, wine.

PYROET, PYROUET, or rather PIROUETTE, in the manage. See PIROUETTE.

PYROMANCY, πυρομανία, a kind of divination, performed by means of fire. See DIVINATION.

The ancients imagined they could foretel futurity by inspecting fire and flame: to this end they considered its direction, or which way it turned. Sometimes they added other matters to the fire, e. g. a vessel full of urine, with its neck bound about with wool, watching narrowly on which side it would burst, and thence taking their augury.

Sometimes they threw pitch on it, and if it took fire immediately, they esteemed it a good augury.

PYROTECHNY *, πυροτεχνία, the art of fire, or a science which teaches the management and application of fire in several operations.

* The word is formed from the Greek πυρ, fire, and τεχνη, art.

Pyrotechny is of two kinds, military and chymical.

Military PYROTECHNY is the doctrine of artificial fire-works, and fire-arms, teaching the structure and use both of those used in war for the attacking of fortifications, &c. as gunpowder, cannons, bombs, grenades, carcasses, mines, fuses, &c. and of those made for amusement-sake, as rockets, stars, serpents, &c.

Some call *Pyrotechny* by the name *artillery*; though that word is usually confined to the instruments used in war.—Others chuse to call it *Pyrology*, or rather *Pyroballology*, q. d. the art of missile fires, from the Greek πυρ, fire, and βάλλω, to cast, or throw.

Wolffius has reduced *Pyrotechnia* into a kind of mixt mathematical art: indeed it will not allow of geometrical demonstrations; but he brings it to tolerable rules and reasons: whereas before it had used to be treated by authors at random, and without regard to any reasons at all.

See the elements of *military Pyrotechny* under the several instruments and operations; CANNON, BOMB, ROCKET, GUNPOWDER, &c.

Chymical PYROTECHNIA, is the art of managing and applying fire in distillations, calcinations, and other operations of chymistry.

Some reckon a third kind of *Pyrotechnia*, viz. the art of fusing, refining, and preparing metals.

PYROTECHNICAL Spunge. See the article SPUNGE.

PYROTICS *, πυροτικα, in medicine, caustics, or remedies either actually or potentially hot; and which, accordingly, will burn the flesh, and raise an eschar.

* The word is formed from the Greek πυρ, fire.

PYROUET. See the article PIROUETTE.

PYRRHICHA, πυρρική, in antiquity, a kind of exercise on horseback; or a feigned combat, for the exercise of the cavalry. It was thus called from its inventor Pyrrhichus, or Pyrrhus in Cydonia, who first taught the Cretans to march in measure and cadence to battle, and to observe the pace of the Pyrrhic foot.—Others derive the name from Pyrrhus son of Achilles, who instituted this exercise at the obsequies of his father. Aristotle says, that it was Achilles himself who invented it. The Romans also called it *ludus Trojanus*, the Trojan game; and Aulus Gellius, *decurfus*.—It is doubtless this exercise that we see represented on medals by two cavaliers in front running with lances, and the word *decurfus*, in the exergum.

PYRRICHIUS, πυρρικός, in the Greek and Latin poetry, a foot consisting of two syllables, both short;—as *deus*.

Among the ancients this foot is also called *periambus*; by others *hegemonia*. Quintil. l. 9. c. 4. Plot. de metr. p. 2665.

PYRRHONIANS, PYRRHONEANS, or PYRRHONISTS, a sect of ancient philosophers, so called from their founder Pyrrho.

The distinguishing character of this philosopher was, that he

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professed to doubt of every thing, maintaining, that men only judge of truth and falshood from appearances which deceive. On this principle he kept himself in continual suspension of mind, never determining on any thing; to avoid the inconveniences of error, and false judgments.

Those now distinguished by the name of *Pyrrhonians*, or *Skeptics*, are persons who, from the great number of things that are dark and obscure, and from the averfion they bear to popular credulity, maintain, that there is nothing certain in the world.

The truth is, *Pyrrhonism* has some foundation in nature: we do not judge of things from their real effences, but from their relations to ourselves. Most of our ideas we receive by means of our senses; but our senses are not given us to judge of the effences, but of the relations of things to ourselves; i. e. how they may affect us so as to do us good or harm.

Thus, e. g. our eyes do not give us the real magnitudes of objects, but their relative ones only.

The Academics differed from the *Pyrrhonians*, in that they owned there were some things more like or more near skin to truth than others, which the *Pyrrhonians* peremptorily denied. See ACADEMICS.

Le Clerc observes, that the *Pyrrhonians*, in affirming that there is nothing certain, were the most assuming and decisive of all philosophers; since they must have first examined all things, to be able to determine precisely, that all things are uncertain.

It may be added, that the very principle of the *Pyrrhonians* destroys itself: for if there be nothing certain, then must that dogma itself be precarious; and if no one thing be more probable, or liker to truth than another, why shall the principle of the *Pyrrhonians* be believed preferably to the opposite one? since itself is come at in the same way as our other knowledge.

PYTHAGORAS's table. See the article TABLE.

PYTHAGOREAN, or PYTHAGORIC system, among the ancients; was the same with the Copernican system among the moderns. See SYSTEM.

It was thus called, as having been maintained and cultivated by Pythagoras and his followers; not that it was invented by him, for it was much older.

PYTHAGOREANS, a sect of ancient philosophers, who adhered to the doctrines of Pythagoras.

Pythagoras, the founder of this sect was of Samos, the son of a lapidary, and a pupil of Pherecydes, who flourished about the seventh olympiad, i. e. about 500 years before Christ. This sect was also called the *Italic sect*, or *Italic school*, because Pythagoras, after travelling into Egypt, Chaldea, and even into the Indies, to inform his understanding, returning home to his own country, and there unable to bear the tyranny of Polycrates, or Syloson, retired into the eastern part of Italy, then called the Greater Greece, and there taught and formed his sect.

He is held to have excelled in every part of science: Lærtius says, among the Chaldees and Hebrews he learnt divination, and the interpreting of dreams; and that in Egypt he learnt all the mysteries of the priests, and the whole system of symbolical knowledge, with all their theology.—Porphyry adds, that he learnt the mathematical sciences in his travels; geometry from the Egyptians, the doctrine of numbers and proportions from the Phœnicians, and astronomy from the Chaldeans: morality and theology he learnt chiefly from the magi.

He was the first who assumed the modest title *philosophebr*; the sages till his time having born the arrogant appellation *σοφοί*.

Jamblichus observes, that in Phœnicia he conversed with the prophets and philosophers, the successors of Mochus the physiologist; which Mochus Selden and some others will have to be Moses.

His school in Italy was at Crotona, where he is said to have been attended by no less than 600 scholars.—His house was called the temple of Ceres, and the street where it stood, the museum.

Out of this school proceeded the greatest philosophers and legislators, Zaleucus, Charondas, Archytas.—Porphyry says, as soon as he arrived in Italy, he had an auditory of two thousand people, to whom he explained the laws of nature, reason and justice.

He endeavoured to assuage the passions of the mind with verses and numbers; and made a practice of composing his mind every morning by his harp, frequently singing the pœans of Thales.—Exercises of the body also made a considerable part of his discipline.

His school became so popular, that whole cities and people committed their republics to the government of his scholars.—At length, Porphyry adds, envy stirring up sedition against them, they were oppressed; and, in time, their learning, which they ever kept secret, was lost; except some difficult things learnt by rote by the crowd of hearers: for Pythagoras never committed any thing to writing.

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Beside his publick school, Pythagoras had a college in his own house, which he called *καλὸν καὶ ἀγαθόν*; in this were two orders or classes of scholars, *ἐξωτερικοί*, called also *αὐσcultantes*; and *ἐσωτερικοί*, *intrinseci*.—The former were novices and probationers, who were kept under a long examen, and had even imposed a quinquennial silence, to teach them modesty and attention, according to Apuleius; or, according to Clemens Alexandrinus, to teach them to abstract their minds from sensible objects, and enure them to the pure contemplation of the deity.

The latter were called *geminii*, *perfecti*, *mathematici*, and *Pythagoreans* by way of eminence. These alone were let into the arcana and depths of the real Pythagoric discipline.

Clemens observes, that these orders corresponded very exactly to those among the Hebrews: for in the schools of the prophets there were two classes, *viz.* the sons of the prophets, who were the scholars; and the doctors or masters, who were also called *perfecti*: and among the Levites, the novices or tyro's, who had their quinquennial exercises, by way of preparation. Lastly, even among the profelytes there were two orders; *exoterici*, or profelytes of the gate; and *intrinseci* or *perfecti*, profelytes of the covenant. He adds, it is highly probable, that Pythagoras himself had been a profelyte of the gate, if not of the covenant.

Gale endeavours to prove, that Pythagoras borrowed his philosophy from that of the Jews; to this end producing the authorities of many of the fathers and ancient authors, and even pointing out the tracts and footsteps of Moses in several parts of Pythagoras's doctrine.

Pythagoras taught, that God is one; that he is a most simple, incorruptible, and invisible being; and therefore only to be worshipped with a pure mind, with the simplest rites, and those prescribed by himself.—Laetius observes, that he made unity the principle of all things; hence arose duality, &c.

In his conversation with the Egyptians, he learnt abundance of secrets about numbers; to which he attributed so much, that he even attempted to explain all things in nature by numbers.—In effect, it was a common opinion of the ancient philosophers, that the species of things have to each other the nature and relation of numbers; and that the universe, and all things therein, were produced according to certain numbers, inherent in the creator's mind.

Hence Porphyry observes, the *Pythagoreans* studied the doctrine of numbers with great attention: since the incorporeal forms, and first principles of things, *i. e.* the divine ideas, could not be delivered in words, they had recourse to demonstration by numbers; and thus called the common reason and cause of unity, identity, and equality, by the name *one*.

Pythagoras further taught, that there is a relation or kinship between the gods and man, and therefore that the gods take care of man.—Which, Clemens Alexandrinus says, is apparently borrowed from the doctrine of providence.

Pythagoras also asserted a metempsychosis, or transmigration

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of souls; and therefore the immortality of the soul. He also taught, that virtue is harmony, health, and every good thing; and that God, and therefore all things consist of harmony.

PYTHAGORIC *theorem*, or *proposition*, is the 47th of the first book of Euclid. See TRIANGLE and HYPOTHENUSE.

PYTHAGORIC *tetractys*. See the article TETRACTYS.

PYTHAGORIC *abacus*. See the article ABACUS.

PYTHIA, or PYTHIAN, in antiquity, the priestess of Apollo, by whom he delivered oracles.

She was thus called from the god himself, who was intitled *Apollo Pythius*, from his slaying the serpent Python; or, as others will have it, *αἰνὴ τοῦ πυθιάδα*, because Apollo, the sun, is the cause of rottenness; or, according to others, from *πυθιάδα*, *I bear*, because people went to hear and consult his oracles.

This priestess was to be a pure virgin.—She sat on the covercle, or lid, of a brazen vessel, mounted on a tripod; and thence, after a violent enthusiasm, delivered her oracles, or rather explained those of the god; *i. e.* she rehearsed a few ambiguous and obscure verses, which were taken for oracles.

All the *Pythia* did not seem to have had the same talent at poetry, or to have memory enough to retain their lesson.—

Plutarch and Strabo make mention of poets, who were kept in pay, as interpreters of Jupiter, &c.

PYTHIA, or PYTHIAN *games*, were solemn games instituted in honour of Apollo, and in memory of his killing the serpent Python with his arrows.

The *Pythia* were celebrated in Macedonia, in a place called *Pythium*.—They were the next in fame after the Olympic games, but were more ancient than they; for it is pretended they were instituted immediately after the defeat of the serpent.—They were held every two years, about the month Elaphebolion, which answered to our February.

The *Pythia* were also celebrated at Delphos; and it was these that were the most renowned.—A part of Pindar's poems were composed in praise of the victors in the Pythian games.

The critics are divided on the subject of the serpent Python.—The poets say, that Juno made use of it to persecute Latona, and prevent her bringing into the world Apollo and Diana, whom she had conceived of Jupiter; and that it was for this reason that Apollo afterwards killed it.

Strabo says, it was no other than a famous villain, one Draco, that Apollo ridded the world of.—Dickinson, in his *Delphi Phœnicizantes*, maintains the Python of the Greeks to be the Typhon of the Phœnicians; and the Typhon of the Phœnicians to be the Og of scripture; and Apollo, who slew it, he will have to be Joshua.

PYXIS * *nautica*, in navigation, the seaman's compass. See COMPASS.

* The word is Greek, *πύξις*, where it literally signifies a *box*.

PYXIS, among anatomists, is also used for the cavity of the hipbone. See ACETABULUM.



QUA

Q A consonant, and the sixteenth letter of the alphabet.

The *Q* has this peculiar to it, that it is always followed by an *U*.

The *Q* is formed from the Hebrew *Qoph*, which most other languages have borrowed; though some of them have rejected it again, particularly the Greeks, who now only retain it as a numeral character, called *κόμμη*.

In effect, there is that resemblance between the *Q* and the *C*, in some languages, and the *K* in others; that many grammarians, in imitation of the Greeks, banish the *Q*, as a superfluous letter. Papias even affirms, that all the Latin words now wrote with a *Q*, were wrote among the ancient Romans with a *C*: but we want better authorities for this. For though that may hold in many cases, inasmuch that some write indifferently *quar* or *cur*, *cum* or *quim*, *quotidie* or *cotidie*, &c. Yet does it not thence follow, that they ever wrote *cis*, *cay*, *cid*, for *quis*, *qua*, *quid*.—What inscriptions authorize such a reading? Far from this, the ancients sometimes substituted *Q* for *C*; and wrote *quajus*, *quos*, for *cujus*, *cui*, &c.

Varro, however, and some other grammarians, as we are told by Censorinus, &c. would never use the *Q*. The truth is, its use or disuse seems to have been so little settled and agreed on, that the poets used the *Q* or *C* indifferently, as best suited their measures; it being a rule, that the *Q* joined the two following vowels into one syllable; and that the *C* imported them to be divided.

Hence it is, that Lucretius uses *cuires* for three syllables, in lieu of *quires*: *acua* for *aqua*; and that Plautus uses *relicium* for *reliquum*; as in *quod dedi datum non vellem relicium non*; where the *cum* must be two syllables, otherwise the Trochaic verse will be lame of a foot.

In the French the sound of the *Q* and *K* are so near akin, that some of their nicest authors think the former might be spared—Ramus adds, that till the establishment of royal professors in the university of Paris under Francis I. they always used *Q* in the Latin the same as in the French; pronouncing *kir*, *kalis*, *kantus*, &c. for *quis*, *qualis*, *quantus*. See *K*. Some very learned men make *Q* a double letter, as well as *K* and *X*.—According to them, *Q* is evidently a *C* and *U* joined together—It is not enough that the sound is the same; but they see the traces of the *CU* in the figure of the *Q*; the *V* being only laid obliquely, so as to come within the cavity of the *C*; as *C* <.

To confirm this, they say the ancients wrote *qi*, *qe*, *qid*. Though Jos. Scaliger, Littleton, &c. think this no proof of the point; for in Gruter's inscriptions we find not only the *Q*, but also the *C*, put for *QU*; as *Cintus*, *Quintus*, *scis* for *quis*, &c. Yet no body ever imagined the *C* a double letter. See *DOUBLE Letter*.

Among the ancients, was a numeral letter, signifying 500; as in the verse,

*Q*ucent *A*cum *D* quingentos vult numerare.

A dash over it, as *Q̄*, denoted it to signify five hundred thousand.

Q is also used as an abbreviature in several arts—*Q. Pl.* in physicians bills, stands for *quantum placet*, or *quantum vis*, as much as you please of a thing.

Q. S. for *quantum sufficit*, or as much as is necessary.

Q. E. D. among mathematicians, signifies *quod erat demonstrandum*, which was to be demonstrated.

Q. E. F. *quod erat faciendum*, which was to be done.

Q. D. is also frequently used among grammarians, &c. for *quasi dictum*, as if it were said, &c. or as who should say.

QUACK, in medicine. See *EMPIRIC*.

QUADRA, in building, any square border, or frame, encompassing a basso-relievo, pannel, painters or other work.

The word is also used abusively for a frame or border of any other form; as round, oval, or the like.

QUADRAGESIMA, a term sometimes used for the time of lent; because consisting of forty days. See *LENT*. Hence, some monks are said to lead a *Quadragesimal* life; or to live on *Quadragesimal* food all the year.

QUADRAGESIMA funday, is the first Sunday in lent; so called because it is about the fortieth day before Easter. See *EASTER*.

On the same account, the three preceding Sundays are called *Quinquagesima*, *Sexagesima*, and *Septuagesima*. See *QUINQUAGESIMA*, &c.

QUADRAGESIMALS, *QUADRAGESIMALIA*, denote *Mid-lent* contributions, or offerings.

It was an ancient custom for people to visit their mother-church on *Mid-lent* Sunday, and to make their offerings at the high altar: and the like was also done in Whitson-week

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—But as these latter oblations, &c. were sometimes commuted for by a payment of *Pence*, or *Whitson-farthings*: so were the former also changed into a customary payment, called *Quadragesimal*, *Denarii Quadragesimales*, and sometimes *Lætare Jerusalem*, from a hymn so called, sung on that day, beginning, *Jerusalem Mater omnium*, &c.

QUADRANGLE, in geometry, a quadrangular, or quadrilateral figure; or a figure which has four sides, or four angles.

To the class of *Quadrangles*, or *Quadrangular figures*, belong the *Square*, *Parallelogram*, *Trapezium*, *Rhombus*, and *Rhomboides*.

A *Square*, &c. is a regular *Quadrangle*—a *Trapezium* an irregular one.

Quadrangular figures are not proper for fortification; the flanks and flanked angles being too small.

QUADRANS, in antiquity, the fourth part of the *As* or *Pound*.

QUADRANS, in our customs, is the fourth part of a penny: or, a farthing.

QUADRANT, *QUADRANS*, in geometry, an arch of a circle, containing 90 degrees, or one fourth of the entire periphery.

Sometimes, also, the space or area included between this arch and two radii, drawn from the centre to each extremity thereof, is called a *Quadrant*, or more properly a *Quadrantal space*; as being a quarter of the entire circle.

QUADRANT, also denotes a mathematical instrument, of great use in navigation and astronomy; for the taking of altitudes, angles, &c.

The *Quadrant* is variously contrived, and furnished with various apparatus, according to the different uses it is intended for; but they have all this in common, that they consist of a *Quadrant*, or quarter of a circle, whose limb is divided into 90 degrees; and that they have a plummet suspended from the centre, and are furnished with Pinnules, or sights, through which to look. See *SIGHTS*, &c.

The principal, most usual, and useful *Quadrants*, are the *Common* or *Surveying Quadrant*, the *Astronomical Quadrant*, the *Herodetical Quadrant*, *Gunter's Quadrant*, *Sutton's* or *Collini's Quadrant*, and the *Sinical Quadrant*.

The *Common* or *Surveying QUADRANT*, (represented *Tab. Surveying*, fig. 30.) is made of brass, wood, or other matter; usually 12 or 15 inches radius—Its circular limb is divided into 90°, and each of those subdivided into as many equal parts as the space will allow; either diagonally, or otherwise.—On one edge, or semidiameter, are fixed two immoveable sights: and in the angle, or centre, is hung a thread with a plummet. To the centre is likewise, sometimes, fixed a label or moveable index, bearing two other sights like the index of a telescope.—And in lieu of the immoveable sights, there is sometimes fitted a telescope; though this more peculiarly belongs to the *astronomical Quadrant*.

On the under side, or face of the instrument, is fitted a ball and socket; by means whereof, it may be put in any position for use.

Besides the essentials of the *Quadrant*, there is frequently added on the face near the centre, a kind of compartment, called the *Quadrat*, or *Geometrical Square*; as in the figure—This, in some measure, making a distinct instrument of itself; see its description and use under the article *QUADRAT*.

The *Quadrant* is to be used in different situations, according to the dimensions to be taken.—To observe heights and depths, its plane is disposed at right angles to the horizon; but to take horizontal distances, the plane is disposed parallel thereto.

Heights and distances, again, may be taken two ways: *viz.* by means of the fixed sights and plummet, and by the label.

Use of the surveying QUADRANT—To take the height, or depth of an object, with the fixed sights and plummets—Place the *Quadrant* vertically, and the eye under the sight next the arch of the *Quadrant*: thus direct the instrument to the object, *v. gr.* the top of a tower, till the visual rays thereof strike through the sights upon the eye.

This done, the portion of the arch intercepted between the thread and the semidiameter, whereon the sights are fastened, shews the complement of the object's height above the horizon, or its distance from the zenith; and the other portion of the arch intercepted between the thread and the other semidiameter, shews the height itself of the object above the horizon.

The same arch likewise gives the quantity of the angle made by the visual ray, and a horizontal line parallel to the base of the tower.

Note, to observe depths, the eye must be placed over that sight next the centre of the *Quadrant*.

From the height, or depth of the object, in degrees thus found, which suppose 33° , 35° , and the distance of the foot of the object from the place of observation carefully measured, which suppose 47 foot; its height or depth in feet, yards, &c. is easily determined by the most common case in trigonometry.

For we have here, in a triangle, one side given, viz. the line measured; and we have all the angles: for that of the tower is always supposed a right angle, the other two therefore are equal to another right angle; but the angle observed is 35° , 35° ; therefore the other is 54° , $25'$.

The case then will be reduced to this; as the sine of 54° , $25'$, is to 47 feet; so is the sine of 35° , $35'$, to a 4th term, viz. $33\frac{1}{2}$ feet: to which add the height of the observer's eye, supposed 5 foot, and the sum $38\frac{1}{2}$ feet, is the height of the tower required.

The further Use of the QUADRANT in taking of altitudes of objects, both accessible and inaccessible; see under the article ALTITUDE.

Use of the QUADRANT in taking heights and distances by the index and sights.—To take e. gr. a height, as that of a tower, whose base is accessible.—Place the plane of the instrument at right angles to the plane of the horizon, and one of its edges parallel thereto, by means of the plummet, which in that case will hang down along the other.—In this situation turn the index, till through the sight you see the top of the tower; and the arch of the limb of the *Quadrant* between that side thereof parallel to the horizon, and the index will be the height of the tower in degrees: whence, and from the distance measured as before, its height in feet, &c. may be found by calculation, as in the former case; or without calculation, by drawing, from the data, on paper, a triangle similar to the great one, whose base is the distance, and its perpendicular measured on the scale, is the height of the tower.

Use of the QUADRANT in measuring horizontal distances.—Though the *Quadrant* be a less proper instrument for this purpose than a theodolite, semicircle, or the like, by reason angles greater than *Quadrants* cannot be taken hereby; yet necessity sometimes obliges persons to have recourse to it.

The manner of its application herein is the same with that of the semi-circle; all the difference between the two instruments consisting in this, that the one is an arch of 180° , and can therefore take an angle of any quantity; and the other is only an arch of 90° , and is therefore confined to angles of that quantity. See, therefore, SEMI-CIRCLE.

Astronomical QUADRANT, is a large *Quadrant*, usually made of brass, sometimes of wooden bars, only faced with plates of iron, or the like; having its limb curiously divided, diagonally or otherwise, into degrees and minutes, and even seconds, if possible; with plain sights fixed to one side of it, or instead thereof a telescope; and an index moving about the centre, carrying either plain sights, or a telescope.

These *Quadrants* are of principal use in taking observations of the sun, planets, or fixed stars.

The ancients used only plain sights; but the moderns have found it of great benefit to use telescopes instead of them.

Add, that the contrivance of moving the index, by the help of a screw on the edge of the limb, and of readily and easily directing it, and the *Quadrant* upon its pedestal, to any desired phenomenon, by means of the screws and dented wheels, is a still greater modern improvement of the instrument.

The particulars of the mechanism whereby this is effected, would afford a very dry and intricate, as well as useless detail; which we shall omit, as being sufficiently known among the instrument-makers: and in lieu thereof, content ourselves with giving a figure or representation. See *Tab. Astronomy*, fig. 53.

The use of this instrument is obvious.—Being adjusted as above, and turned horizontally round on its axis, till through the moveable telescope the object be seen to fall in with the point of intersection of the cross bars; the degrees cut by the index give the altitude required.

Horodistical QUADRANT, is a pretty, commodious instrument, thus called from its use in telling the hour of the day.

Its construction is so simple and easy, and its application so ready, that we shall describe both; for the use of some who may want other conveniences.

Construction and use of the Horodistical QUADRANT—From the centre of the *Quadrant* C, (*Tab. Astron.* fig. 54.) whose limb AB is divided into 90° ; describe seven concentric circles at intervals at pleasure; and to these add the signs of the zodiac in the order they're represented in the scheme. 2. Applying a ruler to the centre C, and the limb

AB, mark upon the several parallels the degrees corresponding to the altitude of the sun when therein, for the given hours; connect the points belonging to the same hour with a curve line, to which add the number of the hour.—To the radius CA, fit a couple of sights, and to the centre of the *Quadrant* C, tie a thread with a plummet, and upon the thread a bead to slide.

If now the bead be brought to the parallel wherein the sun is, and the *Quadrant* be directed to the sun till a visual ray pass through the sights, the bead will shew the hour.

For the plummet in this situation cuts all the parallels in the degrees corresponding to the sun's altitude: since, then, the bead is in the parallel which the sun then describes, and through the degrees of altitude to which the sun is elevated every hour there pass hour-lines; the bead must shew the present hour.—Some persons who are not very nice, represent the hour-lines by arches of circles, or even by straight lines; and that without any sensible error.

Gunter's QUADRANT, is a kind of *Quadrant* (represented *Tab. Astronomy*, fig. 55.) invented by our countryman Edm. Gunter.

This, beside the graduated limb, fixed sights, and a plummet, as in the other *Quadrants*, has, likewise, a stereographical projection of the sphere on the plane of the equinoctial, with the eye placed in one of the poles; by which, besides the common uses of other *Quadrants*, several useful questions in astronomy, &c. are easily solved.

Use of Gunter's QUADRANT. 1. *To find the sun's meridian altitude for any given day; or the day of the month for any given meridian altitude.*—Lay the thread to the day of the month in the scale next the limb; and the degree it cuts in the limb is the sun's meridian altitude.

Thus, the thread being laid on the 15th of May, cuts 59° , $30'$; the altitude sought.—And contrarily, the thread being set to the meridian altitude, will shew the day of the month.

2. *To find the hour of the day.*—Having put the bead (which slides on the thread) to the sun's place in the ecliptic, observe the sun's altitude by the *Quadrant*; then, if the thread be laid over the same in the limb, the bead will fall upon the hour required.

Thus, suppose on the 10th of April, the sun being then in the beginning of Taurus, I observe the sun's altitude by the *Quadrant*, to be 36° ; I place the bead to the beginning of Taurus in the ecliptic, and lay the thread over 36° of the limb; and find the bead to fall upon the hour-line mark'd 3 and 9; accordingly the hour is either 9 in the morning, or three in the afternoon.—Again, laying the bead on the hour given (having first rectified or put it to the sun's place) the degree cut by the thread on the limb, gives the altitude.

Note, the bead may be rectified otherwise, viz. by bringing the thread to the day of the month, and the bead to the hour-line of 12.

3. *To find the sun's declination from his place given; and contrariwise.*—Set the bead to the sun's place in the ecliptic; move the thread to the line of declination ET, and the bead will cut the degree of declination required.—Contrarily, the bead being adjusted to a given declination, and the thread moved to the ecliptic, the bead will cut the sun's place.

4. *The sun's place being given, to find his right ascension; or contrariwise.*—Lay the thread on the sun's place in the ecliptic, and the degree it cuts on the limb is the right ascension sought.—Contrarily, laying the thread on the right ascension, it cuts the sun's place in the ecliptic.

5. *The sun's altitude being given, to find his azimuth; and contrariwise.*—Rectify the bead for the time (as in the second article) and observe the sun's altitude: bring the thread to the complement of that altitude; thus the bead will give the azimuth sought, among the azimuth lines.

6. *To find the hour of the night from some of the five stars laid down on the Quadrant.*—1. Put the head to the star you intend to observe, and find how many hours it is off the meridian, (by article 2.) then from the right ascension of the star, subtract the sun's right ascension converted into hours; and mark the difference: which difference added to the observed hour of the star from the meridian, shews how many hours the sun is gone from the meridian, which is the hour of the night.

Suppose, e. gr. on the 15th of May, the sun being in the fourth degree of Gemini, I set the bead to Arcturus; and observing his altitude, find him to be in the west about 52° high, and the bead to fall on the hour-line of two after noon: then will the hour be 11 hours 50 minutes past noon, or 10 minutes short of midnight.

For 62° , the sun's right ascension converted into time, makes 4 hours 8 minutes, which subtracted from 13 hours 58 minutes, the right ascension of Arcturus, the remainder will be 9 hours 50 minutes, which added to 2 hours, the observed distance of Arcturus from the meridian, shews the hour of the night to be 11 hours 50 minutes.

Sutton's QUADRANT, sometimes, also, called *Collins's pocket QUADRANT*

QUADRANT—One of the best of Mr. Sutton's *Quadrants*, (represented *Tab. Astronomy*, fig. 56) is the stereographic projection of one quarter of the sphere between the tropics, upon the plane of the equinoctial, the eye being in the north pole.

This is fitted to the latitude of London—The lines running from the right hand to the left are parallels of altitude, and those crossing them are azimuths: the less of the two circles bounding the projection is $\frac{1}{2}$ of the tropic of Capricorn, the greater $\frac{1}{2}$ of that of Cancer—The two ecliptics are drawn from a point on the left edge of the *Quadrant*, with the characters of the signs upon them; and the two horizons are drawn from the same point—The limb is divided both into degrees, and time; and by having the sun's altitude, the hour of the day may be here found to a minute.

The quadrantal arches next the centre contain the calendar of months; and under them, in another arch, is the sun's declination.

On the projection are placed several of the most noted fixed stars between the tropics, and next below the projection is the *Quadrat*, and line of shadows.

Use of Sutton's or Collins's QUADRANT—To find the time of sun-rising or setting, his amplitude, azimuth, hour of the day, &c.—Lay the thread over the day and the month, and bring the bead to the proper ecliptic, either that of summer or winter, according to the season; (which is called rectifying) then, moving the thread, bring the bead to the horizon; in which case the thread will cut the limb in the time of the sun's rising or setting, before, or after six; and at the same time the bead will cut the horizon in the degrees of the sun's amplitude.

Again, observing the sun's altitude with the *Quadrant*, and supposing it found 45° on the 24th of April; lay the thread over the 24th of April; bring the bead to the summer ecliptic, and carry it to the parallel of altitude 45° . In which case the thread will cut the limb at 55° , $15'$, and the hour will be seen among the hour-lines to be either 41 minutes past nine in the morning, or 19 past two in the afternoon.

Lastly, the bead among the azimuths shews the sun's distance from the south, viz. 50° , $41'$.

But note, that if the sun's altitude be less than what it is at six o'clock, the operation must be performed among those parallels above the upper horizon; the bead being rectified to the winter ecliptic.

SINICAL QUADRANT, is an instrument of use in navigation—It is represented *Tab. Navigation*, fig. 18. and consists of several concentric quadrantal arches, divided into eight equal parts by radii with parallel right lines crossing each other at right angles.

Now, any of the arches, e. gr. B C may be accounted a *Quadrant* of any of the great circles of the sphere, chiefly of the horizon, and meridian; if, then, B C be taken for a *Quadrant*, e. gr. of the horizon; either of the sides, e. gr. A B, may represent the meridian; and the other, A C will represent a parallel, or line of east and west; and all the other lines parallel to A B will also be meridians; and all those parallel to A C, will be east and west parallels, or east and west lines.

Again, the eight spaces into which the arches are divided by the radii, represent the eight points of the compass in a quarter of the horizon; each containing 11° , $15'$.

The arch B C is likewise divided into 96° , and each degree is subdivided into $12'$ diagonal-wise.

To the center is fixed a thread, as A L; which being laid over any degree of the *Quadrant*, serves to divide the horizon.

If the *Sinical Quadrant* be taken for a fourth part of the meridian; one side therefore, A B, may be taken for the common radius of the meridian and the equator; and then the other, A C, will be half the axis of the world—The degrees of the circumference B C will represent degrees of latitude, and the parallels to the side A B, assumed from every point of latitude to the axis A C, will be radii of the parallels of latitude, as likewise the fine-complements of those latitudes.

Suppose, then, it be required to find the degrees of longitude contained in 83 of the lesser leagues, in the parallel of 48° —Lay the thread over 48° of latitude on the circumference, and count thence the 83 leagues, or A B, beginning at A: this will terminate in H, allowing every small interval, four leagues. Then tracing out the parallel H G, from the point H to the thread; the part A G of the thread shews that 125 greater, or equinoctial leagues, make 6° , $15'$; and therefore that that 83 lesser leagues A H which make the difference of longitude of the course, and are equal to the radius of the parallel G I, make 6° , $15'$ of the said parallel.

If the ship sail an oblique course, such course, besides the north and four greater leagues, gives lesser leagues easterly and westerly; to be reduced to degrees of longitude of the equator—But these leagues being made neither on the parallel

of departure, nor on that of arrival, but in all the intermediate ones; we must find a mean proportional parallel between them.

To find this, we have on the instrument a scale of cross Latitudes. Suppose, then, it were required to find a mean parallel between the parallels of 40° and 60° . With your compasses take the middle between the 40th and 60th degree on the scale: this middle point will terminate against the 51st degree, which is the mean parallel required.

Use of the Sinical QUADRANT—This is to form triangles upon, similar to those made by a ship's way, with the meridians and parallels; the sides of which triangles are measured by the equal intervals between the concentric *Quadrants*, and the lines N. and S. E. and W.

The lines and arches are distinguished, every fifth, by a broader line; so that if each interval be taken for one league, there will be five between one broad line and another.

Now, suppose a ship to have sailed 150 leagues north-east, one fourth north; which is the third point, and makes an angle of 33° , $45'$, with the north part of the meridian—Here are given two things; viz. the course, and the distance sailed, by which a triangle may be formed on the instrument, similar to that made by the ship's course, and her longitude and latitude; and hence may the unknown parts of the triangle be found.

Thus, supposing the centre A to represent the place of departure; count, by means of the concentric arches, along the point the ship sailed in, as A D, 150 leagues from A to D; then is the point D the place the ship is arrived at: which note—This done, let D E be parallel to the side; and then there will be formed a right angled triangle A E D, similar to that of the ship's course, difference of longitude, and latitude: the side A E gives 125 leagues for the difference of latitude northwards, which makes 6° , $15'$: and the side D E gives 83 lesser leagues answering to the parallels; which being reduced, as shewn above, gives the difference of longitude—And thus is the whole triangle found.

QUADRANT, in Gunners, called also the *Gunners Square*, is an instrument serving to elevate or point cannons, mortars, &c. according to the places they are to be levelled or directed to.

It consists of two branches, made of brass or wood; one about a foot long, 8 lines broad, and one line in thickness; the other four inches long, and the same thickness and breadth as the former—Between these branches is a *Quadrant* divided into 90 degrees, beginning from the shorter branch; and furnished with thread and plummet. See its figure represented *Tab. Fortification*, fig. 4.

The use of this instrument is easy; nothing more being required but to place the longest branch in the mouth of the cannon or mortar, and elevate or lower it, till the thread cuts the degree necessary to hit a proposed object.

Sometimes, also, on one of the surfaces of the long branch is noted the division of diameters, and weights of iron bullets; as also the bores of pieces.

QUADRANT of Altitude, is an appendage of the artificial globe; consisting of a lamina; or slip of brass; the length of a *Quadrant* of one of the great circles of the globe; and divided into 90 degrees.

At the end where the divisions terminate; there is a nut rivetted on and furnished with a screw, by means whereof the instrument is fitted on to the meridian; and is moveable round upon the rivet, to all points of horizon: See its figure in *Tab. Astronomy*, fig. 61.

Its use is to serve as a scale in measuring of altitudes, amplitudes, azimuths, &c. See the manner of its application under the use of the **GLOBE**.

QUADRANTAL, in antiquity, a vessel in use among the Romans for the measuring of liquids.

It was at first called *Amphora*; and afterwards *Quadrantal*, from its form, which was square every way; like a die. Its capacity was 80 librae, or pounds of water; which made 48 sextaries, 2 urnae, or 8 congii.

QUADRANTAL Space, in geometry. See **QUADRANT**.

QUADRANTAL Triangle, is a spherical triangle, one of whose sides at least is a quadrant of a circle; and one of its angles a right angle. See **SPHERICAL Triangle**.

QUADRANTATA Terra, in our ancient law-books is used for a quarter of an acre; now called a *Rood*.

QUADRAT, **QUADRATUM**, called also *Geometrical Square*, and *Line of Shadows*, is an additional member on the face of the common Gunter's and Sutton's *Quadrants*: of some use in taking altitudes, &c. See **QUADRANT**.

The *Quadrat* K L H, (*Tab. Astronomy*, fig. 55.) has each of its sides divided into 100 equal parts, commencing from the extremes; so that the number 100 falls on the angle, representing tangents to the arch of the limb.

The divisions are distinguished by little lines from 5 to 5, and by numbers from 10 to 10; and the divisions being occasionally

occasionally produced a-crofs, form a kind of lattice, consisting of 10000 little squares.

The proportion here, is, as radius is to the tangent of the angle of altitude at the place of observation (*i. e.* to the parts of the *Quadrat* cut by the thread) so is the distance between the station and the foot of the object, to its height above the eye. See ALTITUDE.

Use of the QUADRAT, geometrical square, or line of shadows—1. The *Quadrat* being vertically placed, and the sights directed to the top of the tower, or other object whose height is required; if the thread cut the side of the *Quadrat* marked *right shadows*, the distance from the base of the tower to the point of station is less than the tower's height—If the thread fall on the diagonal of the square, the distance is just equal to the height—If it fall on that side marked *versed shadows*, the distance exceeds the height.

Hence, measuring the distance, the height is found by the *Rule of three*; inasmuch as there are three terms given—Indeed, their disposition is not always the same; for when the thread cuts the side of *right shadows*, the first term in the *Rule of three* ought to be that part of the side cut by the thread; the second the side of the square; and the third the distance measured—If the thread cut the other side, the first term is the whole side of the square, the second the parts of the side cut by the thread, and the third the distance.

For an instance of each—Suppose, *e. gr.* in looking at the top of a steeple the thread cut the side of *right shadows* in the point 40, and that the distance measures 20 poles; the case then will stand thus: as 40 is to 100, so is 20 to a fourth term, which I find to be 50; the height of the steeple in poles. Again, supposing the thread to fall on the other side, in the point 50, and the distance to measure 35 poles; the terms are to be disposed thus: as 100 is to 60; so is 35 to a fourth term, *viz.* 21, the height required.

Use of the QUADRAT without calculation—The preceding cases may be performed without calculation where the divisions of the square are produced both ways, so as to form the area into little squares.

Thus, suppose, 1. The thread to fall on 40 in the side of *right shadows*, and the distance be measured 20 poles; seek among the little squares for that perpendicular to the side which is 20 parts from the thread; this perpendicular will cut the side of the square next the centre, in the point 50, which is the height required in poles.

2. If the thread cut the side of *versed shadows* in the point 60, and the distance be 35 poles; count 35 parts on the side of the *Quadrat* from the centre; count also the divisions of the perpendicular from the point 35 to the thread, which will be 21, the height of the tower in poles.

Note, In all cases, the height of the centre of the instrument is to be added. See farther under SHADOW.

QUADRAT, in astrology, called also QUARTILE, an aspect of the heavenly bodies, wherein they are distant from each other, a quadrant, or ninety degrees. This is held a malignant aspect.

QUADRAT, in printing, is a sort of space; that is, a piece of metal, cast like the letters, to be used occasionally in composing, in order to form the intervals between words, at the ends of lines, &c. See PRINTING.

There are *Quadrats* of divers sizes, as *m Quadrats*, *n Quadrats*, &c. which are respectively of the dimensions of such letters.

QUADRATA *Legio*, among the Romans, was a legion consisting of 4000 men. See LEGION.

QUADRATIC Equation, is an equation wherein the unknown quantity is of two dimensions *i. e.* a is the square of the root, or number sought—As is, $x^2 = a + b^2$. See EQUATION.

Quadratic Equations are of two kinds; *simple*, or *pure*; and *affected*.

Simple, or *pure* QUADRATICS, are those where the square of the unknown root is equal to the absolute number given: as in $aa = 36$; $ee = 144$; $yy = 133225$.

The resolution of these is easy; it being apparent that nothing more is required than to extract the square-root out of the number or known quantity.

Thus the value of a in the first equation is equal to 6; in second $e = 12$, and a little more, as being a surd root; and in the third example $y = 365$.

Affected QUADRATICS, are those which between the highest power of the unknown number, and the absolute number given, have some intermediate power of the unknown number: as, $aa + 2ba = 100$.

All equations of this rank are in one or other of the following forms; *viz.* $aa + ad = R$. $aa - ad = R$. $ad - aa = R$.

There are several methods of extracting the roots of *affected Quadratics*; the most convenient is that of Harriot.—Suppose $x^2 + ax = +b^2$; here x being assumed as a part of the root; a , the known quantity of the second term, will be double the other part; and therefore half of a is the other part.—The

square thereof, will be completed by adding one fourth of aa ; which done, the root of the square may be extracted thus:

$$\begin{array}{r} x^2 + ax = b^2 \\ \frac{1}{4}aa \text{ add.} \\ \hline x^2. \quad ax. \quad \frac{1}{4}a^2 = \frac{1}{4}a^2. \quad b^2 \\ x^2. \quad \frac{1}{4}a = \sqrt{\left(\frac{1}{4}a^2. \quad b^2\right)} \\ \hline x = \frac{1}{2}a \sqrt{\left(a^2. \quad b^2\right)} \end{array}$$

In lieu of the characters + and − we here use points; to avoid the necessity of distinguishing several cases.

Construction of QUADRATIC Equations; See CONSTRUCTION.

QUADRATING of a piece, among gunners, is the seeing that a piece of ordnance be duly placed, and poised in its carriages; and that its wheels be of an equal height, &c.

QUADRATO-CUBUS, QUADRATO-QUADRATO-CUBUS, and QUADRATO-CUBO-CUBUS, are names used by Diophantus, Vieta, Oughtred, and others, for the 5th, 7th, and 8th powers of numbers. See POWERS.

QUADRATO-QUADRATUM, or Biquadratum, the fourth power of numbers; or the product of the cube multiplied by the root.

QUADRATRIX, in geometry, a mechanical line, by means whereof we would find right lines equal to the circumference of circles, or other curves and of the several parts thereof.

Or, more accurately, the *Quadratrix* of a circle, is a transcendental curve described on the same axis, the semiordinates whereof being given, the quadrature of the correspondent parts in the other curve, are likewise given. See CURVE.

Thus, *e. gr.* the curve AND, (*Tab. Analysis*, fig. 21.) may be called the *Quadratrix* of the Parabola AMC, since it is demonstrated that APMA = PN, or APMA = AP. PN, or APMA = PN, a, &c.

The most eminent of these *Quadratrices* are, that of Dinostrates, and that of Mr. Tschirnhausen for the circle; and that of Mr. Perks for the hyperbola.

QUADRATRIX of Dinostrates, is a curve, AM nm, (*Tab. Analysis*, fig. 2.) whereby the quadrature of the circle is effected, though not geometrically, but mechanically; it is thus called from its inventor Dinostrates.

Its genesis is thus—Divide the *Quadrantal* arch ANB into any number of equal parts; in N n, &c. by a continual bisection—divide the radius AC into the same number of parts in the points P p, &c. Draw radii CN, c n, &c.—Lastly, on the points P p, &c. erect perpendiculars PM, p m, &c. the curve formed by connecting these lines is the *Quadratrix* of Dinostrates.

Here, from the construction, AB:AN::AC:AP; and therefore, if AB=a, AC=b, AN=x, AP=y; $ax = by$. See QUADRATURE.

QUADRATRIX Tschirnhausiana, is a transcendental curve AM nm B, (*fig. 23.*) whereby the quadrature of the circle is likewise effected; invented by Mr. Tschirnhausen, in imitation of that of Dinostrates.

Its genesis is thus conceived—Divide the quadrant ANB, and its radius AC into equal parts, as in the former; and from the points P p, &c. draw the right lines PM, p m, &c. parallel to CB; and from the points N, n, &c. the right lines NM, nm, &c. parallel to AC—The points AMm, &c. being connected, the *Quadratrix* is formed; wherein AB:AN::AC:AP.

Here again, since AB:AN::AC:AP; if AB=a, and AC=b, AN=x, and AP=y; $ax = by$. See QUADRATURE.

QUADRATUM Cubi, QUADRATO-QUADRATO-QUADRATUM, and QUADRATUM Surdsolidi, &c. are names used by the Arabs for the 6th, 8th, and 10th powers of numbers. See POWERS.

QUADRATURE, QUADRATURA, in geometry, the act of squaring; or of reducing a figure to a square; or finding a square equal to some other figure proposed.

Thus, the finding of a square containing just as much surface or area as a circle, an ellipsis, a triangle, or other figure, is called the *Quadrature* of a circle, of an ellipsis, a triangle, or the like.

The *Quadrature* of rectilinear figures comes under the common geometry; as amounting to no more than the finding their areas, or superficies; which are in effect their squares.

Squares of equal areas are here easily had, by only extracting the roots of the areas thus found: and on such root as a side constructing a square. See the particular methods of finding the areas or squares, under each particular figure, as TRIANGLE, PARALLELOGRAM, TRAPEZIUM, &c.

The *Quadrature* of curves, that is, the measuring of their area, or the finding of a rectilinear space equal to a curvilinear

linear space, is a matter of much deeper speculation; and makes a part of the higher geometry.

Though the *Quadrature*, especially of the circle, be a thing many of the first-rate mathematicians among the ancients were very solicitous about, yet nothing in this kind has been done so considerable, as in and since the middle of the last century; when, *viz.* in the year 1657, Mr. Neil and my lord Brouncker, and afterwards, in the same year, Sir Christopher Wren, geometrically demonstrated the equality of some curves to a straight line.

Soon after this, others at home and abroad, did the like in other curves; and not long afterwards the thing was brought under an analytical calculus, the first specimen whereof ever published was given by Mercator in 1688, in a demonstration of my lord Brouncker's *Quadrature* of the hyperbola by Dr Wallis's reduction of a fraction into an infinite series by division.

Though it appears by the way that Sir Isaac Newton had before discovered a method of attaining the quantity of all quadrable curves analytically by his method of fluxions, before the year 1668.

It is contended between Sir Christopher Wren and Mr Huygens which of the two first found the *Quadrature* of any determinate cycloidal space—Mr Leibnitz afterwards found that of another space; and Mr Bernoulli in 1699 discovered the *Quadrature* of an infinity of cycloidal spaces, not only segments, but also sectors, &c.

QUADRATURE of the circle, or the finding a square equal to a given circle, is a problem that has employed the mathematicians of all ages; but still in vain.

It depends on the ratio of the diameter to the periphery, which was never yet determined in precise numbers.

Were this ratio known, (which would imply the circumference's being expressed by some affection of the diameter; and, of consequence, that it were equal to a right line) the *Quadrature of the circle* were effected: it being demonstrated, that the area of a circle is equal to a rectangular triangle, whose two sides comprehending the right angle, are the radius, and a right line equal to the circumference. So that to square the circle, all that is required is to rectify it.

Many have approached very near this ratio—Archimedes seems to have been one of the first who attempted it; which he did by means of regular polygons inscribed and circumscribed; and by using polygons of 96 sides, he fixed the ratio as 7 to 22.

Some of the moderns have come nearer, particularly Lud. à Ceulen, who with infinite industry found, at length; that supposing the diameter 1, the circumference is less than 3.14159265358979323846264338387950; but yet greater than the same number, if the last cypher be turned into an unit.

Strict geometry here failing, authors have had recourse to other means; and particularly, to a sort of curves, called *Quadratrices*; but these being mechanical curves, instead of geometrical ones, or rather transcendental instead of algebraical ones, the problem is never fairly to be solved thereby.

Hence, recourse has been had, by others, to analytics—and the problem has been attempted by three sorts of algebraical calculations—The first gives a kind of transcendental *Quadratures*, by equations of indefinite degrees: as if $ax + x$ be equal to 30, and x be sought, it will be found to be 3; because $3 + 3$, is 27 + 3, or 30—The second by vulgar numbers, though irrationally such; or by the roots of common equations, which for the general *Quadrature*, or its sectors, is impossible—The third by means of certain series, exhibiting the quantity of a circle by a progression of terms.

Arithmetic, in effect, affords us very accurate and intelligible expressions for all rational numbers; but it is defective as to irrationals, which are infinitely more numerous than the former: there being *e. gr.* an infinity of them between 1 and 2. The root of 2, which is a mean proportional between 1 and 2, is a very obscure idea: and its magnitude is such, as that if you would express it in rational numbers, which alone are clearly intelligible, you may still approach nearer and nearer its exact value, but never arrive precisely at it.

Thus, if for the value of the root of 2, you first put 1, it is visibly too little; if, then, you add $\frac{1}{2}$, it is too much; for the square of $1 + \frac{1}{2}$, or of $\frac{3}{2}$, exceeds 2. If, again, you take away $\frac{1}{4}$, you will find you have taken too much; and if you will return $\frac{1}{8}$, the sum will be too great—Thus, may you proceed to infinity, without ever finding a number to stop at.

Now these numbers, thus found, being disposed in their proper order, make what we call an *infinite series*. See **SERIES**.

Farther, of infinite series's there are some which only yield a finite sum, as $1, \frac{1}{2}, \frac{1}{4}, \frac{1}{8}, \text{ \&c.}$ and in general all such as decrease in geometrical progression—And there are others, on

the contrary, which make an infinite sum; as the arithmetical progression, $1, 2, 3, 4, \text{ \&c.}$

But, here, we have only to do with the former, as expressing a finite magnitude; yet cannot even the sum of these be always found—Thus, we are certain, that it is impossible to find the sum of the series expressing the root of 2.

Geometry, however, is free from the impossibility arithmetical labours under, of expressing irrational numbers—Thus, the diagonal of a square, whose side is 1, expresses the root of 2.

Yet, in other magnitudes, geometry itself may fall under the same difficulty with arithmetic—For it is possible, there may be right lines which cannot be expressed but by an infinite series of similar lines, whose sum it may be impossible to find. In effect, the right lines, which should be equal to curves, are frequently of this kind—In searching, *e. gr.* for a right line equal to the circumference of a circle, we find that the diameter being put 1, the circumference will be $1 + \frac{1}{4} + \frac{1}{16} + \frac{1}{64} + \frac{1}{256} + \frac{1}{1024} + \text{ \&c.}$ making an infinite series of fractions, whose numerator is always 4, and the denominators in the natural series of the uneven numbers; and all these terms, alternately, will be too great, and too little.

Could the sum of this series be found, it would give the *Quadrature of the circle*; but this is not yet done; nor is it at all probable that it ever will be done—That, however, is not yet demonstrated; nor of consequence, is the *Quadrature of the circle* yet demonstrated impossible.

To this it may be added, that as the same magnitude may be expressed by several different series, it is possible the circumference of the circle may be expressed in some other series, whose sum may be found—We have two infinite series; expressing the ratio of the circumference to the diameter, though indefinitely, as above—The first discovered by Sir Isaac Newton; where the diameter being put 1, the circumference, is $4 - \frac{1}{2} + \frac{1}{8} - \frac{1}{16} + \frac{1}{64} - \frac{1}{128} + \text{ \&c.}$ —The second, discovered by Mr. Leibnitz; where the diameter being 1, the circumference, is $4 - \frac{1}{3} + \frac{1}{27} - \frac{1}{243} + \frac{1}{2187} - \frac{1}{19683} + \text{ \&c.}$ The investigation of each of which series, by the *calculus integralis*, is as follows.

Sir Isaac Newton's QUADRATURE of the circle; or the investigation of his series, for squaring the circle.—If the radius of the circle, $AC = 1$ (*Tab. Analysis, fig. 24.*) $CP = x$, $y = \sqrt{1 - x^2}$ and $\sqrt{1 - x^2} = 1 - \frac{1}{2}x^2 - \frac{1}{8}x^4 - \frac{1}{16}x^6 - \frac{5}{128}x^8 - \frac{7}{2048}x^{10} - \text{ \&c.}$ to infinity. Then will $y dx = dx - \frac{1}{2}x^2 dx - \frac{1}{8}x^4 dx - \frac{1}{16}x^6 dx - \frac{5}{128}x^8 dx - \frac{7}{2048}x^{10} dx - \text{ \&c.}$ to infinity.

$\int y dx = x - \frac{1}{6}x^3 - \frac{1}{10}x^5 - \frac{1}{14}x^7 - \frac{1}{18}x^9 - \frac{1}{22}x^{11} - \text{ \&c.}$ to infinity.

When x becomes equal to the radius CA , the space $DCPM$ degenerates into a quadrant. Substituting, therefore, 1 for x , the quadrant will be $1 - \frac{1}{6} + \frac{1}{10} - \frac{1}{14} + \frac{1}{18} - \frac{1}{22} + \frac{1}{30} - \text{ \&c.}$ in infinitum.—Which same series will measure the entire area of the circle, the diameter being 1.

Mr. Leibnitz's QUADRATURE of the circle.—Let the tangent KB (*Tab. Analysis, fig. 25.*) $= x$, $BC = 1$; and the secant AC , infinitely near another CK , and the little arch KL be drawn with the radius CK ; then will $AK = dx$, $KC = \sqrt{1 + x^2}$. Now since the angles at B and L , are right angles; and by reason of the infinitely small angle KCL , the angle $BKC = KAC$; we shall have

$$KC : BC :: KA : KL$$

$$\sqrt{1 + x^2} : 1 :: dx : \frac{dx}{\sqrt{1 + x^2}}$$

$$\text{Farther, } CK : KL :: CM : mM$$

$$\sqrt{1 + x^2} : \frac{dx}{\sqrt{1 + x^2}} :: 1 : \frac{dx}{1 + x^2}$$

Therefore the sector $CMB = \int dx : (1 + x^2) = \frac{1}{2} (dx - x^2 dx + x^4 dx - x^6 dx + x^{10} dx - \text{ \&c.})$ whence by the integral calculus, we find the sector CMB , whose tangent $KB = x$, $1 - \frac{1}{3}x^3 + \frac{1}{5}x^5 - \frac{1}{7}x^7 + \frac{1}{9}x^9 - \frac{1}{11}x^{11} + \text{ \&c.}$ in infinitum. And therefore if BMB be the octant of the circle, or an arch of 45° , the sector will be $\frac{1}{2} - \frac{1}{16} + \frac{1}{64} - \frac{1}{256} + \frac{1}{1024} - \text{ \&c.}$ in infinitum. The double therefore, of this series, $1 - \frac{1}{8} + \frac{1}{16} - \frac{1}{64} + \frac{1}{256} - \frac{1}{1024} + \text{ \&c.}$ in infinitum, is the quadrant of the circle; or if the diameter be $= 1$, the entire area of the circle.

QUADRATURE of the lunes.—Though a definite *Quadrature* of the entire circle was never yet given; yet there have been various portions of it squared—The first partial *Quadrature* was given by Hippocrates of Chio; who squared a portion called, from its figure, the *lune*, or *lunule*. See **LUNE**, where the *Quadrature* is shewn.

This *Quadrature* has no dependence on that of the circle; but then it only extends to the entire lune, or its half; if you would square any portion thereof, at pleasure, the *Quadrature* of the circle comes in the way.

Yet some of the modern geometers have found the *Quadrature* of any portion of the lune at pleasure, independently of the *Quadrature* of the circle; though still subject to a certain restriction which prevents the *Quadrature* from being perfect, and, as the geometers call it, absolute and indefinite.

In 1701, the marquis de l'Hôpital published a new manner of squaring the parts of the lune taken different ways, and under different conditions—though this, too, is imperfect in the same manner as the other.

QUADRATURE of the ellipsis—The ellipsis, also, is a curve whose precise *Quadrature* in definite terms is not yet effected. We have here therefore, as before, recourse to a series.

Let AC (Tab. *Analysis*, fig. 26.) = a GC = c PC = x. Then will

$$\frac{y^2}{c^2} = \frac{(a^2 - x^2)}{a^2}$$

$$y = c \sqrt{(a^2 - x^2)} : a$$

$$\text{But } \sqrt{(a^2 - x^2)} = a - \frac{x^2}{2a} - \frac{x^4}{8a^3} - \frac{x^6}{16a^5} - \frac{5x^8}{128a^7} - \frac{7x^{10}}{256a^9} \text{ &c.}$$

$$\text{in infinitum. Therefore, } ydx = cdx - \frac{cx^3}{2a^2} - \frac{cx^5}{8a^4} - \frac{5cx^7}{16a^6} - \frac{7cx^9}{256a^{10}} \text{ &c. in infinitum.}$$

if then for x be put a ; the quadrant of the ellipsis will be $ac - \frac{1}{2}ac - \frac{1}{8}ac - \frac{1}{16}ac - \frac{1}{32}ac - \frac{1}{64}ac - \frac{1}{128}ac - \frac{1}{256}ac - \frac{1}{512}ac - \frac{1}{1024}ac - \frac{1}{2048}ac - \frac{1}{4096}ac - \frac{1}{8192}ac - \frac{1}{16384}ac - \frac{1}{32768}ac - \frac{1}{65536}ac - \frac{1}{131072}ac - \frac{1}{262144}ac - \frac{1}{524288}ac - \frac{1}{1048576}ac - \frac{1}{2097152}ac - \frac{1}{4194304}ac - \frac{1}{8388608}ac - \frac{1}{16777216}ac - \frac{1}{33554432}ac - \frac{1}{67108864}ac - \frac{1}{134217728}ac - \frac{1}{268435456}ac - \frac{1}{536870912}ac - \frac{1}{1073741824}ac - \frac{1}{2147483648}ac - \frac{1}{4294967296}ac - \frac{1}{8589934592}ac - \frac{1}{17179869184}ac - \frac{1}{34359738368}ac - \frac{1}{68719476736}ac - \frac{1}{137438953472}ac - \frac{1}{274877906944}ac - \frac{1}{549755813888}ac - \frac{1}{1099511627776}ac - \frac{1}{2199023255552}ac - \frac{1}{4398046511104}ac - \frac{1}{8796093022208}ac - 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In the *Quadratures*, and within 35 degrees thereof, the apsidal of the moon go backwards, or move in *antecedentia*; but they move forwards in the *Syzygies*. See *APSIDES*.

The moon's orbit undergoes various alterations in each revolution—Its excentricity is the greatest when the line of the apsidal is in the *Syzygies*; and the least, when in the *Quadratures*.

Considering one entire revolution, the nodes move slower and slower as the moon approaches the *Quadratures*, and they rest when she is therein: but considering several revolutions, the nodes go back fastest in the *Quadratures*.

The Inclination of the plane of the moon's orbit increases as the nodes go from the *syzygies*, and is greatest when the nodes are in the *Quadratures*.

QUADRATURE-lines, or *lines of QUADRATURE*, are two lines frequently placed on Gunter's sector.

They are marked with the letter Q, and the figures 5, 6, 7, 8, 9, 10; of which Q signifies the side of a square, and the other figures the sides of polygons of 5, 6, 7, &c. sides—S there stands for the semi-diameter of a circle, and 90 for a line equal to 90° in circumference.

QUADRATUS, in anatomy, a name applied to several muscles, in respect of their square figure, as the *Palmaris* and *Pronator*.

—There is also a *QUADRATUS femoris*, a member of the muscle *Quadrigenimus*, arising from the apophysis of the ischium, and maintaining an equal breadth and bulk to its insertion just below the great trochanter.—See *Tab. Anat. (Mysol.) fig. 7. n. 25.*

This affixes with the other muscles of the *Quadrigenimus*, to turn the thigh outwards. See *QUADRIGEMINUS*.

QUADRATUS genes, or *maxilla inferioris*, called also *mentatus*, and (on account of its breadth) *platysma raris*, is a square muscle lying immediately under the skin of the neck, thence called also *subcutaneous*.—It arises thin and membranous from the upper part of the spines of the vertebrae of the neck and the skin of the superior parts of the cucullaris and pectoral muscle; whence, spreading over the neck, it becomes fleshy, and is inserted partly into the os hyoides, and partly into the under edge of the lower jaw—It adheres firmly to the panniculus carnosus; from which it is not separated without difficulty; and therefore was not anciently distinguished from it—It serves to pull the lower jaw downward and away.

QUADRELS, in building, a kind of artificial stones, perfectly square, whence their name; they are made of a chalky, or whitish and pliable earth, &c. dried in the shade for at least two years.

They were formerly in great request among the Italian architects.

QUADRIGA*, in antiquity, a carr, or chariot drawn by four horses.

* The word is formed from the Latin, *quatuor*, four, and *jugum*, yoke.

Various are the accounts we have of the author of the *Quadriga*—Cicero makes it the invention of Minerva.—Hyginus attributes it to Erichonius IV. king of the Athenians; which sentiment Virgil also follows in his *Georgics*, lib. iii. v. 113, *Æchylus* gives Prometheus the honour thereof—*Tertullian*, de *Speſſac.* l. ix. says it was invented among the Argians, by Trochilus, in honour of Juno; and at Rome, by Romulus, in honour of Mars, or Quirinus. *Ado of Vienne Chronic. Aet.* 3. will have it to have been invented by one Procidus, about the time of the establishment of the kingdom of Athens. *Lazardels, Hist. Univers. Epitom.* l. xxiv. says the fame of Triptolemus.—Lastly, if there be not opinions enough already, Herodotus gives us another; and says the Greeks borrowed it from the Lybians—*Pliny* tells us, that his seal was a *Quadrige*, lib. xvi.

On the reverses of medals we frequently see victory, or the emperor, in a *Quadrige*, holding the reins of the horses; whence these coins are called among the curious, *nummi Quadrigati* and *victoriat*.

QUADRIGEMINUS, in anatomy, a muscle, or rather an assemblage of four muscles; serving to turn the thigh outward.

The first of the constituent muscles of the *Quadrigenimus*, is the *pyriformis*; the second and third are the *geminii*; and the fourth is the *quadratus femoris*. See each described under its proper article.

QUADRILATERAL, in geometry, a figure whose perimeter consists of four right lines, making four angles; whence it is also called a *Quadrangular* figure. See *QUADRANGULAR*.

If the several angles be right, the figure is a *rectangular Quadrilateral*—If oblique, an *oblique-angular Quadrilateral*.

If the sides of a *Quadrilateral* be equal, and the angles right, the figure is a *square*.

If the sides be equal, but the angles unequal, the figure is a *rhombus*.

If the angles be equal, and the sides unequal, the figure is a *rectangle*.

If only the opposite angles and sides be equal, the *Quadrilateral* is a *rhomboides*.

If the opposite angles and sides be unequal, the *Quadrilateral* is a *trapezium*.

The two opposite angles of any *Quadrilateral* figure inscribed in a circle, always make two right angles.

QUADRILL*, *QUADRILLA*, a little troop or company of cavaliers, pompously drest and mounted: for the performance of carrouals, juffs, tournaments, runnings at the ring, and other gallant divertissements.

* The word is borrowed from the Italian, being a diminutive of *Squadra*, a company of soldiers ranged in a square: for *Squadra* is, properly, to dispose any thing square; whence their *Quadrilla*, the French *Squadra* and *Quadrill*, and our *Quadrill*—It is not fifty years since the French wrote *Squadra* and *Ejquadra*.

A regular carroual is to have at least four, and at most twelve *Quadrills*.

Of these *Quadrills*, each is to consist of at least three cavaliers, and at most of twelve.

The *Quadrills* are distinguished by the form of their habits, or the diversity of their colours.

Quadrille is also a name of a game at cards.

QUADRIPARTITION, the dividing by four; or a taking of the fourth part of any number, or quantity.

Hence *Quadrupartite*, &c. something divided into four.

QUADRIREME, *QUADRIREMIS*, a galley, or vessel, with four oars on a side.

QUADRUGATA terra, in old law records, denotes a team-land; or so much as can be tilled by four horses.

QUADRUPED, *QUADRUPE*, in natural history, a four-footed beast: or a perfect, hairy, viviparous animal, having four feet and no more.

There is a great analogy between the structure of many of the *Quadrupeds*, and that of man—The principal differences result from their different posture; and are seen in the legs, heads, necks, stomachs, hearts, and in the nerves.

Quadrupeds are divided by Mr. Ray, into those which are hoofed, *ungulata*, and those which are clawed or digitate, *unguiculata*.

Hoofed-QUADRUPEDS, are either.

I. *Whole-hoofed*, *solidipeda*, *Moschus*, *Moschus*, *solidungula*: as the horse, and ass, the onager or wild ass; the mule, and the zebra of Africa, or the fine striped Indian or African ass, almost like a mule in form and stature.

Of the whole-hoofed kind, Aristotle has observed, that no one hath two horns—(he might have said any horns) no one hath the talus, or astragalus, nor have the males any appearance of Teats.

II. *Cloven-footed*, and that either 1°. into two divisions only; as the *arctos*, or bifurcate kind, which are again subdivided into such as are, first,

Ruminant, *brachyotis*, that is, such as chew the cud; and these either have hollow and perpetual horns, as the bull, sheep, and goat-kind; or deciduous horns, as the hart and deer-kind, which usually shed their horns annually.

Of the *bull-kind* are reckoned these: the common *bos* or bullock, of which the male is *taurus*, the female *vacca*: the German *urus*, *urachus*, or *urochs*: the *bison*: the *bonafus*: the *bulbalus*, or *bulfalo*: and the *bos Africanus* of Bellonius, *Obs.* l. ii. c. 50. which he takes to be the *bulbalus* of the ancients.

Of the *sheep-kind*, besides the common sort, are reckoned the Arabian *ovis laticauda*, whose tail is sometimes of 30 pound weight; the *ovis strepsiceros cretica* Bellonii; the *ovis Africana*, with short hair instead of wool; and the *ovis Ginenensis*, or *Angolensis* of Marcgrave, *Hist. Brasil.* l. vi. c. x.

Of the *goat-kind*, are, besides the common *capra domestica*; the *ibex*, or German *steinbock*, found on the tops of the Alps; the *rupicapra*, French *chamois*, or German *goms*; the *gazelle Africana*, or antelope; the *gazelle Indica*; the *capra sylvestris Africana* Grimmii; the *capra mambrina*, or *Syriaca* of Gesner; the *buselaphus*, or *moschelaphus* Cui in Gesner; the *tragelaphus* Cui in Gesner; &c.

Of the *hart* or *deer-kind* are reckoned, the *cervus*, *Elæus*, or red deer; the *cervus platyceros* or *palmatus*, the fallow deer; also the elk; *rangifer*, the rein-deer; the *axis* Plinii, according to Bellonius; the *caprea* Plinii, the *cuguacuetz*, and *cuguacu-zapara* of Marcgrave; the *caprea Greenlandica*.

Secondly, of animals whose feet are divided into two parts only, and which do not chew the cud, there is only the hog and swine-kind: under this head, besides the common swine, are reckoned the wild boar, or swine; the *Guineensis* Marcgravi; the *porcus Indicus*, the *tajaca* or *aper mexicanus* *moschiferus* of Dr. Tyfon, called by Marcgrave, *tajaca canigara*, by others *quahita coyalt*, and *quapizotl*, and by Acosta and some others *zaine*.

2°. There

2°. There are some *Quadrupeds*, whose hoof is cloven into four divisions; and these seem to be not ruminant: as the rhinoceros, the hippopotamus, the tapicete of Brazil, the capy-bara of Brazil, and the animal moichitum.

Clawed or digitate QUADRUPEDS—Of this kind, there are, first, a sort whose claws are not divided or separated, but adhere to one another, and are covered with one common skin, but with obtuse nails, sticking out round the margin of the foot; as the elephant, which is anomalous, and not clearly referable to this kind, or to that of cloven-footed *Quadrupeds*.

A second species of this *digitate-kind* of *Quadrupeds*, which has only two claws, is the camel; and though these have no horns, they both ruminate, and have also the four stomachs of horned ruminant animals.

Of the camel, or dromedary, there are two sorts; one having but one hump on the back, the other two.

To this kind also belong the Peruvian *glama*, which some have reckoned among the sheep-kind; as also the *pacos*, the *avis Indica*, or *Peruviana vulgo*, which is much less than the *glama*.

A third species of this *unguiculate-kind*, includes such animals, as the Greek, called *Παρδαλις*, and *Ανδραπομορφα*, which have the foot divided into many claws, with broad nails on them; as the ape and monkey kind.

Of these, some have no tails, and are called *simia*, or apes; others have tails, and are called monkeys, *cercopithec*; and such as have either long or short tails, if they are of a larger size, are called *papiones*, or baboons—There are great numbers and varieties of this species of *Quadrupeds*; of which naturalists have described these: *viz.* the *orang outang*, or *homo filiostris* of Dr. Tyson, described by him in a particular discourse: the *guarita* of Brazil, *Margravii*; the *cagni* of Brazil, greater and lesser; the *cay* of the same region, described by Lerus; the *cattina* of the same country; the *cercopithecus barbatus Guineensis*, two or three sorts of it; the *cercopithecus angolensis major*; the *cercopithecus non barbatus Clusii*; the *cercopithecus Clusii*, called *Jagouin*: lastly, if apes and monkeys have their snouts very prominent like dogs, they are called *cynocephali*.

A fourth species of this *unguiculate-kind*, is, when though the claws are many, yet are not covered at the end with broad flat nails, like monkeys or apes; but are rather like the talons of hawks, &c. crooked, and sharp-pointed.

These, in respect of their teeth, may be divided into such as have many dentes primores, or incisors, (that is, cutting teeth) in each jaw, of which there are two sorts; a greater, which either have a short, round head, as the cat-kind; or a lesser sort, having a long slender body, with very short legs, as the weasel or vermin-kind.—There are also some of this species of *Quadrupeds*, which have only two large remarkable teeth in each jaw: these are the hare-kind, and these live only upon herbs, grass, &c.

Of the cat-kind of *Quadrupeds* are reckoned to be the lion, the tyger, the *pardalis*, whose male is *pardus*, and female *panthera*; the leopard; the *lupus cervarius*, or lynx; the *catus pardus*, or cat-a-mountain; the common cat; and the bear.

Of the dog-kind are reckoned the wolf; the *lupus aureus* or jackall; besides the common dog, of which kind they enumerate, the mastive; the *canis Venaticus graius*, *Græcus*, or *Scoticus*, the greyhound; *græius Hibernicus*, or the Irish greyhound; the *canis Venaticus jagas*, *indagator*, *scitator ferarum*, &c. the hound; *canis Venaticus Hispanicus* or *Aviarius*, the spaniel for land or water; *vertagus* or tumbler; *canis Ovensis*, or *domesticus*, the house-dog; *canis melitæus*, or the lap-dog; *canis getulus* or *Islandicus*, the shcock: and of all these sorts there are many varieties of mongrels, and hybridous breeds.

Other species of the dog-kind are the fox; the animal *zibethicum*, or civet-cat, as it is corruptly called, but by its teeth and snout is plainly of the dog-tribe; the *American coati*, or *rackoon*, or *rattom*; the *yaquiepat*; the *carigueya*, *maritucaca*, *caviggy*, *ropeza* or *epoffum*; the *taxis* or *neler*; the badger, grey, or pate; the *lutra* or otter; to these some add the *phoca*, sea-calf, or seal; the *equus marinus*, morie, or sea-horse, mistaken by some for the *hippopotamus*; the Dutch call him *volras*, the Danes and Islanders *rosmarus*; lastly, the *manati* or *vacca marina*, the sea-cow.

Of the vermin, or weasel-kind of *Quadrupeds*, is, first, the *mustela vulgaris*, the common weasel, in Yorkshire called *fourmart* or *fitcher*, *zeta*; the *viverra Indica*, called *quid* and *quirpel*; and another sort called *mungo*, and *mungathia*, of a reddish grey: the *mustela*, *ermine*, or *foat*, and *mustela filiostris*, the ferret; *utorius*, the pole-cat; *martes* or *foyna*, the marten or martlet; *mustela zibellina* the sable; lastly, the *genetta*; and the *ichneumon Bellini*.

Of the hare-kind of *Quadrupeds*, are first, *lepus*, or the common hare; *cuniculus*, the rabbit or coney; *tapeti*, or Brazil coney, and the *aperea* of Brazil; the *hystrix*, or porcupine, and the *hystrix Americanus*, or *cuanda* of Brazil;

castor, fiber, or the beaver: *sciurus vulg.* or squirrel; the Virginian, Zeylandic, Barbary, and American flying squirrel; *mus domestica*, major and minor, the common rat and mouse: to these also may be referred *mus major aquaticus*, the water-rat; the mink-rat, *mus axellomorum*, major and minor; the dormouse or sleeper, *mus noricus*, *Cricetus*, *Alpinus* seu *Marmota*; the *cavia cobaya*, or *cuniculus Americanus*, the Guinea-pig; the *agati*, and *paca* of Brazil; the *mus Norwegicus*, or *leming*; the *glio Gomeris*, or the *vell*; the *mus Indicus*, &c.

Anomalous QUADRUPEDS—To these several kinds, the following anomalous ones must also be added.

(1) Such four-footed viviparous animals, as have a longish snout, with their feet divided into many claws, and toes, and having teeth; as the *echinus terrestris*, or common urchin, or hedge-hog; *erinæus Indicus albus*; *tatu* or *armadillo prima* of Margrave; *tatete* of Brazil, or the second species of the *armadillo*, according to Margrave: *tatu apara*, his third species of *armadillo*; *Tatu Mytilinus*, *Soc. Reg. Mus.* the weasel-headed *armadillo*; *talpa*, the mole, warp, or mold-warp; and the *mus arvensis*, shrew, hardy shrew, shrew-mouse.

(2) *Quadrupedibus* and viviparous animals with a longish snout, having their feet divided into many claws or toes, but without teeth; as the *tamandua-guaca* of Brazil, *Margravii*; *ursus formicarius Cardani*, the great ant-bear; the *tamandua* of Brazil, or Margrave the lesser ant-bear.

(3) *Anomalous flying Quadrupeds*, with a shorter snout, and their feet divided as above; being of the bat-kind, or flitter-mice, or which there are of several sizes, and different forms.

(4) There is one very anomalous animal which has but three claws on each foot; and that is the *dis*, or *ignatus* of Margrave, the sloth or sluggard.

(5) Viviparous and sanguineous *Quadrupeds*, breathing with lungs, but having only one ventricle in the heart; as the *rana aquatica*, the frog or froth; *rana arborea*, seu *ramanculus viridis*, the small tree or green frog; *lufio*, *foembeta*, the toad; *testudo*, the tortoise, in Greek *χελων*; or these there are land and water ones, and many different species in foreign parts. See TORTOISE.

(6) *Oviparous Quadrupeds*, with a long tail stretched out horizontally, such are the lizard-kind; as *lacertus cinctum maximus*, the crocodile; *cerdyus*, seu *caudiciberos*, *ura-mastrix Græci*, larger than the green lizard; *tepeyaxin Novæ Hispaniæ*; *lacertus orbicularis* of Hernandez; *lacertus vulgaris*, the common est, swift, or newt; *lacertus viridis*, the green lizard; *lacertus succianus Aliboranensis*, at Rome and Naples called the *tarantula*; *lacertus Indicus*, called *senenhi* and *ingana*; *lacertus Brasiliensis*, called *tejuacu*, and *temapara* by Margrave; the *taragura*, *ameiva*, *taragura Ayuraba*, *Americana*, *Carapopepa*, *Teiunham*, &c. of Margrave; the *lacertus Indicus*; the *seincus*, or *crocodilus terrestris*; the *seps*, or *lacerta chalcidica*, a kind of footed serpent; *felio*, the swift, or spotted lizard; *salamandra* called the *salamandra aquatica*, the water eel; *lacerta volans Indica*; and the *chamaeleon*, or camelion.

QUADRUPLE, a sum or number multiplied by four, or taken four times.

QUADRUPLE is particularly used for a gold coin, worth four times as much as that whereof it is the *Quadruple*.

The *Quadruple* of the Spanish pistole is a piece of four pistoles, worth about three pounds twelve shillings sterling, called also the *double doubloon*.

The *Quadruple* of the louis d'or is only equal to two louis d'ors or French pistoles, or one pound thirteen shillings sterling. See PISTOLE.

QUÆ plura, a writ that anciently lay where inquisition had been made by an escheator, of such lands or tenements as any man died seized of, and all was supposed not to be found by the office.

This writ was to enquire what more land or tenements the party died seized of.—But it is now made useless by taking away the court of wards and offices.

QUÆ servitia. See PER quæ servitia.

QUÆSTA, in our ancient writers denotes an indulgence, or remission of penance; exposed to sale by the popes. See INDULGENCE.

QUESTIONARIÆ, in our ancient law-books, were people who went about with indulgences from door to door, desiring charity either for themselves or others.

* Matt. West observes, 1240, that the king, *Terram suam per Papales Questionarios; a pauperari*, &c. permittit.

QUÆSTUS, in law, is that estate, or those effects which a man hath by acquisition, or purchase; in contradistinction to hereditary, which is what he hath by descent. See ACQUEST and GOODS.

* Glanv. lib. vii. *ent habet hereditatem tantam, vel quæstum tantam, aut hereditatem & quæstum*.

QUAKERS, a religious sect, who made their appearance in

in England, during the time of the inter-regnum. They took their origin from George Fox, an illiterate person, born at Draiton in Leicestershire; and by profession a shoemaker.

The accounts of those times tell us, that as he wrought at his trade, he used to meditate much on the scriptures; which, with his solitary course of life, improving his natural melancholy, he began at length to have a sort of visions; and, in consequence thereof, set up for a preacher.

The new prophet proposed but few articles of faith; he dwelt mostly on morality; preached mutual charity, the love of God, and a deep attention to the inner motions and secret workings of the spirit—He would have a simple worship, and religion without any ceremonies; making it a principal point to wait in profound silence, the motion and direction of the holy spirit.

The genius of the times, the novelty of the doctrine, and the great appearance of devotion in the man, soon gained him disciples; and some unusual shakings and convulsions which they were seized withal at their first meetings, procured them the appellation *Quakers*.

They profess a great austerity of behaviour; a singular probity and uprightness in their dealings; a demureness and gravity of countenance; a coldness and sparingness of discourse, to have time to weigh what they say; a great deal of frugality in their tables, and a remarkable plainness in their dress.

They declaim much against the interested views of the English ministers; they blame all war, and set aside all use of oaths, as prohibited under the gospel.

According to the genius of rising sects, an eager zeal at first led them to some extravagancies: they would run about the streets naked; and were frequently put in prison for interrupting the ministers in service time.

One of their company, Naylor, is said to have had the impiety to allow his followers to call him son of God, son of justice, and king of Israel; to strew garments before him, and hail him at his entry into Bristol, with Hosanna son of David. He had his trial for the same, and was whipped for blasphemy, and even excommunicated by the rest.

Beside other penalties inflicted on them, they were laughed at, and rallied in writing, and exposed on the theatre: but they despised alike both the press and the prison, and formed their sect, in spite of all opposition of both; and under the direction of Fox, Dewsbury, and others, they grew from a loose, undisciplined multitude, into a regular body, with stated laws and polity; which they retain with great economy to this day.

The modern *Quakers* retain nothing of the extravagancies charged on their leaders; having approved themselves a sober, quiet people, of exemplary morals, and remarkably charitable and friendly to each other.

Their doctrines are not easily collected; at least, not easily represented out of their own terms, which appear somewhat ambiguous.

They hold Christ to be a light which hath lighted every man; and that whoever will soberly and seriously turn into himself with a sincere desire to know and practise his duty, will not fail to find there a sufficient director; a ray from the fountain of light illuminating the understanding, and assisting to distinguish good from evil.

They add, that such as follow the directions and convictions of this light, shall be holy and acceptable to God; and that this was the end of Christ's coming into the world—That so far as they follow this light, they shall be infallible; and that it is not opinions, or speculations, or notions of what is true, or subscriptions of articles or formula's of faith, how soundly soever worded, that make a man a true believer or a christian; but a conformity of mind and practice to the will of God, according to the manifestation and dictates of this divine principle of light within them.

Our Saviour's injunction about baptism they understand in a figurative sense, of a conversion and change of the heart; and wholly neglect the outward sign—Water-baptism they hold was only John's; that it was no more than a type or figure, fitted for the infant-state of the gospel: and therefore is now useless, in a dispensation, which is spiritual and inward.

The same they hold of the supper; alledging, that both allude to old Jewish practices, and were used as types or significations of a near and accomplishing work—They add, that the communion of saints consists only in a participation of the same divine principle, shewing itself in an unity of spirit.

As to ministry and ordinances, they deny that any are to be used of man's wit, or will, or carnal invention; or imitation; or other than what the inward principle directs them to—Accordingly, they have no persons set apart for the ministry; but without distinction of quality or sex, every one who is of sober life, and approved conversation, and believes him or herself called or moved thereto, is permitted to speak in their assemblies.

They own the scriptures to be given by divine inspiration; and allow them the appellation of the form of sound words;

but they refuse to call them the *word of God*, as being a denomination properly attributed to Christ alone—They add, that what makes them the more scrupulous in this respect is, that people are apt to be hereby led to think that if they have the scriptures, they have all; and so look for no farther word or light.

They acknowledge the holy three that bear record in heaven; father, word, and spirit; but they reject the school-terms, trinity, distinct persons, hypostases, &c. as not scriptural, and as apt to convey too gross ideas.

They have been even charged with denying the incarnation; our Saviour's humanity, divinity, plenary satisfaction, and the resurrection of the dead: but this is injurious to them; and all that can be justly said, is, that they do not allow of them in the same sense, or speak of them in the same terms, as is commonly done among others.—They allow the incarnation, and that the Godhead dwelt bodily in Jesus; and yet many of them say, there is no Christ but what is within them: whence it should seem their notion of the incarnation only implied this, that the light, which they call the Christ within, dwelt in the man Jesus Christ fully.—Their reasoning, here, is, that Christ as God, not being divisible, the measure or manifestation of the spirit of Christ in us, is a manifestation of the same Christ which dwelt bodily and fully in the man Jesus Christ.

They are silent as to the hypostatical union; and some of them are charged with allegorizing away the whole history of the crucifixion, the resurrection, and ascension; though their best and most approved writers have been very explicit in their acknowledgment of the reality of this history.

They decline the use of modes or forms of civility: expressing their respect to their superiors no other way but by obeying all just laws under their government.

The system of *Quakerism* is laid down in fifteen theses, by Robert Barclay, in a well writ apology addressed to king Charles II. Their history, writ in Low Dutch by William Sewel, and since translated into English; traces them from the beginning to the year 1717—A history of this people was also published *An.* 1695, by Gerard Croese; but that author is by them accused as having misrepresented facts, and in many respects done them injustice.

As to discipline and polity; the affairs of the communion are all managed under a democratical government, by rules established by common consent; and this principally at their meetings, whereof they have many kinds; viz. *monthly, quarterly, yearly, second day's meetings, meetings of sufferings, &c.*

Their *monthly* and *quarterly meetings* are held in their respective counties—To these deputies are sent from the several particular meetings—Here enquiry is made into the state of each meeting; who stand fast to the rules and orders; and who backslide; who pay tithes, and church rates, and who suffer for non-payment of either; who are married by priests, &c. and accordingly they proceed to censure, or encourage—Here, too, they excommunicate; and here receive again into communion; of all which things exact registers are kept.

From these meetings appeals lie to their *yearly ones*; which are always held in London, and consist of three orders or classes; viz. representatives sent from the quarterly meetings; correspondents for the several counties, and foreign countries; and ministers, or preachers.—Hither are transmitted accounts of what has been transacted in all the monthly and quarterly meetings over the world—Here are measures concerted, and directions given as to behaviour about tithes, and rates, providing for the poor, composing differences, &c.—Here public accounts are audited, and proper instructions given to the deputies to be observed at their return; and a yearly epistle of admonitions dispatched to be read in all their monthly and quarterly meetings throughout the world.

The *second day's meeting*, is a standing committee consisting of the principal preachers in and about the city, who meet every monday, to concert particular cases, and exigencies relating to the body happening between the yearly meetings; particularly to examine, approve, license, &c. all books printed in their behalf.

The *meeting of sufferings* is held every week, and consists of the correspondents for each county—Its business is to receive complaints from such as have suffered for non-payment of tithes and rates, and to procure them relief, either by sending them money; for which they have a settled fund, or by soliciting their causes above, or both.

QUALE jus, was an ancient writ judicial, which lay where a religious person had judgment to recover land; before execution was made of the judgment.

This writ was issued forth to the escheator between judgment and execution, to enquire whether the religious person had right to recover, or whether the judgment were obtained by collusion between the demandant and tenant; to the intent that the true lord were not defrauded.

QUALIFICATOR, in the canon-law, a divine appointed to quality, or declare the quality of, a proposition brought before an ecclesiastical tribunal; chiefly before the inquisition.

The *qualificators* of the office are not judges; they only give their sentiments on the propositions presented to them—It is the inquisitors that judge.

QUALITY, *Qualitas*, that affection of a thing whence it is denominated such; or that which occasions a thing to affect our senses in this or that manner, and gives it this or that denomination.

Thus, that power in fire, whatever it be, whereby it excites in us the sensation of heat, since it is that whence the fire is denominated hot, is called the *Quality* of fire.

The word *Quality*, *Qualitas*, is said to have been first introduced into the Latin by Cicero: till his time the Romans studiously avoided using a term which denoted an abstract; and in lieu thereof, only considered the concrete, signified by *Quale*—The like is observed of the ancient Greeks, who did not use *qualitas*, but *ποιον*.

Quality, it is to be observed, is an ambiguous term; and has been applied to some things which ought rather to have been looked upon as states of matter, or assemblages of several *Qualities*; as life, health, beauty, &c.

There are, also, other attributes, as size, shape, motion, and rest, usually reckoned among *Qualities*, which might more conveniently be ranked among the primary modes of the parts of matter; since from these simple attributes all the *Qualities* are derived.

The ancient school philosophers distinguish *Quality* in the general, which they call *metaphysical* and *prædicamental Quality*; into *essential* and *accidental*—The moderns, more usually, divide it into *spiritual* and *corporeal*.

Spiritual QUALITIES, or *QUALITIES of the soul*, are affections of the mind, considered as in this, or that habitude or disposition—Of these they make two kinds; the one belonging to the understanding, the other to the will: of the former kind are knowledge, opinion, certainty, doubting, &c. Of the latter, are all the moral virtues and vices.

Corporeal or physical QUALITIES, are what we chiefly consider under this denomination, and to which the definition above laid down is accommodated.

Philosophers are divided as to the nature of these *Qualities*, or what they are in the body—The general language of the peripatetic school, is, that they are things distinct from the bodies themselves; and are superadded to them, or flow from their substantial forms: on which principle, they hold *Qualities* to be real, and denominate them *accidents*; supposing them to be inherent in substances, though not in the relation of parts, but to be sustained thereby as in a subject, and incapable of subsisting without them—In effect, the Thomists define *Qualities* to be accidents following or arising from the form; in the same manner as quantity is an accident following or arising from the substance.

The moderns absolutely explode the notion of *Qualities* distinct from the body: and insist, that the powers whereby bodies excite in us the ideas of such *Qualities* are no other than the mechanical affections of the bodies themselves, viz. the figure, magnitude, motion, &c. of the parts whereof they consist.

The principal considerations insisted on by the retainers to real *Qualities* are, that these powers may be actually separated from the substances they inhere in; as we see in light, heat, &c. That from these very *Qualities* considered as so many determinations there arises a very great diversity in bodies: and that bodies, according to the diversity of their *Qualities*, affect our senses very differently.

The adherents to the experimental way, on the contrary, account for all the *Qualities* of bodies from mechanical causes.

Thus all the phenomena of a clock, the motion of its wheels, its hands, &c. whereby it strikes the hour, points the minute, day, moon's age, &c. do all evidently arise from the single spring; which we never imagine to have any particular powers whereby it should be enabled to make such discoveries; nor any other principle but that one of elasticity—Again, when the smith who first invented locks and keys, had made his first lock, it was only a piece of iron, forged into a particular shape; and when, afterwards, he made a key to it, that also, considered in itself, was nothing but a piece of iron of a determinate figure; but as these two pieces of iron might now be applied to one another, after a certain manner, and, as there was a congruity betwixt the wards of the lock and those of the key, they now each obtained a new capacity; and it became a principal part of the notion and definition of a lock, that it was capable of being made to open or shut, by that other piece of iron called a key; and it was looked on as a peculiar faculty and power in the key to be fit to open and shut the

lock—And yet by these new attributes there was not added any real or physical entity, either to the lock or the key; each of them remaining the same piece of iron, just so shaped, as it was before. And, again, when the smith made other keys of different sizes, or with different wards; though the first lock could not be opened with any of those keys, yet, that indispotion was nothing new in the lock, or distinct from the figure it had before these keys were made.

Why, then, may we not conceive, as to sensible *Qualities*, that though, by virtue of a certain congruity or incongruity in point of figure, texture, or other mechanical properties, the portions of matter they modify are enabled to produce various effects, on account whereof the bodies are said to be endowed with *Qualities*; yet, these are not in the bodies endowed with them, any real or distinct entities, or differing from the matter itself of such a determinate bigness, shape, and other mechanical modifications?

Thus, though the modern goldsmiths and refiners reckon it among the most distinguished *Qualities* of gold, that it is dissoluble in aqua regia, whilst aqua fortis will not work upon it; yet these attributes are not in the gold any thing distinct from its peculiar texture; nor is the gold we have now of any other nature than it was in Pliny's time, when aqua fortis and aqua regia were unknown.

If another menstruum, of which Mr. Boyle suggests he was possessed, should be brought into use to dissolve pure gold in part, and change it into a different metalline body; there would then arise another new property, whereby to distinguish this from other metals: yet the nature of gold is not at all different now from what it was before the discovery of this last menstruum.

There are bodies neither cathartic nor sudorific, with some of which gold being joined acquires a purgative virtue, and with others a power to produce sweat—Nature herself sometimes produces things that have no relations to others: and art, especially if assisted by chemistry, may cause so many new productions, that no man can tell, but the most familiar bodies may have multitudes of *Qualities* he dreams not of, which will hardly be imagined real physical entities.

We all know that the sun hath a power to harden clay, soften wax, melt butter, thaw ice, turn water into vapour, make air expand itself in weather-glasses, contribute to blanch linnen, render the white skin of the face swarthy, and mowed grass yellow, ripen fruit, hatch the eggs of silk-worms, caterpillars, &c. and perform many other things, some of which seem contrary to others; yet these are not distinct powers, or faculties in the sun, but only the production of its heat, diversified by the different textures of the body it chances to work on, and the condition of the other substances concerned in the operation—And, therefore, whether or no the sun, in some cases, has any influence at all distinct from its light and heat, we see that all the phenomena mentioned, are producible by the heat of common fire, duly applied and regulated.

Some of the ancients, and particularly the Peripatetics, have distinguished *Qualities* into *sensible* and *accult*.

Sensible, or manifest QUALITIES, are those arising from certain modifications of matter, and which become immediately the objects of our senses—Such are all those above mentioned.

Though, in strictness, those only are said to be *sensible Qualities* which affect some one sense alone; as colour does the eye, sound the ear, &c.

These are sometimes, also, called *tangible Qualities*, by reason that they only produce their effect, i. e. excite their idea in us when contiguous, or in contact with the organ.

Occult QUALITIES, are certain latent powers arising from the specific forms of things, whereof no rational solution can be given on any principles of physics.

Sensible Qualities are usually subdivided into *primary* and *secondary*.

Primary, or general QUALITIES, are such as are found in all bodies; or which agree to all matter, considered as matter, and therefore to the elements themselves—Such are extension, figure, motion, rest, solidity, impenetrability, and number.

Secondary, or particular QUALITIES, are such as result from a composition or mixture of elements, and do not agree to body as body, but as a mixt—Such are light, heat, cold, colour, sound, taste, smell, hardness, softness, fluidity, firmness, roughness, smoothness, opacity, transparency, &c.

According to Aristotle and the Peripatetics, the primary, or elementary *Qualities*, are those of the four elements themselves; viz. heat, cold, moisture, and dryness.

The secondary *Qualities*, according to the same, are all the rest; which are combinations or assemblages of the former elementary ones; as colour, odour, taste, &c.

To give an idea of Aristotle's method of accounting for these secondary *Qualities* from his primary ones, we shall instance in his account of colour—All colours then, says he, are

are generated of a mixture of the four elementary *Qualities*: white, *e. gr.* is produced when the humidity furmounts the heat, as in old men, whose hair grows grey: black is produced when the humidity dries off, as in walls, cisterns, &c. red, &c.

Among the school-philosophers we meet with other divisions of *Qualities*; as *active*, and *passive*; *real* and *intentional*.

Active QUALITIES, are those by virtue whereof effects and operations are actually produced on other bodies duly disposed with respect thereto—Such are the heat of fire, the moisture of water, &c.

Passive QUALITIES are those whereby bodies are disposed to receive the action of others—Such are inflammability in oil, &c.

Real QUALITIES are those which remain in the subject; and only act on things adjacent thereto—As fire in a piece of iron not ignited, &c.

Intentional QUALITIES are those which issue from the subject, and operate at a distance—Such is the light emitted from the sun, &c.

But the moderns are agreed that either all *Qualities* are real, or all alike intentional—So that the distinction is impertinent.

However ignorant we may be of the nature of *Qualities*, or of the manner of their operation; yet we know the laws of their intention, and remission—Dr Keil demonstrates that every *Quality* which is propagated in *orbem*, such as light, heat, cold, odour, &c. has its efficacy increased, or abated in a duplicate ratio of the distances from the centre of radiation, or exertion of the *Quality*, reciprocally.

Thus, let A (*Tab. Geometry, fig. 80.*) be a centre from whence any *Quality* exerts itself round about, according to the right lines A c, A f, &c. The efficacy of the *Quality*, be it heat, cold, odour, &c. will be (at equal distances from A) as the spissitude or density of the rays A b, A c, A d. But the rays within the inner circle, or rather spherical superficies, b c d H, when they come to be extended to the other spherical surface, e f g K, will be much less close than they were before, and that in the reciprocal proportion of the spaces they take up; that is, if the outer surface be the double of the inner, the rays there will be but half as thick: But since spherical superficies are as the squares of their radii, therefore the efficacy of the *Quality* in the inner surface will be to that of the outer, As A e square, to A b square. Q. E. D.

Sir Isaac Newton lays it down as one of the rules of philosophizing, that those *Qualities* of bodies which are incapable of being intended and remitted, and which are found to obtain in all bodies wherein the experiment could ever be tried, are to be esteemed universal *Qualities* of all bodies. See PHILOSOPHIZING.

Chymical QUALITIES—One may distinguish physical *Qualities*, with Mr Boyle, into *first*, *second*, and *third*; to the two last of which may be referred several *Qualities* not treated of by the writers of physical systems; and these for distinction sake, may, some of them, be stiled the *chymical Qualities* of things, because Aristotle and the schoolmen, were unacquainted with them, and they have been principally introduced by means of chymical operations and experiments: as fumigation, amalgamation, cupellation, volatilization, percolation, &c.

By these operations, among other means, corporeal things come to appear volatile or fixed, soluble or insoluble in some menstrua, amalgamable or unamalgamable, &c. and these as well deserve the name of *Quality*, as several other attributes, to which it is allowed.

To these chymical *Qualities* some others might be added, which, because of the use that physicians principally make of them, may be called *medical Qualities*, whereby some substances received into the human body, are resolving, dissolving, suppurating, absterive, &c. For though some faculties of medicines, as those of heating, cooling, drying, attenuating, purging, &c. may be conveniently referred to the first, second, or third *Qualities*, mentioned by naturalists; whilst others are reckoned occult; yet as several of them ought not to be referred to the *Qualities* whereto they are often ascribed; so the handling of them may be looked upon as a desideratum, and deserves a distinct place in natural philosophy.

Cosmical QUALITIES, see COSMICAL *Quality*.

QUALITY is also used for a kind of title given to certain persons in regard of their territories, dignities, or other pretensions.

Thus the king of Great Britain takes the *Quality* of king of France: the king of Poland that of king of Sweden, the king of Sardinia that of king of Cyprus and Jerusalem: the czars of Russia and kings of Spain have whole pages of *Qualities*—The emperor of China assumes the *Qualities* of son of the sun.

QUAM *dis se bene gesserit*, a clause frequent in letters patent, or grants of offices, to secure them so long as the person they are granted to, shall not be guilty of abusing the same.

Thus, *e. gr.* we find it in those given to the barons of the exchequer; where it intimates that they shall hold the same as long as they shall behave themselves well: which is to be restrained to matters of their offices; and signifies no more than the law would have implied, had the office been granted expressly for life.

A grant therefore with this clause, is equivalent to a grant for life.

QUANTITY, QUANTITAS, any thing capable of estimation, or mensuration; or, which being compared with another thing of the same kind, may be said to be greater, or less, than it; equal, or unequal to it.

Mathematics is the science or doctrine of *Quantity*.

Quantity is a general attribute, applied in a very different manner to things of very different nature; where it is impossible to give any universal definition thereof.

Quantity is applied both to things, and to modes; and this either singularly, to one; or plurally, to several—In the first case it is called *magnitude*, in the latter *multitude*.

Quantity may be reduced to four classes, *viz.*

Moral QUANTITY, which depends on the manners of men, and the free determination of their wills—As the prices and value of things: degrees of dignity and power, good and evil, merit and demerit, rewards and punishments, &c.

Notional QUANTITY, arising from the operation of the understanding only—Such as the largeness or narrowness of the capacity of the mind, and its conceptions—In logic, universals, predicaments, &c.—In grammar, the *Quantity* or measure of syllables, accents, tones, &c.

Physical, or natural QUANTITY, which is of two kinds; 1. That which nature furnishes us with in matter, and its extension. And, 2. In the powers, and properties of natural bodies; as gravity, motion, light, heat, cold, rarity, density, &c.

Transcendental QUANTITY, as duration, the continuation of any being, existence, time, &c.

Quantity is also popularly distinguished into *continued* and *discrete*.

Continued QUANTITY, is when the parts are connected together—This, again, is of two kinds: either *successive* and *improper*, as time;

Discrete QUANTITY, is when the parts whereof it consists, exist distinctly and unconnected together; which makes what we call *number*.*

* The notion of continued quantity, and its difference from discrete, appears to some without foundation—Mr Machin considers all mathematical quantity, or that for which any symbol is put, as nothing else but number, with regard to some measure which is considered as one. For that we cannot know precisely how much any thing is but by means of number. The notion of continued quantity without regard to any measure is indistinct and confused: And tho' some species of such quantity consider'd physically, may be described by motion, as lines by the motion of points, and surfaces by the motion of lines; yet the magnitudes or mathematical quantities are not made by the motion, but by numbering according to a measure. *Vid. Phil. Trans. No. 447, p. 228.*

Permanent Quantity is farther distinguishable into length, breadth, and depth.

Wolffius seems to give us a more precise notion of mathematical *Quantity*, and its two species of discrete and continued—Whatever is referred to unity in the same manner as one right line to another, is what we call *Quantity*; or number in general.

If, now, the thing be referred to a given unit, as 3, it is called a determinate number: if to unity in the general, or at large, it is called a *Quantity*; which, on this principle, is the same with indeterminate number.

Thus, *e. gr.* the breadth of a river is accounted a *Quantity*; If, then, it be enquired how great it is; to conceive its *Quantity* we take some unit at pleasure, and see the relation of the breadth hereto; and according to the different unit assumed, we express the breadth of the river in a different determinate number.

The breadth of the river, therefore, is a *Quantity* considered as referred to a vague unit, or to unity at large; but the unit being determined, the thing is understood by a determinate number.

In this sense, algebra is the arithmetic of *Quantities*.

QUANTITY of motion, in mechanics, is of two kinds, *viz.* of momentary motion, and of entire motion.

QUANTITY of entire motion—The Cartesians define the entire motion as the momentary one, by the factum of the mass, or quantity of matter, into the velocity; but since motion is a successive being, and has no parts co-existing together, its

Quantity

Quantity ought to be estimated by the aggregate of the several parts existing successively; and is therefore equal to the factum of the momenta into the time.

QUANTITY of momentary motion, is the sum of the velocity, into the mass; or it is a measure arising from the joint consideration of the *Quantity* of matter, and the velocity of the motion of the body; the motion of any whole being the sum or aggregate of the motion in all its several parts.

Hence, in a body twice as great as another, moved with an equal velocity, the *Quantity* of motion is double; if the velocity be double also, the *Quantity* of the motion will be quadruple. Hence the *Quantity* of momentary motion coincides with what we call the momentum, or impetus of a moving body.

In the collision of bodies, the *Quantity* of momentary motion, which is found by taking the sum of motion, tending the same way, or their difference if they tend towards contrary parts, is not at all changed by any actions of the bodies on one another.

QUANTITY of matter in any body, is the product of the density into the bulk; or a *Quantity* arising from the joint consideration of its magnitude and density.

As, if a body be twice as dense, and take up twice as much space as another, it will be four times as great.

This *Quantity* of matter is the best discoverable by the absolute weight of bodies.

QUANTITY infinite.—Though the idea of magnitude infinitely great, or such as exceeds any assignable *Quantity*, does include a negation of limits; yet are not all such magnitudes equal amongst themselves; but besides infinite length, and infinite area, there are no less than three several sorts of infinite solidity; all of which are quantities *sui generis*; and those of each species are in given proportions.

Infinite length, or a line infinitely long, is to be considered, either as beginning at a point, and so infinitely extended one way; or else by two ways from the same point: in which case the one, which is a beginning of infinity, is one half of the whole, which is the sum of the beginning and ceasing infinity, or infinity *à parte ante*, and *à parte post*, which is analogous to eternity in time or duration; in which there is always as much to follow, as is past any point or moment of time.

Nor does the addition or subtraction of time, length or space of time, alter the case; either as to infinity or eternity; since neither the one or the other can be any part of the whole.

As to infinite surface or area, any right line infinitely extended both ways on an infinite plane, divides that plane into equal parts, the one to the right, and the other to the left of the said line; but if from any point in such a plane, two right lines be infinitely extended, so as to make an angle; the infinite area, intercepted between these infinite right lines, is to the whole infinite plane, as the arch of a circle drawn on the point of concurrence of those lines as a centre, intercepted between the said lines, is to the circumference of the circle; or as the degrees of the angle to the 360 degrees of a circle.

For an example.—Two infinite right lines meeting at a right angle on an infinite plane, do include a quarter part of the whole infinite area of such a plane: if two parallel infinite lines be supposed drawn on such an infinite plane, the area intercepted between them will be likewise infinite; but at the same time it will be infinitely less than the space intercepted between two infinite lines, that are inclined, though with never so small an angle, for that in the one case the given finite distance of the parallel lines diminishes the infinity in one degree of dimension; whereas in a sector, there is infinity in both dimensions; and consequently the *Quantities* are one infinitely greater than the other, and there is no proportion between them.

From the same consideration arise three several species of infinite space or solidity; for a parallelepiped, or a cylinder infinitely long, is greater than any finite magnitude, how great soever; all such solids supposed to be formed on a given basis, are in proportion to one another, as those bases. But if two of those three dimensions are wanting, as in the space intercepted between two parallel planes infinitely extended, and at a finite distance; or with infinite length and breadth, it have a finite thickness; all such solids shall be as the given finite distances one to another.

But these *Quantities*, though infinitely greater than the other, are yet infinitely less than any of those wherein all the three dimensions are infinite.—Such are the spaces intercepted between two inclined planes infinitely extended; the space intercepted by the surface of a cone, or the sides of a pyramid, likewise infinitely continued, &c. of all which, notwithstanding the proportions one to another, and to the π (as), or vast abyss of infinite space (wherein is the locus of all things that are, or can be) or to the solid of infinite length, breadth, and thickness taken all manner of ways)

are easily assignable.—For the space between two planes is to the whole, as the angle of those planes to the 360 degrees of the circle. As for cones and pyramids, they are as the spherical surface intercepted by them. is to the surface of the sphere; and therefore cones are as the versed sines of half their angles, to the diameter of the circle: these three sorts of infinite *Quantity* are analogous to a line, surface, and solid; and, like them, cannot be compared or have any proportion one to another. See the article INFINITE.

QUANTITIES, in algebra, are indeterminate numbers, or things, referred to unity in general. See NUMBER.

Quantities are properly the subject of algebra; which is wholly conversant in the computation of such *Quantities*.

Given *Quantities* are used to be noted by the first letters of the alphabet *a, b, c, d*, &c. the *Quantities* sought by the last *x, y, z*, &c. See CHARACTERS.

Algebraical *Quantities* are chiefly of two kinds; *positive*, and *negative*.

Positive or *affirmative* **QUANTITIES** are those which are greater than nothing; and which are affected with the sign $+$ prefixed; or supposed to be so.

Negative, or *privative* **QUANTITIES** are those less than nothing; which are affected with the sign $-$ prefixed.

Hence, 1. Since $+$ is the sign of addition, and $-$ the sign of subtraction; a positive *Quantity* is produced by adding any real *Quantity* to nothing; *e. gr.* $0 + 3 = +3$; and $0 + a = +a$. And a privative *Quantity* is produced by subtracting any real *Quantity* out of nothing; *e. gr.* $0 - 3 = -3$; and $0 - a = -a$.

For an illustration.—Suppose when you are quite destitute of money, somebody gives you an hundred pieces; you have then an hundred pieces more than nothing; which pieces constitute a positive *Quantity*.

On the contrary, suppose you have no money, yet owe an hundred pieces; you have then an hundred pieces less than nothing; for you must pay an hundred pieces to have just nothing. This debt is a negative *Quantity*.

Thus in local motion, progress may be called a positive *Quantity*, and regress a negative one; because the first increases, and the second diminishes the space passed over.

And in geometry, if a line drawn towards any part be accounted an affirmative *Quantity*; another the contrary way will be a negative one.

Privative *Quantities*, therefore, are the defects of the positive *Quantities* whereby they are understood; and, consequently are no real *Quantities*: for we measure the defect by the *Quantity* defective; and thus it becomes intelligible.

Since one defect may exceed another, (*e. gr.* if seven be wanting, the defect is greater than if only three be wanting) and since privative *Quantities* are the defect of real *Quantities*; one privative *Quantity* being taken a certain number of times, may exceed another. Wherefore privative *Quantities* are homogeneous to one another.

But since the defects of a positive *Quantity* taken any number of times can never exceed the positive *Quantity*, but grow still the more deficient; privative *Quantities* are heterogeneous to positive ones.

Since, then, privative *Quantities* are heterogeneous to positives ones, and homogeneous to privative ones; there can be no ratio between a privative and a positive *Quantity*, but there is a ratio between privative ones. *E. gr.* $-3^2 : -5^2 :: 3 : 5$. The ratio, here, is the same as if the *Quantities* were positive. But it may be noted, that between 1 and -1 , and between -1 and 1 , the ratio is very different.

Commensurable **QUANTITIES**. See COMMENSURABLE.

Compound **QUANTITIES**. See the article COMPOUND.

Exponential **QUANTITY**. See the article EXPONENTIAL.

Like **QUANTITY**. See the article LIKE.

Simple **QUANTITIES**. See the article SIMPLE.

Transcendental **QUANTITIES**. See TRANSCENDENTAL.

Variable **QUANTITIES**. See the article VARIABLE.

Addition of **QUANTITIES**.—1°. If the *Quantities* denoted by the same letter be affected with the same sign, the numbers prefixed to them are added as in common arithmetic.

2°. If they be affected with different signs, the addition is changed into subtraction; and to the remainder is prefixed the sign of the greater.

3°. *Quantities* denoted by different letters, are added by means of the sign $+$; as in the following example:

$$\begin{array}{r} 4a + 2b - 2c - 5d - g \quad a - b \\ 5a - 2b + 6c + 2d - 3g \quad c \\ 9a + 4c - 3d - 4g \quad a - b + c \end{array}$$

Subtraction of **QUANTITIES**. See SUBTRACTION.

Multiplication and **Division** of **QUANTITIES**. See MULTIPLICATION and DIVISION.

Combination of **QUANTITIES**. See COMBINATION.

If a positive *Quantity* be multiplied, or divided by another positive *Quantity*, the result is also a positive *Quantity*.

2. If a negative *Quantity* be multiplied, or divided by a positive, the result is a negative.

3. If a negative *Quantity* be multiplied, or divided by another negative, the result is a positive.

4. If a positive *Quantity* be multiplied, or divided by a negative, the result is a negative *Quantity*.

QUANTITY, in grammar, denotes the measure, or magnitude of the syllables; or, that which determines them to be called long, or short.

This *Quantity* is the object of prosody; and it is the regard to this that distinguishes verse from prose.

The economy and arrangement of the *Quantities*, i. e. the distribution of long and short syllables, make what we call the *number*.

The *Quantities* are used to be distinguished among grammarians by the characters *u* short, and *—* long.

The proportion between the long and short syllables may be generally fixed the same as that between the crotchet and quaver in music; viz. as 2 to 1. See **TIME**.

In most languages there are some syllables whose *Quantities* vary, as the measure requires; as in the English *reôrd* and *reôrd*.

Some authors confound the *Quantities* with the accent: but the difference is very evident; the former being the length or shortness of a syllable, the latter the raising or falling of the voice.

From two *Quantities*, viz. long and short syllables, arise all the varieties of poetic feet, which are very great. Horace alone uses no less than twenty-eight. Yet the Greeks went vastly beyond the Romans in this respect.—In effect, as many ways as two *Quantities* may be varied by composition, and transposition from two to six syllables, so many different feet have the Greek poets contrived, and that under distinct names, to the number of 124. Tho' it is the opinion of some of the learned, that poetical numbers may be sufficiently explained from the feet of two or three syllables, into which the rest may be resolved.

The feet formed by the antients of the long and short syllables immediately, are the *spondee*, consisting of two long syllables; the *pyrrhic*, of two short ones; the *iambic*, of a long and short syllable; and the *iambic*, of a short and long syllable.

Those of three syllables are the *molestus*, consisting of three long syllables; the *tribrach* of three short ones; the *dactyl* of one long and two short syllables; and the *anapest* of two short and one long syllable.

The English tongue admits of no feet above two syllables, though both the Latin and Greek allow of six.

Our heroic verses consist of five long and five short syllables intermixed alternately; though not so strictly but that the order may be dispensed withal. Dryden varies them with admirable beauty; frequently his heroic verse begins with a long syllable followed by two short ones.

The truth is, the *Quantity* of the syllables is but little fixed in the modern tongues; and there is still less regard had to it in the composition of modern verses.—The want of feet, or rather the shortness and uniformity of our feet, makes a world of difference between the numbers of the ancient and modern verse. Our poets are fettered, and their fetters are so short, consisting of but two poor links, that it is no wonder they can make no extraordinary motions.

The ancients subsisted by their *Quantities* alone; so well were they distinguished, and such a variety and harmony did they afford! Our *Quantities* make such poor music, that we are forced to call in the Gothic aid of rhyme to distinguish our verse from prose.

Yet have attempts been made to settle our verse on the ancient and natural footing of *Quantities*, in exclusion of rhyme, and with such success too, (witness the immortal *Paradise Lost*) as seems to leave the practice of rhiming inexcusable.—The French have likewise attempted the same in their tongue, particularly Jodelet, and after him Faquier, Passerat, and Rapin; but they have all failed.

QUANTITY of a Degree. See the article **DEGREE**.

QUANTITY of an eclipse. See **ECLIPSE**.

QUANTUM meruit, an action upon the case, grounded upon a necessity to pay a man for doing any thing so much as it deserve or merit.

QUARANTAIN*, in old law-books wrote **QUARENTERE**, and **QUARANTENA**, denotes the space of forty days.

* *Quaror Caracatus terre arabilis, continentes in Longitudine 8 Quarentenas, & 8 Quarentenas in Latitudine.* Chart. Whilani Reg. Merc. apud Ingulf.

Quarantena in London ponitur pro respectu balani pro 40 Dies post immolationem per breve Regis ut constans, &c. si sibi videtur expedire. MS. de temp. Ed. 3.

The term is borrowed from the French *quarentain*; and is sometimes used for the time of lent.

QUARANTAIN of the king, in France denotes a truce of forty days appointed by St. Louis, during which it was expressly forbid

to take any revenge of the relation or friends of people who had fought, wounded, or affronted each other in words.

QUARANTAIN is more particularly used for the term of forty days, which vessels, coming from places suspected of contagion, are obliged to wait in certain places appointed, to air themselves before they come into port.

QUARANTAIN, or **QUARANTINE**, **QUARANTENA**, in law, denotes a benefit allowed by the laws of England to the widow of a man dying seized of land; whereby she may challenge to continue in his capital messuage, or chief mansion-house (so it be not a castle) for the space of forty days after his decease.

If the heir, or any other person, attempt to eject her, she may have the writ *de quarantina habenda*; which lies for a widow to enjoy her *Quarantain*.

QUARANTAIN is also used for a measure or extent of land, containing forty perches.

QUARANTIA, in the Venetian polity, a court of judicature composed of forty judges.

The Venetians have an old civil *Quarantia*, a new civil *Quarantia*, and a criminal *Quarantia*.

The criminal *Quarantia* takes cognizance of all crimes except those against the state, which belong to the council of ten.—The new civil *Quarantia* judges of appeals made from sentences passed by judges out of the city.—The old civil *Quarantia* takes cognizance of appeals from sentences of subaltern judges in the city.

QUARE EJECIT infra terminum, a writ which lies for a lessee in case he be cast out of his farm before his term be expired, against the lessor, or feeoffee that ejects him. See **LEASE**.

It differs from *ejectione firmæ*, in that the former lies where the lessor, after the lease made, entitles another who ejects the lessee; whereas the *ejectione firmæ* lies against any other stranger that ejects him.

The effect is the same in both, viz. the recovery of the residue of the term.

QUARE IMPEDIT, a writ which lies for him who has purchased an advowson, against him that disturbs him in the right thereof, by presenting a clerk thereto when the church is void.

It differs from the assise of darrein presentment, *ultima presentationis*, which lies where a man or his ancestors formerly presented; this other lying for him who is the purchaser himself.—Where a man may have the assise, he may have this writ; but not contrarywise.

QUARE INCUMBRavit, a writ which lies against the bishop, who, within six months after the vacancy of a benefice, consents it on his clerk, while two others are contending at law for the right of presenting. See **PRESENTATION**, &c.

QUARE NON ADMISIT, a writ which lies against the bishop for refusing to admit his clerk who has recovered in a plea of advowson; on pretence of lapse, &c.

QUARE NON PERMITTIT, is a writ that lies for one who has a right to present for a turn against the proprietary.

QUARE OBSTRUXIT, a writ that lies for him who having right to pass through his neighbour's grounds, cannot enjoy the same by reason the owner has fenced it up.

QUARERA, or **QUARATIA**. See **QUARRY**.

QUARREL, **QUERELA**, in law. See **QUERELA**.

Quarrel seems properly to relate to personal actions, or at most to mixed ones, wherein the plaintiff is called *Querens*, and in all declarations of trespass it is said, *Queritur*.

Yet if a man release all *Quarrels* or *Querels* (a man's own deed being taken most strongly against himself) *Quarrel* includes all actions; and accordingly all actions, both real and personal, are hereby released.

QUARREL * of *glossi*. See the article **QUARRY**.

* The Word is formed by diminution from the Latin *quadratum*, or the French *quarre*, square; or, p rhaps, immediately from the Italian *quadrrello*, little square.

QUARRY, a place under ground, out of which are dug marble, free-stone, slate, lime-stone, or other matters proper for building.

For *quarries* of free-stone, in many places they first open a hole in manner of a well, twelve or fourteen foot in diameter; and the rubbish drawn out with a windlass in large oval baskets, they heap up all around; placing their wheel, which is to draw up the stones, thereupon.

As the hole advances, and their common ladder becomes too short, they apply a particular ladder for the purpose.—When they have got through the earth, and are arrived at the first bank, or stratum; they begin to apply their wheel and baskets to discharge the stones as fast as they dig through them.

They usually find six or seven of these different strata, or beds of stones, of different heights, and serving for different purposes; though the number as well as order wherein they follow is various.

As to the drawing of the stone, *i. e.* the freeing it from the bed; they find that common stones, at least the softer kinds, as they lie, have two grains; a cleaving grain running parallel with the horizon, and a breaking grain running perpendicular thereto—After uncoping, then, *i. e.* clearing the earth from off it, they observe by the grain where the stone will cleave, and there they drive in a good number of wedges till they have thus cleft it from the rest of the rock.

This done, they proceed to break it: in order to which, applying the ruler to it at both ends, (ten, *e. gr.* or twelve inches a-part, according to the uses the stone is intended for) they strike a line, and by this cut a little channel with their stone-ax; and in the channel set five or six wedges (supposing the stone three or four foot) driving them in very carefully, with gentle blows, and still keeping them equally forward.

Having thus broke the stone in length, (which they are able to do to half an inch of any size) applying a square to the straight side, they strike a line, and proceed as before to break it in breadth.

This method of drawing is found vastly preferable to that where the stones are broken at random—One load of the former being found to do the business of a load and an half of the latter.

But it may be observed, that this cleaving grain being generally wanting in the harder kinds of stones, to break up these in the Quarries, they have great heavy stone-axes wherewith they work down a deep channel into the stone, and into this channel, at the top, lay two iron bars, driving their iron wedges between these bars.

Some in drawing of stone, especially the very hard kinds, make use of gun-powder, and with very good effect—in order to which, making a small perforation pretty deep into the body of the rock, so as to have that thickness of rock over it judged proper to be blown up at once; at the farther end of the perforation they dispose a convenient quantity of gun-powder, filling up all the rest with stones and rubbish strongly rammed in, except a little space for the train—By this means is the rock blown into several pieces, most of them not too unwieldy for a workman to manage.

QUARRY *, in glazery, a pane, or piece of glass cut in a lozenge, or diamond form. See GLASS.

* The word seems formed by corruption from *Quarrel*, (which see) unless we will suppose it to come immediately from the French *quarre*, square.

Quarries or *Quarrels* of glass are of two kinds, *viz.* square and long; each whereof is of different sizes, expressed by the number of pieces which make a foot of glass, *viz.* 8ths, 10ths, 12ths, 15ths, 18ths, and 20ths; but all the sizes are cut to the same angle, the acute angle being 77° 19' in the square *Quarries*, and 67° 22' in the long ones.

QUARRY, in falconry; is the game or fowl which the hawk is in pursuit of, or has killed.

QUARRY among hunters, is sometimes used for part of the vickers of the beast taken; given by way of reward to the hounds.

QUART, *q. d. fourth*, in music, fencing, gaming, &c. See MUSIC, &c.

QUART is particularly used for a diminutive measure, containing one fourth or quarter of some other measure. See MEASURE.

The English *Quart* is a fourth of a gallon, or two pints; the Roman *Quart*, or *Quartarius*, was the fourth part of their congius.

The French, from whom we borrow the word, besides their *Quart*, or *pot* of two pints, have various other *Quarts*, distinguished by the whole whereof they are quarters; as *Quart de Muid*, and *Quart de Boisseau*. See MUD and BUSHEL. They have also their *Quart* of a yard, &c.

QUARTAN, *QUARTANA*, in medicine, an intermitting fever, or ague, where the fit returns every third day. See FEVER, AGUE, &c.

It is called *Quartan*, that is, *fourth*, by reason the two sick days are reckoned, which, with the two intermitting ones, make four.

QUARTATION, among refiners, a method of purifying gold, by melting three parts of silver with one of gold; and then casting the mixture into aqua fortis; which dissolving the silver, leaves the gold at bottom, in form of a black powder. See REFINING.

Quartation, is what we more usually call *parting*, or the *de-part*. See Supplement Article *Quartatio*.

QUARTELOIS, *CARTELOIS*, or *cortices*, fur-touts, or upper garments with coats of arms quartered

on them, wore by the ancient knights in their military expeditions.

QUARTER, the fourth part of a whole, or integer divided into four equal portions.

In working of fractions the *Quarter* is expressed by $\frac{1}{4}$, three *Quarters* by $\frac{3}{4}$.

QUARTER, in weights, is a fourth part of the quintal, or hundred weight.

The *Quarter* is 28 pounds, avoirdupois.

QUARTER * is also a dry measure containing of corn 8 bushels striked; and of coals the fourth part of a chaldron.

* *Quartarium frumenti, caput ex octo Bushelis. P. eta. l. 2.*

QUARTER in law, *QUARTERIUM anni*, is the fourth part of a year.

Hence the days whereon those *Quarters* startedly commence, are called *Quarter-days*.

Quarter-days are the 25th of March called Lady-day; the 24th of June, called Midsummer-day; the 29th of September, called Michaelmas-day; and the 25th of December, or Christmas-day.

QUARTER in astronomy—The moon's period, or lunation, is divided into four *Quarters*, or *Quarters*; containing each from seven to eight days.

The first *Quarter* is from the new moon to the quadrature; the second thence to the full moon, &c.

QUARTER in heraldry, is sometimes used for a scutcheon, or coat of arms.

In this sense there are sixteen *Quarters* required to prove nobility, in companies or orders where none but noble are admitted.

The word *Quarters*, required as a proof of nobility, is derived hence, that they used anciently to put the coats of arms of the father, mother, grand-father, and grand-mother, on the four corners of the tomb of the deceased.—In Flanders and Germany we frequently see tombs that have eight, sixteen, and even thirty-two *Quarters*.

QUARTER is also applied to the parts, or members of the first division of a coat that is quartered, or divided into four *Quarters*; as in *Tab. Herald. fig. 45*.

The king of Great Britain in the first *Quarter* bears gules three lions passant or, &c.—In the second *Quarter* he bears azure three flowers de lys, &c.

Franc QUARTER, is a *Quarter* single, or alone; which is to possess one fourth part of the field.

This makes one of the honourable ordinaries of a coat. See ORDINARY.

QUARTER in navigation—A *Quarter* of a point, wind, or rhumb, is the fourth part of a cardinal point, wind or rhumb: or of the distance between two cardinal points, winds, &c.

The *Quarter* contains an arch of 11 degrees 15 minutes.—The *Quarter* is what Wolhus, with regard to the other divisions, calls a secondary point of the second order.

QUARTER of a ship, is that part of the ship's hull, which lieth from the steerage-room to the transom.

QUARTER is also used for a canton, or division of a city: consisting of several ranges of buildings, &c. separated from some other *Quarter* by a river, a great street, or by some other boundary.

Such are the twenty *Quarters* of the city of Paris—Antient Rome was divided several times, under its several augmentations, into *Quarters* which were called *regions*; as may be observed in the topographies of Aurelius Nictor, Onaphrius Panvinus, Marilian, Pnyro Ligoric, Boissard, and other antiquaries.

In many cities there are commissaries of the *Quarter*, appointed to look to the policy thereof.—The prior of the Capucins accounts himself the chief, and colonel of the fourteen regions, or *Quarters* of Rome. *Muscarati, p. 134*.

Franchise of QUARTERS. See the article FRANCHISE.

QUARTER in war, the place allotted to certain forces to live, lodge, and incamp upon, during a siege, or the like. See CAMP.

The general's *Quarter* is that where the general lodges and incamps in person—They used to make lines of communication, to join the several *Quarters* together.

QUARTERS at a siege are the incampments on the principal passages about a place, serving to stop the avenues and to prevent relief and convoys.

QUARTER is also used for any lodgment made in the field or campaign out of a siege—Thus they say, the general has extended his *Quarters* a good way—The enemy coming by made him contract his *Quarters*.

Winter QUARTERS, is the place allotted troops to pass the winter season in—Wherein these differ from garrisons, see GARRISON.

Winter

Winter **QUARTERS** is also used for the time the troops continue in this lodgement; and for the advantage the captains make thereof—Thus they say, such a regiment was put to *Winter-quarters* in such a village—The *Winter-quarters* only held three months—Each captain will make at least a thousand crowns of his *Winter-quarters*.

In Spain they have also *Summer-quarters*.

QUARTER of assembly, is the place of rendezvous, where the troops are to meet and draw up to march in a body.

QUARTERS of refreshment, is some well-provided fertile spot, to which troops, that have been much fatigued and harassed, are sent to recover their strength, or health; even during the season of the campaign.

There are also *Quarters* assigned for the hucksters, and their equipage.

QUARTER also denotes the safety, and good treatment promised to persons, or troops that surrender, and lay down their arms—Thus they say, the enemy begged *Quarter*.

The phrase took its rise from an agreement anciently made between the Dutch and Spaniards, that the ransom of an officer or soldier, should be a quarter of his pay—Hence, to beg *Quarter* was to offer a quarter of their pay for their safety; and to refuse *Quarter* was not to accept of that composition for their ransom.

QUARTERS in building, those slight upright pieces of timber, placed between the punchions and posts; used to lath upon.

They are of two kinds, *single* and *double*—The *single Quarters* are fawn to two inches thick and four inches broad; the *double* are four inches square.

QUARTERS in a clock, are little bells which sound the *Quarters* of an hour.

QUARTER-BULLET, a bullet quartered into four or eight parts.

QUARTER-DAY, see the article **QUARTER**.

QUARTER-DECK, of a ship, is that aloft the steerage, reaching to the round-house.—See *Tab. Ship. fig. 2. lit. O*.

QUARTERED Counter. See the article **COUNTERQUARTERED**.

QUARTERIDGE, money paid quarterly, or by the quarter.

QUARTERING, in the sea-language—When a ship under sail goes at large, neither by a wind nor before a wind, but as it were betwixt both; she is said to go *Quartering*. See **SAILING**.

The term is also used when a ship sails with quarter winds.

QUARTERING, in gunnery, is when a piece of ordnance is so travelled, that it will shoot on the same line, or on the same point of the compass as the ship's quarter bears.

QUARTERING in heraldry, the act of dividing a coat into four or more quarters, or *Quarterings*; by parting, coupling, &c. i. e. by perpendicular and horizontal lines, &c. See **QUARTERING** and **QUARTERLY**.

The king of Great Britain quarters with Great Britain, France, Ireland, Brunswick, &c.

Colombiere reckons twelve sorts of *Quarterings*; but other authors give us more—viz. Party per pale, dividing the escutcheons from top to bottom. See **PALE**.—Party per cross, dividing it from side to side. See **CROSS**.—Party of six pieces, when the escutcheon is divided into six parts or quarters—Party of ten; of twelve; of sixteen; of twenty; and of thirty-two, when there are so many partitions respectively.

Others give the divisions in another manner: as—Party per cross—per pale—per chief—per pale inlaid—per bend dexter—per bend sinister—per chevron—barry bendy of eight pieces—paleways of six pieces—barry of six pieces—barry of eight pieces—bendy of six—chequy—fustilly, or lozengy—pale bendy, or bendy lozengy—barry bendy lozengy, or bend lozengy—gyronny—barry lozengy counterchanged—waved of six pieces—barry nebule of six pieces—party per saltier—and party per pale in point. See *further under their respective articles*.

Counter **QUARTERING** a coat, is when the quarters are quartered over again, or subdivided each into four.

There are *counter-quartered* coats which have twenty or twenty-five quarters.

QUARTERING is also applied to the partitions or compartments themselves, that is, the several coats borne on an escutcheon, or the several divisions made in it, when the arms of several families are to be placed on the same shield, on account of intermarriages, or the like.

Colombiere observes, that thirty two is the greatest number used in France, but that the English and Germans sometimes extend to forty; as a testimony of the truth whereof, he says, he saw the escutcheon of the earl of Leicester, ambassador extraordinary in France in the year 1639, divided into the number of forty; and some, he affirms, do go on to sixty four several coats.

But a multitude of quarters makes a confusion; and accordingly all the writers of armoury cry out against it as an abuse—The first instance of *Quartering* whereof we have any account, is said to be in the arms of Renatus, king of Sicily, &c. in the year 1435, who quartered the arms of Sicily, Aragon, Jerusalem, &c.

William Wickly observes, that such *Quarterings* are much properer for a pedigree to be looked up in a chest, and occasionally produced as an evidence for the clearing or ascertaining of alliances of families, or titles to land, &c. than to be borne as a cognizance.

In blazoning, when the *Quartering* is performed per cross, the two quarters a-top are numbered the first and second; and those at bottom the third and fourth; beginning to tell on the right side—When the *Quartering* is by a saltier, &c. the chief and point are the first and second quarters, the right side the third, the left the fourth.

QUARTERING is sometimes also used for the distinguishing of younger brothers from elder. See **DIFFERENCE**.

QUARTERIZATION, **QUARTERING**, part of the punishment of a traitor, by dividing his body into four quarters.

* *Walsingham in Ric. 2. Audium & Confisum in pignora ferula irrotationis, suspensionis, decollationis, executionis & Quarterizationi adjudicavit*

QUARTERLY, in heraldry. A person is said to bear *Quarterly*, when he bears arm-quartered.

The king of Great Britain bears *Quarterly* of four; in the first quarter, gules, &c. Great Britain: in the second, azure, &c. Ireland, &c.

QUARTER-MASTER, an Officer in the army, whose business is to look after the quarter, of the soldiers, whereof there are several kinds; viz.—The

QUARTER-MASTER general, whose business is to provide good quarters for the whole army.

QUARTER-MASTER of foot, he who is to provide quarters for a regiment of foot.

QUARTER-MASTER of horse, he who is to provide quarters for a troop of horse.

QUARTER-MASTER, is also an Officer aboard a ship of which there are more or fewer according to her burthens. Their business is to rummage in the hold on all occasions, to overlook the steward in his delivery of victuals to the cook, and in his pumping and drawing out the beer; and in general to take care there be no waste.

The *Quarter-master*, or *Quarter*, is also to mind the ship's loading, which is the business he is chiefly employed about.

QUARTERN, **QUARTERON**, a diminutive of *Quart*; signifying a quarter of a pint; as a quart does a quarter of a gallon.

QUARTER-ROUND, in architecture, is a term used by the workmen for any projecting moulding in general, whose contour is a perfect quadrant, or quarter of a circle, or which approaches near that figure—See *Tab. Archit. Fig. 5*.

The architects usually call it *ovolo*; and Vitruvius, the *echinus*. **QUARTER-SESSIONS**, a court held quarterly, by the justices of peace of each county, alternately in the chief towns thereof as appointed by the *custos rotulorum*.

Hither the grand inquest, or jury of the county is summoned to appear, who upon oath are to inquire of all traitors, heretics, thieves, murderers, coiners, rioters, &c.

Those who appear to be guilty are by the said justices committed to prison, to be tried at the next assizes, when the judges go their circuits.

QUARTER-STAFF, a long staff or pole, borne by foresters, park-keepers, &c. as a badge of their office; and occasionally used as a weapon.

QUARTER-WHEELING, or **QUARTER of conversion**, in the military art, is a motion whereby the front of a body of men is turned round to where the flank was; this making a *quarter* of a circle.

If it be done to the right, the man in the right-hand angle keeps his ground, and faces about, while the rest wheel; if to the left, the left-hand man keeps his place, &c.

QUARTER-WIND, at sea, is a lateral, or side wind; or a wind which does not blow in stern, but a little aside of it. Properly the *Quarter-wind* is that which comes in abaft the main mast shrouds, even with the quarter of the ship.

The *Quarter-wind* is the best of all winds, as bearing into all the sails; whereas a wind blowing full in stern, is kept off by the fails of the mizzen.

QUARTILE, an aspect of the planets when they are three signs or go degrees distant from each other.

The *Quartile* aspect is marked thus ☐. See **CHARACTER**.

QUARTO, or *4to*, a book whereof four leaves, or eight pages, make a sheet.

QUARTO-DECIMANS, **QUARTO-DECIMANI**, an ancient sect in the church, who maintained that Easter was

was always to be celebrated conformably to the custom of the Jews, on the fourteenth day of the moon in the month of March, whensoever that day fell out. And hence their name *Quarto-decimari*, *q. d.* fourteenthers.

The Asiatics were mightily attached to this opinion, pretending that it was built on the authority of St. John, who was their apostle; and pope Victor could never bring them to obedience in this article, though he was upon the point of excommunicating them—Some are of opinion he actually did excommunicate them, but it is more probable he contented himself with menaces.

It is said Polycrates, bishop of Ephesus, wrote a long and warm letter, in the name of all the bishops of Asia, to Victor and the church of Rome, wherein he explained at large the usage of those churches with regard to the celebration of Easter; and maintained, that herein they only followed a constant tradition that had obtained immutably among them from the time of the apostle St. John, who died at Ephesus—But the pope not satisfied with this answer of Polycrates, had proceeded to excommunication, but that some of the most eminent bishops, among the rest Irenæus, interposed, and dissuaded him from disturbing the peace of the church by excommunicating a people for adhering to what they accounted a tradition.

QUASHING, in law, the overthrowing, and annulling a thing.

An array returned by one that has no franchise, shall be *Quashed*. *Coke on Littl. Fol. 156.*

QUASI-CONTRACT, in the civil-law, an act which has not the strict form of a contract, but yet has the force thereof.

In a contract there must be the mutual consent of both parties; whereas in a *Quasi-contract*, one party may be bound or obligated to the other without having given his consent to the act whereby he is obliged.

For an example—I have done your business, in your absence, without your procuration; and it has succeeded to your advantage. I have then an action against you for the recovery of what I have disbursed, and you an action against me to make me give an account of my administration: which amounts to a *Quasi-contract*.

QUASI-CRIME, or **QUASI-DELICT**, in the civil-law, the action of a person who does damage, or evil involuntarily.

The reparation of *Quasi-crimes* consists in making good the damages with interest.

QUASI-MODO *funday, low Easter-sunday*, or the next funday after Easter; thus called from the initial words of the introit of the mass for the day, *Quasi-modo geniti Infantes*.

In ancient deeds these words were signified by *q. m. g.*

QUATER-COUSINS, **QUATRE-COUSINS**; fourth cousins, or the last degree of kindred.

Hence, when persons are at variance, it is said they are not *Quater*, or *cater-cousins*.

QUATRE-NATIONS, *q. d. four nations*, the denomination of a college founded in 1661, by cardinal Mazarin; for the education and maintenance of sixty children, natives of the four countries conquered by the kings, *viz.* fifteen for Pignerol and Italy, fifteen for Alsatia, twenty for Flanders, and ten for Roussillon.

QUATUOR *homines præpositi*.

QUATUOR-VIR, in antiquity, frequently wrote **III. VIR**, a Roman magistrate who had three colleagues joined with him in the same administration.

To the *Quatuor-viri* was committed the charge of conducting and settling the colonies sent into the provinces.

Upon unlucky accidents, and other dangerous affairs, it was usual to create *Quatuor-viri* with commission to take care *ne quid detrimenti Respublica caperet*, that the republic were not prejudiced.

There were also *Quatuor-viri* appointed to inspect and take care of repairs, &c.

QUAVER, in music, a measure of time, equal to one half of the crotchet, or one eighth of the semibreve.

The *Quaver* is marked by the character *q*.

The English *Quaver* makes what the French call *crochne* crotchet; because of the hook at bottom. See **CROTCHET**.

The *Quaver* is divided into two semiquavers, noted *q*, and four demisemiquavers marked *q*.

QUAVERING, in music, the act of trilling, or shaking; or the running a division with the voice. See **DIVISION**.

QUAY, *Kay*, a space of ground paved on the shore of a river, or port; destined for the loading and unloading of merchandise. See **WHARF** and **KAY**.

QUEEN* *Regina*, a woman who holds the crown of a realm, singly and by right of blood.

* The word *Queen* is derived from the Saxon, *Cwen, cwen*, *war*, the wife of any one, but applied by way of excellency to the wife of the king only; whence she was antiently called the *king's Queen*: the West Saxons having no other name for a *Queen*, but the king, *viz.* *Afri. de Alfred. r. bar.* &c. She also was called *lady*, in Saxon, *plægis*; just as *madame*, or *mademoiselle*, are still used in France for the wife and daughter of the duke of Orleans.

The name *Queen* is also given by way of courtesy to her that is married to the king; called, by way of distinction, *Queen consort*—In respect whereof the former is called *Queen regnant* or regent.

The widow of a king is also called *Queen*, but with the addition of *Dowager*.

In the first sense, *Queen* is in all construction the same with *king*, and has the same power and prerogative in all respects that the king has.

The *Queen consort* is inferior, and a person distinct from and a subject of the king—In England, though she be a feme covert, yet may she sue, and be sued in her own name, and may make leases, and grants, &c. as a feme sole. She has several other prerogatives—Though an alien, she may purchase lands in fee simple, without either naturalization, or denization; she may present to a benefice; nor is plenary a bar against her more than against the king—She shall not be amerced if she be non-suited in any action; and may not be impeached till first petitioned.

To conspire her death, or violate her chastity, is high-treason. She has an ancient peculiar revenue, called *Queen-gold*.—Besides a very large dower, with a royal court, and officers apart.

The *Queen dowager* has this particular, that she loses not her dignity though she marry a private gentleman—Thus queen Katherine, widow of Henry VI. being married to Owen ap Tudor, Esq; maintained her action as *queen* of England—Much less does a *Queen regnant*, follow her husband's condition, or is subject to other *Queens*, but she is sovereign to her own husband, as queen Mary was to king Philip; unless it be otherwise appointed by parliament.

QUEEN-GOLD, *aurum regine*, a royal revenue, belonging to the queen of England, during her marriage to the king, and payable by divers persons (upon several grants of the king) by way of oblation out of fines, amounting to ten marks, or upwards, *viz.* one full tenth part above the entire fine, or ten pounds for every hundred pounds fine, on pardons and contracts, or agreements.

This becomes a real debt to the *Queen*, by the name of *aurum regine*, upon the party's bare agreement with the king for a fine, and recording it; without any farther promise or contract for this tenth part extraordinary.

QUEEN'S bench. See **KING'S bench**, &c.

QUE-ESTATE, in law, a plea whereby a man entitling himself to land, &c. saith, that the same estate which another had, he now has from him.

Thus, *e. gr.* the plaintiff alleges, that such four persons were seized of lands, whereunto the advowson in question belonged in fee; and who did present to it, and that afterwards the church was vacant, *que estate*—*i. e.* which estate he now has, and by virtue thereof he presents, &c.

QUE EST MEME, in law, a term used in actions of trespass, &c. for a direct justification of the very act complained of by the plaintiff as a wrong.

Thus in an action upon the case, the plaintiff saying the lord threatened his tenants at will in such sort, as he forced them to give up their lands; the lord in his defence pleads, that he said to them, if they would not depart, he would sue them at law—*Que est meme*, *i. e.* this being the same threatening that he used, the defence is good.

QUERELA, *Quarrel*, in law, denotes an action or declaration preferred in any court of justice.

In an action where the plaintiff is called *Querens*, *i. e.* complainant, his brief, complaint, or declaration, is called *Querela*.

QUERELA audita. See the article **AUDITA**.

QUERELA coram rege & concilio, a writ whereby one is called to justify a complaint of a trespass made to the king himself; before the king and his council.

QUERPO. See the article **CUERPO**.

QUERRIES, or **QUERRIES**. See **QUERRY**.

Gentleman of the QUERRY, is an officer appointed to hold the king's stirrup, when he mounts on horseback.

QUEST, or **INQUEST**, an inquisition, or inquiry made upon oath of an impannelled jury. See **INQUEST**.

* The word is formed of the French *quite*, search, of the Latin *questum*, a thing sought.

QUEST, in hunting, the seeking out of hounds; or the venting

venting and winding of spaniels. See HOUND.

QUESTION, QUÆSTIO, in logic, &c. a proposition, whose truth a person being inquisitive about, propoſes it, by way of interrogation, to another.

Logical questions are variously diſtributed; the ordinary diſtinction is into *ſiſt* or *primary Questions*; as, *quid eſt*; what is ſuch a thing?—And *ſecondary*, which ariſe out of the former; as, how is it?

QUODLIBETICAL QUESTION. See QUODLIBETICAL.

QUESTION, in law—The *Queſtio de jure* is generally to be diſtinguiſhed from the *Queſtio de factis*.

QUEST-MEN, perſons choſe yearly in each ward, to enquire into abuſes, and miſdemors, eſpecially ſuch as relate to weights and meaſures.

QUESTOR*, QUÆTOR, an officer in antient Rome who had the care of the public treaſure.

* The word is formed à *querendo*, ſeeking, ſearching.

The *Queſtorſhip*, *Queſtura*, is very antient, as having been eſtabliſhed under the kings—In the time of the republic, the ſenate appointed *Queſtors* in each province, to aſſiſt the proconſuls, as lieutenants or treaſurers, in the adminiſtration of the revenues; but under the emperors, there was properly but one *queſtor*, or treaſurer general of the empire: thoſe other inferior, or ſubordinate *queſtors* were then called aſſiſtants of the *queſtor*, *adjutores queſtoris*.

The *queſtor's* office was originally confined to the army.—They paid the ſoldiery, and took charge of moneys coming by ſpoil and plunder, &c.

At length there were new ones erected to reſide in the city, and to receive the public money, taxes, tribute, &c.—Their number was increaſed as the empire encreaſed: Sylla augmented it to twenty.

There was alſo another kind of *queſtors*, whoſe office was to enquire into and take cognizance of capital crimes.

QUESTOR ſacri palatii, or of the *ſacred palace*, was one of the firſt dignities under the emperors of Conſtantinople.

It was this *queſtor* that ſubſcribed the reſcripts of the emperor, and the answers to the petitions and ſupplications preſented to him.—He alſo drew up and ſigned the laws and conſtitutions which the emperor thought fit to publiſh; and took care of the adminiſtration of juſtice.

Some compare his function to that of our lord high chancellor.—It was uſually one of the *juris conſulti* that was charged with this office; it being required that he ſhould know the laws of the empire, be able to preſcribe and ſee them executed, and judge of cauſes brought by way of appeal before the emperor.

Conſtantine was the firſt who erected *queſtors* of the ſacred palace.

QUESTUS, or QUÆSTUS. See QUÆSTUS.

QUESTUS eſt nobis, a writ of nuſance, which by Stat. 15. Edw. I. lies againſt him to whom a houſe, or other thing that breeds a nuſance is defended, or alienated; whereas before that ſtatute, the action lay only againſt him who firſt levied, or cauſed the nuſance, to the damage of his neighbour.

See NUSANCE.

QUEUE, in heraldry, the tail of a beaſt.

If a lion have a forked tail, he is blaſoned by *double-queued*.

QUEUE d'ARONDE, q. d. *Swallow's-tail*, in fortification, a term applied to outworks, when narrower at the gorge than at the face or front; i. e. where the ſides open towards the campaign, and contract towards the gorge.

The name is occaſioned by its reſemblance in figure to a ſwallow's tail, which the French call *queue d'aronde*.

Of this kind are ſome ſingle as well as double tenailles; and ſome horn-works whoſe ſides are not parallel. See TENAILLE.

On the contrary, when the ſides are leſs than the gorge, the work is called *contre queue d'aronde*.

QUEUE d'aronde, in carpentry, a method of jointing, called alſo DOVE-TAIL.

QUIA, in logic. See the article REASON.

QUIA improvide, a ſuperſedeas granted in many caſes where a writ is erroneouſly ſued out, or miſ-awarded.

Such is that granted in behalf of a clerk of the chancery ſued againſt the privilege of the court, in the common-pleas, and purſued to the exigent.

QUICKEST deſcent, line. See DESCENT.

QUICK-lime. See LIME.

QUICK pulſe. See the article PULSE.

QUICKSET hedge. See the article HEDGE.

QUICKSILVER, a very ponderous fluid mineral, by the chemiſts called *mercury*—For the method of gaining, preparing it, &c. with its properties, uſes, &c. See MERCURY.

Virgin QUICKSILVER. See the article VIRGIN.

QUID, *what*, in the ſchools, is uſed to denote the definition of a thing.

It is thus called by reaſon the definition answers to the queſtion, *quid eſt*, what is it?

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Hence we have two kinds of *quid*; nominal, *quid nominis*; and real, *quid rei*.

QUID pro quo, in law; q. d. *what for what*, denotes the giving one thing of value for another: or the mutual conſideration and performance of both parties to a contract.

QUID pro quo, or **QUI pro quib** is alſo uſed in phyſic to expreſs a miſtake or cheat of an apothecary, in adminiſtring one medicine for another; or in uſing an ingredient in a compoſition different from that preſcribed.

In propriety, *quid pro quo* is a miſtake in the phyſician's bill, where *quid* is wrote for *quo*, one thing for another; or of the apothecary in reading *quid* for *quo*, and giving the patient the wrong medicine.

Hence the term is in the general extended to all cheats and all blunders or miſtakes committed in medicine, either in the preſcription, the preparation, or application of remedies.

A northern phyſician in a printed theſis on *quid pro quo's* owns ingenuouſly, that they are very frequent—He diſtinguiſhes very accurately a great variety of kinds of *quid pro quo's*; ſome with regard to the operation, others with regard to the ſubject, and others with regard to their form, or effects.

The firſt comprehends the *quid pro quo's* of the phyſician, the ſecond thoſe of the patient, the third thoſe of the apothecary.

He adds *quid pro quo's* of the chirurgion, *quid pro quo's* of the cook: *quid pro quo's* of the nurſe, &c. Nor does he omit that there are ſalutary *quid pro quo's*; dangerous *quid pro quo's*, i. different *quid pro quo's*, &c.—God preſerve us from *quid pro quo's*!

QUIDDENY, QUIDDENY, (of the Latin *cydonium*, or *cydeniatum*) a conſerve of quinces, called alſo MARMLADE.

QUIDDITY, QUIDDITAS, in the ſchools, a word of the ſame ſignification with *effence*.

The name is derived hence, that it is by the effence of a thing that is *tale quid*, ſuch a *quid*, or very thing; and not another—When upon ſeeing, or hearing the name of a thing whoſe nature, &c. we are unacquainted withal, we ask, *quid eſt*? what is it? we mean no more by the interrogation, but that we deſire to have its nature and effence explained by a Definition—Whence *quiddity* is uſually defined the effence known or expreſſed in a Definition.

And hence what is eſſential to a thing is ſaid to be *quiddative*—As *quiddative*, knowledge, &c.

QUID PRO QUO. See the article QUID.

QUIESCENT, ſomething at reſt. See REſT.

QUIETISM, the ſentiments of the *Quietiſts*, a religious ſect which made a great noiſe towards the cloſe of the laſt century.

Molinos, a Spaniſh prieſt, who died at Rome in the priſon of the inquisition, paſſes for the author of *quietiſm*; and yet the Illuminati in Spain had taught ſomething like it before.

The name is taken from a ſort of abſolute reſt, and inaction, which the ſoul is ſuppoſed to be in, when arrived at the ſtate of perfection, which in their language is called the *unitive life*—To arrive at this, a man is firſt to paſs through the purgative way; that is, through a courſe of obedience, inſpired by the fear of hell: hence he is to proceed into the illuminative way, before he arrives at perfection; to go through cruel combats, and violent pains; i. e. not only the uſual dryneſſes of the ſoul, and the common privations of grace, but infernal pains: he believes himſelf damned; and the perſuaſion that he is ſo continues upon him very ſtrongly ſeveral years: St. Francis de Sales, ſay the *quietiſts*, was ſo fully convinced thereof, that he would not allow any body to contradict him therein—But the man is, at length, ſufficiently paid for all this; by the embraces of God, and his own deification.

The ſentiments of the *quietiſts*, with regard to God, are wonderfully pure and diſintereſted—They love him for himſelf, on account of his own perfections, independently of any rewards or puniſhments: the ſoul acquieſces in the will of God, even at the time when he precipitates it into hell; inſomuch that inſtead of ſtopping him on this occaſion, B. Angelo de Foligny cry'd out, *Hæſte, Lord, to caſt me into hell: do not delay, if thou haſt abandoned me, but finiſh my deſtruction, and plunge me into the abyſs*.

At length, the ſoul, after long travail, enters into reſt, into a perfect *quietude*—Here it is wholly employed in contemplating its God; it acts ſto more, thinks no more, deſires no more; but lies perfectly open, and at large, to receive the grace of God, who by means thereof drives it where it will, and as it will.

In this ſtate, it no longer needs prayers or hymns, or vows; prayers where the ſpirit labours, and the mouth opens, are the lot of the weak, and the imperfect: the ſoul of the ſaint is, as it were, laid in the boſom, and between the arms of its God, where, without making any motion, or exerting any action, it waits, and receives the divine graces—It, then, becomes

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happy : quitting the existence it before had, it is now changed, it is transformed, and, as it were, sunk and swallowed up in the divine being, inasmuch as not to know or perceive its being distinguished from God himself. *Fencl. Max. dei Joints.*

QUIETISTS, the disciples of Mich. de Molinos; or the adherents to the opinions delivered in the article **QUIETISM**.

QUIETUS, *freed, or acquitted*; a term used by the clerk of the pipe, and the auditors in the exchequer, in their acquittances or discharges given to accountants; which usually conclude with the words *abinde receptus quietus*: which is called a *quietus est*.

A *quietus est* granted to a sheriff discharges him of all accounts due to the king.

QUINAQUINA. See the article **QUINQUINA**.

QUINARIUS, **QUINARY**, in antiquity, a little Roman coin, equal to half the denarius. See **COIN**.

The *quinarius* was properly the Roman half-penny. Medalists indeed use the term *quinarius* in the general for a medal of any matter, not exceeding the size of our six-pence; but P. Chamillart, in an express dissertation, shews this to be an abuse.—The silver coins, current under the republic, he shews, were two: the one weighing a drachm, and called *denarius*, as containing ten as's; the other weighing half a drachm, and called *quinarius*, as containing five as's: which coins continued on the same footing under the emperors.

Hence the origin of the word *quinarius*: and hence, in propriety, it is only the silver medal of the weight of half a drachm that the name belongs to; the Romans having never given it to any other species of the same size therewith.—It is only by way of analogy, therefore, that the moderns apply it to the medals of gold, or copper, of the same size with the silver *quinarius*; those of gold being fixed at a value much above, and those of brass much below five as's.

The only relation between these *quinarii*, is, that the gold *quinarius* is the half of a gold medal as to weight and value, and the brass *quinarius* half a brass medal, as the silver *quinarius* is half a silver one.

Hence a series of *quinaries* should seem at least as necessary in the cabinets of the curious, as the series of great medals; they being all equally different species of money, which teach us how many kinds of pieces there were of any metal current in commerce.

Add to this, says our author, that the *quinaries* were of a finer and more finished coin than the other medals, being wrought by the hands of the masters; which seems owing to the nicety required in engraving whole figures in so small compass. He adds, that though *quinaries* are very scarce, yet M. the duke of Maine had almost a complete set of them.

QUINCUNX, *quinque unciae*, denotes a thing that consists of five twelfth parts of another.

QUINCUNX, is chiefly used in gardening, for a plantation of trees, disposed originally in a square; consisting of five trees, one at each corner, and a fifth in the middle; which disposition repeated again and again, forms a regular grove, wood, or wilderness, and then viewed by an angle of the square, or parallelogram, presents equal and parallel alleys.

Or, the *quincunx* is the figure of a plantation of trees disposed in several rows, both length and breadthwise; in such manner as that the first tree of the second row commences in the centre of the square formed by the two first trees of the first row, and the two first of the third: resembling the figure of a five at cards.—The finest manner of planting trees to form a grove, is in the *quincunx*. It is of this kind of *quincunx* that Cicero speaks in his *Cato major*; and Quintilian, lib. 8. cap. 3.

The modern *quincunxes*, Daviler observes, are made like those of the ancients, except for the fifth tree, which is now generally disused; so that, being as it were, netted, and their alleys viewed by the side of the rectangle, they form a perfect chequer.

QUINCUNX, in astronomy, &c. denotes a position, or aspect of the planets when distant from each other 150 degrees, or five signs.

QUINDECAGON*, in geometry, a plain figure which has fifteen sides and fifteen angles.

* The word is formed somewhat irregularly, from the Latin *quinque*, five; and the Greek, *deka*, ten; and *gonia*, angle, —Pentecagon would be a more regular Term.

If the sides be all equal, it is a regular *quindecagon*.

Euclid shews how to inscribe it in a circle, Prop. 16. l. 4. And the side of a regular *quindecagon* so described, is equal in power to the half-difference between the side of the equilateral triangle, and the side of the pentagon; and also to the difference of the perpendiculars let fall on both sides, taken together.

QUINDECIM-VIR, **XV-VIR**, a Roman magistrate, who had fourteen colleagues joined with him in the same function.

Under Tarquin the Proud, there were first two magistrates erected to take care of the sacrifices to be performed; these were called *duumviri*. Their number, at length, grew to ten, and then they were called *decumviri*. In the time of Cicero it had reached to fifteen, when they assumed the name of *quindecimviri*: and though their number grew to forty afterwards, yet Servius observes, on the sixth of the *Æneid*, that their name never after changed, but they still continued to be called *quindecimviri*.

It was they who examined the Sibyl's books, and were the interpreters thereof; yet they never did this but by express order of the senate, declared by a *senatus-consultum*—They also presided at the sacrifices, and all other extraordinary ceremonies of religion.

On medals, a dolphin joined with a tripod marks the priesthood of the *quindecimviri*; who, to publish their solemn sacrifices, used, on the eve thereof, to carry a dolphin at the end of a pole, throughout the city; that fish being esteemed sacred to Apollo, as the crow was among birds.

QUINI-SEXTA, in ecclesiastical history, denotes a council held at Constantinople in the year 602; called also the council in *Trullo*, and by the Greeks *Pentheôte*, *q. d.* five sixth; as intimating that it was only a supplement of the two preceding councils. Though, in propriety, Fleury observes, it was a council itself.

Marshall observes, that the fifth and sixth general councils having made no canons, the Orientals judged it necessary to supply that defect by this; so that the 102 canons falsely attributed to those, were, in reality, made here. See **TRULLO**.

QUINQUAGENARIUS, among the Romans, an officer in the army who had the command of a *compas*, of fifty men.

QUINQUAGENARIUS was also an officer of policy, who had the inspection of fifty houses, or families.

And in the ancient monasteries, *quinquagenarius* was a superior who had fifty monks under his guidance.

QUINQUAGESIMA-SUNDAY, *Shrove-sunday*; It is thus called as being about the fiftieth day before easter.

Anciently they used *quinquagesima* for whitsunday, and for the fifty days between easter and whitsunday; but to distinguish this *quinquagesima* from that before easter, it was called the *pascual quinquagesima*.

QUINQUANNION, **QUINQUENNium**, in the French customs, a respite of five years which insolvent debtors formerly obtained by virtue of the king's letters, to have time for the payment of their debts.

When the thing intended was only to prevent the sale of their effects at an under value, the term of one year was ordinarily granted, and this was called the benefit of *annion*.

But when the debtor would avoid the surrendering of his effects, upon proving that he was reduced by poverty, losses, &c. to make use of this expedient, the term of five years was granted, and called the benefit of *quinquannion*.

QUINQUATRIA, in antiquity, a name given to the feasts of Minerva, otherwise called *Panathenæa*. See **PANATHENÆA**.

Some think they were termed *quinquatria*, because they lasted five days; but others, with more reason, think it was because they fell out five days after the ides of the month.

QUINQUENALIA, in antiquity, games, or feasts celebrated every five years, in honour of the deified emperors.

The *quinquennalia* began to be expressed on medals about the middle of the third century—F. Pagi produces a medal wherein are engraven those of the emperor Posthumus; they are not found in any medals of his predecessors.

QUINQUENNALIS, in antiquity, a magistrate in the colonies, and municipal cities of the Roman commonwealth; much the same with *ædile* at Rome.

They were not thus called from their continuing in their office five years; but because they were elected every fifth year, to preside at the census, and to receive the declaration each citizen made of his effects.

QUINQUE PORTUS, the five cinque ports; which are, Hastings, Romney, Hythe, Dover, and Sandwich.—To the first hereof also belong Winchelsea and Rye, which are esteemed members of the cinque ports. See **CINQUE-PORTS**.

* *Servitium quod baroni quinque portuum prescriptum recognoscunt facere ad summationem regis per annum, si contigerit per 15 dies ad eorum eorum proprium; ita quod primus dies computatur a die quo vela navium exierunt, usque partes ad quos tendere debent, vel ulterius quam diu rex excurrit ad eorum jus.* Thorn.

QUI

QUINQUE-VIR, frequently wrote **V-VIR**, a Roman magistrate, who had four colleagues joined with him in the same function.

There were various kinds of officers thus denominated—Pomponius the lawyer mentions *quinqueviri* on this, and on that side of the Tiber, established for the administration of justice in the night-time, in lieu of the ordinary magistrates who were not judged proper to run up and down the streets in the dark.

Rufinus tells us, that it was sometimes the *quinqueviri* who conducted the colonies, and divided the lands assigned to them, among the several families.

Sometimes the *Epulones* were five in number; in which case they were called *quinqueviri*. See **EPULO**.

QUINQUEVIRI monetarii were officers first erected under the consulate of Valerius Poplicola, to moderate the excessive usury, or interest, which creditors or bankers used to exact from the people.

QUINQUINA, **QUINAQUINA**, called also *China China*, and *Kim Kina*, a medicinal bark brought from the West Indies; called also by way of eminency, the *bark*, and *cortex Peruvianus*, the Peruvian bark, from the country whence it is brought; and popularly the *jesuits bark*, because at its first introduction it was chiefly sold and administered by the jesuits.

The tree which yields this bark grows in divers provinces of Peru, but chiefly Quenca, Ayavaca, and Loxa. The best and finest comes from the mountains 14 leagues round the city of Loxa.

The tree that produces the *quinaquina* is tall, and its trunk thicker than a man's thigh, tapering from the root upwards, but without any branches till near its top, where they grow regular as if lopped by art, and with the leaves form an exact hemisphere.—The bark is blackish on the outside, but sometimes variegated with white spots, where grows a kind of moss by the Spaniards called *Barbas*—Its leaves resemble the leaves of our plumb-trees.

The Spaniards distinguish four sorts of this precious bark, viz. the *Cascarilla colorada*, or reddish bark: *Amarilla*, or yellowish: *Crepilla* or curling: and *Blanca*, or whitish. The *Colorada*, and *Amarilla* are reckoned the best: The *Crepilla* is the produce of the same sort of tree, only growing in a cold, frosty climate, which impairs the quality of the bark, and renders it whitish on the outside, and cinnamon colour'd within, and unfit for medicinal use.—For the *blanca*, it is procured from another species of the tree of a much larger trunk, the leaves of a lighter green colour, and the bark of a very thick spongy substance, whitish on the outside; being withal so tough as to require the force of an ax to slice it from the tree—When first cut down it is as bitter as the best sort, and has then the same virtue in the cure of intermitting fevers; but when dry and kept any length of time it grows insipid and good for nothing. In reality, both sorts are found to have much sorer and quicker effects when green, than when dry; so that the Europeans only come in for the second rate virtues: what is worse, the bad sort is in great plenty, and the good is very scarce, and hard to come at: for which reason, with a little of the fine bark sent yearly to Panama for Europe, large quantities of the worse sort are usually mixed.

The small bark which curls up like sticks of cinnamon, and which in England is much esteemed as being supposed to be taken from the branches of the tree, and therefore more efficacious in the cure of Fevers, is only the bark of the younger trees; which being very thin curls in this manner.—For the bark of the branches it is never gathered: It would not compensate the charge of cutting.

The season for cutting the bark is in August, the only settled dry time in the country. The cutters are Indians, and are provided each with a large knife and a bag. When they have sliced down the bark as high as they can reach, they fasten short sticks with withs to the tree at proper distances, like the steps of a ladder, and thus mount and slice to the very top; when the bag is full they carry it to the low country to a neighbouring hut to dry, which is done by spreading it in the open air, and frequently turning it.—If it happen to have been cut wet, they always carry it directly as they cut it to the low country to dry; otherwise it loses its colour, turns black and rots.—After a tree has been barked it requires 18 or 20 years for a good bark to grow again.

Mr Arrot, a Scots surgeon, who had gathered the bark in the place where it grows, and from whom we received this account by means of Mr Gray, now at Carthagen, is of opinion that the gathering the better sort of bark will soon be at an end, or at least very much reduced, partly by reason of its distance from any inhabited place, and the impenetrability of the woods where it grows, and partly by the want of Indians to cut it, whose race thro' the cruelties of the Spaniards is like to be totally extinct. See *Philos. Transact.* N^o. 446. p. 81. seq.

QUI

The *quinaquina* was but little known in Europe till the year 1640.—The jesuits of Rome first brought it in vogue in Spain and Italy in 1640; and in 1650 the cardinal de Lugo, of that order, brought it into France.

It was at first sold for its weight in gold: when reduced into powder it is by foreigners called the *cardinal's powder*; and among us often, the *jesuits powder*, *pulvis patrum*.

It met with a world of opposition at first—Chifflet and Plempius distinguished themselves against it. But it is now almost universally allowed one of the greatest and best remedies within the whole province of medicine.

Some call the gentian-root the European *quinaquina*, because good against intermitting fevers.

QUINSEY, **QUINZY**, or **QUINCY**, in medicine. See **QUINZY**.

QUINSIEME, or **QUINZIEME**, in our old law-books. See **FIFTEENTH**.

QUINT, a sequence of five cards of the same colour. See **SEQUENCE**.

QUINTA ESSENTIA; see **QUINTESSENCE**.

QUINTAIN, **QUINTENA**, in ancient customs, a post driven into the ground, with a buckler fixed to it, for the performance of military exercises on horseback, the throwing of darts, breaking of lances, &c.

Matth. Paris describes the *quintain* as a kind of mark, form'd like a man from the navel upwards, holding a shield in his left hand, and in his right a sword or stick: the whole so fitted as to turn round on its foot, and so as that a cavalier running a-tilt against it with a lance, if he hit it in the breast, it whir'd round, and, unless he were very dextrous, struck him with the sword held in the other hand.

In other places, at the top of a post was erected a slender beam fitted to turn round a spindle; at one of whose ends was a soap or flat board, and at the other a bag of sand, or dirt.—The sport was, with a long staff, or wooden lance, to ride a-tilt at the board, and to be either so skilful or lucky as to escape the blow of the sand-bag.

This some take to be the same with the *arietum levatis*, frequently prohibited in our old synods and episcopal constitutions.

The custom is still retained in Shropshire, and some other counties, among the nuptial solemnities—He that breaks the most poles against the *quintain* has the prize, which was anciently a peacock, but is now a garland.

Some derive the word from an ancient game called *quintus*; others from a man of the name Quintus.

The Vallas and Paffus mentioned in Cæsar, are taken, by Vigenere, for a kind of *quintain*, or wooden man fix'd up as an adversary, or man of straw, to prove one's dexterity against.

Mention is made of this exercise in the Code, *de aleatoribus*, and in the Paratides of Cujas on the same—Juvenal speaks of women engaging therein:

Aut quis non vidit vulnera Pali? &c.

QUINTAIN was also a right which the lord had to oblige all the millers, watermen, and other young people unmarried, to come before his castle every three years, and break several lances, or poles, against a post, or wooden man for his diversion.

QUINTAL, in commerce, the weight of an hundred pounds.

The *quintal* admits of some difference in different places, according as the pound consists of more or fewer ounces, and as the ounce is lighter or heavier.

Thus, e. gr. the Paris *quintal*, or hundred, yields 123 pounds at Montpellier; and the Montpellier hundred only 81 pounds at Paris.—The *quintal* of Constantinople is esteemed the heaviest of all those used in the Levant. It contains 45 *ocques*, the *ocques* weighing two Dutch pounds $\frac{1}{8}$; so that the *quintal* is equal to 112 pounds $\frac{1}{2}$ of Amsterdam, 124 pounds of Venice, and 160 of Leghorn.

The English *quintal* usually consists of 112 pounds *avoirdupois*, and is divided into four quarters.

QUINTAL was also formerly used for a weight of lead, iron, or other common metal, usually equal to an hundred pounds, at sixscore to the hundred.

QUINTESSENCE, **QUINTA-ESSENTIA**, in chemistry, a preparation consisting of the essential oil of some vegetable substance, mixed and incorporated with spirit of wine.

Thus, on a proper quantity, e. gr. of essential oil of fennel pouring twelve times the quantity of pure alcohol prepared *per se*; they instantly unite into one similar liquor, which is the *quintessence* of that plant.

The ancients were perfectly unacquainted with the method of dissolving oil in spirit of wine; and even some of the moderns have questioned its reality: but the certainty of the thing is easily proved from the instance above, and from a thousand others.

If such *quintessence* be several times digested, cohobated, &c. the oil will at length be broke so fine, as, like the spirit itself,

self, perfectly to mix with water; which is one of the most extraordinary effects in all chemistry.

After the like manner is made a *quintessence* of camphor, by only pouring on it spirit of wine.

Quintessences thus prepared have great medicinal virtues; as may appear from the pure and potent ingredients used in their composition, which retain, in a great degree, all the virtues of the plants they are procured from: and hence their denomination.

Boerhaave thinks they might properly be called vegetable sulphurs made potable, and raised to their utmost degree of power and efficacy.

Dry *quintessences* may be made from the liquid ones, by adding to them some more essential oil of the same vegetable from whence the liquid *quintessence* was procured, with a little sugar; all mixed together, and distilled by a very gentle heat till all the moisture is come over: the matter remaining is then a dry *quintessence*.

This form is principally useful for travellers, sailors, &c. inasmuch as it renders the *quintessence* portable; so that the quantity, *e. gr.* of a pin's point, shall be an efficacious medicine.

QUINTESSENCE, in alchemy, is a mysterious term signifying the fifth, or last and highest essence, or power of a natural body.

This is supposed to be, as it were, the soul drawn from the gross body and its four elements, by a most perfect distillation; and by means hereof, the thing is said to be spiritualized, *i. e.* rendered exceedingly pure, spirituous, and, as it were, incorruptible. *Dict. Hermetique.*

The ancients, who allowed nothing to be real but what has a body, would have the soul of man to be a fifth element, a kind of *quintessence* without a name, unknown here below, indivisible, immoveable, all celestial, and divine. *Fenelon.*

QUINTESSENCE of the elements, is the hermetical mercury. See **MERCURY**.

QUINT-EXACT, in old law-books, the last call of the defendant sued to an outlawry.—If he appear not to it, he is by the judgment of the coroners returned outlawed; if a feme, waived.

QUINTILE, **QUINTILIS**, in astronomy, an aspect of the planets, when they are 72 degrees distant from one another, or a fifth part of the zodiac.

QUINTILIANS, **QUINTILIANI**, a sect of ancient heretics, the same with the *Pepuzians*; thus called from their prophetess, *Quintilia*.

In this sect the women were admitted to perform the sacerdotal and episcopal functions; grounding their practice on that passage of St Paul to the Galatians, where he says, *That in Christ there is no distinction of males and females.*

They attributed extraordinary gifts to Eve, for having first eaten of the tree of knowledge; told mighty things of Mary the sister of Moses, as having been a prophetess, &c. they added, that Philip the deacon had four daughters, who were all prophetesses, and were doubtless of their sect.

In their assemblies, it was usual to see the virgins enter in white robes performing prophetesses.—The *Quintilians* bore a good deal of resemblance to the modern quakers.

QUINZY*, a disease which stops the freedom of respiration and deglutition.

* The word is formed from the French *squinance*, or Italian *squinantia*, or *esquinancia*; and these again from the Greek *σκιζαν*, of *σίζω*, I suffocate.

The *quinzy*, by physicians also called *angina*, consists in an inflammation of the throat, and particularly of the muscles of the larynx or pharynx, which exactly closing the chinks thereof, prevent the air from passing in and out of the trachea, and the food from being swallowed and conveyed into the stomach.

If any symptoms appear on the outside of the throat, the *quinzy* is said to be *external*—If none appear there, *internal*. The *quinzy* is also divided into *true* and *spurious*—the true is always accompanied with a fever: the bastard or spurious *quinzy* is free from it.

They are caused by a defluxion of blood, either pure or bilious, from the branches of the carotid arteries; and there causing a phlegmon, either a simple or an erysipelatous one. In the external *quinzy* before any suppuration appears, recourse is had to repeated venesection in the jugulars—Vesicatories and cupping are also used with emollient gargles, &c.

The *quinzy* is of all others the most dangerous, when the tumour is neither perceivable on the inside nor on the out. That appearing on the outside is the most easily curable. In violent *quinzaies*, recourse should be had to laryngotomy or bronchotomy, which though rarely practised, may yet be used with safety.

QUIRE of paper, of the French *Cahier*; the quantity of 24 or 25 sheets.

QUIRISTER, or **CHORISTER**, *Chorista*, a person ap-

pointed to sing in the quire, or choir of a cathedral. See **CHOIR**, **CHANTOR**, **CATHEDRAL**, **ANTHEM**, &c.

QUIRINALIA, in antiquity, feasts celebrated among the Romans in honour of Romulus, who was called Quirinus, See **QUIRITES**.

The *quirinalia*, called also *stultorum ferie*, were held on the 13th of the kalends of March, *i. e.* on our 17th of February.

QUIRITES, in antiquity, an appellation given to the people of Rome, chiefly the common citizens, as distinguished from the soldiery.

It took its rise from the *Curites*, the inhabitants of the Sabine town *Cures*; but this occasion Romulus, and Tatius king of the Sabines, having united their two people, and their two states into one; upon Romulus's death and deification, the Sabines, outdoing the Romans in number, became masters of the councils; and accordingly appointed that Romulus should be denominated *Quirinus*, from *Cures* a city of the Sabine, or rather from *Quirinus*, the name of a god worshipped in that city.

From the new *Quirinus*, all the people came afterwards to be called *quirites*; unless we will suppose that the same authority which denominated Romulus *Quirinus*, from *Cures*, did also denominate the people *quirites*, immediately from the *Curites*.

Some authors derive the word *quirinus* from *curis*, which in the Sabine tongue signified a pike or halbert—Struvius adds, that Romulus was always painted with a pike in his hand.

QUIRK, in building, a piece of ground taken out of any regular ground-plot, or floor.

Thus, if the ground-plot were square, or oblong, and a piece be taken out of a corner, to make a court, or yard, &c. the piece is called a *quirk*.

QUIS, in natural history, a kind of marcasite of iron or copper, from which vitriol is drawn. See **MARCASITE** and **VITRIOL**.

It is more frequently called *Pyrites*. See **PYRITES**.

QUIT-CLAIM, a release, or quitting ones claim or pretensions to a thing.

QUIT-RENT, *q. d. quiet-rent*, a certain small rent, payable yearly, by the tenants of most manors in token of subjection; upon the payment whereof they are quiet and free.

In some ancient records it is written *white-rent*; because paid in silver, to distinguish it from *rent-corn*, *rent-pepper*, &c. **QUITTANCE**. See the article **ACQUITTANCE**.

QUITTER-BONE, among farriers, a hard, round swelling, upon the coronet of a horse's foot; or between the heel and the quarter.

Or, it is an imposthume breeding between the hoof and coffin-bone, on the upper part; and shewing itself by a swelling on the coronet.

Sometimes it is occasioned by gravel under the shoe, or by a bruise, stab, or a prick of a nail; or from peccant humours descending to that place; or a blow, strain, or over-reach, &c. It occasions the horse to halt much, and the swelling grows visible, and comes to a head in four or five days, and breaks out with matter at a little deep hole, like a fistula.

QUOD clerici non elegantur in officio, is a writ that lies for a clerk, who by reason of some land he hath, is made, or like to be made, a bailiff, beadle, reeve, or such like officer.

QUOD medium. See the article **MEDIUM**.

QUOD non permittat. See **CONSUETUDINIBUS & SERVITIIS**.

QUOD persona nec prebendarii, &c. a writ that lies for spiritual persons, when disfranchised in their spiritual possessions, for the payment of a fifteenth, with the rest of the parish.

QUODLIBETICAL question, *questio QUODLIBETICA*, a college term for a thesis, or problem, antiently proposed to be debated in the schools, out of curiosity and entertainment, rather than for the settling of any useful point.

The term is formed from the Latin *quodlibet*, any thing, what you please; and so well satisfied were the public of the impertinences of these questions, that the term *quodlibet* has been since retained to signify any little ridiculous quibble.

QUOIL, **QUOYL**, or **COILE**, in the sea-language—A cable is said to be *quailed*, when it is laid round in a ring, one turn over another on the deck of a ship.

The middle of such ring or *quail*, is a good place to lay shot in, they are more fast there than in lockers along the side, where the enemy's shot may fall into them.

QUOIN*, or **COIN**, a-board a ship, is a wedge fastened on the deck, close to the breech of the carriage of a gun, to keep it firm up to the ship's side, and prevent its rolling.

* The word is formed from the French *coin*, of the Latin *cutis*, wedge. See **WEDGE**.

Cantic QUOINS are short, three-legged *quoins*, put between calks to keep them steady.

QUOINS,

QUOINS, in architecture, denote the corners of brick or stone walls.

The word is particularly used for the stones in the corners of brick buildings—When these stand out beyond the brick-work (their edges being chamfered off) they are called *ruffic quoins*.

QUOITS, a kind of exercise or game, known among the ancients under the name of the *discus*. See *DISC*.

QUO JURE, a writ that lies for him who has land, where-in another challengeth common of pasture time out of mind: its design is to compel the party to shew by what right or title he challengeth it.

QUO MINUS is also a writ which lies for the king's farmer or debtor in the court of exchequer, against him to whom he selleth any thing by way of bargain, touching his farm; or against whom he hath any cause of personal action—For that by the vendee's detaining any due from him, the farmer is made less able to pay the king's rent.

Quo minus, is also a writ that lies for him who has a grant of house-bote in another man's wood, against the grantor making such waste, as that the grantee cannot enjoy his grant.

QUORUM, a term frequently mentioned in our statutes, and often used in commissions, both of peace, and others.

It is thus called from the words in the commission, *quorum A. B. unum esse volumus*.

For an example—Where a commission is directed to seven persons, or to any three of them, whereof A. B. and C. D. are to be two; there A. B. and C. D. are said to be of the *quorum*, because the rest cannot proceed without them.

So a justice of the peace and *quorum* is one without whom the rest of the justices in some cases cannot proceed.

QUOTATION, in literature, a citation; or a passage rehearsed expressly in one author from another.

Quotations are used to be distinguished by inverted comma's, thus; "Half an age ago quotations were wonderfully common; and Ovid and Catullus came every day with the pandects to the assistance of the widow and the orphan."

—*La Bruyere*.

The manner of quoting by book, and chapter, or section, is chiefly affected by men of erudition: But it is abused: This method ought only to obtain where the whole chapter or section is expressly on the subject. On other occasions, quoting by page is more commodious; except in classics and other ancient writings, whereof there are many editions in different forms, where this method is of little use, unless the edition be also specified.

The quotations from the old testament, found in the new, have occasioned infinite doubt, dispute, and criticism—The apostles are frequently referring to the old testament, and quoting passages, and prophecies thence as fulfilled in our Saviour; yet these passages thus quoted, are frequently either not found in the old testament at all, or they are not urged in the new according to the literal and obvious sense they seem to bear in the old.

A late ingenious author, in an essay upon the truth of the christian religion, frankly owns, that the Evangelists sometimes apply to the Messiah passages of the old testament, which, as they lie in our present copies, plainly relate to some other person, or thing—This is evident, *e. gr.* in the passage, *Matth. ii. 15. Out of Egypt have I called my son*; which is quoted from Hosea xi. where it is plainly understood of the coming of the Israelites out of Egypt.

This proves to many a heavy obstacle in the way of christianity, which the divines, commentators, critics, &c. have long laboured to remove, though by very different means.

Some have recourse to a double completion; and imagine, that though the prophecies were primarily accomplished in other events, yet they might have a secondary accomplishment in the Messiah: but others set aside a double completion, except where the prophet himself declares as much, this otherwise making all prophecy useless.

The generality chuse therefore to have recourse to an allegorical, typical, or spiritual meaning in the prophecies, &c. and suppose them to have been thus understood among the ancient Jews, thus fulfilled in our Saviour, and thus applied by the apostles.

In effect, the Jewish rabbins, it is allowed, took a world of liberty in quoting and interpreting scripture; and it is supposed the apostles might follow these rules in their quotations.

Accordingly, M. Surenhusius, Hebrew professor at Amsterdam, has endeavoured to retrieve these rules, long since lost, in an express treatise on this subject, published in 1713. This author observes a great deal of difference implied in the different forms of quoting used by the sacred writers: as, *It has been said; it is written; that it might be fulfilled which was spoken by the prophets; the scripture says; see what is*

said; the scripture foreseeing; is it not written, &c.—He adds, that the books of the old testament having been disposed in a different order at different times, and having had different names, it is thence that one book or writer is sometimes confounded with another.

For the rules of quoting and interpreting practised among the rabbins, he gives us ten; recovered with much study from the Thalmud, and the ancient Jewish doctors: instances whereof he gives us in the writings of the apostles; and by those rules he endeavours to explain and justify all the quotations made from the old testament in the new.

The rules are 1. reading the words not according to the points placed under them, but according to others substituted in their stead; as is done by St Peter, Acts iii. 3. by Stephen, Acts vii. 43. and by Paul, 1 Cor. xv. 54. 2 Cor. viii. 15, &c. The second is by changing the letters; as is done by Paul, Rom. ix. 33. 1 Cor. xi. 9. Heb. viii. 9. and x. 5. and by Stephen, Acts vii. 43.

The third is by changing both letters and points, as is done by Paul, Acts xiii. 41. and 2 Cor. viii. 15.—The fourth is by adding some letters, and taking away others.

The fifth is by transposing words and letters—The sixth is by dividing one word into two—The seventh, adding others words to make the sense more clear—The eighth, changing the order of the words—The ninth, changing the order of the words, and adding other words. Both of which are done by the apostles—Lastly, changing the order of words, adding words, and retrenching words; which is a method often used by St Paul.

Other authors, as bishop Kidder, M. le Clerc, Mr Sykes, &c. solve the difficulty another way—That usual form of quotation among the evangelists, "That it might be fulfilled which was spoken by the prophets," according to these authors, means no more than an accommodation of the prophets words to the case in hand.

The word *accomplished*, does not necessarily determine us to such a sense, as if the evangelists designed to speak of a prediction of future events accomplished; but may barely express an accommodation of borrowed words—In effect, says bishop Kidder, a scripture may be said to be fulfilled two ways; properly, as when that which was foretold comes to pass; and improperly, by way of accommodation, as when an event happens to any place or people like to what fell out some time before—And thus it is that St Matthew says on occasion of the murder of the innocents, that "then was fulfilled what was spoke by the prophet Jeremy, *In Rama was a voice heard, &c.*"

This interpretation is confirmed by M. le Clerc, who observes that the Jews, in their language, used to say, that a passage of scripture was fulfilled, as often as any thing happened which it might be applied to: so that the evangelist Matthew, who was a Hebrew, and wrote, as it is commonly supposed, in that language, intended no more in the passage just cited, but that a thing happened to which one might apply what Jeremy had formerly said on another occasion.

Accordingly, says Mr Sykes, the evangelists in citing that passage of Isaiah, *Behold a virgin shall be with child, &c.* only use it as words of that prophet remarkably agreeing to the miraculous birth of Jesus, and not as a prophecy of his birth.

It may be added, that this way of speaking was not unknown among the heathen writers—Thus in *Ælian*, *Diongenes Sinopenis* used continually to say of himself, that he fulfilled and underwent all the curses of tragedy.

QUOTIDIAN, **QUOTIDIANA**, in medicine, an intermitting fever, or ague, the access whereof returns every day. See *AGUE*.

QUOTIENT, **QUOTIENS**, in arithmetick, the number resulting from the division of a greater number by a smaller; and which shews how often the smaller is contained in the greater, or how oft the divisor is contained in the dividend. See *DIVISION*.

* The word is formed from the Latin, *quoties, q. d.* How often is such a number contained in such another?

In division, as the divisor is to the dividend; so is unity to the quotient—Thus the Quotient of 12 divided by 3 is 4; which is thus disposed, 3) 12 (4 Quotient.

QUOUSQUE—Execution with a **QUOUSQUE**. See *EXECUTION*.

QUO WARRANTO, a writ that lies against him who usurps any franchise, or liberty against the king; as to have waste, stray, fair, market, court-baron, leet, or such like, without good title.

It also lies for mis-user or non-user of privileges granted—And even, according to Bracton, against him that intrudeth himself as heir into land. See *INTRUSION*.

QUOYL, see the article *QUOIL*.

R A B

R, A liquid consonant, and the seventeenth letter of the alphabet.

The grammarians hold it a semi-vowel; especially in the Greek, where, in common with the other vowels, it admits an aspirate, &c. though whether the aspirate should be sounded before or after it, is some doubt. We find instances of each.

Thus *rho* the Latins wrote *rheda*; and *rho* the Æolians wrote *rheda*.—The ancient Goths, and Teutones, Littleton observes, always prefixed *h* to *r*. See H.

The Hebrews allow the *r* the privilege of a guttural, that is, they never double it, which yet is done by the Arabs, Greeks, and Latins, &c.

Perlius, calls the *r*, *litera canina*, because the dogs seem to pronounce it in snarling: Yet it should seem to have had a softer sound among the Romans than among us, by its being frequently interpolated to prevent the clashing of vowels: as in *rarus* from *arus*, *nurus* from *nurus*, *murex* from *mu*, *mus* from *mu*, &c.; and this softness was such as frequently occasioned its being dropt as useless in writing.

Thus for *Hetrufci* they frequently wrote *Tufci*, and even *Tufci*; and for *fursum*, *rufus*, *profus*: *sum*, *rufus*, *profus*. In effect there was that agreement between the sound of the *s* and *r*, that as the Romans avoided the doubling of their consonants, it was no wonder they here dropped the *r* in such words; the *s* supplying the place of both. Hence too it came to pass, that what they at first pronounced, *Ala*, *A-fena*, *Cajmen*; was afterwards, *Ara*, *Arena*, *Cormen*; and those first named *Fufci* and *Valefci* were afterwards called *Farii* and *Valerii*. Cicero tells us, the *Papirii* were first called *Papifii*; and even fixes the time when the change was made, viz. in the year of Rome 415. Festus adds, that *olera*, *pignora*, *pluvina*, were anciently written *olefa*, *pignofa*, *pluvina*.

From the same softness of the sound of the *r*, it came to be used indifferently with the *l*, in many words, *e. gr.* *latiaris* and *latialis*, *palilia* and *parilia*, &c.

Though the *r* more frequently degenerated into *l*; thus *remiges* became changed into *lemures*, *interlego*, *perlego* into *intelligo* and *pelluceo*, *frater* into *fratellus*, &c. and the same is sometimes done between *n* and *r*, as *arcus* and *ancus*, &c.

R, was antiently a numeral letter, signifying 80; according to the verse,

Octoginta dabit tibi R, siquis numerabit.

When a dash was added a top, as **R̄**, it signified eighty thousand.

The Greek **ρ**, *rho*, signified an hundred.

R, or **R̄** in medical prescription, stands for *recipe*, take.

RABATE in falconry.—A hawk is sometimes said to *rabate*, when by the motion of the hand of the bearer, the lure, call, &c. the leaves pursuing her prey, or quarry; and recovers the fit.

RABATE in commerce. See **REBATE**.

RABBETING, in carpentry, the planing or cutting of channels, or grooves, in boards.

In ship-carpentry, it signifies the letting in of the planks of the ship into the keel; which in the rake, and run of a ship, is hollowed away, that the planks may join the closer.

RABBET-plane. See the article **Rabbit-Plane**.

RABBI*, or **RABBIN**, a doctor of the Jewish law.

* The word in its original רבב signifies *master*.

The words *rabbi* and *rabbini*, have the same signification; yet is there some difference in their use.—When we speak absolutely, and without applying the term to any proper name, we say *rabbini*, not *rabbi*. Thus, we say, it would be unjust to attribute to the antient rabbins all the notions of the modern ones.

On the other hand, when we prefix the term to the proper name of some Jewish doctor, we say *rabbi*, not *rabbini*: *rabbi* Saloman Jarchi is of this opinion.

Yet *rabbi* having no plural, we say, the rabbins Juda Chiug, and Juda ben Chabin, are the authors of two antient Hebrew grammars.

The modern rabbins are entitled to a good deal of respect among the Jews: they have the first places in the synagogues; they determine all matters and controversies of religion, and very frequently pronounce upon civil affairs. They have even a power to excommunicate the disobedient.

They retain a vast number of superstitious traditions, from the writings of their predecessors; which they observe as scrupulously as they do the law of Moses.

R A C

The antient rabbins were infinite dealers in allegories. Their writings are almost wholly allegorical, particularly their comments and interpretations of the scripture.

They had a great number of rules, and forms of interpreting and quoting, which some modern writers suppose to have been followed by the apocryphes, in their interpretation, and quotation of the prophecies of the old testament, in the new. See **QUOTATION**.

The loss of these rules Dr Stanhope, Dr Jenkins, &c. lament, as what in all probability would perfectly reconcile the jarring passages in the old and new testament. Surenhusius, Hebrew professor at Amsterdam, imagines he has retrieved those rules from the antient Jewish writers.

The rabbins, he observes, interpreted scripture in such a manner as to change the literal sense into a more noble and spiritual one. To this end, he says, they used ten ways of quoting and explaining the old testament; instances of each whereof he gives in the writings of the apocryphes.

They confist in changing the points; the letters; both letters and points; adding and taking away letters; transposing words and letters; dividing one word into two; adding words; changing the order, &c.

RABBINICAL character. See the article **CHARACTER**.

RABBINICAL Hebrew. See the article **HEBREW**.

RABBINIST, a follower of the doctrine of the rabbins; a term used in contradistinction to *carait*.

Father Simon contends for *rabbaniſt*, or *rabbenite*, instead of *rabbiniſt*; in effect, the former readings are apparently preferable to the latter; the word being derived from the Hebrew *rabbanim*, which is the name of the sect, and which the Jews use to distinguish their doctors from those of the *carait* Jews.

Rabbiniſt, then, signifies a Jewish doctor who adheres to the traditions of his fathers; not simply a rabbin or doctor; for the *caraites* who oppose those traditions, have their rabbins as well as the other Jews.

RABDOIDES, } See { **RHABDOIDES**.
RABDOLOGY, } { **RHABDOLOGY**.
RABDOMANCY, } { **RHABDOMANCY**.

RABINET, a small piece of ordnance, between a falconet and a bass. Its dimensions, &c. See under **CANNON**.

RACA, or **RACHA**, a Syriac term, found in the gospel of St Matthew, ch. v. 22. and preserved in most translations.

Father Simon observes that the Greek translator of St Matthew's gospel retained the Syriac *raca* which he found in the original, by reason it was very common among the Jews. And St Jerom, Luther, and the English translators, those of Geneva, Louvain, Port-Royal, &c. still preserve it in their respective languages.

F. Bouhours chuses rather to express the sense thereof in a fort of paraphrase, thus: he that says to his brother, *bomme de peu de sens*, man of little understanding, shall deserve to be condemned by the tribunal of the council, &c.

Most translators, except the English, and F. Simon, for *raca* write *racha*, but the former orthography seems the best founded; all the Latin copies having *raca*, and all the Greek ones *ρακα* or, with Helychius, *ρακα*, which is the same: all we mean, but St Irenæus, and Beza's copy, now at Cambridge, which have *ρακα*.—In effect, the origin of the word, shews it should be *raca*; as coming from the Syriac **רַקָּה**, *raca*, of the Hebrew **רַק** *rek*, empty, shallow.

RACCOURCY, in heraldry, signifies the same as *coupy*, that is, cut off, or shortened; and denotes a cross or other ordinary, when it does not extend to the edges of the escutcheon, as they always do when absolutely named, without such distinction.

RACE*, in genealogy, a lineage, or extraction continued from father to son. See **LINE**.

* The word is French, formed from the Latin, *radix*, root; so intimating the root of the genealogical tree.

In several orders of knighthood, as in that of Malta, &c. the candidates must prove a nobility of four races or descents.

In some republics the magistrates are to prove themselves of plebeian race, to be qualified.

The French reckon their kings by races; as, the first race, the second race, the third race. We also say the race of the Ottomans, the Arificades, the Ptolemys, &c.

D'Hervieux observes, that it is usual to put the female canary bird to the male goldfinch, linnet, or the like; to breed; but, for his part, he should chuse to put the male canary-bird to the

the female goldfinch, linnet, &c. because the male usually *paces* more than the female, *i. e.* the young ones take more after the male than after the female.

RACHA. See the article **RACA**.

RACHITIS, or rather **RIACHITIS**, in medicine, a disease affecting the bones of children; more usually called the *rickets*. See **RICKETS**.

RACK, an engine of torture furnished with cords, &c. for extorting confession from criminals.

The duke of Exeter, constable of the tower under Henry VI. with the duke of Suffolk, and others, having a design to introduce the civil law into England; for a beginning, the *rack*, or *brake*, allowed in many cases by the civil law, was first brought to the tower, where it is still preserved.—In those days, the *rack* was called the duke of Exeter's daughter.

RACK, in the manege, a pace wherein a horse neither trots nor ambles, but shuffles, as it were, between both.

The *racking pace* is much the same as the amble; only that it is a swifter time, and a shorter tread.

To **RACK** wines, &c. is to draw them from off their lees, after their having stood long enough to clear and settle.

Hence **RACK-vintage** is frequently used for the second voyage our wine merchants used to make into France for racked wines; whence they used to return about the end of December.

RACKET*, a kind of bat, to strike the ball withal at tennis; consisting usually of a lattice, or net-work of cat-gut, strained very tight over a circle of wood, with a handle or shaft of a moderate length.

* The word is formed from the French, *raquette*, which *Ménage* derives from the Latin, *retetta*, a diminutive of *rete*, net; whence also *reticum*, and *reticulum*.

Paquier observes, that antiently they used no *rackets* at tennis, but plaid with the palm of the hand; and hence, he conjectures, it is, that the French call tennis-play, *jeu de paume*—He adds, that *rackets* were not introduced till a little before his time.

RACKET is also a machine, which the savages of Canada bind to their feet, to enable them to walk more commodiously over the snow; made much in the manner of a tennis-racket.

Its figure is a lozenge, whereof the two obtuse angles are rounded off. It is bound about with very fine thongs of leather, and the meshes of it are much smaller and closer than those of our rackets.

In the middle is fitted a kind of shoe, lined with wool, or hair; to be tied on to the ankle: by which means the feet are prevented from sinking in the snow.—*Rackets* oblige the person to take very long steps, and, as we say, to walk a great pace, to keep them from knocking against each other.

RADIAL curves, is a denomination given by some authors to curves of the spiral kind, whose ordinates, if they may be so called, do all terminate in the center of the including circle, and appear like so many *radii* of that circle; whence the name. See **CURVE**.

RADIALIS, or **RADIEUS extensor**, in anatomy. See **EXTENSOR carpi**.

RADIALIS, or **RADIEUS flexor**. See **FLEXOR carpi**.

RADIANT point, or **RADIATING** point, is any point of a visible object, whence rays proceed. See **RAY**, and **POINT**. Every *radiant* point diffuses innumerable rays all around: but only those *radiants* are visible, from which right lines may be drawn to the pupil; because the rays are all right lines.

All the rays proceeding from the same *radiant* continually diverge; the crystallin collects or re-unites them again. See **DIVERGING**.

Every ray is supposed to carry with it the species, or image of the *radiant*.

RADIATED, in botany, an epithet applied to round flat flowers, consisting of a disk, and a single row of longish pointed leaves, ranged all around it in manner of rays, or spokes.

Radiated flowers are properly such as have several semi-florets set round a disk, so as to resemble a *radiant* star: such are daisies, camomile-flowers, &c. These are sometimes also called *radiated discous*-flowers.

The word is also used in speaking of medals, and in heraldry, where the antient crowns are called *radiated crowns*, *coronæ radiatæ*.

RADIATION, in physics, the action of a body diffusing rays of light as from a center.

Every visible body is a *radiating* body; it being purely by means of its rays that it affects the eye.

Yet no body can *radiate*, unless it be either luminous, or illuminated; since the rays it diffuses must either be its own, or it must receive them from another body. Therefore no body is visible, unless it be either luminous, or illuminated.

The surface of a *radiating* body may be conceived as consisting of radiant points.

Place of **RADIATION** is that space in a transparent body, or

medium, through which a visible body *radiates*. See **MEDIUM**, &c. See also **PLACE**.

RADIATION, or **IRRADIATION**, is also used by some authors to express the manner of the motion of the animal spirits; on a supposition that they are diffused from the brain towards all parts of the body, through the little canals of the nerves, as light is from a lucid body.

But in lieu of a *radiation*, the moderns rather incline to the opinion of the circulation of the spirits.

RADICAL, **RADICALIS**, in physics, &c. something serving as a basis or foundation; or which, like a *root*, is the source or principle whence any thing arises.

The schools talk much of a *radical moisture* inherent in the seeds of all animals, which nourishes and preserves the vital heat or flame, as oil does a lamp; and which when exhausted, life is extinguished.

Dr. Quincy observes, that this *radical moisture* is a mere chimera; unless we thereby mean the mass of blood, which is the promptuary whence all the other juices and humours are derived; and which, while it circulates, sustains life, &c.

In grammar, we use the term, *radical words*, for roots and primitives; in opposition to compounds and derivatives.

RADICAL sign, in algebra, the sign or character of the root of a quantity.

$\sqrt{\quad}$ is the character of radicality, and expresses the square root; $\sqrt[3]{\quad}$ the cube root, &c.

RADICATION, in physics, the action whereby plants take root, or shoot out roots.

The French royal academy of sciences have made a great number of curious observations on the germination and *radication* of plants.

RADICLE, **RADICULA**, *little root*; in botany, is a little point discovered by the microscope in all seeds, which, in the growth of the plant, becomes the root.

When, in sowing, the *radicle* happens to light lowest, it is no wonder the root should spread itself under ground, and that the stem of the plant should rise up perpendicularly: but when the *radicle* falls uppermost, by what means it is that it changes its position to favour the ascent of the stem is one of the wonders of vegetation: a more particular account whereof see under the article **PERPENDICULARITY**.

RADII brevis. See the article **BREVIS**.

RADIOMETER, a name which some writers give to the *radius astronomicus*, or Jacob's staff. See **CROSS-STAFF**.

RADIUS*, **RAY**, in geometry, the semidiameter of a circle; or a right line drawn from the center to the circumference.

The word is derived from the Greek $\rho\acute{\alpha}\delta\iota\varsigma$, *rad*.—Fleta uses the word *radius*, for a furrow.

The *radius* is also called, especially in trigonometry, *sinus totus*, the *whole sine*.

It is implied in the definition of a circle, and it is apparent from its construction, that all the *radii* of the same circle are equal.

RADIUS, in the higher geometry—**RADIUS** of the *evoluta*, **RADIUS curvædimi**, or **RADIUS osculi**, is the right line CM, *Tab. Analysis*, fig. 12. representing a thread, by whose evolution from off the curve BC, whereon it was wound, the curve AMm is formed.

RADIUS astronomicus, an instrument usually called Jacob's staff, or the *cross-staff*. See **CROSS-STAFF**.

RADIUS, in optics. See the article **RAY**.

RADIUS, in mechanics, is applied to the spokes of a wheel; because issuing like rays from the center thereof.

RADIUS, in anatomy, is a long slender bone of the arm, descending along with the ulna from the elbow to the wrist; called also *facile minus*, the *læsser facil*.—See *Tab. Anat. (Osteol.)* fig. 3. n. 7. 7. ** &c. fig. 7. n. 9.

The *radius* only touches the ulna at its extremities; at the upper whereof it is both received by, and also receives it; making, by both articulations, an imperfect kind of ginglymus.

The upper end, rolling upon the ulna, is covered with a cartilage, and has, at the top, a small round sinus, which receives the outer process of the humerus: the lower end is thicker than the upper, and has, besides the lateral sinus, two other sinuses at its extremity, which receive the bones of the wrist.

The *radius* and ulna are both a little crooked; by which means they are kept a-part, excepting at their extremities; and are tied together by a strong membranous ligament.

The *radius* has four proper muscles, besides the biceps, common to it and the ulna: the proper are two pronators, and two supinators. See **PRONATOR** and **SUPINATOR**.

RADIX, *the* root. See the article **ROOT**.

RADIX is used among some anatomists for the sole of the foot.

RADIX, among grammarians. See **RADICAL**.
RAD-KNIGHTS. See the article **REDMANS**.

RA DMANS. See the article **REDMANS**.

RAFFLING*, a sort of game with three dice, wherein he who throws the greatest pair, or pair royal, in three casts, wins the prize or stake.

* The word probably comes from the base Latin, *raflare*, to rifle, plunder, take all away.

The *raffle* is properly the doublet or triplet: a *raffle* of acres or duces carries it against meer points.

RAFFLING is also used when a company of persons club to the purchase of a commodity; and he that throws the highest on three dice takes it.

RAFTERS, in building, are pieces of timber, which standing by pairs on the rafter piece, or raising piece, meet in an angle at the top, and form the roof of a building.

It is a rule in architecture, that no rafters should stand farther than twelve inches from one another.

For the sizes or scantlings of rafters, it is provided by act of parliament, that principal rafters from 12 foot 6 inches, to 14 foot 6 inches long, be 5 inches broad at-top, and 8 at the bottom, and 6 inches thick—Those from 14, 6, to 18, 6 long, to be 9 inches broad at the foot, 7 at-top, and 7 thick—And those from 18, 6, to 21, 6, to be ten inches broad at the foot, 8 at-top, and 8 thick.

Single rafters, 6 foot 6 inches long, to be 4 and 3 inches in their square—Those 8 foot long must be 4 1/2 and 3 1/2 inches square.

RAG, or **RAKE**, among hunters, denotes a company, or herd of young colts.

RAGGED hawk, in falconry, is a hawk that hath its feathers broken. See **HAWK**.

RAGGED, in heraldry. See the article **RAGULED**.

RAGGULED. See the article **RAGULED**.

RAGMAN's-roll, or **RAGMUND's-roll**. See **ROLL**.

RAGOÛT, or **RAGOO**, a sauce, or seasoning, to intended rouse or recover the appetite when languishing, or lost.

The term is French, but naturalized—It is also used for any high-seasoned dish, prepared of flesh, fish, greens, or the like, by stewing them with the addition of bacon, salt, pepper, cloves and the like high flavoured ingredients.

We have *ragoos* of beef, of cray-fish, of gibbles, of asparagus, of endive, of cocks-combs, of gammon, of celery, &c.

The ancients had a *ragoût*, called *garum*, made of the putrefied guts of a certain fish, which they kept till it dissolved by meer force of corruption into a sauce: this was held such a valuable dainty among them, that Pliny observes, its price equalled that of the richest perfumes.

RAGULED, or **RAGGED**, in heraldry, is applied to an ordinary, e. gr. a cross, whose out-lines are jagged or knotted. (Tab. Herald. fig. 48.)

He beareth fable, a cross *raguled*, or, by the name of *Slouey*.

Ragged differs from indented, in that the latter is regular, and the former not.

The bearing is very ancient: Julius Cæsar gave for his badge, a boar's head, on a *ragged* staff.

RAGULED is sometimes also used in the sense of *truncated*, or *couped*, and applied to a branch that is sawed from the tree; or a stock sawed from its root.

RAJA, an Indian appellation given to a kind of idolatrous princes, the remains of those that ruled there before the conquest of the Moguls.

There are some *Rajas* who still retain a kind of sovereignty in the mountains: the Indians call them *Rai*; the Persians, plurally, *Raian*; our travellers *Rajas*, or *Ragias*.

The chief lords of the Moguls, viz. the vice-roys, governors of provinces, and chief ministers of state, F. Catrou observes, are called *Ombras*; and the idolatrous *Rajas*, or Indian lords who governed petty states before the conquest of their country, hold the same rank at court with the *Ombras*.

All the difference is, that the children of the *Rajas* succeed their fathers in the shew of the sovereignty left them; whereas the children of the Mahometan lords lose all in losing their fathers.

The Indians account four ages from the beginning of the world; and in the second, which lasted 1296000 years, they hold the *Rajas* or Khatrys had their rise; a noble cast; though inferior to the Bramins.—Vice then they say began to creep into the world; men only lived to 300 years, and their stature was reduced, &c. Lett. Edif. & Cur. See **AGE**.

R A I L, in architecture, is applied variously; particularly, to those pieces of timber, which lie horizontally between the pannels of wainscot, and over and under them.

The word is also applied to those pieces of timber which lie over and under balusters in balconies, stair-cases, &c. See **BALLUSTER**.

Also, to the pieces of timber that lie horizontally from post to post in fences with pales or without.

R A I N, a very frequent and useful meteor, descending from above in form of drops of water.

Rain is, apparently, a precipitated cloud; as clouds are nothing but vapours raised from moisture, waters, &c.

And vapours are demonstratively nothing else but little bubbles or vesiculae detached from the waters, by the power of the solar, or subterraneous heat, or both.

These vesiculae being specifically lighter than the atmosphere, are buoyed up thereby, until they arrive at a region where the air is a just balance with them; and here they float, till by some new agent they are converted into clouds, and thence either into rain, snow, hail, mist, or the like.

But the agent in this formation of the clouds into *rain*, &c. is a little controverted: the generality will have it the cold, which constantly occupying the superior regions of the air, chills and condenses the vesiculae, at their arrival from a warmer quarter; congregates them together, and occasions several of them to coalesce into little masses: and by this means their quantity of matter increasing in a greater proportion than their surface, they become an overload to the thin air, and accordingly they descend in rain.

Mr. Derham accounts for the precipitation, hence; that the vesiculae being full of air, when they meet with a colder air than that they contain, their internal air is contracted into a less space, and consequently the watery shell or case is rendered thicker, so as to become heavier than the air, &c.

Others only allow the cold a part in the action, and bring in the winds as flarers with it: indeed it is clear, that a wind blowing against a cloud will drive its vesiculae upon one another, by which means several of them coalescing as before, will be enabled to descend; and the effect will be still more considerable if two opposite winds blow together towards the same place. Add to this, that clouds already formed, happening to be aggravated by fresh accessions of vapour continually ascending, may thence be enabled to descend.

Yet, the grand cause, according to Rohault, is still behind; that author conceives it to be the heat of the air, which after continuing for some time near the earth, is at length carried up on high by a wind, and there thawing the snowy villi, or flocks of the half frozen vesiculae, it reduces them into drops; which coalescing, descend, and have their dissolution perfected in their progress through the lower and warmer stages of the atmosphere.

Others, as Dr. Clark, &c. ascribe this descent of the clouds rather to an alteration of the atmosphere, than of the vesiculae; and suppose it to arise from a diminution of the spring or elastic force of the air.

This elasticity which depends chiefly or wholly on the dry terrene exhalations, being weakened, the atmosphere sinks under its burthen; and the clouds fall, on the common principle of precipitation.

Now, the little vesiculae by any, or all, these means, being once upon the descent, will persist therein, notwithstanding the increase of resistance they every moment meet withal in their progress through still denser and denser parts of the atmosphere.

For, as they all tend toward the same point, viz. the centre of the earth, the farther they fall, the more coalitions will they make; and the more coalitions, the more matter will there be under the same surface; the surface only increasing as the squares, but the solidity as the cubes; and the more matter under the same surface, the less friction or resistance there will be to the same matter.

Thus, if the cold, the wind, &c. happen to act early enough to precipitate the ascending vesiculae, before they are arrived at any considerable height; the coalitions being few in so short a descent, the drops will be proportionably small: and thus is formed what we call *dew*.

If the vapours prove more copious, and rise a little higher, we have a *mist* or *fog*.

A little higher still, and they produce a *small rain*, &c.

If they neither meet with cold, nor wind enough to condense or dissipate them; they form a heavy, thick, dark sky; which lasts sometimes several weeks.

Hence we may account for many of the phenomena of the weather; e. gr. why a cold is always a wet summer; and a warm a dry one? because the principle of precipitation is had in the one case, and is wanting in the other.

Why we have ordinarily most rain about the equinoxes? because the vapours arise more plentifully than ordinarily in the spring, as the earth becomes loosened from the brumal configurations; and because as the sun recedes from us in autumn; the cold increasing, the vapours that had lingered above during the summer heats, are now dispatched down, &c.

Why a settled, thick, close sky scarce ever rains till it have been

been first clear? because the equally diffused vapours must first be condensed, and congregated into separate clouds, to lay the foundation of rain; by which means the rest of the face of heaven is left open, and pervious to the rays of the sun, &c.

For other phenomena of rain, as they relate to the weather-glass, see BAROMETER.

As to the general quantity of rain that falls, and its proportion in several places at the same time, and in the same place at several times, we have force of observations, journals, &c. in the Memoirs of the French academy, the Philos. Transf. &c. an idea whereof may not be unacceptable.

Upon measuring, then, the rain falling yearly, its depth at a medium, is found as in the following table:

Depth of RAIN falling yearly, and its proportion in several places.

	Inches.		
At Townley in Lancashire, observed by Mr. Townley	-	-	42
Upminster in Essex, by Mr. Derham	-	-	19
Zurich in Switzerland, by Dr. Scheuchzer	-	-	32
Pisa in Italy, by Dr. Mich. Ang. Tilli	-	-	43
Paris in France, by M. de la Hire	-	-	19
Life in Flanders, by M. de Vauban	-	-	24

Proportions of the RAIN of several years to one another.

At Upminster.			At Paris.		
1700	19	Inch. 03 Cent.	21	Inch. 38	Cent.
1701	18	69	27	78	
1702	20	38	17	42	
1703	23	99	18	51	
1704	15	81	21	20	
1705	16	93	14	82	

Proportion of the RAIN of the several seasons to one another.

	Depth at Pisa.	Depth at Upm.	Depth at Zurich.		Depth at Pisa.	Depth at Upm.	Depth at Zurich.
	Inch.	Inch.	Inch.		Inch.	Inch.	Inch.
1708				1708			
Jan.	6 41	2 88	1 64	Jul.	0 00	1 11	3 50
Febr.	3 28	0 46	1 65	Aug.	2 27	2 94	3 15
Mar.	2 65	2 03	1 51	Sept.	7 21	1 46	3 02
Apr.	1 25	0 96	4 69	Oct.	5 33	0 23	2 24
May.	3 33	0 02	1 91	Nov.	0 13	0 86	0 62
Jun.	4 90	2 32	5 91	Dec.	0 00	11 97	2 62
Half-year.	28 82	10 67	17 31	Half-year.	14 94	8 57	15 35

Præternatural-RAINS, or showers, as of blood, &c. are very frequent in our annals, and even in natural histories; yet if strictly inquired into, they will be all found other things than rain.

Bloody rains, Dr. Merret observes, are certainly nothing else but the excrements of insects.—Accordingly, Gassendus gives an instance of a bloody rain in France, which terrified the people; but which Peirec found to be only red drops coming from a sort of butterflies that flew about in great numbers. This he concluded from seeing such red drops come from them; from the drops not being laid on buildings, or the outer surfaces of stones, &c. but in cavities and holes; and from those walls only being tinged therewith that were next the fields, not those in the streets; and the former only to a little height, such as butterflies are used to fly to.

Dr. Merret adds, that it is most evident the rains of wheat are nothing but the seeds of ivy-berries, swallowed by the starling, and again cast forth by stool.—An instance of such a rain we have in the Philos. Transf. from the country about Bristol, by Mr. W. Cole; who, upon examining the drops, found them to be the seeds of ivy-berries, blown down by fierce winds from towers, churches, chimneys, walls, &c. where they had been left by birds, chiefly starlings and choughs.

The French have a tradition of a rain of stones, in a plain six or seven leagues long, between Arles and Marseilles, called *la Crau*, which is now quite covered therewith.—The fable has it, that Hercules, in his engagement with Albion and Bregon, in favour of Neptune, wanting darts, was assisted by Jupiter with a shower of these stones, which are seen there to this day.—Another account of their origin, see under the article STONE.

Freezing RAIN. See the article FREEZING.

RAINS, in the sea-language, denote all that tract of sea to the northward of the equator, between 4 and 10 degrees of latitude; and lying between the meridian of Cape Verde, and that of the easternmost islands of the same name.

It takes its name from the almost continual calms, constant rains, and thunder and lightning to a great degree, always found there. The winds, when they do blow, are only small uncertain gusts, and shift about all round the compass; so that ships are sometimes here detained a long while, and can make but very little way.

RAIN-BOW, *IRIS*, or simply the *Bow*, a meteor in form of a party-coloured arch or semicircle, exhibited in a rainy sky, opposite to the sun, by the refraction of his rays in the drops of falling rain.

There is also a secondary or fainter bow, usually seen investing

the former at some distance. Among naturalists we also read of *lunar rainbows*, *marine rainbows*, &c.

The rainbow, Sir Isaac Newton observes, never appears but where it rains in the sun-shine; and it may be represented artificially, by contriving water to fall in little drops like rain, through which the sun shining, exhibits a *bow* to a spectator placed between the sun and the drops; especially if a dark body, *e. gr.* a black cloth, be disposed beyond the drops.

Anton. de Dominis first accounted for the rainbow in 1611; he explained at large how it was formed, by refraction and reflexion of the sun-beams in spherical drops of water; and confirmed his explications by experiments made with glass globes, &c. full of water. Wherein he was followed by Des Cartes, who mended and improved on his account: but, as they were both in the dark as to the true origin of colours, their explications are defective, and in some things erroneous. This it is one of the glories of the Newtonian doctrine of colours to supply and correct.

Theory of the RAINBOW.—To conceive the origin of the rainbow, let us consider what will befall rays of light coming from a very remote body, *e. gr.* the sun, and falling on a globe of water, such as we know a drop of rain to be.

Suppose then ADKN (*Tab. Optics*, fig. 45.) to be a drop of rain, and the lines EF, BA, ON, to be rays of light coming from the centre of the sun; which, by reason of the immense distance of the sun, we conceive to be parallel.

Now the ray BA being the only one that falls perpendicularly on the surface of the water, and all the rest obliquely, it is easily inferred, that all the other rays will be refracted towards the perpendicular. See REFRACTION.

Thus, the ray EF, and others accompanying it, will not go on straight to G; but, as they arrive at HI, they will deflect from F to K, where some of them, probably, escaping into the air, the rest are reflected upon the line KN, so as to make the angles of incidence and reflexion equal.

Farther, as the ray KN, and those accompanying it, fall obliquely upon the surface of the globe, they cannot pass out into the air, without being refracted, so as to recede from the perpendicular LM; and therefore they will not proceed straight to Y, but will deflect to P.

It may be here observed, that some of the rays arriving at N, do not pass out into the air, but are again reflected to Q; where being refracted like the rest, they do not proceed right to Z, but declining from the perpendicular TV, are carried to R; but since we here only regard the rays as they may affect the eye placed a little below the drop, *e. gr.* at P, those which deflect from N to Q, we set aside as useless; because they never come at the eye. On the contrary, it is to be observed, that there are other rays, as 2, 3, and the like; which being reflected from 3 to 4, thence to 5, and from 5 to 6, may at length arrive at the eye placed beneath the drop.

Thus much is obvious: but, to determine precisely the quantities of refraction of each ray, there must be a calculation; by such calculation it appears, that the rays which fall on the quadrant AD, are continued in lines, like those here drawn in the drop ADKN; wherein there are three things very considerable: *First*, That the two refractions of the rays in their ingress and egress are both the same way; so that the latter does not destroy the effect of the former. *Secondly*, That of all the rays passing out of AN, NP, and those adjoining to it, are the only ones capable of affecting the sense; as being sufficiently close or contiguous; and because coming out parallel: whereas the rest are divaricated, and dispersed too far to have any sensible effect, at least to produce any thing so vivid as the colours of the bow. *Thirdly*, That the ray NP has shade or darkness under it: for since there is no ray comes out of the surface N 4, it is the same thing as if the part were covered with an opaque body. We might add, that the same ray NP has darkness above it; since the rays that are above it are ineffectual, and signify no more than if there were none at all.

Add to this, that all the effectual rays have the same point of reflexion, *i. e.* the parallel and contiguous rays, which alone are effectual after refraction, will all meet in the same point of the circumference, and be reflected thence to the eyes.

Farther, it appears by calculation, that the angle ONP, included between the ray NP, and the line ON drawn from the centre of the sun, which is the angle whereby the rainbow is distant from the opposite point of the sun, and which makes the *semidiameter of the bow*, contains $41^{\circ} 30'$. The method of determining it see hereafter.

But since, besides those rays coming from the centre of the sun to the drop of water, there are many more from the several points of its surface; there are a great many other effectual rays to be considered, especially that from the uppermost, and that from the lowest part of the sun's body.

Since then, the apparent diameter of the sun is about 16 seconds,

it follows that an effectual ray from the upper part of the sun will fall higher than the ray EF, by 16 seconds: thus does the ray GH, (fig. 46.) which being refracted as much as EF; deflects to L, thence to L₁, and at length emerging equally refracted with the ray NP, proceeds to M; and makes an angle ONM, of $41^{\circ} 14'$, with the line ON.

In like manner the effectual ray QR coming from the lowest part of the sun, falls on the point R, 16 minutes lower than the point F, on which the ray EF falls; and this being refracted declines to S; whence it is reflected to T; where emerging into the air, it proceeds to V; so, that the line TV, and the ray OT contain an angle of 41° and $46'$.

Again, upon computing the deflexions of the rays, which, like that 23 (fig. 45.) coming from the centre of the sun, and being received into the lower part of the drop, we have supposed to be twice reflected, and twice refracted, and to enter the eye by lines like that 67 (fig. 47.); we find that which may be accounted effectual, as 67 with the line 86 drawn from the centre of the sun, contains an angle 867, of about 52 degrees; whence it follows that the effectual ray from the highest part of the sun, with the same line 86 includes an angle less by 16 minutes; and that from the lowest part of the sun, an angle greater by 16 minutes.

Thus, since ABCDEF is the path of the efficacious ray from the highest part of the sun to the eye in F; the angle 86 F becomes of about fifty one degrees, and forty four minutes. In like manner, since GHKLM is the way of an effectual ray from the lowest part of the sun to the eye, the angle 86 M becomes nearly of fifty two degrees, and sixteen minutes.

Since then we admit several rays to be effectual, besides those from the centre of the sun; what we have said of the shade will need some alteration; for of the three rays described (fig. 45 and 46.) only the two extreme ones will have a shadow joined to them, and that only on the outer side. Hence it is evident that these rays are perfectly disposed to exhibit all the colours of the prism.

For the great quantity of dense or intense light, i. e. the bundle of rays collected together in a certain point, v. gr. in the point of reflection of the effectual rays, may be accounted as a lucid or radiant body, terminated all around by shade. But the several rays thus emitted to the eye are both of different colours, that is, they are fitted to excite in us the ideas of different colours, and are differently refracted out of the water into the air, notwithstanding their falling alike upon the refracting surface.

Hence it follows that the different or heterogeneous rays will be separated from one another, and will tend separate ways; and the homogeneous rays will be collected, and tend the same way: And therefore this lucid point of the drop, wherein the refraction is effected, will appear fringed, or bordered with several colours; that is, red, green and blue colours will arise from the extremes of the red, green and blue rays of the sun transmitted to the eye from several drops one higher than another; after the same manner as is done in viewing lucid, or other bodies through a prism.

Thus, adds Sir Isaac Newton, the rays that differ in refrangibility, will emerge at different angles; and consequently, according to their different degrees of refrangibility, emerging most copiously at different angles, they will exhibit different colours in different places.

A great number then of these little globules being diffused in the air, will fill the whole space with these different colours; provided they be so disposed as that effectual rays may come from them to the eye; and thus will the rainbow at length arise.

Now to determine what that disposition must be; suppose a right line drawn from the centre of the sun through the eye of the spectator, as the line VX, (fig. 46.) called the line of aspect: being drawn from so remote a point, it may be esteemed parallel to all other lines drawn from the same point: but a right line falling on two parallels makes the alternate angles equal.

If, then, an indefinite number of lines be imagined drawn from the spectator's eye to a part opposite to the sun where it rains; which lines make different angles with the line of aspect, equal to the angles of refraction of the differently refrangible rays, e. gr. angles of 41° , $46'$, and of 41° , $30'$, and of 41° , and $40'$. These lines falling on drops of rain illuminated by the sun, will make angles of the same magnitude with rays drawn from the centre of the sun to the same drops. And therefore the lines thus drawn from the eye will represent the effectual rays that occasion the sensation of any colour.

That e. gr. making an angle of 41° , $46'$, representing the least refrangible or red rays of the several drops, and of 41° , $40'$, the most refrangible or violet rays; the intermediate colours and refrangibilities will be found in the intermediate space.

Now, it is known that the eye being placed in the vertex of a cone, sees objects upon its surface, as if they were in a circle; and the eye of our spectator is here in the com-

mon vertex of several cones, formed by the several kinds of efficacious rays, with the line of aspect. Now in the surface of that whole angle at the vertex or eye is the greatest, and wherein the others are included, are those drops or parts of drops which appear red; and in the surface of that cone whose angle is least, are the purple drops; and in the intermediate cones are the green, blue, &c. drops. Hence then several kinds of the drops must appear as if disposed into so many circular coloured fauces or arches, as we see in the rainbow.

This part of the solution Sir Isaac Newton expresses more artfully thus: suppose O (fig. 48.) the eye, and OP a line parallel to the sun's rays, and let POE, POF be angles of 40° , $17'$, and 42° , $2'$. And suppose the angles to turn about their common side OP, with their other sides OE and OF, they will describe the bounds or verges of the rainbow.

For, if E, F be drops placed any where in the conical surface described by OE, OF; and be illuminated by the sun's rays SE, SF; the angle SEO being equal to the angle POE or 40° , $17'$, shall be the greatest angle in which the most refrangible rays can, after reflection, be refracted to the eye; and therefore all the drops in the line OE shall send the most refrangible rays most copiously to the eye, and thereby strike the senses with the deepest violet colour in that region.

And in like manner the angle SFO being = to the angle POF = 42° , $2'$, shall be the greatest in which the least refrangible rays after one reflection can emerge out of the drops; and these rays shall come most copiously to the eye, from the drops in the line OF, and strike the senses with the deepest red colour in that region.

And by the same argument the rays, which have intermediate degrees of refrangibility, shall come most copiously from drops between E and F, and so strike the senses with the intermediate colours, in the order which their degrees of refrangibility require; that is, in the progress from E to F, or from the inside of the bow to the outside, in this order, violet, indigo, blue, green, yellow, orange, red: though the violet, by the mixture of the white light of the clouds, will appear faint, and incline to a purple.

And since the lines OE, OF may be situated any where in the abovementioned conical surface; what is said of the drops and colours in these lines is to be understood of the drops and colours throughout the whole superficies. Thus is the primary or inner bow formed.

Secondary, or outer RAIN-BOW.—As to the secondary or fainter bow usually surrounding the former; in assigning what drops would appear coloured, we excluded such as lines drawn from the eye, making angles a little greater than 42° , $2'$, should fall upon; but not such as should contain angles much greater.

For, if an indefinite number of such lines be drawn from the spectator's eye, some whereof make angles of 50° , $57'$, with the line of aspect; e. gr. OG; other angles of 54° , $7'$, e. gr. OH; those drops whereon these lines fall, must of necessity exhibit colours. Particularly those of 50° , $57'$.

E. gr. the drop G will appear red; the line OG being the same with an effectual ray, which after two reflections, and two refractions, exhibits a red colour. Again, those drops which receive lines of 54° , $7'$, e. gr. the drop H will appear purple, the line OH being the same with an effectual ray which after two reflections, and two refractions, exhibits purple.

Now there being a sufficient number of these drops, it is evident there must be a second rainbow, formed after the like manner as the first.

Thus Sir Isaac Newton: in the least refrangible rays, the least angle at which a drop can send effectual rays after two reflections, is found by computation to be 50° , $57'$, and in the most refrangible the least angle is found 54° , $7'$.

Suppose, then, O the place of the eye, as before, and POG, POH to be angles of 50° , $57'$, and 54° , $7'$. And these angles to be turned about their common side OP; with their other sides OG, OH, they will describe the verges or borders of the rainbow, CHDG.

For if G H be drops placed any where in the conical superficies described by OG, OH, and be illuminated by the sun's rays; the angles SGO being equal to the angle POG or 50° , $57'$, shall be the least angle in which the then least refrangible rays can, after two reflections, emerge out of the drops; and therefore the least refrangible rays shall come most copiously to the eye from the drops in the line OG, and strike the senses with the deepest red in that region.

And the angle SHO being equal to POH, 54° , $7'$, shall be the least angle in which the most refrangible rays, after two reflections, can emerge out of the drops; and therefore those rays shall come most copiously to the eye from the drops in the line OH, and so strike the senses with the deepest violet in that region.

And by the same argument, the drops in the region between G and H shall strike the senses with the intermediate colours, in the order which their degrees of refrangibility require; that is, in the progress from G to H, or from the inside of the bow to the outer, in this order: *red, orange, yellow, green, blue, indigo, violet.*

And since the lines OG, OH, may be situated any where in the conical surface; what is said of the drops and colours in these lines is to be understood of the drops and colours every where in these superficieses.

Thus are formed two bows, an *interior* and stronger, by one reflection; and an *exterior* and fainter by two; the light becoming weaker and weaker by every reflection.

Their colours will lie in a contrary order to one another; the first having the red without, and the purple within: and the second the purple without and red within; and so of the rest.

Artificial RAIN-BOW—This doctrine of the rainbow is confirmed by an easy experiment: for upon hanging up a glass globe full of water in the sun-shine, and viewing it in such a posture as that the rays which come from the globe to the eye, may, with the sun's rays include an angle either of 42° , or 50° ; if *e.g.* the angle be about 42° , the spectator, supposing at O, will see a full red colour in that side of the globe opposite to the sun, as at F. And if that angle be made a little less, suppose by depressing the globe to E, the other colours, yellow, blue and green will appear successively, in the same side of the globe, also exceedingly bright.

But if the angle be made about 50° , suppose by raising the globe to G, there will appear a red colour in that side of the globe towards the sun; though that somewhat faint; and if the angle be made greater, suppose by raising the globe to H; this red will change successively to the other colours, yellow, green, and blue.

The same thing is observed in letting the globe rest, and raising or depressing the eye so as to make the angle of a just magnitude.

Dimension of the RAIN-BOW—Des Cartes first determined its diameter by a tentative, and indirect method; laying it down that the magnitude of the bow depends on the degree of refraction of the fluid; and assuming the ratio of the sine of incidence to that of refraction, to be in water as 250 to 187.

But Dr. Halley has since, in the *Philosoph. Trans.* given us a simple, direct method of determining the diameter of the rainbow from the ratio of refraction of the fluid being given; or *vice versa*, the diameter of the rainbow being given, to determine the refractive power of the fluid. The praxis is as follows.

First, *The ratio of refraction being given; to find the angles of incidence, and refraction of a ray which becomes effectual after any given number of reflections*—Suppose any given line as AC (*Tab. Optics, Fig. 49.*) which divide in D; so, as that AC be to AD in the ratio of refraction; and again divide it in E, so as AC be to AE as the given number of reflections increased by unity, is to unity; with the diameter CE describe a semicircle CBE, and from the centre A with the radius AD describe an arch DB intersecting the semicircle in B. Then drawing AB, CB; ABC or its complement to two right angles, will be the angle of incidence; and ACB the angle of refraction required.

Secondly, *The ratio of refraction, and any angle of incidence being given to find the angle which a ray of light emerging out of a refracting sphere, after a given number of reflections, makes with the line of aspect, or an incident ray; and consequently to find the diameter of the rainbow*—The angle of incidence, and the ratio of refraction being given, the angle of refraction is given; which angle being multiplied by double the number of reflections increased by 2, and double the angle of incidence subtracted from the product, the angle remaining is the angle sought.

Thus supposing the ratio of refraction to be, as Sir Isaac Newton has determined it, *viz.* as 108 to 81, in the red rays, as 109 to 81 for the blue rays, &c. the preceding problem will give the distance of the colours in the

I. RAIN-BOW,	{ Red $42^\circ 11'$ Violet $40^\circ 16'$	The spectator's back
II. RAIN-BOW,	{ Red $50^\circ 58'$ Violet $54^\circ 9'$	being turned to the sun.

If the angle made by a ray after three or four reflections, were required, and therefore the diameters of the third and fourth rainbows, (which are scarce ever seen, by reason of the great diminution of the rays, by so many repeated reflections) they will be found,

III. RAIN-BOW,	{ Red $41^\circ 37'$ Violet $37^\circ 9'$	The spectator being
IV. RAIN-BOW,	{ Red $43^\circ 52'$ Violet $49^\circ 34'$	turned towards the sun.

Hence, the breadth of the rainbow is easily found: for the greatest semidiameter of the first bow, *i.e.* from red to red being $42^\circ 11'$, and the least, *viz.* from violet to violet 40° ,

$16'$; the breadth of the *fascia* or *bow*, measured a-crofs from red to violet will be $1^\circ 45'$, and the greatest diameter of the second bow being $54^\circ 9'$, and the least $50^\circ 58'$ the breadth of the *fascia* will be $3^\circ 10'$. And hence the distance between the two will be found $8^\circ 15'$.

In these measures the sun is only esteemed a point; wherefore as his diameter is really about $30'$ so much must be added to the breadth of each *fascia* or *bow*, from red to violet, and so much must be subtracted from the distance between them.

This will leave the breadth of the *primary bow*, $2^\circ 15'$, that of the *secondary bow* $3^\circ 40'$, and the interval between the bows $8^\circ 25'$; which dimensions deduced by calculation, Sir Isaac Newton assures us from his own observations, agree very exactly with those found by actual mensuration in the heavens.

Particular phenomena of the RAIN-BOW—from this theory of the rainbow all the particular phenomena of it are easily deduced: hence we see why the Iris is always of the same breadth; by reason the intermediate degrees of refrangibility of the rays between red and violet, which are its extreme colours, are always the same.

Secondly, Why it is more distinctly terminated on the side of the red, than on that of the violet? there being no efficacious rays in the space adjoining to the red drops, *i.e.* to the space between the bows; whence it terminates abruptly; whereas in the space on the side of the violet ones, there are some rays emitted to the eye, which though too feeble to affect it strongly, yet have this effect, that they soften the violet edge insensibly, so that it is difficult to determine precisely where it terminates.

Thirdly, Why the bow shifts its situation as the eye does; and, as the popular phrase has it, *flies those who follow it, and follows those that fly it?* the coloured drops being disposed under a certain angle about the line of aspect, which is different in different places: whence, also, it follows that every different spectator sees a different bow.

Fourthly, Why the bow is sometimes a larger portion of a circle, sometimes a less? its magnitude depending on the greater, or less part of the surface of the cone, above the surface of the earth at the time of its appearance; and that part being greater or less as the line of aspect is more inclined or oblique to the surface of the earth; which inclination, or obliquity, is greater as the sun is higher: whence, also, the higher the sun, always the less the rainbow.

Fifthly, Why the bow never appears when the sun is above a certain altitude? the surface of the cone wherein it should be seen being lost in the ground, at a little distance from the eye, when the sun is above 42° high.

Sixthly, Why the bow never appears greater than a semicircle, on a plane? since be the sun never so low, and even in the horizon, the centre of the bow is still in the line of aspect; which, in this case, runs along the earth, and is not at all raised above the surface.

Indeed, if the spectator be placed on a very considerable eminence, and the sun in the horizon, the line of aspect wherein the centre of the bow is will be notably raised above the horizon, (considering the magnitude of the circle whereof the bow uses to be a part.) Nay, if the eminence be very high, and the rain near, it is possible the bow may be an entire circle.

Seventhly, How the bow may chance to appear inverted. *i.e.* the concave side be turned upwards? to wit, a cloud happening to intercept the rays, and prevent their shining on the upper part of the arch: in which case only the lower part appearing, the bow will seem as if turned upside down: which probably has been the case in several prodigies of this kind, related by authors.

Indeed the bow may appear inverted from another cause: for, if, when the sun is $41^\circ 46'$ high, his rays fall upon the smooth surface of some spacious lake, in the middle whereof a spectator is placed; and if at the same time there be rain falling to which the rays may be reflected from the lake: it will be the same as if the sun should shine below the horizon, and the line of view be extended upwards: thus the surface of the cone wherein the coloured drops are to be placed, will be wholly above the surface of the earth. But since the upper part will fall among the unbroken clouds, and only the lower part be found among the drops of rain, the arch will be inverted.

Eighthly, Why the bow sometimes appears inclined? the accurate roundness of the bow depending on its great distance, which prevents us from judging of it exactly: if the rain which exhibits it chance to be much nearer, we shall see its irregularities; and if the wind in that case drive the rain so as the higher part be farther from the eye than the lower, the bow will appear inclined.

Ninthly, Why the legs of the rainbow sometimes appear unequally distant? If the rain terminate on the side of the spectator, in a plane so inclined to the line of aspect as to make an acute angle on the left hand, and an obtuse angle on the right, the surface of the cone which determines what drops will

will appear, will fall upon them in such manner as that those on the left hand will appear farther from the eye than those on the right. For the line of aspect being perpendicular to the plane of the bow, if you suppose two rectangular triangles, a right and left, the cathetus of each to be the line of view, and the base of the femidiameter of the bow, inclined as above: it is evident, since those angles of the triangles, next the eye, must always be the same, (*viz.* 43° in the inner bow) the basis of the right-hand triangle will in this case appear much longer than that of the left.

Lunar RAIN-BOW.—The moon, sometimes, also, exhibits the phenomenon of an Iris, or bow; by the refraction of her rays in the drops of rain in the night-time.

Aristotle says, he was the first that ever observed it; and adds that it never happens, *i. e.* is never visible, but at the time of the full moon; her light at other times being too faint to affect the sight after two refractions, and one reflection.

The lunar Iris has all the colours of the solar, very distinct and pleasant; only faint, in comparison of the other; both from the different intensity of the rays, and the different disposition of the medium.

In that mentioned *Philos. Transact.* N^o. 331. Mr. Thoresby observes, the largeness of the arch was not so much less than that of the sun, as the different dimensions of their bodies, and their distances from the earth should seem to require: but, as to its intireness and the beauty of its colour, it was admirable. This continued about 10 minutes before the interposition of a cloud hindered its observation.

Marine RAIN-BOW.—The *marinor or sea-bow*, is a phenomenon sometimes observed in a much agitated sea; when the wind sweeping part of the tops of the waves, carries them aloft; so that the sun's rays falling upon them, are refracted, &c. as in a common shower; and paint the colours of the bow.

F. Bourzes, in the *Philos. Transact.* observes, that the colours of the marine rainbow are less lively, less distinct, and of less duration than those of the common bow; that there are scarce above two colours distinguishable, a dark yellow on the side next the sun, and a pale green on the opposite side.

But these bows exceed as to number, there being sometimes 20 or 30 seen together: they appear at noon-day, and in a position opposite to that of the common bow, *i. e.* the concave side is turned upwards, as, indeed, it is necessary it should be, from what we have shewn in accounting for the phenomena of the solar bow.

To this class of bows may be referred a kind of *white or colourless rainbows*, which Mentzelius, and others, affirm to have been at noon-day. M. Mariotte in his fourth *Essai de Physique*, says, these bows are formed in mists, as the others are in showers; and adds, that he has seen several both after sun-rising, and in the night.

The want of colours he attributes to the smallness of the vapours which compose the mist: but we should rather account for it from the exceeding tenuity of the little *vesiculae* of the vapour; which being in effect only little watery pellicles bloated with air, the rays of light undergo but little refraction in passing out of air into them; too little to separate the differently coloured rays, &c.

Hence the rays are reflected from them, compounded as they came, that is, white.

Rohault mentions coloured rainbows on the grass; formed by the refractions of the sun's rays in the morning dew. *Trait. de Phys.*

RAIN-water. See the article **WATER**.

RAISED-air. } See the articles } **AIR**.

RAISED-plan. } **PLAN**.

RAISE R, in building, a board set on-edge under the fore-side of a step, a stair, &c. See **STAIR**, &c.

RAISING, in the manage, one of the three actions of a horse's legs; the other two being the stay, and the tread.

The *raising* or lifting up of his leg in caprioles, curvets, &c. is esteemed good, if he perform it hardly and with ease; not crossing his legs, nor carrying his feet too much out or in; yet bending his knees as much as is needful.

RAISING-pieces, or **REASON-pieces**, in architecture, are pieces that lie under the beams, and over the posts or puncheons.

RAISINS, grapes prepared by drying them in the sun, or in the air; to fit them for keeping, and for some medicinal purposes.

Of these there are various kinds: as, *raisins* of Damascus, thus called from the capital city of Syria, in the neighbourhood whereof they are cultivated. They are much used in the composition of pitfams, together with jujubes and dates; they are brought flat and seeded, of the size of the thumb; whence it is easy judging of the extraordinary bulk of the grape, when fresh. Travellers tell us of bunches weighing 25 pounds. Their taste is faintish and disagreeable.

Raisins of the sun, are a kind of *raisins* brought from Spain, of a reddish or blueish colour, seeded, and very agreeable to eat.

There are various other sorts, denominated either from the place where they grow, or the kind of grape, &c. as *raisins* of Calabria, Muscadine *raisins*, &c.

RAITING, or **RATING**, the laying of hemp, flax, timber, &c. when green, in a pond or running water, to season and dispose it for future uses.

RAKE, of a ship, is so much over her hull as overhangs at both ends of her keel.

That part of it which is before, is called the *rake forward on*: and that part which is at the setting on of the stern-post, is called her *rake-aft*, or *afterward-on*.

When a ship hath but a small *rake forward on*, but is built with her stern too straight up, she is called *bluff-headed*.

RAKE of the rudder, is the hindmost part of it.

RAKE, among hunters. See the article **RAG**.

RAKING, of a horse, is the drawing his ordure with the hand out of the fundament, when he is coiffive and cannot dung. In order to do this the hand must be anointed with fallet-oil or butter.

A horse is also said to *rake*, when being shoulder-splaid, or having strained his fore-quarters, he goes so lame as to drag one of his fore-legs in a circle.

RAKING-table, or **RAKED table**, among architects, a member hollowed in the square of a pedestal, or elsewhere. See **CAVETTO**, and **SCOTIA**.

RALLYING, in war, the re-assembling, or calling together of troops, broken, routed, and put to flight.

RAM, in astronomy. } See the article **ARIES**.

Battering RAM.

RAMADAN, a sort of lent observed by the Mahometans; during which they fast the whole day, with such extreme superstition, that they dare not wash their mouth, nor even swallow their spittle.

The men indeed are allowed to bathe themselves; but it is on condition they do not plunge the head under water, lest some drops enter by the mouth or ears, &c.—But for the women they are strictly forbid bathing, for fear of taking in water at the pudendum.—To make amends, they fast all night; and usually spend more in this month than in fix others.

RAMAGE, a term used for the boughs or branches of trees. See **BRANCH**, &c. Hence

RAMAGE hawk, or *falcon*, one that is wild and coy, as having been long among the boughs, preying for itself. All falcons retain this name till they have left the aery; being so called in May, June, July, and August—These are very rarely reclaimed.

RAMAGE velvet. See the article **VELVET**.

RAMIFICATION, the production of boughs or branches; or of figures resembling branches.

RAMIFICATIONS, in anatomy, are the divisions of the arteries, veins and nerves, arising from some common trunk—See *Tab. Anat. (Angiol.) fig. 1. n. 18. 18. fig. 4. fig. 5.*

RAMMER, or **BETTEL**, an instrument used for driving down stones or piles into the ground; or for beating the earth, and making it more solid for a foundation.

RAMMER of a gun, the *gun-stick*; a rod or staff used in charging a gun, to drive home the powder to the breech, as also the shot, and the wad, which keeps the shot from rolling out.

The rammer of a great gun has a round piece of wood at one end; the other is usually rolled in a piece of sheep-skin, fitted to the bore of the piece, in order to clear her after she has been discharged: which they call *sponging the piece*.

RAMPANT*, in heraldry, is applied to a lion, bear, leopard, or other beast, in a posture of climbing, or standing upright on his hind-legs, and rearing up his fore-feet; shewing only half his face, as one eye and one ear.

* The term is french, and signifies literally, *creeping*.

It is different from *saliant*, which denotes a posture less erect, or somewhat stooping forwards, as if making a fall.

This posture is to be specified in blazoning in all animals, except in the lion and griffon; it being their natural situation.

RAMPART*, or **RAMPIER**, in fortification, a massy bank, or elevation of earth about the body of a place, to cover it from the great shot; and formed into bastions, curtains, &c. See *Tab. Fort. fig. 21. lit. rr.*

* The word is formed from the Spanish *Amparo*, defence, or covering.

Upon the *rampart* the soldiers continually keep guard, and pieces of artillery are planted there for the defence of the place—Hence, to shelter the guard from the enemies shot, the outside of the *rampart* is built higher than the inside, *i. e.* a parapet is raised upon it with a platform. See **PARAPET**, and **PLATFORM**—Hence, also, earth not being capable to be raised perpendicularly, like stone; the *rampart* is built with a talus or slope, both on the inner and outer-side.

The *rampart* is sometimes lined, *i. e.* fortified with a stone wall within side, otherwise it has a berme. See **BERME**—It is encompassed also with a moat or ditch, out of which the earth that forms the *rampart* is dug.

The height of the *rampart* should not exceed three fathom, this being sufficient to cover the houses from the battery of the cannon: neither ought its thickness to be above ten or twelve, unless more earth be taken out of the ditch, than can be otherwise belowered.

The *ramparts* of half-moons are the better for being low, that the small fire of the defendants may the better reach the bottom of the ditch; but yet they must be so high, as not to be commanded by the covert-way.

RAMPART is also used, in civil architecture, for the space left void between the wall of a city and the next houses.

This is what the Romans call *pomarium*, wherein it was forbid to build, and where they planted rows of trees, for the people to walk and amuse themselves under.

RAMUS, in anatomy, &c. a branch of a greater vessel.

RAMUS anterior is particularly used for a branch of the subcutaneous vein, passing under the muscles of the ulna.

Ramus posterior denotes a branch of the same vein, running near the elbow.

RANA. See the article **RANULA**.

RANCID*, **RANCIDUS**, denotes a fatty substance that is become rank, or musty; or that has contracted an ill smell by being kept close.

* The word is particularly understood of old ratty bacon. It comes from the Latin *rancidus*, of *rancio*, to be rank.

RANDOM-shot, a shot made when the muzzle of a gun is raised above the horizontal line, and is not designed to shoot directly, or point-blank.

The utmost *random* of any piece is about ten times as far as the bullet will go point-blank; and the bullet will go farthest when the piece is mounted to about 45 degrees above the level-range.

The space or distance of the *random* is reckoned from the platform to the place where the ball first grazes.

RANFORCE ring. See **RE-IN-FORCED ring**.

RANGE, in gunnery, the path of a bullet, or the line it describes from the mouth of the piece to the point where it lodges.

If the piece be laid in a line parallel to the horizon, it is called the *right* or *level range*.

If it be mounted to 45 degrees; the ball is said to have the *utmost range*; and so proportionably, all others between 00 degrees and 45 degrees being called the *intermediate ranges*.

Amplitude of the RANGE of a projectile. See **AMPLITUDE**.

RANGER, a sworn officer of a forest, whose business it is to walk daily through his charge, to drive back the deer out of the purlieu or disforested places into the forest-lands; and to prevent all trespasses done in his bailiwick at the next court held for the forest.

The *ranger* is made by the king's letters, and has a fee paid yearly out of the exchequer, and certain fee-deer.—In the charter de foresta mention is made of twelve kind of *rangers*.

RANGES in a ship are two pieces of timber going a-cross from side to side; one aloft on the fore-castle, a little abaft the fore-mast; and the other in the beak-head; before the wouplings of the bow-sprit.

RANGING, in war, the disposing of troops in a condition proper for engagement, or for marching.

The army was *ranged* in form of battle to receive the enemy; *ranged* in three columns for a march, &c.

In building, the side of a work that runs straight, without breaking into angles, is said to *range*, or *run range*.

RANK, a due order, or a place allotted a thing suitably to its nature, quality, or merit.

Kings are persons of the first *rank* on earth: In cavalcades, processions, &c. every person is to observe his *rank*.

RANK, in military discipline, denotes a series or row of soldiers, placed side by side; a number of which *ranks* form the depth of the squadron or battalion, as a number of files does the width.

To *close the rank*, is to bring the men nearer: to *open* it, is to set them farther apart.—To *double the ranks*, is to throw two into the space of one, by which the files are thinned.

Rear RANK. See the article **REAR**.

RANK, in respect of ships. See **RATE**.

RANSOM, a sum of money paid for the redemption of a person out of slavery; or for the liberty of a prisoner of war.

In our law-books, *ransom* is also used for a sum paid for the pardoning of some notorious crime.

Horn makes this difference between *ransom* and *amercement*, that *ransom* is the redemption of a corporal punishment due to any crime.

When one is to make a fine and *ransom*, the *ransom* shall be treble the fine. *Crompt. Just.*

RANT, in the drama, an extravagant flight of passion, overshooting nature and probability.

Lee's tragedies abound with *rants*: yet the rankest, it is observed, frequently meet with applause on the stage.

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We find instances of *Rants*, even in our severest poets. Such, *e. gr.* is that in the beginning of Ben Johnson's *Catiline*, where the parricide in speaking to Rome, says, *I'd plough up rocks, sleep as the alps, in dust; and leave the Tyrrhenian waters into clouds, but I would reach thy head!*

RANULA, or **RANA**, in medicine, a tumour under the tongue, which like a ligature hinders a child from speaking, or sucking.

The *Ranula sub lingua*, is sometimes the same with what we popularly call being *tongue-tied*: a defect which is usually caused by a short frænum not permitting the tongue to perform its proper motions.—Though at other times, there is a strong concretion, or rather imposthume under the tongue, which is the proper *ranula*, by the Greeks called *Βεραχια*.

This imposthume contains in a bag a matter that is sometimes oedematous, at other times melicerous; scirrhous, black, or livid; in which cases the operation of cutting is dangerous if usually grows to the magnitude of a bean or chestnut. *Shaw.*

RANULARES, or **RANINÆ vena**, in anatomy, two veins under the tongue, arising from the external jugular, and running on either side the linea mediana.

These veins are opened with good success in quinzies.—They take their denomination from a resemblance of their state to that of little frogs, called in Latin, *ranule*, because never out of water.

RAPACIOUS animals, in the general, are such as live upon prey.

Naturalists divide birds into *rapacious*, *carnivorous*, and *frugivorous*.

The characteristic notes of *rapacious* birds are; that they have a great head, and a short neck; hooked, strong, and sharp pointed beak and talons; fitted for tearing of flesh; strong and brawny thighs, for striking down their prey; a broad thick fleshy tongue like that of man: 12 feathers in their train; and 24 flag feathers in each wing. And the two appendices, or blind guts, are always very short.

Rapacious birds have a membranous stomach, and not a muscular one; of a gizzard, such as birds have which live on grain.

They are very sharp sighted; and gather not in flocks, but generally speaking, are solitary; though vultures will fly 50 or 60 in a company.

RAPE, **RAPTUS**, in law, a *ravishing*; or the having carnal knowledge of a woman by force, and against her will. If the woman conceives, the law esteems it no *rape*; from an opinion that she cannot conceive unless the consent. *Coke in Litt. lib. 2. cap. 11.*

This offence is felony in the principal and in his aiders, by several statutes; and the criminal is excluded from the benefit of his clergy.

By the civil law, *C. de raptu virginum*, ravishing is decreed capital; even though the woman, being a maid, or widow, consent to marry the ravisher. In France, the civil law constitution obtains, though it was suspended some time by the ordinances, which allowed the man to marry the woman with her consent. By an ordinance in 1639, the *rape* of a girl or a boy are put on the same footing. Fleta observes that by our law the complaint must be made within forty days; else the woman may not be heard. *lib. 3. cap. 5.* All carnal knowledge of a maid before ten years of age, is deemed by the law a *rape*. *Stat. An. 8. Edw. cap. 6.*

In Bracton's time, the *raptor* or *ravisher*, was punished with the loss of his eyes and testicles, *quia colorem stupri induxerunt*. 3 Inst. fol. 60.

The civilians make another kind of *rape*, called *subornatio*, *rape of subornation*, or *seduction*; which is when a person seduces, or intices a maid to uncleanness, or even marriage, and that by gentle means; provided there be a considerable disparity in age or condition between the parties: In this case, the father and mother intend their action reciprocally for the *crimen raptus*; or *subornationis*.

The French laws make no difference between the *rape* of violence and that of solicitation, or *subornation*; they make both capital.—This kind of *rape* our laws call *ravishment*.

RAPE, of the forest, is a trespass committed in the forest by violence.

This is mentioned in the laws of Henry I. as one of the crimes cognizable alone by the king.

RAPE, is also a name given the wood or stalks of the clusters of grapes, when dried and freed from the fruit.

The *rape* is used in making vinegar; serving to heat, and sour the wine: but it is first put into a place to sour itself, before it be cast into the vinegar vessel; to which end, presently after the vintage, it is carefully put up in barrels, left it take air; otherwise it would heat itself, and be spoiled: There is no other way of keeping *rape*, hitherto discovered, but to fill the vessel, wherein it is contained, with wine or vinegar.

RAPE, RAPA, is also used for a part, or division of a county; signifying as much as a *hundred*. Though, sometimes *rape* is taken for a division containing several hundreds—Thus Suffex is divided into six *rapes*, viz. those of Chichester, Arundel, Bramber, Lewes, Pevensey, and Hastings; every one of which, besides its hundreds, has a castle, a river, and forest belonging to it. The like parts in other counties are called *tithings*, *lathes*, or *wapentakes*.

RAPIER, properly denotes a long, ordinary, old fashioned cutting sword, such as those wore by the common soldiers.

* The word is formed from the French *rapier*, of the Greek *ῥάπιον*, *cedere*, to smite, or strike.

In this sense do the French still use the term: so that among them to *take the rapier*, is to enter in the army.

RAPIER, in a modern sense among us, usually denotes a small sword—as contradistinguished from a back-sword, or cutting sword.

RAPINE, RAPINA in law—To take a thing in private against the owner's will, is properly *theft*; but to take it openly, or by violence, is *rapine*, or *robbery*.

RAPSODIST, { See } **RHAPSODIST**.

RAPSODY, { See } **RHAPSODY**.

RAPTU heredis, an ancient writ which lies for the taking away an heir, holding in fofage; of which there are two sorts; one when the heir is married, the other when not. See **RAVISHMENT**.

RAPTURE, RAPTURA, an extasy, or transport of mind. See **EXTASY**, **ENTHUSIASM**, **RHAPSODY**, &c.

RARE, in physics, denotes a body that is very porous whole parts are at a great distance from one another, and which contains but little matter under a great deal of bulk.

In this sense *rare* stands opposed to *dense*.

The corpufcular Philosophers, viz. the Epicureans, Gassendists, Newtonians, &c. assert that bodies are *rarer* some than others, in virtue of a greater quantity of vacuity included between their pores.—The Cartesians hold, that a greater *rarity* only consists in a greater quantity of materia subtilis, included in the pores.—Lastly, the Peripatetics contend, that *rarity* is a new quality superinduced upon a body, without any dependance, either on vacuity or subtle matter.

RAREFACTION, RAREFACTIO, in physics, the act whereby a body is rendered *rare*; that is, is brought to possess more room, or appear under a larger bulk, without accession of any new matter.

Rarefaction is opposed to *condensation*.

Our more accurate writers restrain *rarefaction* to that expansion of a mass into a larger bulk, which is effected by means of heat—All expansion from other causes they call dilatation.

The Cartesians deny any such thing as absolute *rarefaction*: extension with them, constituting the essence of matter, they are obliged to hold all extension equally full.

Hence, they make *rarefaction* to be no other than an accession of fresh, subtle, and infensible matter, which entering the parts of a body, sensibly distends them. See this disproved under **VACUUM**.

It is by *rarefaction* that gunpowder has its effect; and to the same principle also we owe our acipiles, thermometers, &c.

The degree to which the air is *rarefiable* exceeds all imagination: Merfennius, long ago, by means of an intense heat, found that air might be rarefied, so as to possess more than 70 times its former space.

Mr. Boyle afterwards found, that air, by its own elasticity, and without the help of any heat, would dilate itself so as to take up 9 times its former space; then 31 times; then 60; then 150: at length, by many degrees he found it would reach to 8000 times, then 10000, and finally to 13679.

Such is the rarefaction of common air, from its own principle of elasticity, and without any previous condensation; but if it be compressed, the same author found its greatest space when most rarified, is to its least when most condensed, as 55000 to 1.

Such an immense *rarefaction*, Sir Isaac Newton shews, is inconceivable on any other principle than that of a repelling force inherent in the air, whereby its particles mutually fly from one another.

This repelling force, he observes, is much more considerable in air than in other bodies, as being generated from the most fixt bodies, and that with much difficulty, and scarce without fermentation; those particles being always found to fly each other with the most force, which when in contact, cohere the most firmly.

The members of the French royal academy have bestowed a world of attention on the different *rarefactions*, or rather the different *rarities* of the air at different heights. M.

Mariotte established this as a principle, from experiments, that the different *rarefactions* or condensations of the air follow the proportion of the weights wherewith it is pressed.

Hence, supposing the mercury in the level of the sea suspended to 28 inches, which is the weight of the whole atmosphere; and that 60 feet height of air are equivalent to a line, or $\frac{1}{2}$ of an inch of mercury; so that the barometer, at the height of 60 feet from the sea, would fall a line; it is easy finding what height of air would be equal to a second, or any other line of mercury: for as 28 inches of mercury are to 28 inches, so is the height of 60 feet of air to a fourth term; which is the height of air corresponding to a second line of mercury.

And after the same manner may the heights of air corresponding to each line be found; which will make a geometrical progression, the sum whereof will be the whole height of the atmosphere; and of consequence a certain part of that sum will be the height of a mountain, at whose top the barometer shall have funk a certain quantity.

Mess. Cassini and Maraldi, upon measuring the heights of several mountains, found, that this progression of M. Mariotte was defective; that it always gave the height of the mountains, and consequently the *rarefactions*, less than they really were; and from some farther experiments M. Amontons found, that the principle will only hold in the mean *rarefactions*, not in the extremes.

RAREFACTIVES, RAREFACIENTIA, in medicine, remedies which open and enlarge the pores of the skin, to give an easy vent to the matter of perspiration.

Such are anise, mallows, pellitory, camomile-flowers, linseed, &c.

RASANT, or RAZANT, in fortification—**RASANT flank, or line**, is that part of the curtain, or flank, whence the shot exploded raze or glance along the face of the opposite bastion.

The defence of the bastion is *rasant*.

RASH, in clock-work. See the article **RATCH**.

RASH, in medicine, an eruption or efflorescence upon the skin, thrown out in fevers or furfeits.

RASP, a rank foot of file. See **FILE**.

RASFATORY, a chirurgeon's instrument, wherewith they scrape foul, carious, or fractured bones.

RASPHUYS, or RASP-houfe, a celebrated work-houfe, or houfe of correction, at Amsterdam. See **WORK-houfe**.

RATA pro RATA. See the article **Pro rata**.

Oneranda pro RATA portionis. See **ONERANDO**.

RATAFIA, a fine spirituous liquor, prepared from the kernels, &c. of several kinds of fruits, particularly of cherries and apricocks.

Ratafia of cherries is prepared by bruising the cherries, and putting them into a vessel wherein brandy has been long kept; then adding to them the kernels of cherries, with strawberries, fugar, cinnamon, white pepper, nutmegs, cloves; and to 20 pound of cherries, 10 quarts of brandy.—The vessel is left open 10 or 12 days, and then stopped close for two months before it be tapped.

Ratafia of apricocks is prepared two ways; viz. either by boiling the apricocks in white wine, adding to the liquor an equal quantity of brandy, with fugar, cinnamon, mace, and the kernels of apricocks; infusing the whole for eight or ten days; then straining the liquor, and putting it up for use: or else by infusing the apricocks, cut in pieces, in brandy, for a day or two; passing it through a straining bag, and then putting in the usual ingredients.

RATCH, or RASH, in clock-work, a sort of wheel having twelve fangs, which serve to lift up the detents every hour, and to make the clock strike.

RATCHETS, in a watch, are the small teeth at the bottom of the fufy, or barrel; which stop it in winding up.

RATE, a standard or proportion, by which either the quantity or value of a thing is adjusted.

The rates of bread, &c. in London, are fixed by authority. See **ASSISE**.

The rate of interest, as now established by law in England, is 5 per cent. The rate of interest in Italy is 3 per cent. In Sweden 6. In France 5. In Spain 10. In Barbadoes 10. In Ireland 12. In Turkey 20.—Low rates of interest advance the prices of land.

The rates or fares of hackney-coachmen, chairmen, and waitermen, are fixed by act of parliament, 14 Car. II. See **Hackney-COACH**, &c.

The rates of exchange, factordship, &c. are different. See **EXCHANGE**, **FACTORAGE**, &c.

RATE-tithe. When sheep, or other cattle, are kept in a parish for less time than a year, the owner must pay tithe for them *pro rata*, according to the custom of the place.

RATE of a ship of war is its order, degree, or distinction, as to magnitude, burthen, &c.

The

The *rate* is usually accounted by the length and breadth of the gun-deck, the number of guns, and the number of men and guns the vessel carries.—There are six rates:

First RATE man of war has its gun-deck from 159 to 174 feet in length, and from 44 to 50 feet broad; it contains from 1313 to 1862 tons; has from 706 to 800 men; and carries from 96 to 100 guns.

Second RATE ships have their gun-decks from 153 to 165 feet long; and from 41 to 46 broad; they contain from 1086 to 1482 tons; and carry from 524 to 640 men, and from 84 to 90 guns.

Third RATE ships have their gun-decks from 140 to 158 feet in length; from 37 to 42 feet broad; they contain from 871 to 1262 tons; carry from 389 to 476 men; and from 64 to 80 guns.

Fourth RATE ships are in length on the gun-deck, from 118 to 146 feet; and from 29 to 38 broad; they contain from 448 to 915 tons; carry from 226 to 346 men; and from 48 to 60 guns.

Fifth RATE ships have their gun-decks from 100 to 120 feet long; and from 24 to 31 broad; they contain from 259 to 542 tons; carry from 145 to 190 men; and from 26 to 44 guns.

Sixth RATE ships have their gun-decks from 87 to 95 feet long; and from 22 to 25 broad; they contain from 152 to 256 tons; carry from 50 to 110 men; and from 16 to 24 guns.

Note. The new-built ships are much larger, as well as better than the old ones of the same rate; whence the double numbers all along; the larger of which express the proportions of the new-built ships, as the less those of the old ones.—For the number of each rate in the English fleet. See NAVY.

RATEEN, or **RATTEN**, in commerce, a thick woollen stuff, quilted, wove on a loom with four treadles, like serges and other stuffs that have the whale or quilting. There are some *rateens* dressed and prepared like cloths; others left simply in the hair; and others where the hair or nap is frized.

Rateens are chiefly manufactured in France, Holland, and Italy; and are mostly used in linings.

The frize is a sort of coarse *rateen*; and the drugget is a *rateen* half linen, half woollen.

RATIFICATION, **RATIFICATIO**, an act, approving of, and confirming something done by another, in our name.

A treaty of peace is never secure till the princes have *ratified* it.

All procurator imports a promise of *ratifying* and approving what is done by the proxy or procurator. After treating with a procurator, agent, factor, &c. a *ratification* is frequently necessary on the part of his principal.

RATIFICATION, is particularly used in our laws, for the confirmation of a clerk in a benefice, prebend, &c. formerly given him by the bishop, &c. where the right of patronage is doubted to be in the king.

RATIFICATION is also used for an act confirming something we ourselves have done in our own name.

An execution, by a majority, of an act passed in his minority, is equivalent to a *ratification*.

RATING. See the article **RATING**.

RATIO, **REASON**, in arithmetic and geometry, that relation of homogeneous things which determines the quantity of one from the quantity of another, without the intervention of any third.

The homogeneous things thus compared, we call *the terms of the ratio*; particularly, that referred to the other, we call *the antecedent*; and that to which the other is referred, the *consequent*.

Thus, when we consider one quantity, by comparing it with another, to see what magnitude it has in comparison of that other; the magnitude this quantity is found to have in comparison thereof is called *the ratio, reason*, of this quantity to that; which some think would be better expressed by the word *comparison*.

Euclid defines *ratio* by *the habitude or relation of magnitudes of the same kind in respect of quantity*.—But this definition is found defective; there being other relations of magnitudes which are constant, yet are not included in the number of *ratio's*; such as that of the right sine, to the sine of the complement in trigonometry.

Hobbes endeavoured to mend Euclid's definition of *ratio*, but unhappily; for in defining it, as he does, by *the relation of magnitude to magnitude*, his definition has not only the same defect with Euclid's, in not determining the particular kind of relation; but it has this farther, that it does not express the kind of magnitudes which may have a *ratio* to one another. *Ratio* is frequently confounded with *proportion*; yet ought they by all means to be distinguished, as very different things. *Proportion*, in effect, is an identity, or similitude of two *ratio's*.

Thus, if the quantity A be triple the quantity B; the relation of A to B, i. e. of 3 to 1, is called *the ratio* of A to

B. If two other quantities, C, D, have the same *ratio* to one another that A and B have, i. e. be triple one another; this sameness of *ratio* constitutes *proportion*; and the four quantities A : B :: C : D, are in proportion, or proportional to one another.

So that *ratio* exists between two terms, proportion requires more.

There is a twofold comparison of numbers: by the first, we find how much they differ, i. e. by how many units the antecedent exceeds, or comes short of, the consequent.

This difference is called, *the arithmetical ratio*, or exponent of the arithmetical relation or habitude of the two numbers. Thus if 5 and 7 be compared, their arithmetical *ratio* is 2.

By the second comparison, we find how oft the antecedent contains, or is contained in the consequent; i. e. as before; what part of the greater is equal to the less.

This *ratio*, being common to all quantity, may be called *ratio* in the general, or by way of eminence. But it is usually called *geometrical ratio*; because expressed, in geometry, by a line, though it cannot be expressed by any number.

Wolffius better distinguishes *ratio*, with regard to quantity in the general, into *rational* and *irrational*.

Rational RATIO, is that which is as one rational number to another, e. gr. as 3 to 4.

Irrational RATIO, is that which cannot be expressed by rational numbers.

Suppose, for an illustration, two quantities A and B; and let A be less than B. If A be subtracted as often as it can be; from B, e. gr. five times; there will either be left nothing or something. In the former case A will be to B, as 1 to 5; that is, A is contained in B five times; or $A = \frac{1}{5} B$. The *ratio*, here, therefore, is *rational*.

In the latter case, either there is some part, which being subtracted certain times from A, e. gr. three times, and likewise from B, e. gr. 7 times leaves nothing; or there is no such part: if the former, A will be to B, as 3 to 7, or $A = \frac{3}{7} B$; and therefore the *ratio*, *rational*. If the latter, the *ratio* of A to B, i. e. what part A is of B, cannot be expressed by rational numbers; nor any other way than either by lines, or by infinite approaching series.

The exponent of a *geometrical ratio* is the quotient arising from the division of the antecedent by the consequent.—Thus the exponent of the *ratio* of 3 to 2, is $1 \frac{1}{2}$; that of the *ratio* of 2 to 3, is $\frac{2}{3}$; for when the less term is the antecedent, the *ratio*, or rather the exponent, is an improper fraction. Hence the fraction $\frac{3}{2} = 1 \frac{1}{2}$. If the consequent be unity, the antecedent itself is the exponent of the *ratio*: thus the exponent of 4 to 1 is 4. See EXPONENT.

If two quantities be compared without the intervention of a third; either the one is equal to the other, or unequal: Hence, the *ratio* is either of equality or inequality.

If the terms of the *ratio* be unequal, either the less is referred to the greater, or the greater to the less: That is, either the less to the greater, as a part to the whole; or the greater to the less as the whole to a part: The *ratio* therefore determines how often the less is contained in the greater, or how often the greater contains the less, i. e. to what part of the greater the less is equal.

The *ratio* which the greater term has to the less, e. gr. 6 to 3, is called *the ratio of the greater inequality*. The *ratio* which the less term has to the greater, e. gr. 3 to 6, is called *the ratio of the lesser inequality*.

This *ratio* corresponds to quantity in the general; or is admitted of by all kinds of quantities, discrete or continued, commensurable, or incommensurable. But discrete quantity, or number does likewise admit of another *ratio*.

If the less term of a *ratio* be an aliquot part of the greater, the *ratio* of the greater inequality is said to be *multiplex*, *multiple*: and the *ratio* of the less inequality, *submultiple*.

Particularly, in the first case, if the exponent be 2, the *ratio* is called *duplex*; if 3, *triple*, &c. In the second case, if the exponent be $\frac{1}{2}$, the *ratio* is called *subduplex*; if $\frac{1}{3}$, *subtriple*, &c. E. gr. 6 to 2 is in a *triple ratio*; because 6 contains two thrice. On the contrary, 2 to 6 is in a *subtriple ratio*; because 2 is the third part of 6.

If the greater term contain the less once, and over and above, an aliquot part of the same, the *ratio* of the greater inequality is called *superparticularis*; and the *ratio* of the less *subsuperparticularis*.

Particularly, in the first case, if the exponent be $1 \frac{1}{2}$, it is called *sesquialterate*; if $1 \frac{2}{3}$, *sesquitercial*, &c. In the other, if the exponent be $\frac{2}{3}$, the *ratio* is called *subsesquialterate*; if $\frac{2}{4}$, *subsesquitercial*, &c.

E. gr. 3 to 2 is in a *sesquialterate ratio*; 2 to 3 in a *subsesquialterate*.

If the greater term contain the less once, and over and above several aliquot parts; the *ratio* of the greater inequality is called *superpartiens*; that of the less inequality is *subsuperpartiens*.

Particularly, in the former case, if the exponent be $1 \frac{1}{3}$, the *ratio* is called *superbipartiens tertias*; if the exponent be $1 \frac{2}{3}$, *super-*

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superquadrupartiens quartus; if $1\frac{1}{2}$, *superquadrupartiens septimas*, &c. in the latter case, if the exponent be $\frac{1}{2}$, the ratio is called *subsuperquadrupartiens tertius*; if $\frac{1}{3}$, *subsuperquadrupartiens quartus*; if $\frac{1}{4}$, *subsuperquadrupartiens septimas*.

E. gr. the ratio of 5 to 3 is *superbipartiens tertius*; that of 3 to 5, *subsuperbipartiens tertius*.

If the greater term contain the less several times; and, besides, some quota part of the same; the ratio of the greater inequality is called *multiplex superparticularis*; and the ratio of the less inequality, *submultiplex subsuperparticularis*.

Particularly, in the former case, if the exponent be $2\frac{1}{2}$, the ratio is called *dupla sesquialtera*; if $3\frac{1}{2}$, *tripla sesquialtera*, &c. In the latter case, if the exponent be $\frac{2}{3}$, the ratio is called *subdupla subsequaltera*; if $\frac{1}{2}$, *subtripla subsequaltera*, &c.

E. gr. the ratio of 16 to 5 is *tripla sesquiquinta*; that of 4 to 9 *subdupla subsequaltera*.

Lastly, if the greater term contain the less several times, and several aliquot parts thereof besides; the ratio of the greater inequality is called *multiplex superpartiens*; that of the less inequality, *submultiplex subsuperpartiens*.

Particularly, in the former case, if the exponent be 3, the ratio is called *dupla superbipartiens tertius*, if $3\frac{1}{2}$, *tripla superbipartiens septimas*, &c. In the latter case, if the exponent be $\frac{2}{3}$, the ratio is called, *subdupla subsuperbipartiens tertius*; if $\frac{1}{2}$, *subtripla subsuperquadrupartiens septimas*, &c.

E. gr. the ratio of 25 to 7 is *tripla superquadrupartiens septimas*; that of 3 to 8, *subdupla subsuperbipartiens tertius*.

These are the various kinds of rational ratio's; the names whereof, though they occur but rarely among the modern writers, (for in lieu thereof they use the smallest terms of the ratio's, *e. gr.* for *dupla* 2:1, for *sesquialtera*, 3:2) yet are they absolutely necessary to such as converse with the ancient authors.

Clavius observes, that the exponents denominate the ratio's of the greater inequality, both in deed and name; but the ratio's of the less inequality, only in deed, not in name. But it is easy finding the name in these; if you divide the denominator of the exponent, by the numerator.

E. gr. if the exponent be 4, then $5:8=1\frac{1}{2}$; whence it appears the ratio is called *subsuperbipartiens quintas*.

As to the names of irrational ratio's, nobody ever attempted them.

Same, or identic ratio's, are those whose antecedents have an equal respect to their consequents, *i. e.* whose antecedents divided by their consequents, give equal exponents.—And hence may the identity of irrational ratio's be conceived.

Hence, *first*, as oft as the antecedent of one ratio contains its consequent, or whatever part it contains of its consequent, so oft, or such part of the other consequent does the antecedent of the other ratio contain: or, as oft as the antecedent of the one is contained in its consequent, so oft is the antecedent of the other contained in its consequent.

Secondly, If A be to B as C to D, then will A : B :: C : D; or A : B = C : D. The former of which is the usual manner of representing the identity of ratio's; the latter is that of the excellent Wolfius; which has the advantage of the former, in that the middle character =, which denotes the sameness is scintillat, *i. e.* it expresses the relation of the thing represented, which the other : does not. See CHARACTER.

Two equal ratio's, *e. gr.* B : C = D : E, we have already observed, do constitute a proportion: of two unequal ratio's, *e. gr.* A : B and C : D we call A : B the greater, if A : B > C : D; on the contrary we call C : D the lesser, if C : D < A : B.

Hence, we express a greater and less ratio thus. *E. gr.* 6 to 3 has a greater ratio, than 5 to 4; for, $6:3 (=2) > 5:4 (=1\frac{1}{4})$. But 3 to 6 has a less ratio than 4 to 5, for $3:6 (=1\frac{1}{2}) < 4:5 (=1\frac{1}{4})$. Compound ratio is that made up of two or more other ratio's, which the factum of the antecedents of two or more ratio's has to the factum of their consequents. Thus 6 to 72 is in a ratio compounded of 2 to 6, and 3 to 12.

Particularly, if it be compounded of two, it is called a duplicate ratio; if of three, a triplicate, if of four, quadruplicate; and in the general multiplicate, if it be composed of several similar ratio's. Thus 48 : 3 is a duplicate ratio of 4 : 1 and 12 : 3.

Alternate RATIO, is where the antecedent of one ratio is to its consequent, as the antecedent of another is to its consequent; the very same ratio, in this case, holding alternately in respect of the antecedents to each other, and the consequents to each other.—Thus if A : B :: C : D; then, alternately, A : C :: B : D.

Ordinate RATIO, is that wherein the antecedent of the first ratio is to its consequent, as the antecedent of the second is to its consequent.

Denominator of a RATIO. See DENOMINATOR.

Properties of RATIO's—*First*, ratio's similar to the same third

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are also similar to one another; and those similar to similar, are also similar to one another.

Secondly, If A : B = C : D; then, inversely, B : A = D : C.

Thirdly, Similar parts P and p have the same ratio to wholes T and t; and if the wholes have the same ratio, the parts are similar.

Fourthly, If A : B = C : D; then alternately, A : C = B : D. And hence, if B = D : A = C; hence, also, if A : B = C : D; and A : F = C : G; we shall have B : F = D : G. Hence, again, if A : B = C : D; and F : A = G : C; we shall have F : B = G : D.

Fifthly, Those things which have the same ratio to the same, or equal things, are equal : and vice versa.

Sixthly, If you multiply any quantities, as A and B, by the same or equal quantities; their products D and E will be to each other as A and B.

Seventhly, If you divide any quantities as A and B, by the same or equal quantities, the quotients F and G will be to each other as A and B.

Eighthly, The exponent of a compound ratio is equal to the factum of the exponents of the simple ratio's.

Ninthly, If you divide either the antecedents, or the consequents of similar ratio's, A : B and C : D by the same E; in the former case, the quotients F and G will have the same ratio to the consequents B and D; in the latter, the antecedents A and B will have the same ratio to the quotients H and K.

Tenthly, If there be several quantities in the same continued ratio A, B, C, D, E, &c. the first, A is to the third, C, in a duplicate ratio; to the fourth, D, in a triplicate, to the fifth, E, in a quadruplicate, &c. ratio of the ratio of the first, A, to the second B.

Eleventhly, If there be any series of quantities in the same ratio, A, B, C, D, E, F, &c. the ratio of the first, A, to the last, F, is compounded of the intermediate ratio's, A : B, B : C, C : D, D : E, E : F, &c.

Twelfthly, ratio's compounded of ratio's, whereof each is equal to each other, are equal among themselves. Thus the ratio's 90 : 3 = 960 : 32 compounded of 6 : 3 = 4 : 2, and 3 : 1 = 12 : 4; and 5 : 1 = 20 : 4.

For other properties of similar or equal ratio's, see PROPORTION.

RATIO, in our law writers, is used for a judgment given in a cause.

Hence, *ponere ad rationem* is to cite one to appear in judgment. Wallingh. 88.

RATIO-status, RAGIONE di stato. See REASON of state.

RATIO victus. See the article VICTUS.

RATIOCINATION, the act of reasoning. See REASONING.

*RATION**, or *RATIAN*, in the army, a pittance, or proportion of ammunition, bread, drink, or forage, distributed to each soldier for his daily subsistence.

* Some write the word *ration*, and borrow it from the Spanish *raccon*. But they both come from the Latin, *ratio* : in some parts they call it *aragon*.

The horse have *rations* of hay and oats, when they cannot go out to forage.

The *rations* of bread are regulated by weight—The ordinary *ration* of a foot soldier is a pound and half of bread per day.

The officers have several *rations* according to their quality, and the number of attendants that they are obliged to keep.

When the *ration* is augmented on occasions of rejoicing, it is called a *double ration*.

The ship's crews have also their *rations* or allowances of biscuit, pulse, and water, proportioned according to their stock.

The usual *ratio* at sea, particularly among the Portuguese, &c. is a pound and half of biscuit, a pint of wine, and a quart of fresh water per day, and each month an arrobo or 31 pound of salt meat, with some dried fish and onions.

RATIONABLES expensae, reasonable expensae. The commons in parliament, as well as the proctors of the clergy in convocation, were anciently allowed *rationabiles expensae*; that is, such allowance as the king, considering the prices of all things, shall judge meet to impose on the people to pay for the subsistence of their representatives.

This, in the 17th of Edward II, was settled at 10 groats per day for knights, and 5 for burgesses. Afterwards 4 shillings a day for knights, and 2 shillings for burgesses; which was then deemed an ample retribution both for expences, for labour, attendance, neglect of their own affairs, &c. See PARLIAMENT.

RATIONABILI parta bonorum, a writ which lies for the wife, against the executors of her husband denying her the third part of her husband's goods, after debts and funeral expences paid.

Fitzherbert quotes Magna Charta and Glanville, to prove that

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that, by the common law of England, the goods of the deceased, his debts first paid, should be divided into three parts; whereof his wife is to have one, his children a second, and the executors a third. Adding, that this writ lies as well for the children, &c. as the wife.—But it seems only to obtain where the custom of the country makes for it.

Relio de RATIONABILI parte. See RECTO.

RATIONABILIBUS divisi is a writ that lies where two lords have feignories joining together, for him that finds his waste encroached upon, within the memory of man, against the encroacher, thereby to rectify the bounds of the feignories: in which respect, Fitzherbert says, it is of the nature of a writ of right.

RATIONAL, reasonable. See REASON.

RATIONAL fable. See the article FABLE.

RATIONAL fraction, or broken number, is that equal to some aliquot part or parts of unity. See FRACTION.

RATIONAL or true horizon is that whole plane is conceived to pass through the centre of the earth; and which therefore divides the globe into two equal portions, or hemispheres. See HORIZON.

It is called the *rational horizon*, because only conceived by the understanding; in opposition to the *sensible* or apparent horizon, which is visible to the eye.

RATIONAL integer, or whole number, is that whereof unity is an aliquot part. See NUMBER and ALIQUOT part.

RATIONAL mixt number is that consisting of an integer and a fraction; or of unity and a broken number.

Commensurable quantities are defined by being to one another as one rational number to another.

For unity is an aliquot part of a rational number; and a fraction has some aliquot part common with unity: in things, therefore, that are as *rational* to a rational number, either the one is an aliquot part of the other, or there is some common aliquot part of both: therefore they are commensurable.

Hence, if a rational number be divided by a rational, the quotient is always a rational.

RATIONAL physician. See PHYSICIAN.

RATIONAL quantity or number, a quantity or number commensurable to unity.

Supposing any quantity to be 1, there are infinite other quantities, some whereof are commensurable to it, either simply, or in power: these Euclid calls *rational quantities*.

The rest, that are incommensurable to 1, he calls *irrational quantities, or surds*.

RATIONAL ratio is a ratio whose terms are *rational quantities*; or a ratio which is as one rational number to another, *e. gr.* as 3 to 6.

The exponent of a rational ratio is a *rational quantity*.

RATIONAL soul. See the article SOUL.

RATIONALE, a solution or account of the principles of some opinion, action, hypothesis, phenomenon, or the like. See PRINCIPLE, PHENOMENON, &c.—Hence,

RATIONALE is also the title of several books—The most considerable is the *Rationale of divine offices*, by Guil. Durandus, a celebrated school divine, bishop of Mende, finished in 1286, as he himself tells us.

RATIONALE also denotes an antient sacerdotal vestment, wore by the high-priest under the old law; and called by the Hebrews *חֹשֶׁת*; by the Greeks *αἶμα*; by the Latins *rationale* and *pectoralis*; and, by the English translators, *breast-plate*.

The *rationale* was a piece of embroidered stuff wore on the breast, about a span-square—Du Cange describes it as a double square of four colours, interwove with gold, and set with twelve precious stones in four rows, whereon were engraven the names of the twelve tribes, and fastened to the shoulder by two chains and two hooks of gold—The form of the *rationale* was prescribed by God himself, Exod. xxviii.

RATIONALE appears also to have been antiently wore by the bishops under the new law—But authors are in doubt about its form; some will have it resemble that of the Jews; others take it to be only the pallium. See PALLIUM.

RATIONALIS, an officer mentioned in several antient inscriptions.

Lampridius, in the life of Alex. Severus, uses *rationalis* as synonymous with *procurator*.

The *rationales* were intendants or surveyors under the emperors; and though Lampridius pretends they were first established by Severus, it is evident there were some under Augustus.

ENS RATIONIS. See the article ENS.

Distinctio RATIONIS. See the article DISTINCTIO.

RATIONIS os, in anatomy, the bone of the forehead, otherwise called *os frontis*. See FRONTIS.

RATLINES, or, as the seamen call them, *RATLINS*;

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RAY

those lines which make the ladder steps, to get up the shrouds and puttocks; hence called the *ratlings of the shrouds*.

RAT TEN. See the article RATEEN.

RATTLE, among the antients, a musical instrument, called by the Romans *crepitaculum*.

Mr. Malcolm takes the tintinnabulum, crotalum, and sistrum, to have been only so many different kinds of rattles.

The invention of the *rattle* is ascribed to the famous mathematician Archytas; whence Aristotle calls it, Ἀρχύτας ὀλαστωρ, Archytas's *rattle*—Diogenianus adds the occasion of the invention; *viz.* that Archytas having children, he contrived this instrument to prevent their tumbling over things about the house. So that how much soever some instruments have changed their uses, the *rattle* we are sure has preserved its.

RAVELIN, in fortification, was antiently a flat bastion, placed in the middle of a curtain.

RAVELIN is now a detached work, composed only of two faces, which make a salient angle, without any flanks; and raised before the curtain on the counterescarp of the place.

A *ravelin* is a triangular work resembling the point of a bastion, with the flanks cut off—See Tab. Partif. fig. 21. lit. iii. Its use before a curtain, is to cover the opposite flanks of the two next bastions. It is used also to cover a bridge or a gate, and is always placed without the moat.

What the Engineers call a *ravelin*, the soldiers generally call a *demilune*, or half moon.

There are also *double ravelins*, which serve to defend each other—They are said to be *double* when they are joined by a curtain.

RAVISHMENT, in law, denotes an unlawful seducing either a woman, or an heir in ward.

Sometimes it is also used in the same sense as *rape*.

RAVISHMENT de gard, is a writ which antiently lay for the guardian against him who took from him the body of his ward.

RA W hids. See the article HIDE.

RA W silk. See the article SILK.

RAY, RADIUS, in optics, a beam or line of light, propagated from a radiant point, through an unrefracting medium.

Sir Isaac Newton defines *rays* to be the least parts of light, whether successive in the same line, or contemporary in several lines.

For, that light consists of parts of both kinds, appears hence, that one may stop what comes this moment in any point, and let pass that which comes the next; and again one may stop what comes in this point, and let pass that in the next—Now, the least light, or part of light which may be thus stopped alone, he calls a *ray of light*.

If the parts of a *ray* of light do all lie straight between the radiant and the eye, the *ray* is said to be *direct*: the laws and properties whereof make the subject of optics.

If any of them be turned out of that direction, or bent in their passage, the *ray* is said to be *refracted*.

If it strike on the surface of any body, and be driven back, it is said to be *reflected*.

In each case, the *ray*, as it falls either directly on the eye, or on the point of reflection, or of refraction, is said to be *incident*.

Again, if several *rays* be propagated from the radiant equidistantly from one another, they are called *parallel rays*.

If they come inclining towards each other, they are called *converging rays*.

And if they go continually receding from each other, they are called *diverging rays*.

It is from the circumstances of *rays*, that the several kinds of bodies are distinguished in optics. A body, *e. gr.* that diffuses its own light, or emits *rays* of its own, is called a *lucid, or luminous body*.

If it only reflect *rays* which it receives from another, it is called an *illuminated body*.

If it only transmit *rays*, it is called a *transparent body*.

If it intercept the *rays*, or refuse them passage, it is called an *opaque body*.

Hence no body radiates, *i. e.* emits *rays*, unless it be either luminous, or illumined.

It is by means of *rays* reflected from the several points of illumined objects to the eye, that they become visible, and that vision is performed; whence such *rays* are called *visual rays*.

In effect we find that any point of an object is seen in all places to which a right line may be drawn from that point: but it is allowed, nothing can be seen without light, therefore every point of an object diffuses innumerable *rays* every way. Again, from other experiments it appears that the images

of all objects, whence right lines may be drawn to the eye, are painted in the eye, behind the crystallin, very small, but very distinct.

And lastly, from other experiments, that each ray carries with it the species, or image of the radiating point: and that the several rays emitted from the same point are again united in one point, by the crystallin, and thus thrown on the retina.

It is the spissitude or closeness of the rays emitted from a luminous body, that constitutes the intenseness of the light. Yet the direction wherein the rays strike the eye, has a great sway. In effect, a perpendicular ray, striking with more force than an oblique one, in the ratio of the whole sine to the sine of the angle of obliquity, (as follows from the laws of percussion) a perpendicular ray will affect the eye more vividly than an oblique one in that ratio.

If then the spissitude of the rays be equal, the intensity will be as the direction; if the direction be the same, the intenseness will be as the spissitude. If both differ, the intenseness will be in a ratio compounded of the direction and the spissitude.

Hence, first, if light be propagated in parallel rays through an unrefracting medium, its intensity will not be varied by distance.

Secondly, If light be propagated in diverging rays, through an unrefracting medium, its intensity will decrease in a duplicate ratio of the distances from the radiant point, reciprocally.

Thirdly, If light be propagated in converging rays, through an unrefracting medium; its intensity will increase in a duplicate ratio of the distances from the point of concourse, reciprocally.

Fourthly, If the breadth of an illuminated plane be to the distance of the radiant point, as 1 to 2000000, it is the same thing as if the rays struck upon it parallel: and hence, since the diameter of the pupil of the eye, when largest, scarce exceeds $\frac{1}{4}$ of an inch; the rays will fall upon it parallel, as to sense, at the distance of 3860 English feet, which is nearly 6 furlongs. See LIGHT.

The effect of concave lenses, and convex mirrors, is to make parallel rays diverge; converging rays become parallel; and diverging rays to become more divergent.

The effect of convex lenses, and concave mirrors, is to make diverging rays become parallel; parallel rays become convergent, and converging rays to converge the more.

The rays of light are not homogeneous, or similar, but differ in all the properties we know of, viz. refrangibility, reflexivity and colour.

It is probably from the different refrangibility, that the other differences have their rise; at least it appears, that those rays which agree or differ in this, do so in all the rest.

Thus from the different sensations the differently disposed rays excite in us, we call them, red rays, yellow rays, &c.

The effect of the prism is to separate and sort the different kinds of rays, which come blended promiscuously from the sun; and to throw each kind by itself, according to its degree of refrangibility and colour, red to red, blue to blue, &c.

Besides, refrangibility, and the other properties of the rays of light already ascertain'd by observation and experiment, Sir Isaac Newton suspects they may have many more; particularly, a power of being inflected, or bent, by the action of distant bodies; and those rays which differ in refrangibility, he conceives likewise to differ in this flexibility.

In passing by the edges and sides of bodies, he conceives that the rays may be bent several times backwards and forwards, with a motion like that of an eel; and that those rays which appear to fall on bodies, are reflected or refracted before they arrive at the bodies. And adds, that they may be refracted, reflected and inflected, all by the same principle acting in different circumstances.

Again, do not the rays falling on the bottom of the eye excite vibrations in the retina; which being propagated along the fibres of the optic nerve into the brain cause vision; and do not several sorts of rays make vibrations of several bignesses, which excite sensations of several colours, much after the manner as the vibrations of the air, according to their several bignesses, excite sensations of several sounds?

Particularly, do not the most refrangible rays excite the shortest vibrations, to make a sensation of a deep violet; and the least refrangible, the largest, to make a sensation of a deep red? and the several intermediate kinds of rays, vibrations of intermediate bignesses, to make sensations of the intermediate colours?

And may not the harmony and discord of colours arise from the proportion of these vibrations; as those of sound depend on the vibrations of the air; for some colours, if viewed together, are agreeable, as gold and indigo; others disagreeable.

Again, have not the rays of light several sides endued with several original properties?—It is certain we find, that every ray of light has two opposite sides, originally endued with a property, whereon the unusual refraction of island crystal depends, and other two opposite sides not endued with that property.

Lastly, are not the rays of light very small bodies emitted from shining substances?

Such bodies may have all the conditions of light: and there is that action and re-action between transparent bodies and light, which very much resembles the attractive force between other bodies. Nothing more is required for the production of all the various colours, and all the degrees of refrangibility, but that the rays of light be bodies of different sizes; the least of which may make violet, the weakest and darkest of the colours, and be the most easily diverted by refracting surfaces from its rectilinear course; and the rest, as they are bigger and bigger, may make the stronger and more lucid colours, blue, green, yellow, and red.

Nor is any thing more requisite for the putting of the rays into fits of easy reflection, and easy transmission, than that they be small bodies, which, by attraction, or some other force, excite vibrations in the bodies they act upon; which vibrations being swifter than the rays, overtake them successively, and agitate them so as by degrees to increase and diminish their velocity, and thereby put them into those fits.

See TRANSMISSION.

Lastly, the unusual refraction of island crystal looks very much as if it were performed by some attractive virtue lodged in certain sides both of the rays and of the crystal.

Common RAY, in optics, is sometimes used for a right line drawn from the point of concourse of the two optical axes, through the middle of the right line which passes through the middle of the centres of the pupils of the two eyes.

Cone of RAYS.	} See	CONE.
Deflection of RAYS.		DEFLECTION.
Inclination of incident RAYS.		INCLINATION.
Optic RAYS.		OPTIC.

Reflexibility of the RAYS. See REFLEXIBILITY.

Principal RAY, in perspective, is the perpendicular distance between the eye and the vertical plane or table, as some call it. See PERSPECTIVE.

Pyramid of RAYS.	} See	PYRAMID of rays.
Pencil of RAYS.		PENCIL of rays.

RAZANT.	} See	RASANT.
RAZANT flank.		FLANK.
Line of defence RAZANT.		LINE.

RE, in grammar, &c. an inseparable particle, or preposition, added to the beginning of words, to vary, double, or otherwise modify their meaning.

The modificative *re* was first introduced by the Latins, from whom it is borrowed into most of the modern tongues: Priscian derives it from *retrō*, backwards; others rather derive *retrō* from *re*; others derive *re* from the Greek *πρὸς*, easy, or from *ῥέω*, I flow.

The effect of the *re* is various: usually it signifies *again*, *re-sum*, *etc.*; as in *re-joyn*, *re-sign*, *re-fume*, *re-courte*, *re-bound*, *re-cite*, *re-hear*, *re-cognize*, *re-compare*, *re-double*, *re-linquish*, &c.

Sometimes it stands for *contra*, *anti*, against; as in *re-luctance*, *re-cumbent*, *re-cline*, &c.

Sometimes for *super*, over, as in *re-dundant*; sometimes for *longe*, far, as in *re-moving*, &c.

RE, in music. See the article NOTE.

RE, in matters of monies. See the article REE.

REACH, in the sea-language, the distance between any two points of land that lie in a right line one from another.

RE-ACTION, in physics, the action whereby a body acted upon, returns the action by a reciprocal one upon the agent.

The Peripatetics define *re-action* to be that which a passive body returns upon the agent, by means of some quality contrary to that received therefrom, in the same part where-with the agent acted, and at the same time—as if water, while it is heating by the fire, does, at the same time, cool the fire.

It was known, even in the schools, that there is no action in nature without *re-action*; and it was a maxim among them, *omne agens, agens reparatur*.

But the equality of the actions was not known: Sir Isaac Newton established it as one of the laws of nature, that *action* and *re-action* are equal and contrary; or that the mutual actions of two bodies, striking one against another, are exactly equal, but in contrary directions; or, in other words, that, by the action and *re-action* of bodies one on another, there are produced equal changes in each; and those changes are imprefect towards directly contrary parts or ways. See Law of NATURE.

Thus, whatever body presses or draws another, is equally pressed or drawn by it again: if any one press a stone with his finger, his finger is as much pressed by the stone.

If a horse by a rope, &c. draw a stone; the horse will be equally drawn by the stone; for the rope being stretched both ways alike, endeavours to relax itself again, and by that means draws the horse towards the stone, and hinders the progression of the horse, as much as it forwards that of the stone.

If any body striking against another, doth by its force any way change its motion, itself will undergo the same change in its own proper motion, but that towards a contrary part; from the *re-action* of that body, and the equality of its mutual pressure.

By these actions are produced equal changes, not indeed of the velocities, but of the motions of bodies; (that is of such bodies as have no impediment any other way) for the changes of their velocities being made towards contrary parts, (because the motions are equally changed) are reciprocally proportional to the bodies themselves.

Some of the school philosophers deny any such thing as *re-actions*, properly so called, at all; urging that action arises only from the ratio of the greater inequality; that is, we are only to account for action the excess of action, or what the agent does more than is returned by the patient. But the equality between action and *re-action*, sets aside this exception.

READINGS, in criticism—*Various READINGS, varie lectiones*, are the different manners of reading the text of authors in ancient manuscripts; where a diversity has arisen from the corruption of time, or the ignorance of copists.

A great part of the business of the critics lies in settling the readings, by confronting the various readings of the several manuscripts, and considering the agreement of the words, and sense—The various readings in the bible and in the classic authors, are almost innumerable.

READINGS are also used for a sort of commentary or gloss on a law, text, passage, or the like; to shew the sense an author takes it in, and the application he conceives to be made of it.

RE-AFFORESTED, is where a forest having been disafforested, is again made a forest—As the forest of Dean was, by an act of parliament in the 20th of King Charles II. See **FOREST**.

RE-AGGRAVATION, in the romish ecclesiastical law, the last monitory, published after three admonitions, and before the last excommunication.

Before they proceed to fulminate the last excommunication, they publish an aggravation, and a *re-aggravation*—Fevret observes, that in France the minister is not allowed to come to *re-aggravation*, without the permission of the bishop or official, as well as that of the lay judge. See **EXCOMMUNICATION**.

REAL, REALE, is applied to a being that actually exists; in which sense it coincides with *actual*.

REAL, in law, is opposed to *personal*. See **PERSONAL**.

REAL action, that whereby the plaintiff lays title to land, &c.

Customs are said to be *real*; that is, they determine all inheritances within their extent; and none may dispose of them, but according to the conditions allowed by the customs where they are situate.

REAL altitude. See the article **ALTITUDE**.

REAL character.	} See the articles	CHARACTER.
REAL chattels.		CHATELLE.
REAL covenant.		COVENANT.
REAL distinction.		DISTINCTION.
REAL distress.		DISTRESS.
REAL estate , is that consisting in lands, tenements, &c.		
REAL horizon . See HORIZON .		
REAL optic place.	} See the articles	PLACE.
REAL patronage.		PATRONAGE.
REAL privilege.		PRIVILEGE.
REAL qualities.		QUALITY.
REAL root.		ROOT.
REAL services.		SERVICE.
REAL suit.		SUIT.
REAL writs.		WRIT.

REAL, RIAL, or **RYAL** in commerce. See **RIAL**.

REALGAR, RISGALLUM, a red friable factitious substance, popularly called *Chinese red arsenic*.

Realgar is sometimes prepared from orpiment, by fusing it over the fire in a close vessel.

It is of an acrimonious nature, and reputed poisonous, though not in any great degree.

Boerhaave takes it for the same with the *sandaracha* of the ancients.

In the history of the French academy, we have an account of a cup brought to Paris by the ambassadors of Siam, and presented there, as a remedy used by that people against all diseases.

Upon an examination; which had like to have cost M. Homberg dear, he found it to be a kind of *realgar*, or red arsenic, much more caustic than ours.

Its use among the Siamese, he takes to have been the same with that of *regulus* of antimony, *viz.* to give an emetic quality to the wine drank out of it.

As the dose of medicines is much stronger in the torrid zone than among us, (the quantity of ipecacuanha; *e. gr.* ordinarily taken by the Indians, being twenty times as great as that among us) it is very possible a cup of *realgar*, though enough to poison an European, may prove a gentle medicine to a Siamese. See Supplement article *Realgar*.

REALISE, in commerce, a term little known in trade before the year 1719, when those immense fortunes began to be made in France and England, by the business of actions or stock.

By *realising* is meant the precaution many of those who had gained most, took, to convert their paper into real effects; as lands, houses, rich moveables, jewels, plate; but above all into current species. A precaution, capable of ruining the state; but the French regency had the wisdom to frustrate it, by taking proper measures to have the money thus ready to be hoarded up, returned to the public.

REALISTS, REALISTÆ, a sect of school philosophers, formed in opposition to the Nominalists. See **NOMINALISTS**.

Under the *Realists* are included the Scotists, Thomists, and all excepting the followers of Ockham.

Their distinguishing tenet is, that universals are realities, and have an actual existence, out of an idea and imagination; or, as they express it in the school language, *a parte rei*; whereas the Nominalists contend that they exist only in the mind; and are only ideas, or manners of conceiving things.

Doctor Odo, or Oudart, a native of Orleans, afterwards abbot of St. Martin de Tournay, was the chief of the sect of the *Realists*; he wrote three books of dialectics; where, on the principles of Boethius and the ancients, he maintained that the object of that art is things, not words: whence the sect took its rise, and name.

REALITY, REALITAS, in the schools, a diminutive of *res*, thing, first used by the Scotists to denote a thing which may exist of itself, or which has a full and absolute being of itself, and is not considered as a part of any other.

Yet a *reality* is conceived as something less than *res*; and accordingly every *res* is supposed to contain a number of *realities*, which they otherwise call *formalities*.

Thus, *e. gr.* in a man, according to the doctrine of the Scotists, are a number of *realities, viz.* a substance, life, animal, and reason.

Some distinguish *reality* into subjective and objective.

REALM*, **REGNUM, kingdom**, a country which gives its head or governor the denomination of king.

* The word is formed of the French, *Royaume*, which denotes the same.

REAR*, a term frequently used in composition, to denote something behind or backwards in respect of another: In opposition to *van*, or *vant*, before.

* It is formed by corruption of the French, *Arriere*, signifying the same.

REAR, in a military sense, is used for the hind-part of an army, &c. in opposition to the *front*, or face thereof.

REAR-GUARD, is that part of an army which marches last; following the main body, to hinder or stop deserters.

REAR-HALF-FILES, are the three hindmost ranks of a battalion, when it is drawn up six deep.

REAR-LINE, of an army encamped, is the second line; it lies about four or five hundred yards distant from the first line, or front.

REAR-RANK, is the last rank of a battalion, or squadron, when drawn up.

REAR-ADMIRAL, is the admiral of the third and last squadron of the royal fleet.

REASON, RATIO, a faculty, or power of the soul, whereby it distinguishes good from evil, and truth from falsehood.

Or, *reason* is that principle, whereby, comparing several ideas together, we draw consequences from the relations they are found to have.

Some of the later school philosophers define *reason* to be the comprehension of many principles which the mind successively can conceive, and from which conclusions may be drawn.

Others conceive *reason* as no other than the understanding itself, considered as it discourses.—Chauvin thinks it better defined, an innate notion or idea, farther diffused, and arising from a continued attention.

Reason,

Reason, Mr Lock observes, comprehends two distinct faculties of the mind, *viz.* *sagacity*, whereby it finds intermediate ideas; and *illation*, whereby it so orders and disposes of them as to discover what connection there is in each link of the chain, whereby the extremes are held together, and thereby, as it were, draws into view the truth sought for.

Illation, or inference, consists in nothing but the perception of the connection there is between the ideas in each step of the deduction, whereby the mind comes to see either the certain agreement or disagreement of any two ideas; as in demonstration, in which it arrives at knowledge: or their probable connection, on which it gives or withholds its assent; as in opinion.

Sense and intuition reach but a little way: the greatest part of our knowledge depends upon deductions and intermediate ideas. In those cases, where we must take propositions for true, without being certain of their being so, we have need to find out, examine, and compare the grounds of their probability: In both cases, the faculty which finds out the means, and rightly applies them to discover certainty in the one, and probability in the other, is that which we call *reason*.

In *reason*, therefore, we may consider four degrees: *first*, the discovering and finding out of proofs. See *INVENTION*.

Secondly, the regular and methodical disposition of them, and laying them in such order, as their connection may be plainly perceived.

Thirdly, The perceiving of their connection; and,

Fourthly, The making a right conclusion.

Reason fails us in several instances: as, *first*, Where our ideas fail.

Secondly, It is often at a loss because of the obscurity, confusion, or imperfection of the ideas it is employed about—Thus, having no perfect idea of the least extension of matter, nor of infinity, we are at a loss about the divisibility of matter.

Thirdly, Our *reason* is often at a stand because it perceives not those ideas which would serve to shew the certain or probable agreement or disagreement of any two other ideas.

Fourthly, Our *reason* is often engaged in absurdities and difficulties, by proceeding upon false principles, which being followed, lead men into contradictions to themselves, and inconsistency in their own thoughts.

Fifthly, Dubious words, and uncertain signs, often puzzle men's *reason*, and bring them to a non-plus.

Though the deducing one proposition from another, be a great part of the office of *reason*, and that about which it is usually employed; yet the principal act of ratiocination is the finding the agreement or disagreement of two ideas one with another, by the intervention of a third. As a man, by a yard, finds two houses to be of the same length, which could not be brought together to measure their equality by juxtaposition. Words have their consequences as the signs of such ideas and things agree, or disagree, with what they really are, but we observe it only by our ideas.

Hence we may be able to form an idea of that ordinary distinction of things, into such as are *according to*, those that are *above*, and those *contrary to reason*.

Those *according to reason*, are such propositions, whose truth we can discover by examining and tracing those ideas we have from sensation and reflection, and by natural deduction find to be true or probable.

Those *above reason* are such propositions, whose truth or probability we cannot by *reason* derive from those principles.

Those *contrary to reason*, are such propositions as are inconsistent with, or irreconcilable to, our clear and distinct ideas.

Thus the existence of one God, is according to *reason*: the existence of more than one God, is contrary to *reason*: and the resurrection of the body after death, *above reason*.

Above *reason* may be also taken in a double sense; *viz.* above probability, or above certainty.

They who dispute most against the power and privileges of human *reason*, do it because their own *reason* persuades them to that belief; and so, whether the victory be on their or our side, they are equally defeated.

They seek to terrify us with the example of many great wits, who by following this *ignis fatuus*, (so they call the only polestar God has given us to direct our course by) have fallen into wild and ridiculous opinions, and increased the catalogue of heresies to so great a number: but these men either followed not their *reason*, but made it follow their will; or else they first hoodwinked it by interest and prejudice, and then bad it shew them the way; or were wanting in those necessary diligences required for so doubtful a passage: or, if, without any of these, the weakness of their understanding had deceived them, the error is neither hurtful to themselves, nor would be to others, if this doctrine of governing ourselves by our own

reason, and not by authority and example, were generally established. *Disc. concern. Hum. Res.*

It is not the use of such liberty, but the appropriating it to ourselves, that is the cause of all the disorders charged thereon: for those who lay a restraint on other men's *reason*, have first made use of their own to fetter them, and do make use of it in this very restraining of others. *ibid.*

REASON, in matters of religion, is used in opposition to *faith*.

This use of the word, Mr Lock takes to be in itself very improper: for faith is nothing but a firm assent of the mind; which if it be regulated, as it is our duty, cannot be afforded to any thing but upon good *reason*, and so cannot be opposite to it. See *FAITH*.

He that believes without having any *reason* for believing, may be in love with his own fancies, but he neither seeks truth, as he ought, nor pays the proper obedience due to his Maker, who would have him use those discerning faculties he has given him, to keep him out of mistake and error—But since *reason* and faith are by some men opposed, it may be necessary to consider them together.

Reason, as contradistinguished to faith, is the discovery of the certainty or probability of such propositions, or truths, which it has got by the use of its natural faculties, *viz.* by sensation or reflection.

Faith, on the other hand, is the assent to any proposition upon the credit of the proposer, as coming immediately from God; which we call revelation.

REASON, in logic and rhetoric, denotes a necessary or probable argument; or an answer to the question, *cur est?* Why is it?

As if it be enquired, why do the subject and predicate agree? And it is answered, because they are spoke of the same thing: This last enunciation is a *reason*.

Hence, say the schoolmen, because, *quia*, is the sign or character of a reason, as *non*, no, of a negation, and *est*, is, of an affirmation.

They make three kinds of *reasons*, *rationes*; *viz.* *ratio ut*, that; *ne*, lest; and *quia*, because. For, answering to a question, *cur*, why; we begin with because, *quia*; as, why do you study; that I may become learned; which is the *ratio ut*. Again, why do you study? Lest I should be ignorant; which is the *ratio ne*. Lastly, why is a body tangible? Because matter is impenetrable; which is the *ratio quia*.

The *reason ut*, properly denotes the end, or final cause; and *reason ne*, the beginning: accordingly the one is called the beginning, the other the end; so that the *reason quia*, is left the only *reason*, properly so called.

Among metaphysicians, *REASON* is used in the same sense with *elence*; or that whereby any thing is what it is.

This is sometimes also called formal *reason*, as representing the thing under that form or nature under which it is conceived.

REASON, in mathematics, See the article *RATIO*.

*REASON of state**, *Ratio status*, in matters of policy, denotes a rule or maxim, whether it be good or evil, which may be of service to the state.

* The phrase is borrowed from the Italians, who first used *ragione di stato* in this sense.

Reason of state, is properly understood of something that is necessary and expedient for the interest of the government, but contrary to moral honesty, or justice.

Politicians have a long time disputed about the *ratio status*: whether states and governments are tied down to the same laws of morality with individual persons; or whether things, otherwise immoral and unlawful, may not be practised on urgent occasions, by way of *reason of state*?

The question is, whether any thing be unlawful, or prohibited a state, that is necessary to the preservation of that state, or whether it be allowed to preserve itself on any terms?

Challenge upon REASON. See *CHALLENGE*.

REASONABLE aid, a duty which the lord of the fee anciently claimed of his tenants holding in knight's service, or on socage: towards the marrying his daughter, or the making his eldest son knight.

This is taken away by *Stat. 2. Car. II.* See *AID*.

REASONING, *RATIOCINATION*, the exercise of that faculty of the mind called *reason*, or it is reason deduced into discourse.

The agreement or disagreement of two ideas, does not appear from the bare consideration of the ideas themselves, unless some third be called in, and compared, either separately or conjointly therewith: the act, then, whereby from ideas thus disposed and compared we judge this or that to be so or not so, is called *reasoning*.

Rohault defines *reasoning* to be a judgment depending on some antecedent judgment: thus; having judged that no even number can be composed of five uneven numbers; and that

ten is an even number; to conclude, that ten cannot be divided into an uneven part, is a *reasoning*, or *reasoning*.

This agrees with *Alabarache's* doctrine, one of the great points whereof is, that *reasoning*, on the part of the understanding, is only a more *perceiving*.

That ingenious author endeavours to shew, that, as to the understanding, there is no difference between a simple *perception*, a *judgment*, and a *reasoning*, except in this, that the understanding perceives a simple thing without any relation to any thing else, by a simple *perception*—That it perceives the relations between two or more things in a *judgment*—And lastly, that it perceives the relations that are between the relations of things in a *reasoning*. So that all the operations of the understanding are no more than mere perceptions.

Thus, *et. c.* when we conclude, that 4, being less than 6, twice 2 being equal to 4, are of consequence less than 6, we do no more than perceive the relation of the inequality between the relation of twice 2 and 4, and the relation of 4 and 6.

The manner of proceeding justly in *reasoning*, so as to arrive with the greater facility at the knowledge of truth, makes what we call *method*.

For the real benefit of logic to *reasoning*. See *LOGIC* and *SYLLOGISM*.

RE-ATTACHMENT, in law, a second attachment of him who was formerly attached, and dismissed the court without day, by the not coming of the justices, or the like casualty.

Brook makes *re-attachment* either *general* or *special*—*General* is where a man is *re-attached* for his appearance on all writs of assize lying against him—*Special*, for one or more certain writs.

RE-BAPTISANTS, a religious sect, who maintain, that persons irregularly baptized, are to be baptized afresh.

The anabaptists are *re-baptists*, inasmuch as they baptize those at maturity, who had been before baptized in childhood.

St. Cyprian and pope Sixtus, had mighty differences about the rebaptizing of converted heretics.

Donatus was condemned at Rome in a council, for having re-baptized some persons who had fallen into idolatry after their first baptism.

REBATE, REBATEMENT, in commerce, a term much used at Amsterdam for a discount or abatement in the price of certain commodities, when the buyer advances the sum in hand, for which he might have taken time. See *DISCOUNT*.

Rebate (among us usually called *prompt payment*) is estimated by months, and is only allowed for certain kinds of merchandizes, which, according to the custom of Amsterdam, are,

German wools,	which are sold at	$\left\{ \begin{array}{l} 15 \\ 18 \\ 33 \\ 20 \\ 21 \end{array} \right\}$ months <i>rebate</i> .
Affes and pot-affes,		
Italian silks,		
Sugars of Brazil,		
Spanish wools,		

That is, those commodities are sold for ready money, only deducting or *rebating* the interest of the money, which ought not to be paid till the end of 15, 18, &c. months.

This interest, called *rebate*, is usually regulated on the footing of 8 per cent. per annum.

The reason of this expedient is, that the merchants having not always wherewithal to pay for their goods in hand, by means of the *rebatement*, such as have, will find their account in it, and such as have not, will be engaged to discharge themselves as soon as possible, for the sake of the discount.

REBATEMENT, in heraldry, a diminution or abatement of the dignity of the figures or bearings in a coat of arms. See *ABATEMENT*.

REBELLION originally signified a second resistance or rising of such as had been formerly overcome in battle by the Romans, and had yielded themselves to their subjection.

It is now generally used for a traitorous taking up of arms against the king, either by his own natural subjects, or by those formerly subdued.

Rebel is sometimes also used, in our ancient statutes, for a person who wilfully breaks a law; and sometimes for a villain disobeying his lord.

Commission of REBELLION. See *COMMISSION*.

REBELLIOUS assembly, a gathering of twelve persons, or more, intending, going about, or practising, unlawfully, and of their own authority, to change any laws of the realm; or to destroy the inclosure of any park or ground inclosed, banks of fish-ponds, ponds, conduits, &c. to the intent the same shall remain void, or that they shall have way in any of the said grounds; or to destroy the deer in any park, fish in ponds, coney in any warren, dove-houses, &c. or to burn stacks of corn, or to abate rents, or prices of victuals. See *RIOT*.

REBOUND. See the article *RECORD*.

REBUS, a name-device, as Cambden englishes it; or an enigmatical representation of some name, &c. by using figures or pictures, instead of words, or parts of words.

Such is that of the gallant mentioned by Cambden, who expressed his love to Rose Hill, by painting in the border of his gown a rose, a hill, an eye, a *kat*, and a well; which, in the *rebus*-style, reads, *rose hill I love well*.

The Picards have the honour of the invention of this notable kind of wit; whence the French, to this day, call it *rebus de Picardie*. Cambden adds, that the English first learnt it of them in the reign of our Henry III. by means of the garifons we then had in Calais, Guienne, and other places bordering on Picardy.

Its origin is by Menage, &c. ascribed to the priests of Picardy, who, it seems, antiently in carnival-time, used every year to make certain libels, entitled, *de rebus que geruntur*, being raileries on what intrigues and transactions had passed about the city; wherein they made great use of such sort of enigmas and allusions, breaking and joining word, and applying them with paintings.

Thus, in the *rebus* of Picardy, says Marot, a curry-comb, a scythe, *finax*, and a cask, *veau*, make *ceste finaveau*. But this practice has been since prohibited there, by reason of the scanal.

Cambden tells us, the *rebus* was in wonderful esteem among our forefathers; and that he was nobody who could not hammer out of his name an invention by this wit-craft, and picture it accordingly.

The sieur Des Accords has made an ample collection of the most famous *rebus*'s de Picardy. And Mr. Cambden has done something of the same kind in his *Remains*—The abbot of Ramsey, he tells us, engraved in his seal a ram in the sea, with this verse, to shew he was a right ram, *cujus signa gerat, dux gregis est ut ego*—Sir Thomas Caval (Caval signifying a horse) engraved a galloping horse in his seal, with this limping verse, *Homo creditur, non certatur equum*—So John Eaglehead bore in his seal an eagle's head, with this motto around it, *Ha aquila caput est, signumque figura Johannis*.

Bolton, prior of St. Bartholomew's, signified his name by a bolt thrust through a tun—*Slip*, abbot of Westminster, a man highly in favour with Henry VII, had a quadruple *rebus* for his single name; sometimes he set up in his windows the figure of an eye, with a slip of a tree; sometimes the letter I, with the said slip; in other places, one slipping boughs in a tree; and in others, one slipping from a tree, with the word, *I-slip*.

Thomas earl of Arundel signified his name by a capital A in a rundle. Morton, the great archbishop of Canterbury, was contented to use *mor* upon a tun; and sometimes a mulberry, called *morus*, out of a tun. So Luton, Thornton, Athton, &c. signified their names by a lute, a thorn, an ass, upon a tun. So a hare on a bottle was the device of Hare-bottle; a magpie on a goat, of Pigot; a hare by a sheaf of rye in the sun, of Hamilton. Lionel Duckett used a lion with an L on its head; whereas, says Cambden, it should have been on its tail: had the lion been eating a duck, adds the same author, it had been a rare device, worth a *ducat* or a *duck-egg*. Garret Dews signified his name on his sign by two men in garret casting duce at dice.

Abel Dragger's device in Ben. Johnson's Alchymist, and Jack of Newberry in the Spectator, are known to every body.—But the *rebus*, being once raised to sign-posts, grew out of fashion at court, and has been left to hang there ever since. Indeed, attempts have been some years since made for its rescue by a reverend divine, in his *Timber of Love-Letters*, &c.

Yet has *rebus* antiquity on its side, as having been in use in the pure Augustan age: Cicero, in a dedication to the gods, inscribed Marcus Tullius, with a little pea, called by the Latins *cecer*, by us a *chick-pea*. And Julius Cæsar, in some of his coins, used an elephant, called *Cæsar* in the Mauritanian tongue. Add to these, that two mint-masters in that age, L. Aquilius Flavianus, and Vocconius Vitellus, used, the first a flower, the second a calf, on the reverse of their coins.

REBUTTER*, in law, the answer of the defendant in a cause to the plaintiff's sur-rejoinder.

* This is called a *rebutter*, from *re*, and the French *ester*, to repel, or bar.

The plaintiff's answer to the defendant's *rebutter*, is called a *sur-rebutter*.

REBUTTER is also when a man warrants any land or hereditament to another, and the person making the warranty, or his heir, sues him to whom the warranty is made, or his heir or assignee, for the same thing: if he, who is so sued, plead the deed or fine with warranty, and pray judgment if the plaintiff shall be received to demand the thing which he ought to warrant to the party, against the warranty in the deed, &c. this is called a *rebutter Term de Ley*, §11.

Again, if I grant to the tenant to hold *fine impetitive waste*, and afterwards implead him for waste, he may debar me of the

the action, by shewing my grant: which is likewise a *re-butter*.

RECANTATION. See **PALINGODY**, or **RETRAC-TATION**.

RECAPITULATION, in oratory, &c. a part of the peroration; called also, *anacephalaesit*. See **PERORATION**, &c. *Recapitulation* is a summary of the preceding discourse; or a concise, transient enumeration of the principal things insisted on at large therein; whereby the force of the whole is collected into one view.

An instance of this may be given in the peroration of Cicero's *Manilian*: *Quare cum totum ita necessarium sit ut negligi non possit: ita magnum ut accuratissime sit administrandum; & cum ei imperatorem praefectus possitis, in quo sit cuncta belli scientia, singularis virtus, clarissima auctoritas, egregia fortuna: dubitabitis, Quirites, quin, &c.*

RECAPTION, **RECAPTIO** in law, the taking a second distress of one formerly distrained for the same cause, and also during the plea grounded on the former distress.

Recaption is also the name of a writ lying for the party thus distrained, to recover damages.

RECEIPT, or **RECEIT**, in commerce, an acquittance or discharge; or an act whereby it appears, that a thing has been paid off, or acquitted.

Where the *receipt* is on the back of a bill, &c. it is usually called an *endorsement*. See **ENDORSEMENT**.

Among tradesmen **RECEIPT** usually makes the second of the three articles of an account: the *receipt* contains the moneys received; the two others the expence, and the return or balance.

RECEIPT, or **RECEIT**, in law, denotes also an admission, or receiving of any person to plead his right, in a cause formerly commenced between two other persons. See **RECEIT**.

RECEIPT of homage.

RECEIPT of the Exchequer.

RECEIPT in medicine.

Audite of RECEIPTS. See the article **AUDITOR**.

RECEIVER, a vessel used in chemistry; pneumatics, &c. See **RECIPIENT** and **EXHAUSTED**.

RECEIVER, **RECEPTOR**, or **RECEPTATOR**, in law, is used commonly in the evil part, for such as knowingly receive stolen goods from thieves, and conceal them—This crime is felony, and the punishment transportation.

RECEIVER, also denotes an officer; whereof there are various kinds denominated from the particular matters they receive, the places where, or the persons for whom, &c.

As *receiver of rents*: *receiver general of the customs*. See **CUSTOMS**—*Receiver of the fines*, upon original writs in chancery, &c.

RECEIVER general of the dutchy of Lancaster, is he who gathers all the revenues and fines of the lands of the said dutchy, all forfeitures, assessments, &c.

RECENT fruits. See the article **FRUIT**.

RECEPTACULUM chyli, **RECEPTACULUM commune**, or *cisterna chyli*, in anatomy, a reservoir or cavity near the left kidney, into which the lacteal vessels do all discharge their contents.

This receiver, called also from its inventor *dustus Pecqueticus*, lies under the emulgent and great arteries, between the two origins of the diaphragma. Hither do the lacteal vessels of the second order bring the chyle after its being diluted, and rendered thinner by the lymph in the glands of the mesentery.

In a preparation of this part, by filling it with mercury, Mr Cowper found it to consist of three several large trunks; two of them more than a quarter of an inch in diameter.

This division is only observed in human bodies, in whom Dr Drake thinks its erect position makes it necessary, in order to take off the resistance which would arise from the pressure of the chyle and lymph, were it contained in a single receiver. In *qua ruped*, its horizontal position may make one trunk sufficient.

Its osculum, or exit is upwards in the thorax, and thence is called the *thoracic duct*. See **THORACIC duct**.

RECEPTION, **RECEPTIO**, in philosophy, denotes the same with *passion*, considered as opposed to *action*.

The schoolmen, however, make some difference: The *receptive passion*, say here, does not tend to the destruction of the being, as *passion* does; but to the perfection thereof. It is conceived as the acquisition of some new reality or modification, by means of the action of another.

RECEPTION is also properly used for the manner of treating or entertaining a person; and the solemnities and ceremonies practised on that occasion. See **ENTRY**.

The queen of Sweden's *reception* into Paris was one of the most magnificent these ages have seen. The *reception* of ambassadors is usually performed with a great deal of pomp.

RECEPTION, is sometimes also used for the act of approving, accepting, and admitting a thing. See **ACCEPTANCE**.

The canon law only binds where it is *received*: The civil law is received in some countries, not in others.

The French would never *receive* the council of Trent, the Spanish inquisition, nor the dogmata of the ultramontane canonists.

RECEPTION, in astrology, is a dignity befalling two planets when they exchange houses: *e. gr.* when the sun arrives in cancer, the house of the moon; and the moon, in her turn, arrives in the sun's house.

The same term is also used, when two planets exchange exaltation.

RECEPTITIOUS goods. See the article **GOODS**.

RECESSION, of the equinoxes.

RECESSUS imperii, **RECESS** of the empire, a phrase used in speaking of the affairs of Germany; signifying a collection of the votes or determinations of a diet.

At the end of each diet, before it breaks up, they gather together all their resolutions, and reduce them into writing; the act which contains them they call the *recessus imperii*, because made when on the point of retiring.

There being, now, no articles of succours for the war against the Turks, which used to make the greatest part of the *recessus imperii*; they are at a loss for matter to fill them withal, as well as for the manner of drawing them up. *Mozambique*. The disorders in the imperial chamber of Spire were so great, that in 1654 they made several regulations therein; inserted in the *recessus imperii*. *Id.*

RECHABITES, a kind of religious order among the ancient Jews, instituted by Jonadab the Son of Rechab; and comprehending his family and posterity.

Their founder prescribed them three things; *first*, not to drink any wine. *Secondly*, not to build any house, but to dwell under tents. *Thirdly*, not to sow any corn, or plant any vines. The *Rechabites* observed these rules with a great deal of strictness, as appears from Jeremy xxxv. 6, &c.—Whence, St. Jerome in his xliiith epistle to Paulinus, calls them *Monachi, Monks*. Jonadab, their founder, lived under Jehoash, king of Judah, cotemporary with Jehu king of Israel; his father Rechab, from whom his posterity were denominated, descended from Raguel or Jethro, father-in-law to Moses, who was a Kenite, or of the race of Ken; whence *Kenite* and *Rechabite* are used as synonymous in scripture.

RECHACING, in hunting, the driving back of the deer, or other beasts, into the forests, chaces, &c. which had straggled out into the copes, or thickets, &c.

Antiently there were offices of *rechacers* of the deers bestowed by the king on gentlemen, or old hunters, with salaries for the keeping of running dogs to *rechace* the deer into the forests, and then to beat the dogs off, without pursuing any farther.

RECHANGE in commerce. See **RE-EXCHANGE**.

RECHANGE is also used at sea for such tackle as is kept in reserve aboard the ship, to serve in case of failure of that already in use. See **TACKLE**.

The Levantines use the word *recept* or *repsit* in the same sense.

RECHARGE, of a fire arm, is a second loading or charge. The *recharge* should never be so deep as the first charge, lest the piece being overheated should burst.

RECHEAT, in hunting, a lesson which the huntsman winds on the horn, when the hounds have lost their game; to call them back from pursuing a counter-scent.

RECIPE, in medicine, a prescription, or formula of a remedy, appointed to be administered to a patient. See **PRESCRIPTION**.

It is thus called, because always beginning with the word *re-ripe*, take; or ordinarily expressed by the abbreviation **R**.

RECIPIANGLE, or **RECIPIENT-ANGLE**, a mathematical instrument, serving to take the quantity of angles; used especially in the drawing plans of fortifications.

The *recipiangle* is a popular instrument among the French, but little known among us: it is usually very simple, in form of a square, or rather a bevel; consisting of two arms or branches, riveted together, and yet moveable, like a sector on the centre or rivet.

To take an angle with it, they lay the centre of a protractor to the joint, and the degrees cut by the edge shew the quantity of the angle: otherwise the angle made by the two rulers is drawn on paper, and then measured with a protractor.

Sometimes there is a circle divided into degrees added over the centre or rivet, with an index to shew the degrees without a protractor—At other times the under branch is divided.

To measure a salient-angle with any of the *recipianglers*, apply the infides to the lines that form the angle; for a re-entrant angle, apply the outides, &c.

RECIPIENDO excommunicato. See **EXCOMMUNICATO**.

RECIPIENDO & faciendo attornato. See **ATTORNATO**.

RECIPIENT, **RECEIVER**, in chemistry, an appendage of an alembic, retort, &c. being a vessel luted to the beak thereof, to receive the liquor raised in distillation, &c.

RECIPIENT

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RECIPIENT is also part of the apparatus of an air-pump; being a glass vessel placed on the top of the plate, for the air to be exhausted from. See **AIR-PUMP**.

To an air-pump belong various *recipients*, of various forms and sizes, and serving for various purposes.

RECIPROCAL, **RECIPROCUS**, something that is mutual, or which is returned equally on both sides, or affects both parties alike.

The end of human society is to afford each other *reciprocal* aid: there are *reciprocal* duties between the prince and his subjects, the husband and wife, &c. There is a *reciprocal* action between the agent and patient.

The *lex talionis* establishes a kind of *reciprocation* of justice.

If two similar triangles be cut by parallel lines, the sections of the sides will be proportional; and *reciprocally*, if the sides be cut proportionably, the triangles are similar.

RECIPROCAL, in logic, is applied to terms which have the same signification, or are convertible—as, *reasonable animal*, and *man*.

Schoolmen define *reciprocation*, a conversion of the several terms in an enunciation—And terms are said to be converted in an enunciation, when the predicate is put in the place of the subject, and *reciprocally*, the subject in that of the predicate.

Thus rationality and risibility are said to *reciprocate*; for we say equally, a *rational* is *risible*, and a *risible* is *rational*.

RECIPROCAL, in grammar, is applied to certain verbs and pronouns in some of the modern languages; in regard of their turning or reflecting the noun, or person upon himself. Thus the pronoun-relative *himself*, refers Cato to Cato's self.

The abbé de Dangeau defines *reciprocal verbs* to be those whose nominative is plural, and denotes persons acting mutually on one another: as, *Ces quatre hommes s'entrejettèrent*; these four men fought together. *Pierre & toi vous vous luez*; Peter and you praise one another, &c.

Reciprocal verbs are a species of those which that author calls *pronominales*, and which he distinguishes into *reciprocal* and *identical*.

RECIPROCAL, in poetry, is applied to verses which run the same both backwards and forwards; called also *recurrents*.

RECIPROCAL figures, in geometry, are such as have the antecedents and consequents of the same ratio in both figures. See *Tab. Geom. fig. 22. n. 2. Here*,

$$A : B :: C : D, \text{ or,} \\ 12 : 4 :: 9 : 3$$

That is, as much longer as the side A, in the first rectangle, is than B; so much deeper is the side C in the second rectangle, than the side D in the first: and consequently, the length of one is compensated by the depth of the other.

Also, as the side A is $\frac{3}{2}$ longer than the side C, so the side B is longer than D: wherefore the rectangles must needs be equal.

This is the foundation of that catholic theorem; that the rectangle of the extremes must always be equal to that of the means: and consequently, the reason of the rule of three, or golden rule.

For, suppose there were given any three numbers, or quantities, geometrically proportional, as A, B, and C; and that it were required to find a fourth, D, proportional to them: since $A : B :: C : D$, therefore $AB = BC$, and consequently,

$D = \frac{BC}{A}$ that is, the fourth term is equal to the quotient of the second, multiplied by the third term, divided by the first.

Or thus in numbers: suppose given 12, 4, and 9; required a fourth proportional. Now as $12 : 4 :: 9 : Q$. But $12Q = 4 \times 9 = 36$. Therefore $Q = \frac{4 \times 9}{12}$ ($= 3$ by

dividing both sides by 12.

And hence it follows, that if any two triangles, parallelograms, prisms, parallelepipeds, pyramids, cones, or cylinders, have their bases and altitudes *reciprocally* proportional, those two figures or solids are equal to one another; and *vice versa*, if they are equal, their bases and altitudes are *reciprocally* proportionable.

RECIPROCAL proportion, is when in four numbers, the fourth is lesser than the second, by so much as the third is greater than the first; and *vice versa*.

This is the foundation of the inverse, or indirect rule of three. Thus; $4 : 10 :: 8 : 6$.

Great use is made of this *reciprocal proportion*, by Sir Isaac Newton, and others, in demonstrating the laws of motion.

RECIPROCAL theorem. See the article **THEOREM**.

RECITATION, the act of *reciting*, or delivering a dis-

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course, either in the way of narration, rehearsal, declamation, or reading.

RECITATIVO, or **RECITATIVE music**, a kind of singing, which differs but little from ordinary pronunciation: such as that wherein several parts of the liturgy are rehearsed in cathedrals, or that wherein the actors ordinarily deliver themselves on the theatre, at the opera, &c.

The Italians value themselves on their performance in the *recitative* way. The *recitative's*, or *recitativo's*, in our operas, usually tire the audience, by reason they do not understand the language; but the songs make them amends.

RECITATIVE style, is the way of writing accommodated to this sort of music.

RECKONING, in navigation, the act of estimating the quantity of a ship's way; or of the distance run between one place and another.

This is usually performed by means of the log line: the manner of applying which see under its proper article, **LOG-LINE**.

Yet is this liable to great irregularities—Vitruvius advises an axis to be passed through the sides of the ship, with two large heads propending out of the ship, wherein are to be included wheels touching the water, by whose revolution the space passed over in any given time, may be measured. The same has been lately recommended by Snellius: but there are few who have wrote of navigation, but have shewn the insufficiency of this method.

Dead RECKONING. See **DEAD reckoning**.

RECLAIMING, or **RECLAIMING**, in our ancient customs, the action of a lord pursuing, prosecuting, and recalling his vassal, who had gone to live in another place, without his permission.

RECLAIMING is also used in a similar sense, for the demanding of a person or thing to be delivered up, or surrendered, to the prince or state it properly belongs to; when, by any irregular means it has come into the possession of another.

An officer was sent to reclaim the vessel seized by the Algerines, contrary to the terms of the treaty of peace. The government *reclaimed* the late cashier of the South-sea company, who had refuted himself in Flanders, but in vain.

RECLAIMING, in falconry, is the calling of a hawk, or bird of prey back to the fist.

The spar-hawk, gos-hawk, &c. are *reclaimed* with the voice: the falcon only by shaking the lure—So that the term *luring* with regard to the falcon, is more proper than *reclaiming*.

The partridge is also said to reclaim her young ones, when she calls them together upon their scattering too much from her.

RECLINATION, of a plane, in dialling, the number of degrees which a dial-plane leans backwards, from an exactly upright or vertical plane, *i. e.* from the zenith.

The *reclination* is easily found, by means of a ruler and a quadrant; for having drawn an horizontal line on the plane by a level or quadrant, and to it another line at right angles; apply a ruler, so that one end of it may hang over, or reach beyond the plane: then will a quadrant, applied to the under edge of the ruler shew the degrees and minutes of the plane's *reclination*; accounting from that side of the quadrant that is contiguous to the edge of the ruler.

RECLINER, or **RECLINING dial**, is a dial whose plane *reclines* from the perpendicular; *i. e.* leans from you when you stand before it.

When this reclination is equal to the height of the pole, the dial is said to be equinoctial.

Declining RECLINER, or **declining RECLINING dial**, is a dial which neither stands perpendicularly, nor opposite to one of the cardinal points.

RECLUSE, among religious, a person close shut up in a very narrow cell of a hermitage, or other religious house; and cut off, not only from all conversation with the world, but even with the house.

The word is chiefly used for such as thus imprison themselves out of devotion, to do penance—It is sometimes also applied to incontinent wives, whom their husbands procure to be thus kept in a perpetual prison in some convent.

Recluses were antiently very numerous: they were then a kind of solitaries who shut themselves up in some little cell, with a vow never to stir out of it.

None were admitted to this oath until they had given sufficient proofs of their abstinence, and had leave from the bishop, or the abbot of the monastery where they were shut up: for the cells of the *recluses* were always to join to some monastery.

The prelate's permission being obtained, they were tried for a year in the monastery: out of which, during that time, they never stirred.

They were then admitted to their vow of stability in the church before the bishop; which being done, and the *recluse* having entered his little cell, the bishop set his seal on the door.

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The cell was to be very small, and very exactly closed. See *Cell*. The *reclus* was to have every thing within it necessary to live; and even, if he were a priest, an oratory consecrated by the bishop, with a window which looked into the church, through which he might make his offerings at the altar, hear the singing, sing himself with the community, and answer those who talked to him. But the window was to have curtains before it, both within-side and without; so that the *reclus* might neither see nor be seen.

Indeed he was allowed a little garden in his *recluson*, to plant a few herbs and take fresh air: adjoining to his cell was that of his disciples, which he was very rarely without; with a window, through which they served him with necessities, and received his instructions.

When it was judged proper to have two or three *recluses* together, their cells were made contiguous to each other, with windows of communication: if any woman would consult them, or confess to them, it was to be in the church, and in the face of all the world.

Where there were two or three *recluses* together, they were never to hold any conference, but on spiritual matters; and to confess to each other: where there was but one, he was to confess and examine himself.

If the *reclus*, fell sick, his door was opened for people to come in and assist him; but he was not allowed to stir out on any pretence whatever.

These articles are extracted from the rule, compiled for the *recluses*, by Grimlaic, a priest, in the IXth century.

There were also women *recluses*, who led the same life, in proportion. St Viborade lived a *recluse* at St Gall, and was there martyred by the Hungarians in 825.

RECLUSION, the state of a recluse; or the cell and other appendances thereof. See *RECLUS*.

F. Helyot gives a particular account of the ceremonies practised in the *recluson* of a woman, in that of mother de Cambrai, institutrix of the order of the representation of Notre Dame. A cell being built for her in 1625, adjoining to the church of St Andrew in Tourmay: the bishop waited for her early in the morning at the church door. Upon her arrival, presenting herself at the feet of that prelate, he gave her his benediction, conducted her to the grand altar; and there blessing a mantle, veil, and scapular, he put them on her, and gave her a new name.

Having here made her vow, and the bishop having harangued the people in praise of the new *recluse*; he conducted her personally to her *recluson*; the clergy all the way singing *Veni, sponsa Christi*, &c.

Here the bishop blessing her afresh, consecrated the *recluson*, and shut her up in perpetual confinement.

RECOGNITION. See the article *RECOGNIZANCE*.

RECOGNITION, *RECOGNITIO*, denotes an acknowledgment. The word is particularly used in our law-books, for the title of the first chapter of the Stat. 1 Jac. I. whereby the parliament acknowledged the crown of England, after the death of queen Elizabeth, to have rightfully descended to king James.

RECOGNITION, in the drama. See *DISCOVERY*.

RECOGNITIONE *adulterata per vim & durtum facta*, is a writ to the justices or the common-bench, for issuing a record touching a recognizance, which the recognizer suggests to have been acknowledged by force and hard dealing: that if it so appear it may be dissolved.

Transcriptio RECOGNITIONIS factae coram iudicialis iudicatus. See *TRANSCRIPTION*.

RECOGNIZANCE, or *RECOGNISANCE*, in law, a bond, or obligation of record acknowledged to the king; testifying the recognizer to owe to the recognizee a certain sum of money.

It is thus called, because *recognized*, or acknowledged in some court of record, or before some judge, master in chancery, or justice of the peace.

Meer *recognizances* are not sealed, but enrolled; and execution, by force thereof, is of all the recognizer's goods or chattels, (except draught beasts, or implements of husbandry) and the moiety of his land.

There are also *recognizances* for bail, others for appearing at the sessions to prosecute a felon, others for good behaviour, &c.

RECOGNIZANCE is also used in our antient statutes, for the verdict of the twelve jurors impanelled upon an affize; hence called *recognitors*.

RECOGNIZEE, is he to whom one is bound in a recognizance—He that is so bound is called *RECOGNIZOR*.

RECOIL, or *REBOUND*, the resiliency of a body, chiefly a fire-arm; or the motion whereby, upon explosion, it starts or flies backward.

The greater the charge, *ceteris paribus*, the greater the rebound—By an experiment made before the royal society, and related in the *Philos. Transact.* it was found that cannons

charged to a certain degree, throw the ball from right to left of their own direction; but that the cannons themselves recoil from left to right.

Some of the gentlemen of the French academy, doubting the justness of the observation; Mr Castini, the younger, undertook to repeat the experiment; which he did by means of a machine, as like that used in England as he could; and that tried over, and over again.

The result was, that the ball, when the gun had liberty to recoil, was always thrown to the right of the point to which it was thrown when the gun was fixed without a possibility of rebounding; but then the recoil was always made the same way, viz. to the right; and he never found that contrariety of directions between the ball and the rebound, observed in the English experiment. See *Hist. Acad. R. Science. A. 1703. p. 120. &c.*

The cause of the phenomenon seems very difficult to assign: for supposing the guns of a common make, with the touch-hole on the top, we cannot so much as guess what cause should constantly determine the ball from right to left—Unless some very material circumstances be omitted in the recital they have given us of the experiment.

RECOLLECTION, a mode of thinking, whereby those ideas fought after by the mind, are with pain and endeavour found, and brought again to view.

RECOLLECTS, a congregation of reformed Franciscans, called also *Friars minor of St Francis, of the strict observance*.

They were established about the year 1530; when some religious of the order of St Francis, being willing to keep his rule to the letter; Clement VII. gave them houses, particularly Tullis in the Limosin, and Murat in Auvergne, whether they might retire, and receive such as were disposed to follow them—The same year he approved the reform; and in 1584 it was carried into Italy.

RECOMMENDATI. See *AFFIDATUS*.

RECONCILIARI, in our law-books, &c.—A church is said *reconciliari*, to be *reconciled*, when it is consecrated afresh, after having been polluted or profaned; as by the possession of pagans, heretics, &c.

RECONNOITRE*, in war, to go to view and examine the state of things, in order to make a report thereof.

* The word is pure French, signifying literally, to know, *reconnaître*.

We say, to *reconnoitre* the coasts, to *reconnoitre* a port, &c.—A body of horse was sent to *reconnoitre* their camp, the ground, the condition of the roads, rivers, &c.

A general ought to go to *reconnoitre*, in person, the place to be besieged, in order to learn its situation, and avenues, its strengths and weaknesses.

RECONNOITRE is also used at sea—To *reconnoitre* a vessel, a fleet, &c. is to approach near enough to examine the rate and burthen of a vessel, &c. the force it may have at board, what nation it is of, &c.

To *reconnoitre* a land, or shore, is to observe its situation, in order to find what land it is.

RECORD, *RECORDUM*, in law, an authentic testimony of any thing in writing, contained in rolls of parchment, and preserved in a court of record.

Records are said to be *veritatis & veritatis vestigia*—An act committed to writing in any of the king's courts, during the term wherein it is written, is alterable; being no record; but that term once ended, and the act enrolled, it is a record, and of such credit, as admits no alteration, or proof to the contrary.

Lawyers reckon three sorts of records: viz. a judicial record, as attainer, &c.—a ministerial record upon oath, as an office of inquisition found—and a record made by conveyance and consent, as a fine, or deed enrolled, and the like.

Matter of Record. } See { MATTER.
Muster of Record. } MUSTER.
Oyer de Record. } OYER.
Prisoner upon matter of Record. } PRISONER.

RECORD, among fowlers; a bird is said to *record*, when it begins to tune or sing within itself; or to form its notes, and dispose its organs for singing.

The cock thrush is distinguished from the hen in *recording*; the first being more loud and frequent in it than the second.

RECORDARE facias, a writ directed to the sheriff to remove a cause depending in an inferior court, as hundred-court, county-court, court of antient demesne, &c. to the king's bench, or common-pleas.

It is thus called, because it commands the sheriff to make a record of the proceedings either by himself, or others; and then to send up the cause.

RECORDER, *RECORDATOR*, a person whom the mayor, or other chief magistrate of any city or town corporate having jurisdiction and a court of record within their precincts, does associate with him, for his better direction

in matters of justice, and proceedings according to law.

He is usually a man versed and experienced in the common law.—In some towns, which have their particular affizes within themselves, and no mayor, the *recorder* is the judge.

RECORDO & *processo mittendis* is a writ to call a *record*, together with the whole proceedings in the cause, out of an inferior court into the king's court.

RECOVERY, in a legal sense, an obtaining of any thing by judgment, or trial at law; answering to *evictio* among the civilians.

There is a *true* and a *feigned recovery*.

True Recovery is an actual or real *recovery* of any thing, or of the value thereof, by judgment—as if a man sue for any land, or other thing, and have a verdict or judgment for him.

Feigned or common Recovery is a sort of *fictio juris*, being a certain form or course prescribed by law to be observed for the better assuring of lands and tenements to us; the end and effect whereof is to discontinue and destroy estates tail, remainders, and reversions, and to bar the entails thereof.

This *recovery* is either with a *single* or a *double voucher*.

In **RECOVERY with a single voucher**, there are three parties required, the *demandant*, the *tenant*, and the *vouchee*.

The *demandant* is he who brings the writ of entry, and may be termed the *recoverer*—The *tenant* is he against whom the writ is brought, and may be called the *recoveree*—The *vouchee* is he whom the *tenant* voucheth, or calls to warrant for the land in demand.

RECOVERY with double voucher is where the *tenant* voucheth one, who voucheth another, or the common *vouchee*.

The point is a little quaint and perplexed: to explain it; suppose a man desirous to cut off an estate tail in lands or tenements, to the end that he may sell, give, or bequeath them; the first thing he does, is to cause a feigned writ of entry *sur dessein en le poss* to be brought of the lands, of which he intends to dock the entail; and, in a feigned declaration thereupon made, he pretends he was disseised by him, who, by a feigned fine, or deed of bargain and sale, is named and supposed to be tenant of the lands.

This feigned tenant, if it be a *single recovery*, is made to appear, and vouch a poor fellow, the bag-bearer of writs of the *custos brevium* of the common-pleas; (where alone these common *recoveries* are allowed) who makes default: upon which a judgment is, by this fiction, entered, that the *demandant* shall recover, and have a writ of *seisin* for the possession of the lands in question; and that the *tenants* shall recover the value of the lands against the lands of the *vouchee* bag-bearer, (who has not a foot of land) which is an imaginary satisfaction for the heir in tail, though he is to be never the better for it.

By this means, one Edward Howes, a bag-bearer, and common *vouchee*, in the space of twenty years, passed, or suffered to be *recovered* against him, a great part of the lands of England; obliging his own lands to answer the value of those recovered against the *tenants* or remainders in tail.

Clerk of enrollments of Recoveries and fines. See **CLERK**.

RECOUPE*, in law, to rebate or discount. See **DISCOUNT**.

* The word is pure French, formed of *re* and *couper*, to cut again.

Thus, if a man have ten pounds issuing out of certain lands, and he disseises the tenant of the land; in an assize brought by the disseisee, the disseisor shall *recoupe* the rent in the damages.

RECOUPE also denotes a quick, sharp reply to a peremptory demand. See **REPAREE**.

RECREANT, in our old law-books, implies cowardly, faint-hearted.

Hence *recreantise*. See the article **CRAVEN**.

Recreant was so reproachful a word, that Glanville would not describe it—*Recreantes equi* is used by Fleta, lib. 2. c. 2. for dull, jaded horses.

RECREMENT, *RECREMENTUM*, in medicine, some superfluous matter separated from some other that is useful.

In which sense it amounts to much the same with *secret*, or *excrement*. See **FACTS**.

RECREMENT is sometimes also used to denote such secreted juices in the body, as are afterwards of use to the economy; as the lymphas, gall, &c.—which are thus called in contradistinction to *excrements*, which are expelled out of the body, as of no farther use.

RECRIMINATION, a posterior accusation brought by the accused against his accuser, upon the same fact.

When two parties have made their mutual complaint at the

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same time, the business is, first to determine who shall be the accuser, and who the accused, i. e. on whom shall fall the *recrimination*.

By the French laws, *recrimination* is of no force till the criminal have been purged legally.

RECRUESCENCE, *RECRUESCENTIA*, in medicine, is a relapse, when a disease that was gone off returns again.

RECTANGLE, in geometry, called also *oblong*, and *long square*, a quadrilateral rectangular figure. (MLIK, *Tab. Geometry*, fig. 60.) whose opposite sides (OP and NQ, as also ON and PQ) are equal.

Or, a *rectangle* is a parallelogram; whose sides are unequal, but its angles right.

To find the area of a *rectangle*; measure the length of the sides ML and MI, and multiply them by one another; the product is the area of the *rectangle*.

Thus, ML being=345 feet, and MI=123 feet, the area will be found 42435 square feet.

Hence, 1°. *rectangles* are in a ratio compounded of that of their sides ML and IK; and therefore *rectangles*, which have the same height, are to each other as their bases; and those which have the same base, are to each other as their heights.

2°. If therefore there be three lines in continual proportion; the square of the middle one is equal to the *rectangle* of the two extremes.

3°. If there be four right lines in continual proportion, the *rectangle* under the extremes is equal to the *rectangle* under the middle terms.

4°. If from the same point A, fig. 61. be drawn two lines, one whereof, AD, is a tangent to a circle, the other a secant AB; the square of the tangent AD will be equal to the *rectangle* under the secant AB, and that part of it without the circle AC.

5°. If two or more secants Aa, AB, &c. be drawn from the same point A; the *rectangles* under their wholes, and their parts without the circle, will be equal.

6°. If two chords intersect each other, the *rectangles* under their segments will be equal.

Similar RECTANGLES. See the article **SIMILAR**.

RECTANGLE, in arithmetic, is the same with *product* or *factum*.

See **PRODUCT**.

RECTANGLED, **RIGHT-ANGLED**, *triangles* is a triangle, one of whose angles is right, or equal to 90°.

There can be but one right angle in a plain triangle; therefore a *rectangled* triangle cannot be equilateral.

RECTANGULAR, in geometry, is applied to figures and solids, which have one or more angles right.

Such are squares, rectangles, and rectangled triangles, among plain figures; cubes, parallelepipeds, &c. among solids.

Solids are also said to be *rectangular* with respect to their situation: thus, if a cone, cylinder, &c. be perpendicular to the plane of the horizon, it is called a *rectangular* or *right* cone, cylinder, &c.

The ancients used the phrase *rectangular section of a cone*, to denote a parabola; that conic section, before Apollonius, being only considered in a cone, whose section by the axis would be a triangle, right-angled at the vertex.

Hence it was that Archimedes entitled his book of the quadrature of the parabola, by the name of *rectanguli conic section*.

RECTANGULAR barometer. } See { **BAROMETER**.

RECTANGULAR windmills. } See { **WINDMILLS**.

RECTIFICATION*, the act of *rectifying*, i. e. of correcting, remedying, or redressing some defect or error, in respect either of nature, art, or morality.

* The word is compounded of *rectus*, right, direct, and *facio*, I become.

RECTIFICATION, in chemistry, is the repeating of a distillation or sublimation several times, in order to render the substance purer, finer, and freer from aqueous and earthy parts.

Rectification is a reiterated depuration of a distilled matter, e. g. brandy, spirits, or oils, by distilling them over again, to render them more subtle, and exalt their virtues. See *Supplement* article **RECTIFICATION**.

Fixed salts are *rectified* by calcination, dissolution, or filtration.

Metals are *rectified*, i. e. *refined*, by the *coppel*; and regulus's by repeated fusions, &c.

RECTIFICATION, in geometry, is the finding of a right line equal to a curve.

All we need to find the quadrature of the circle, is the *rectification* of its circumference; it being demonstrated, that the area of a circle is equal to a rectangled triangle, whose two sides, comprehending the right angle, are the radius, and a right line equal to the circumference.

To *rectify* the circle, therefore, is to *square* it: or rather, both the one and the other are impossible—For the various attempts

tempts to rectify the circle, in order to the quadrature, &c. see QUADRATURE of the circle.

The rectification of curves is a branch of the higher geometry; wherein the use of the new-invented integral calculus, or inverse method of fluxions, is very conspicuous—For, since a curve line may be conceived to consist of innumerable right lines, infinitely small; if the quantity of one of them be found, by the differential calculus; their sum, found by the integral calculus, gives the length of the curve. Thus, if MR (Tab. *Analys.* fig. 18.) = dx , and mR = dy ; Mm , or the element of the curve will be $\sqrt{dx^2 + dy^2}$. See ELEMENT.

If then, from the differential equation, to the particular curve, we substitute the value either of dx , or of dy , we shall have the particular element, which being integrated,, gives the length of the curve. See FLUXIONS.

Indeed the element of the curve is sometimes more commodiously determined from some particular circumstances; instances whereof we shall give in the rectification of the parabola and cycloid.

To RECTIFY the parabola—For this we have

$$\frac{adx = 2ydy}{a dx^2 = 4y^2 dy^2}$$

$$\frac{dx^2 = 4y^2 dy^2 : a^2}{dx^2 = 4y^2 dy^2 : a^2}$$

$$\sqrt{(dx^2 + dy^2)} = \sqrt{(4y^2 + 4y^2 dy^2 : a^2)} = dy \sqrt{(aa + 4yy : a)}$$

To render this element of the curve integrable; let it be resolved into an infinite series; (see SERIES.) Then in the general theorem.

$$n = 2m = 1P = a^2 Q = 4y^2 : a^2 P^{n:n} = a = A$$

$$m A Q = \frac{1}{2} a \cdot 4y^2 : a^2 = -2y^2 : a = B$$

$$\frac{m-n}{2n} B Q = -\frac{1}{2} \cdot \frac{2y^2}{a} \cdot \frac{4y^2}{a^2} = -\frac{2y^4}{a^3} = C$$

$$\frac{m-2n}{3n} C Q = -\frac{1}{3} \cdot \frac{2y^4}{a^3} \cdot \frac{4y^2}{a^2} = \frac{4y^6}{a^5} = D$$

$$\frac{m-3n}{4n} D Q = -\frac{1}{4} \cdot \frac{4y^6}{a^5} \cdot \frac{4y^2}{a^2} = -\frac{10y^8}{a^7} \text{ &c. in infinitum.}$$

Wherefore, $dy \sqrt{(aa + 4yy)} : a = dy + \frac{2y^2 dy}{a^2} - \frac{2y^4 dy}{a^4} +$

$$\frac{4y^6 dy}{a^6} - \frac{10y^8 dy}{a^8} \text{ &c. Whole integral } y + \frac{2y^3}{3a^2} - \frac{2y^5}{5a^4} +$$

$$\frac{4y^7}{7a^6} - \frac{10y^9}{9a^8} \text{ &c. In infinitum expresses the parabolic arch AM.}$$

Hence, first, let AC, and DC (Tab. *Analys.* fig. 19) be the conjugate semi-axes of an equilateral hyperbola; then will $AC = DC = a$. Suppose $MP = 2y$, $QM = x$; then will $AP = x - a = 4yy + aa$; and hence $xx = 4yy + aa$; consequently, $x = \sqrt{(4yy + aa)}$. If then gm be supposed infinitely near QM , we shall have $Qg = dy$; and therefore the element of the area $CQMA = dy \sqrt{(aa + 4yy)}$. The rectification of the parabola therefore depends on the quadrature of the hyperbolic space $CQMA$.

It is to be here noted that all integrations or summations are reduced to the quadratures of curves; in what cases soever they be used: so that to have them perfect, the rule laid down under quadrature of the logarithmic curve, must be observed throughout.

To RECTIFY the cycloid.—Let $AQ = x$, $AB = 1$, (fig. 27). then will $Qg = MS = dx$, $PQ = \sqrt{(x - xx)}$. And hence: $AP = \sqrt{x - x^{1:2}}$; consequently by reason of the similitude of the triangles APQ and MmS ,

$$AQ : AP :: MS : Mm$$

$$x : x^{1:2} :: dx : x^{-1:2} dx$$

Therefore Mm is the differential of the cycloidal arch $AM = x^{-1:2} : 2dx$. Wherefore $\int x^{-1:2} : 2dx = 2x^{1:2} = 2AP$ is the arch AM .

The rectification of curves Mr de Moivre shews may be obtained by considering the fluxion of the curve as an hypotenuse of a rectangular triangle, whose sides are the fluxions of the ordinate and abscissa: care being taken in the expression of this hypotenuse, that only one of the fluxions be remaining, as also only one of the intermediate quantities, viz. that whose fluxion is retained: an example will render this clear.

The right line CB (fig. 20) being given, to find the arch AC .—Let $AB = x$, $CB = y$, $OA = r$. CE the fluxion of the abscissa, ED the fluxion of the ordinate, CD the fluxion of the arch, CA . From the property of the circle $2rx - xx = yy$,

whence $2rx - 2xx = 2yy$, and therefore $x = yy$. But

$$CD = g = \dot{y} + \dot{x} = \dot{y} + r - x \frac{\dot{y}}{r - 2rx + xx} = \frac{\dot{y}}{r - 2rx + xx} + \frac{\dot{y}}{r - 2rx + xx}$$

$$= \frac{rr - yy}{rr - yy}; \text{ therefore } CD = \frac{r\dot{y}}{\sqrt{rr - yy}} = \frac{1}{\sqrt{rr - yy}} + \frac{r\dot{y}}{\sqrt{rr - yy}}$$

$$\frac{+rr - yy}{-}$$

And consequently, if $rr - yy$ be thrown

into an infinite series, and the several members of it be multiplied into ry , and then the flowing quantity of each be taken, we shall have the length of the arch AC .

RECTIFIED spirits, &c. are such as have undergone the operation of rectification, or have been distilled over and over, to separate from them any heterogeneous matter, which might have arisen with them in the former distillations.

Hence we say, spirit of wine twice rectified, thrice rectified, &c.

It is the rectification that makes the difference between brandy and rectified spirits of wine.

RECTIFIER, in navigation, is an instrument used for determining the variation of the compass, in order to rectify the ship's course, &c. See VARIATION and COURSE.

It consists of two circles, either laid upon, or let into, one another, and so fastened together in their centres, that they represent two compasses, the one fixed, the other moveable: each is divided into 32 points of the compass, and 360 degrees, and numbered both ways, from the north and the south, ending at the east and west in 90 degrees.

The fixed compass represents the horizon, in which the north, and all the other points, are liable to variation.

In the centre of the moveable compass is fastened a silk thread, long enough to reach the outside of the fixed compass. But, if the instrument be made of wood, an index is used instead of the thread. See COMPASS.

RECTIFYING of curves. See RECTIFICATION.

RECTIFYING of the globe or sphere is a previous adjusting of the globe or sphere, to prepare it for the solution of problems.

It is done by bringing the sun's place in the ecliptic, on the globe, to the graduated side of the brass meridian; elevating the pole above the horizon, as much as is the latitude of the place; fitting the hour index exactly to twelve at noon, and screwing the quadrant of altitude (if there be occasion) to the zenith.

All this is comprehended under the term, rectifying the globe. When this is done, the celestial globe represents the true posture of the heavens, for the noon of that day which it is rectified for.

RECTILINEAR, RIGHT-LINED, in geometry, is applied to figures, whose perimeter consists of right lines.

RECTILINEAR angle. } See } ANGLE.

RECTILINEAR maps. } See } MAPS.

RECTILINEAR superficies. } See } SUPERFICIES.

RECTITUDE, RECTITUDO, RECTUM, in matters of philosophy, refers either to the act of judging, or of willing; and therefore, whatever comes under the denomination of rectitude, is either what is true, or what is good; these being the objects about which the mind exercises its two faculties of judging and willing.

Rectitude of the mind considered as it judges, i. e. rectitude of the faculty of judgment, consists in its agreement and conformity to the nature and reason of things, and in its determining and deciding about them according to what their constitutions, properties, uses, &c. really are.

Rectitude of the mind, considered as it wills, called also moral rectitude, or uprightness, consists in the choosing and pursuing of those things which the mind, upon due inquiry and attention, clearly perceives to be good; and avoiding those that are evil.

RECTITUDENES, in law, rights, or legal dues, belonging either to God or man. See RIGHT.

RECTO, in law, a writ usually called a writ of right; of so high a nature, that whereas other writs in real action are only to recover the possession of the lands, &c. in question, lost by the plaintiff, or his ancestor: this aims to recover both the seisin thus lost, and the property of the things; so that both rights are here pleaded together; that of property, and that of possession.

If a man lose his cause upon this writ, he is without all remedy.

There are two kinds of this writ; *breve magnum de recto*, or *breve de recto patens*, a writ of right patent; and *recto clausum*, a writ of right clofe.

The first is so called, because sent open—it lies only for him that hath fee-simple in the lands sued for, against the tenant of the freehold at least.

Indeed, the writ of right patent is extended in practice beyond its original intention; for a writ of right of dower, which lies for the tenant in dower, is patent; and so in several other cases. *Fitzherb.*

The writ of right clofe, called also *breve parvum de recto*, is directed to the lord of antient demesne, or the bailiff of the king's manors, and lies for those who hold lands and tenements by charter, in fee-simple, or in fee-tail, or for term of life, or in dower, if they be ejected out of such lands, or disfiled.

In such case a man or his heirs may sue out the writ of right close, directed to the lord of ancient demesne, commanding him to do him right in his court.

RECTO de advocacione ecclesie, a writ of right, lying where a man has right of advowson in fee to him and his heirs, and the incumbent dying, a stranger prebends his clerk to the church; and he not having brought his action of *quare impedit nos darrein presentment* within six months, has suffered the stranger to usurp upon him.

RECTO de custodia terre & hereditas, a writ which lies for him whose tenant dying in his nonage, a stranger enters and takes the body of the heir.

This writ as to lands holden in *capite*, or by knights service, is become useless by the Stat. 12 Car. II. But not where there is a guardian in socage, or appointed by the last will of the ancestor.

RECTO de dote, a writ of right of dower, which lies for a woman that has received part of her dower, and proceeds to demand the remnant in the same town against the heir or his guardian.

RECTO de dote unde nihil habet, is a writ of right which lies in case where the husband having divers lands and tenements, has assured no dower to his wife; and she is thereby driven to sue for her thirds against the heir, or his guardian.

RECTO de rationabili parte, a writ that lies between privies of blood, as brothers in gavel-kind, or sisters, or other copar-teners, as nephews and nieces; and for land in fee-simple.

If a man leave his land for life, and afterwards die, leaving issue two daughters, and after, the tenant for life likewise dies; the one sister entering on all the land, and so deforming the other, the sister so deformed shall have this writ to recover her part.

RECTO quando dominus remittit, a writ of right, which lies in case where lands or tenement in the feignory of any lord, are in demand by a writ of right.

If the lord hold no court; or at the prayer of the demandant or tenant, send his writ to the king's court, to put the cause thither for that time; this writ issues for the other party, and has its name from the words comprised, which is the true occasion thereof.

RECTO per disclaimer, a writ which lies where the lord, in the court of common pleas, does avow upon his tenant, and the tenant disclaims to hold of him; upon which disclaimer the lord shall have this writ.

RECTO folio. See the article FOLIO.

RECTOR, of a parish, the *parson*; or he who has the charge or cure of a parish church.

If the predial tythes of the parish be impropriated, or appropriated, *i. e.* either in lay hands, or in those of some ecclesiastical community, then instead of *rector*, the parson is called *vicar*. In England are reckoned 3485 rectories.

The name *rector* denotes him governor, or ruler, *quia tantum ius in ecclesia parochiali habet, quantum praelatus in ecclesia collegiata*.

RECTOR, also denotes the chief elective officer in several foreign universities, particularly in that of Paris.

The *rector* is chosen afresh every three months: antiently he was chosen every six weeks. The alteration was made by the legate of pope Nicholas III. in 1278.

The *rector* is chosen out of the faculty of arts—While that faculty and the faculty of theology were united, one officer had the inspection of both, under the title of *chancellor*; upon their division, a *rector* was created.

The *rector* makes a solemn procession four times a year, attended by the doctors, bachelors, &c. in their formalities.

RECTOR is also used in several convents for the superior, or officer who governs the house.

The Jesuits use it for the superiors in such of their houses, as are either seminaries, or colleges.

RECTOR, or **RECTORATE**, **RECTORIA**, a parish-church, parsonage, or spiritual living, with all its rights, glebes and tithes.

RECTUM, in law. See **RECTO**.

RECTUM, in our old law writers, is also used for a trial or accusation. See **TRIAL**, &c.

Commune RECTUM, denotes a trial at law, or in the common course of law—*Stare ad rectum*, denotes to stand a trial—*Rectum regere*, to petition the judge to do right.

RECTUM, in anatomy, denotes the third and last of the large intestines or guts—See *Tab. Anat. (Splanchn.) fig. 9. lit. f.*

It is thus called, because it passes straight from the os sacrum to the anus; without making any turns or circumsolutions, as all the other guts do.

Its length is usually about a hands-breadth; and its capacity the thickness of three fingers—Its upper part is tied fast to the ossa sacrum and coccygis, by means of the peritonæum; and in men to the neck of the bladder, in women to the va-

gina uteri: its lower end, the anus, is furnished with three muscles.

The first, is the sphincter ani serving to shut it, and prevent the extremities from passing out involuntarily.

The other two, are the levatores ani, which serve to raise or pull back the *rectum* after the expulsion of the excrements; which especially after hard stools, is apt to be too far protruded.

RECTUS, in anatomy, a name common to several muscles; on account of the straightness of the course of their fibres, from their origin to their insertion; having particular denominations from the parts to which they minister, such are the *Rectus abdominis*, *rectus femoris*, *rectus capitis lateralis*, *major externus*, *minor externus*, *major internus*, *minor internus*, and *rectus palpebrae*.

RECTUS abdominis, is a muscle of the lower belly; which arises from the sternum, and the extremity of the last two ribs, and goes straight down the fore-part of the abdomen, to be inserted in the os pubis.—See *Tab. Anat. (Myol.) fig. 1. n. 47. fig. 2. n. 28.*

It hath three or four innervations, or rather tendinous contractions of its fleshy fibres, which divide the belly of it, as it were, into so many distinct muscles.

It has veins and arteries, which creep on its inside from the mammillary and epigastric vessels; these communicate together, that the blood may return by the mammillary veins, when the passage is stopped by the epigastric which are compressed in women with child.

RECTUS femoris, is a muscle of the leg, which arising from the lower part of the spine of the ilium, and descending between the two vasti, is inserted into the patella.—See *Tab. Anat. (Myol.) fig. 1. n. 52.* See also **FEMUR**.

RECTUS palpebrae, is a muscle which lifts up the eye-lid: It arises from the bottom of the orbit of the eye; where the optic nerves pierce the cranium, and passing above the superbus, is inserted by a large tendon into the border of the eye-lid.

RECTUS capitis lateralis, a pair of short thick fleshy muscles, rising from the superior part of the transverse processes of the first vertebra of the neck, whence it ascends, and is inserted into the os occipitis.

Its use is to move the head laterally towards either shoulder: when they act together, being antagonists, they keep it steady.

RECTUS externus capitis major, the third of the muscles of the head, arising fleshy and tendinous from the upper part of the double spine of the second vertebra of the neck, and spreading in its ascent; is inserted into the posterior part of the os occipitis—It serves to draw the head directly back upon the first vertebra.

RECTUS externus minor, a muscle arising from the hind-part of the first vertebra of the neck; and inserted into the middle of the os occipitis.

It serves likewise to draw the head directly backwards.

These two muscles are otherwise called *renuantes*.

RECTUS internus capitis major, a pair of muscles arising from the fore-part of the five interior transverse processes of the first vertebra of the back, near its great hole.

RECTUS internus minor, arises from the fore-part of the first vertebra of the neck; and is inserted into the anterior appendix of the os occipitis, immediately under the former.

These serve to nod the head forwards, being antagonists to the *rectus externus*, or *renuans*, on the back of the head; and they are hence also called *annuentes*.

RECTUS in curia, in law, one who stands at the bar, and no man objects anything against him.

When a man hath revered the outlawry, and can participate of the benefit of the law, he is said to be *rectus in curia*.

RECURRENT, **RECURRENS** in anatomy, a nerve arising from the *pærvagus*, and distributing several branches to the larynx, to assist in the formation and modulation of the voice; whence it is also called the *vocal nerve*.

It has its name *recurrent*, from its ascending or running back again from the thorax to the larynx.

There are really two *recurrents*, right and left: the left arises from the trunk of the *vagus*; the right from a plexus thereof, immediately under the clavicle—They both run up along the trachea, to which they impart some twigs, and end at last in the muscles of the larynx.

Their office appears partly hence, that a dog is not able to bark after they are cut.

RECUSANTS, persons who refuse to acknowledge the king's supremacy.

Such are the Roman catholics, who hold the pope to be over him: and are hence called popish *recusants*.

The romanists are not charged with double taxes, &c. merely as romanists, but as *recusants*.

RECUSATION, RECUSATIO, an act whereby a judge is desired to refrain from judging some certain cause, on account of his relation to one of the parties; or of some capital enmity, or the like.

By the French laws kinship within the fourth degree, is deemed a legal cause of *recusation*; as also the judge's being god-father, &c. of one of the parties.

RED, in physics, one of the simple or primary colours of natural bodies, or rather of the rays of light.

The red rays are those which are of all others the least refrangible: hence, as Sir Isaac Newton supposes the different degrees of refrangibility to arise from the different magnitudes of the luminous particles whereof the rays consist, the red rays, or red light, is concluded to be that which consists of the largest particles.

Authors distinguish three general kinds of red; one bordering on the blue, as columbine, or dove colour, purple, and crimson. Another bordering on yellow, as flame-colour and orange. And between these extremes is a medium partaking neither of the one nor the other; which is what we properly call red.

Acids generally turn black, blue, and violet into red; and red into yellow; and yellow into a very pale yellow—Alkali's change red into violet, or purple, and yellow into feuillet-mort, or dead leaf colour.

Terrrestrial and sulphurous matters become red by extreme heat; and some, at length, black, as we see in brick, red bole, red chalk, slate, &c. all these when vitrified by a burning glass, become black.

Lobsters become red by a moderate fire; and by a violent one, black. Mercury and sulphur mixed and heated over a moderate fire, make a beautiful red, called *artificial cinnabar*.

An acid spirit, as lemon juice, being poured on a blue solution of turnsole, turns it into a beautiful red—Alkali restores it again to its original blue. Filtrating of some reddish wines takes from them all their red colour.

M. de la Hie observes, that a very luminous body viewed through a black one, always appears red: as when the sun is seen shining through a black cloud. He adds, that some people who see all the other colours perfectly well, yet have no idea of red, and only see it as black. See BLUE.

RED, in dyeing, is one of the five simple, or mother colours of the dyers.

Some reckon seven kinds, or casts of red: viz. scarlet red, crimson red, madder red, half-grain red, lively orange red, and scarlet of cochineel. But they may be all reduced to three; according to the three principal drugs which give the colours; which are kermes, cochineel, and madder.

The fine scarlet, called *scarlet of the gobelins*, is given with agaric, bran-water, wood and scarlet grain, or kermes. Some dyers add cochineel, and others fenugreek; brightening it with bran-water, agaric, tartar, and turmeric. See SCARLET.

Crimson red is dyed with bran-water, tartar, and melleque cochineel.

Madder red is dyed with madder; to which some add realgar, or red arsenic; others common salt, or other salts, with wheat flower; or agaric with spirit of wine, with galls or tanneric.

The *half-grain* is made with agaric and bran-water, half scarlet-grain, half madder, and sometimes turmeric.

The *half crimson* is made of half madder, half cochineel.

As to the *lively orange red*, the stuff must be first put in yellow, then in a liquor made of goat's hair, (which has been boiled several times with madder,) dissolved over the fire with certain saline liquors, as urine, tartar, &c.

The *scarlet of cochineel*, or *dutch scarlet*, as the French call it, is made with starch, tartar, and cochineel; after first boiling it with alum, tartar, sal-gemma, and aqua-fortis wherein p-wter has been dissolved.

Besides these seven reds; which are good and allowed colours, there is also a *brasil red*; which is discouraged, as fading easily.

Of the seven good reds, only four have particular casts or shades: the madder red, crimson red, lively orange red, and scarlet of cochineel.

The casts or shades of crimson, are flesh-colour, peach-colour, carnation-rose-colour, and apple-tree-flower-colour. Those of madder, are flesh-colour, onion-peel-colour, and flame-colour. Those of orange are the same with those of crimson.

Scarlet, besides the shades of all the rest, has some peculiar to itself, as cherry-colour, fire-colour, &c.

RED, in painting.—For painting in oil colours they use a red called *cinnabar* or vermilion; and another called *lacca*. See each in its place.

In limnings, and fresco, for a violet red, instead of lacca they

use *reddle* a natural earth found in England; for a brown red they use burnt oker.

RED, in heraldry. See the article GULES.

RED, in cosmetics, a focus or paint wherewith the ladies enliven their cheeks and lips.

There are two kinds of reds; the one in leaves, called Spanish red; the other a liquor, which is an extract of a scarlet dye.

RED arsenic. See the article ARSENIC.

RED chalk.

RED decr.

RED fish.

RED lead.

RED star.

RED storax.

RED tartar.

REDANS or REDANT. See REDENS.

REDDAT—*Prescipe quod REDDAT*. See PRECIPUE.

REDDANDIS chartis. See the article CHARTIS.

REDDENDUM, in law, a clause in a lease, &c. whereby a rent is reserved to the lessor.

REDDITARIUM, an ancient law term, for a tarrier, roll, or rental, in which the rents and services of a manor are set down.

REDDITION, REDDITIO, a surrendering or restoring. In law it also denotes a judicial acknowledgment that a thing in question belongs to the demandant.

REDDLE, RUDDLE, or Red oker, a red fofile earth, which has its particular mine or quarry; and is used by painters, &c.

The best is the produce of England; it is soft to the touch and stains the hands—Some call *reddle*, *lapis hematites*, but the real hematites is another thing. See Supplement article RUBRICA.

REDEEMABLES, are lands, funds, &c. sold with a reservation of the equity of redemption. See REDEMPTION.

Crown lands are *redeemable* for ever; others only for a certain time.

REDEMPTION, REDEMPTIO in law, a faculty or right of re-entering upon lands, &c. that have been sold, and assigned; upon re-imbursing the purchase-money, with legal costs.

Bargains wherein the *faculty*, or as some call it, the *equity of redemption* is reserved, are only a kind of pignorative contracts.

A certain time is limited, within which the faculty of redemption shall be exercised; and beyond which it shall not extend.

REDEMPTIONS, REDEMPTIONES, in our old law-writers, denote grievous mulcts imposed by way of commutation for the head or life of the delinquent.

REDENS, REDANS or REDANT, in fortification, a kind of work indented in form of the teeth of a saw, with salient and re-entering angles; to the end that one part may flank or defend another.

It is also called *saw work*, and *indented work*. The faces in this flank one another.

Redans are frequently used in the fortifying of walls, where it is not necessary to be at the expense of building bastions; as when they stand on the side of a river, a marsh, the sea, &c.

The parapet of the corridor also is frequently *redented*, or carried on in the way of *redans*.

REDHIBITION, REDHIBITIO, in the civil law, an action allowed a buyer, whereby to annul the sale of some moveable, and oblige the seller to take it back again, upon the buyer's finding it damaged, or that there was some personal cheat, &c.

The *redhibition*, or *redhibitory action*, has place in several cases, in the body of the civil law.—If a horse was sold that had the glanders, were broken-winded, or foundered, it was a *redhibitory case*; and the buyer might be obliged to take him again within nine days.

REDINTEGRATED medals. See the article MEDAL.

REDINTEGRATIO, REDINTEGRATIO, in the civil law, the act of restoring a person to the enjoyment of a thing whereof he had been illegally dispossessed.

In France, where a person is depofited of his property, he claims it again by a *redintegratio*, or action of restitution.—But the *redintegratio* must be demanded within a year and a day, otherwise it is precluded.

REDINTEGRATION, in chemistry, the restoring of any mixt body, or matter, whose form has been destroyed by calcination, corrosion, sublimation, or the like, to its former nature and constitution.

The *redintegration* of mercury is properly called *revivification*.—Mr. Boyle has an express treatise on the *redintegration* of salt petre; where he shews that after reducing it by fluxion into fixed nitre, which is next of kin to salt of tartar in all its properties, he could presently *redintegrate*

redintegrate it, by pouring a sufficient quantity of spirit of nitre to it; *i. e.* he could re-produce true crystals of the usual form and virtue of salt-petre.

It is a strong objection against the chemical principles, that we cannot *redintegrate* the body they were procured from, by re-mixing them.

This seems to argue, that the body did not properly consist of such elements; or that they were not originally contained in it, but were rather produced by the fire.

REDIRE *ad pacem*. See the article *Ad pacem*.

REDISSEISIN, in law, a disseisin made by him who once before was tound and adjudged to have disseised the same man of his lands or tenements; for which there lies a special writ, called a *writ of redisseisin*.

RED-MANS, or RADMANS, in doomsday and other antient books, are probably the same with *rad*; or *rad-nights*; *viz.* men who, by the tenure or custom of their lands, were to ride with, or for, the lord of the manor about his business.

REDOUT*, or REDOUTE, REDUCTUS, in fortification, a small square fort, without any defence but in front, used in trenches, lines of circumvallation, contravallation, and approach; as also for the lodging of corps de garde, and to defend passages. See FORT.

* The word is French, formed from the Latin, *reductus*.

In marshy grounds, *robusts* are often made of stone-work, for the security of the neighbourhood: their face consists of from ten to fifteen fathom; the ditch round them from eight to nine foot broad and deep; and their parapets have the same thickness.

REDRESSING, the rectifying or setting any thing straight again.

Trees, and other plants, have a natural faculty of *redressing* themselves, when, by any external cause, they are forced out of the perpendicular. See PERPENDICULARITY.

In the moral sense, to *redress* grievances, is to reform or remove them.

To *redress* a stag, among hunters, is to put him off his chagrin.

REDSEAR. See the article IRON.

REDUBBORS, those who buy stolen cloaths, &c. and, to the end they may not be known, turn them into some other fashion, &c. See FRIPPERY and REGRAVATOR.

REDUCE in chemistry. See the article REDUCT.

REDUCED *chart*. See the article CHART.

REDUCING *jule* is a thin broad piece of box, with several lines and scales of equal parts thereon, for turning chains and links into axes and rods, by inspection.

It is used by surveyors to reduce maps or draughts from one dimension into another: it is sometimes also called the *surveyor's scale*.

REDUCT, or REDUIT, a military term, signifying an advantageous piece of ground, entrenched and separated from the rest of the place, camp, &c. for an army, garrison, &c. to retire to in case of a surprise.

REDUCT, in building, a quirk or little place, taken out of a larger, to make it more uniform and regular; or for some other convenience, as for a little cabinet aside of a chimney, for alcoves, &c.

REDUCT, or REDUX, among chemists, is a powder by which calcined metals and miners are reduced again to their regular, or pure substance. See Supplement article FLUX.

REDUCTION, REDUCTIO, in the schools, a manner of bringing a term or proposition, which before was opposite to some other, to be equivalent to it.

Reduction is effected by the addition or retrenchment of a negative particle.—Thus, to reduce this proposition: *no man is an animal*, to be equivalent to its opposite, *every man is an animal*, I drop the negative, and say, *man is an animal*.—After the like manner might the term, *every man*, be reduced, by adding the negative, and saying, *there is no man*.

REDUCTION of propositions is used in a more general sense, for any expression of one proposition, by another proposition equivalent thereto.

To a *reduction*, therefore, there are two propositions required, the *reduced*, and the *reducing*; which are considered as the extremes thereof, and to be connected in the *reduction*, by means of the particle *that is*, which here has the effect of a copula.

As here, *only animals think; that is, animals think, and nothing beside animals think*.—Where the proposition preceding the particle is *reduced*, and the subject of the *reduction*, that following the particle *reduces*, and has the effect of the predicate of the *reduction*; and the particle *that is* acts as a copula, importing, not barely that the proposition is expressed by another, but by another equivalent one, or as it were the same.

REDUCTION of syllogisms is a regular changing or trans-

forming of an imperfect syllogism into a perfect one.—Or, it is a change of a syllogism in respect of form; whereby the necessity of the illation or inference is made more evident.

Reduction obtains in syllogisms of the second and third figure; as also in the indirect modes of the first.—By it, these are all brought to the first.

There are two kinds of this *reduction*, the one *direct* or *ostensive*, performed merely by a conversion of one or both the premises, or by a transposition thereof; as when CAMESTRES is reduced to CELARENT.

The other *indirect*, called *per impossibile*, or *ad absurdum*; whereby the person who denies the goodness and legitimacy of an imperfect syllogism, is reduced to assert or grant something absurd and impossible, or contradictory to some other thing maintained by him.

Suppose, *e. gr.* a person granting the premises of the following syllogism, denies the conclusion—*All fraud is prohibited, but some trading is not prohibited; therefore some trading is not fraud*.—We thus proceed against him: if the syllogism be not good, the antecedent is just, but the consequent false; and therefore the contrary of the conclusion must be true: now, I take the contrary of the conclusion, which you thus give, *viz.* all trading is fraud; and of that, with the other premise of the former syllogism, *viz.* the major, which you likewise grant, make a new syllogism; thus, *all fraud is prohibited; all trading is fraud; therefore all trading is prohibited*. But this proposition, *all trading is prohibited*, and the other, *some trading is prohibited*, which you granted me in the first syllogism, are contradictories.

REDUCTION, in arithmetic, is the converting of monies, weights, or measures, into the same value in other denominations; *e. gr.* pounds into shillings and pence; or shillings and pence into pounds.

The *reductions* of the principal monies, coins, weights, and measures, antient and modern, foreign and domestic, are found under the respective articles, MONEY, COIN, WEIGHT, MEASURE, POUND, FOOT, &c.

Reduction is of two kinds: 1^o. *descending*, when a quantity is to be brought from a higher denomination to a lower.

This is done, by considering how many of the next less denomination are contained in the next greater before, and by that number multiplying the greater.

Thus, pounds are reduced into shillings by multiplying by 20; shillings into pence by multiplying by 12; and pence into farthings by multiplying by 4.

Troy pounds are reduced into grains by multiplying by 576, 20, and 24. And *averdupoids* hundreds into ounces by 4, 28, and 16.

The 2^o *ascending*, when a lower denomination is to be reduced to an higher.

In order to this, the business is to divide the least by so many of its denomination as are contained in the next greater: thus 24720 pence, divided by 12, and the quotient by 20, give 103 pounds.

If there remain any thing in each division, it is respectively either odd pence, or shillings: thus, 6713 pence reduced, give 27 l. 19 s. 5 d. cut off the last, the rest are the pounds required.

To expedite the practice, several compendious ways of *reduction* have been invented. See PRACTICE.

Thus, yards are turned into ells by subtracting a fifth; and into ells Flemish by adding a fifth.—Ells Flemish are reduced into yards by subtracting a quarter.—Ells Flemish reduced to ells English by multiplying by 6, and cutting off the right hand figure.

Great pounds of silk of 24 ounces are reduced to pounds of 16 ounces, by adding one half; and pounds of 16 ounces into pounds of 24, by subtracting one third.

REDUCTION of fractions. See the article FRACTION.

REDUCTION of equations, in algebra, is the clearing them from all superfluous quantities, bringing down the quantities to their lowest terms, and separating the known quantities from the unknown ones, till at length only the unknown quantity is found on one side, and known ones on the other.

The *reduction* of an equation is the last part of the resolution of the problem.

The end of all algebraical operations is to have the unknown letter alone in one member of the equation; and in the other, all the known letters, without any mixture of unknown; for, in this case, it is evident the value of the unknown quantity is found.

This *reduction* is effected by adding the quantities subtracted, subtracting those added; multiplying those divided, and dividing those multiplied; extracting the roots out of powers, and raising roots to powers; so as still to preserve an equality. This suffices for the *reduction* of simple equations; but, for higher equations, the process is less obvious.

From the manner wherein powers are formed, it is evident, that, as the unknown letter is raised to a higher power, it will be found, in its lower powers, mixed and combined to many

RED

more times with known quantities, and of consequence it will be so much the more difficult to be disengaged therefrom. And the difficulty is the same, where there are several unknown letters multiplied singly one into another, and again multiplied by known letters.

The *reduction* of the equation being made; from the last quantity thus gained, the geometrical construction is to be deduced.

REDUCTION of curves. See the article **CURVE**.

REDUCTION of a figure, design, or draught, is the making a copy thereof either larger or smaller than the original; still preserving the form and proportion.

The great use of the proportional compasses is in the *reduction* of figures, &c. whence they are also called *compasses of reduction*. See **COMPASS**.

There are various methods of reducing figures, &c. the most easy is by means of the pentagraph or parallelogram; but this has its defects. See **PENTAGRAPH**—The best and most usual methods of *reduction* are as follows:

To REDUCE a figure: As **ABCDE**, (*Tab. Geometry, fig. 64.*) into a less compass: about the middle of the figure, as *a*, pitch on a point; and from this point draw line, to its several angles, *A, B, C*, &c. then drawing the line *a b*, parallel to *A B*, be parallel to *B C*, &c. you will have the figure *abcde* similar to **ABCDE**.

If the figure *abcde* had been required to be enlarged, there needed nothing but to produce the lines from the point beyond the angles, as *a D, a C*, &c. and to draw lines, *viz. D C, D B*, &c. parallel to the sides *d c, d b*, &c.

To REDUCE a figure by the angle of proportion—Suppose the figure **ABCDE** (*Fig. 65.*) required to be diminished in the proportion of the line *A B*, to *a b*. (*Fig. 66.*) Draw the indefinite line *G H*, (*Fig. 67.*) and from *G* to *H* set off the line *AB*: on *G* describe the arch *H I*. Set off the line *a b* as a chord on *H I*, and draw *G I*. Then with the angle *I G H* you have all the measures of the figure to be drawn. Thus to lay down the point *c*, take the interval *B C*, and upon the point *G* describe the arch *K L*; also, on the point *G* describe *M N*; and upon *A* with the distance *M N* describe an arch cutting the preceding one in *c*, which will determine the side *b c*. And after the same manner are all the other sides and angles to be described—The same process will also serve to enlarge the figure.

To REDUCE a figure by a scale—Measure all the sides of the figure, *a. g.* **ABCDE**, by a scale, and lay down the same measures, respectively from a smaller scale in the proportion required.

To REDUCE a map, design, or figure, by squares—Divide the original into little squares, and divide a fresh paper of the dimensions required, into the same number of squares; which are to be larger or less than the former, as the map is to be enlarged or diminished.

This done, in every square of the second figure, draw what you find in its correspondent one in the first.

REDUCTION to the ecliptic, in astronomy, is the difference between the argument of latitude, as *N P*, (*Tab. Astron. fig. 26.*) and an arch of the ecliptic *N R*, intercepted between the plane of a planet, and the node *N*.

To find the *reduction*: the angle of inclination *P N R*, and the argument of latitude *N P* being given; find, by the doctrine of spherics, the arch *N R*: subtract *N R* and *N P* from each other, the remainder is the *reduction*.

REDUCTION into first matter, is a term which alchemists use when they find their substances purify, and grow black.

REDUCTION is more particularly used for the converting of a dry matter into a liquid, particularly into water; which by the alchemists is held the principle of all things.

The *reduction* of metals into their first matter or principles, according to these philosophers, can only be effected by mercury; nothing else being able to loosen the fixt sulphur of metallic bodies, which binds them together.

REDUCTION, in chirurgery, denotes an operation whereby a dislocated, luxated, or fractured bone, is restored to its former place—*Reduction* or *reposition*, is always to be performed before any remedy be applied.

REDUIT, in military affairs. See the article **REDUCT**.

REDUNDANCY, or **REDUNDANCY**, a fault in discourse, consisting in the use of a superfluity of words.

Words perfectly synonymous, are *redundant*, and ought to be retrenched—*Redundancy* necessarily makes the style weak and languid.

REDUNDANT hyperbola, is a curve of the higher kind, thus called, because it exceeds the conic section of that name in the number of its hyperbolic legs; being a triple hyperbola, with six hyperbolic legs.

REDUPLICATION, in rhetoric, a figure whereby a verse begins with the same word as the preceding one ends with. See **ANADIPLOSIS**.

REDUPLICATION, in logic, is a kind of condition expressed in a proposition, indicating or assigning the manner wherein the predicate is attributed to the subject.

REE

The usual *reduplicating* words are *quatenus*, *at*, *so far as*, *considered as*, *inasmuch as*, &c. Hence,

REDUPLICATION *propositions*, are such wherein the subject is repeated, with some circumstance or condition—Thus, *men, as men, are rational: kings, as kings, are subject to none but God*.

REDUX, in chymistry. See the article **REDUCT**.

REE, **RE**, **REIS**, or **RES**, a little Portuguese copper coin, nearly equal to the late French denier tournois, or to a third part of the English farthing.

The *ree* is both a current and an imaginary money; the Portuguese usually reckoning by *rees*, as the Spaniards by *maravedis*.

Strangers in treating with them, are frequently surprized with demands of several thousand *rees*, when the matter betwixt them is only of a few pieces of eight; the *milree* or thousand *rees*, only making 6s. 3d. *sterl.*—750 of them are equal to the piece of eight.

RED, an ancient Jewish measure. See **MEASURE**.

Answerable to this is the *canna* or *cane* of some modern nations.

Ezekiel's REED. See **EZEKIEL'S REED**.

REEF, a term in navigation—When there is a great gale of wind, they commonly roll up part of the sail below, that by this means it may become the narrower, and not draw so much wind; which contracting or taking up the sail, they call a *reef*, or *reefing the sail*.

So also when a top-mast is sprung, as they call it, that is, when it is cracked, or almost broken in the cap; they cut off the lower piece that was near broken off, and setting the other part, now much shorter, in the step again, they call it a *reefed top-mast*.

REEL, in the manufacturies, a machine serving for the office of *reeling*.

There are various kinds of *reels*; some very simple, others very complex; of the former kinds those most in use are, 1^o. A little *reel*, held in the hand, consisting of three pieces of wood; the biggest and longest whereof (which does not exceed a foot and a half in length, and $\frac{1}{4}$ of an inch in diameter) is traversed by two other pieces disposed different ways.

2^o. The *common reel*, or *windlass*, which turns upon a pivot and has four flights, traversed by long pins or flukes whereon the flax to be *reeled* is put, and which are drawn closer, or opened wider, according to the flax.

Other *reels* used in particular arts are explained under their particular articles; as the *reel* used in milling of silk, under the article **MILLING**: and that in the *reeling* or winding of silks, under the article of **SILK**, &c.

REELING, in the manufacturies, the winding of thread, silk, cotton, or the like, into a flax, or upon a bottom; to prevent its intangling.

It is also used for the charging or discharging of bobbins or quills, to use them in the manufacture of different stuffs, as thread, silk, cotton, &c.—*Reeling* is performed different ways, and by different engines.

RE-ENTR'ING angle, in fortification. See **ANGLE**.

RE-ENTR'Y, in law, the resuming or retaking of possession which any one had lately fore-gone.

As, if I make a lease of land, or tenement, I do thereby forego the possession: and if I condition with the lessee, That for non-payment of the rent at the day, it shall be lawful for me to *re-enter*; this is as much as if I conditioned to take again the lands, &c. into my own hands, and to recover the possession by my own act, without the assistance of judge, or other process.

REER county. See the article **RIER**.

REEVE of a church, is the guardian of it; or the churchwarden.

So, *shire-reeve* is the sheriff, or guardian of a county. See **SHERIFF**—And *port-reeve*, the warden of a port or haven.

REEVING in the sea language, is the putting a rope through a block—Hence to pull a rope out of a block, is called *unreeving*.

RE-EXCHANGE, in commerce, a second payment of the price of exchange; or rather the price of a new exchange, due upon a bill of exchange that comes to be protested; and to be refunded the bearer, by the drawer or endorser. See **EXCHANGE**.

The occasion of *re-exchange* is, when the bearer of a bill of exchange, after protesting it for want either of acceptance, or of payment, borrows money on his own promise, bond, or the like; or draws a bill of exchange in the place where the payment was to be made, on the person who furnished the first; for which he pays a second exchange, which being added to the first already paid, the drawer of the first bill is answerable for two exchanges, properly called *exchange* and *re-exchange*.

The bearer of a protested bill has a right to recover both the one and the other on the drawer. Yet the simple protestation which the bearer makes in the act of protest, that he will take

take up a like sum at *re-exchange*, for want of his bill being accepted or paid, is not sufficient to entitle him to demand the re-imbursment of his *re-exchange*; unless he make it appear that he has actually taken up money in the place whereon the bill was drawn.

Otherwise, the *re-exchange* will only amount to the restitution of the first exchange, with interest, the expences of protesting, and those of the journey, if there have been any.

If a bill of exchange payable to the bearer or order, come to be protested, the *re-exchange* is only due upon the drawer for the place where the remittance was made; not for those places where it may have been negotiated; at least, the drawer has a right to be refunded his *re-exchange* for those places, by the endorser.

Indeed the *re-exchange* is due from the drawer upon all places where a power of negotiation is given by the bill, and upon all others, if the power of negotiating be indefinite. Lastly, the interest of the *re-exchange*, of the expences of the protest, and the journey, are only due from the day of the demand.

It is supposed to be Gibelins driven out of Italy by the faction of the Guelphs, and shelter'd at Amsterdam, who first established the custom of *re-exchange*; on pretence of the interests, damages and expences they underwent, when the bills given them for the effects they had been obliged to abandon, were not accepted, but came to be protested.

RE-EXTENT, in law, a second extent made upon lands or tenements, on complaint that the former extent was partially made. See **EXTENT**.

REFECTION, **REFECTIO**, among monks and ecclesiastics, a spare meal or repast, just sufficing for the support of life.

REFECTION is also used in antient authors for a duty or service incumbent on any person to provide meals, for ecclesiastics, or even for princes.

REFECTORY, or **REFECTUARY**, **REFECTORIUM**, a spacious hall in convents, and other communities, where the monks, nuns, &c. take their refectiions or meals in common.

The *refectory* of the Benedictines of St. George at Venice, designed by Palladio, is one of the finest in the world. *Deviser*.

REFERENCE, in writing, &c. a mark relative to another similar one in the margin, or at the bottom of the page; where something omitted in the text is added; and which is to be inserted either in reading or copying.

A copist must be very expert at taking *references*.

References are also used in books, where things being but imperfectly handled, the reader is directed to some other part or place where they are more amply explained.

Dictionaries are full of *references* denoted by *see*, or *vide*.—By means of these *references* the dictionary writer settles a correspondence between the several parts of his work; and may give his dictionary most of the advantages of a continued treatise.

Indices or tables are only *references* to the several parts of the work, where the several matters are handled.

REFERENDARY, **REFERENDARIUS**, in antient customs, an officer who exhibited the petitions of the people to the king; and acquainted the judges with his commands. An officer of this kind, Spelman observes, we had in England, in the time of the Saxons—The like office was afterwards discharged by others, called masters of requests.

REFINING, the art or act of purifying a thing; or of rendering it finer, clearer and purer.

Refining is chiefly used in speaking of metals, sugar and salt.

The **REFINING** of gold is performed three ways: either with antimony, with sublimate, or with aqua-fortis; which last method, much the most usual and least dangerous of the three, is called *departing* or *parting*; the process whereof see under the articles **GOLD** and **DEPARTING**.

REFINING of gold with antimony—They here use a wind-furnace; (a description whereof may be seen under the article **FURNACE**) with an ordinary crucible, of a size answerable to the quantity of gold to be refined; observing that the gold and antimony together do not above half fill it.

The gold being melted in the crucible, the antimony is thrown in, in powder.—The proportion of the mineral to the metal is about a pound to eight ounces, if the gold be between 22 and 16 carats fine: if it be beneath 16 carats, they use about five quarters of a pound to eight ounces: the coarser the gold is, still the more antimony is required.

As soon as the antimony is in the crucible, it is covered up; and after charging the furnace with charcoal, they put on its head or cover; which stands till such time as the crucible be left quite bare; then the head being taken off, and the crucible left to cool in the furnace itself, till such time as it may be taken out by the hand, they break it, to get out the bottom or culot, which is a mass of fine gold remaining at the bottom, with the faces of the antimony, the silver and

copper alloy, and sometimes little particles of gold itself, over it.

Though the gold thus prepared be very pure, yet the antimony gives it such a harsh brittle quality, that it ceases to be ductile; and must be softened by fusion with salt-petre and borax, to bring it to itself.

For this operation they prepare what they call a *dry-coppel*; that is, a coppel made of crucible earth, which does not imbibe like the coppels made of ashes.

The coppel being sufficiently heated in the *refining* furnace, they put the gold in it, and cover it up with charcoal.

As soon as the gold is dissolved, which is very soon, by reason of the remains of the antimony, they blow it with the bellows to drive that mineral entirely away, which now goes off in smoke, adding to it, as soon as the fumes cease, a little salt-petre and borax, in powder; which collect the impurities remaining upon the dissolution, and fix the gold in the coppel, in form of a plate.

The gold being taken out of the coppel, and melted a-fresh in a crucible, with an addition of two ounces of salt-petre and as much borax in powder, to each eight ounces of gold, as soon as it ceases to fume, they cast it into an ingot; and this upon trial is found 23 carats, 26 thirty-seconds fine.

As to the particles of gold which may have been left behind with the alloy in the faces of the antimony, they get them out by a dry coppel, with the same meltings and ingredients: as are used in softening the former.—And when they are assured, by the essay, of the share of gold that matter contains, they refine it, to separate the copper; and afterwards make the deposit.

As to the gold which may be left sticking to the dry coppels, they get it out by breaking and pulverizing the vessels, and by repeated lotions of the powder thereof in several waters: after the manner described under the article *washing*. See **WASHING**.

REFINING of gold by means of sublimate—The process is begun like that with antimony: i. e. in the same furnace, with the same coal, the same fire, and the same crucibles.

The gold being melted in the crucible, they cast in the sublimate, not pulverized, but only broke in pieces.—As to the proportion; to 8 ounces of gold to be refined they put an ounce or ounce and a half, or even two ounces, if the gold be of 22 carats; three ounces, if of 20 carats; and 4 or 6 ounces, if it only be from 18 to 20 carats. In which last case they part the sublimate into two; putting half at a time, with the gold, into a new crucible; which when the operation is over, leaves the gold from 18 to 23 carats, according to its fineness before.—After this, they raise it farther by the fire, as follows:

The broken sublimate being put into the crucible with the melted gold, the crucible is immediately covered up, to smother the mineral: which done, the furnace is filled with charcoal, and the head put on.—A quarter of an hour afterwards they take off the head, lay the crucible bare, and give the gold air, i. e. blow off all the ashes, and other impurities that may be floating on the liquid gold, with a pair of bellows, the nozzle whereof is crooked.

This they repeat again and again, till all the impurities of the gold being carried off, by virtue of the sublimate, it be found of a bright glittering colour; after which it is taken out of the crucible, and the gold is cast into an ingot.

The method of *refining* by sublimate is both more complete and cheaper than that by antimony; but they are both exceedingly dangerous, by reason of their sulphurous and arsenical exhalations: the only difference in their malignity consisting in this, that the poison of the antimony is slower than that of the sublimate.

Gold may also be *refined* with lead and ashes; but this is a method seldom used, excepting in essays.

REFINING of silver—There are two ways of *refining* silver; the one with lead, the other with salt-petre. The best and cheapest is that with lead; though that with salt-petre still obtains in many places, for want of workmen who understand the process of the latter.

We shall here only give that with salt-petre; referring for the other to the article **SILVER**.

REFINING with salt-petre is performed in a wind-furnace.—The silver to be *refined* having been reduced into grains, of the size of little peas, by pouring it, when melted, into a tub of common water; it is heated over again in a boiler. After this they put it in a crucible, and along with it, to every eight ounces of metal they put two ounces of salt-petre.

The crucible is now covered up with an earthen lid, in form of a dome, exactly luted; which lid, however, is to have a little aperture in the middle.

The crucible being put in the furnace, and covered with charcoal, which is only to be lighted by degrees, at length they give it the full force of the fire to put the metal into a perfect fusion. This they repeat three times successively, at an interval of a quarter of an hour.

After the third fire they uncover the furnace, and let the crucible

cible cool; and at length break it, to get out the silver, which is found in a button or culot, the bottom whereof is very fine silver; and the top mixed with the feces of the salt-petre, and the alloy of the silver; and among these some particles of the fine silver.

The culot being separated from the impurities, is melted in a new crucible, and into the dissolution is thrown charcoal dust, and the whole is then briskly worked together. Then the crucible being covered up again, and the furnace charged with coal, a second fire is given it.

This done, the ashes and other impurities are blown from the top of the metal, till it appears as clear as a looking-glass; and then an ounce of borax broke in pieces is thrown in.

Lastly, the crucible being covered up again, they give it the last fire; after which it is cast into ingots; which are found eleven penny-weights, and sixteen grains fine.

To recover the silver that may or left in the feces, or scoria, they pound them, and give them repeated lotions in fresh waters.

REFINING of copper, is only performed by giving the mineral matter several lotions before the melting it; and then giving it several repeated fusions. See COPPER.

REFINING of tin is performed much after the same manner as that of copper. See TIN.

Though we may distinguish two kinds of fineness of this metal: the one arising from its fusion; that tin taken first out of the furnace wherein it is melted, being always purer than that towards the bottom.

The other kind of fineness is that given the tin by adding some other metal or mineral to it, to render it more sonorous, as well as brighter: such is tin with antimony, pewter, &c.

REFINING of iron begins likewise by the melting it. See IRON.

The greater degree of fusion the mineral has, the more the metal is purified: but this first fusion is not sufficient—To render the iron malleable, and fit it to endure the file, it must be melted a second time; then forged or beaten a long time with huge heavy hammers, which are wrought by water, then heated in the fire, and at last reduced on the anvil, into bars of several thicknesses.

The more the iron is heated in the fire; and the more it is beaten, whether hot or cold, the finer it always becomes.

Steel is only iron refined to a great degree by heating it, with some other ingredients which close up the pores, and heighten the grain thereof.

REFINING of lead, is performed like that of most other imperfect metals, by frequent melting, still fuming it before it be cold, and casting in tallows, and other kinds of fat.

They also make essays of lead; not to refine it, but to see if it be pure, and without mixture of any other metal.

REFINING of sugar—This operation is begun by several strong lixiviums or lyes of lime-water and eggs, shells and all, mixed and beaten together.

This first refining is performed in the Caribees and other places where the sugar-canes are cultivated; and only serves to make the brown or coarse sugars.

When these are imported into Europe, the sugar-bakers take them up, and refine them further, by a second operation, or rather a repetition of the first.

To render the sugar very fine, fit for confections, &c. they give it a third refining; wherein they only use the whites of eggs, and their shells beaten together, and thrown into the melted sugar; which is called *clarifying the sugar*. See SUGAR.

REFINING of salt-petre—The salt being put in an earthen or iron vessel, as much spring-water is poured on it as suffices to dissolve it. The vessel is then put over a gentle fire; and as soon as the water begins to boil, alum-powder is thrown into it: the proportion is, one pound of alum to 128 pound of salt-petre; and a little vinegar is added. As it boils, the scum is to be taken off; and it is to be evaporated till a pellicle appears on it, and then set to shoot.

For the **REFINING of other matters**, as camphor, cinnabar, sulphur, salt, borax, &c. See CAMPHOR, CINNABAR, SULPHUR, SALT, &c.

REFLECTED vision. See the article VISION.

REFLECTING, or **REFLEXIVE dial**, is a sort of dial, which shews the hour by means of a thin piece of looking-glass plate, duly placed to cast the sun's rays, to the top of a ceiling, on which the hour-lines are drawn.

REFLECTING microscope. See MICROSCOPE.

REFLECTING level. See LEVEL.

REFLECTING telescope. See TELESCOPE.

REFLECTION, or **REFLEXION**, in mechanics, the return, or regressive motion of a moveable, occasioned by the resistance of a body, which hindered its pursuing its former direction.

It is controverted, whether there be any moment's rest or in-

terval between the incidence and the reflection? for the affirmative, stand the peripatetics, and all who conceive the reflected motion to be different from the incident one of the same body.—The motion of incidence, according to these authors, is wholly lost, and destroyed by the resistance of the obstacle struck against; and the moveable is thus rendered absolutely quiescent in the point of contact; till a new motion of reflection is produced therein, from a contrary cause.

The Cartesians assert the negative; absolutely denying any rest at all between the incidence and reflection: urging that if the motion were once destroyed, though but for a moment, there would be nothing to excite it again; but the body would persevere in that new state, as much as if it had been at rest a thousand years.

Accordingly Rohault, and others, define reflection to be no other than a change of determination; or a continuation of the former motion in a new direction.

As, say they, a pendulum, when arrived at its greatest sweep, does not stop; so a hard body, striking on another hard one, does not rest, but pursues its motion the contrary way, according to the established law of nature; and this from the immediate influence or impulse of the cause that first moved it.—But this doctrine is now generally set aside.

Reflection is conceived by the latest and best authors, as a motion peculiar to elastic bodies, whereby after striking on others which they cannot remove, they recede, or turn back by their elastic power.

On this principle it is asserted, that there may be, and is a period of rest between the incidence and reflection; since the reflected motion is not a continuation of the other, but a new motion, arising from a new cause or principle, viz. the power of elasticity.

It is one of the great laws of reflection, that the angle reflected body makes with the plane of a reflecting obstacle, is equal to that wherein it struck on that obstacle. For the several laws of motion observed in the REFLECTIONS of bodies, see the article PERCUSSION.

REFLECTION of the rays of light, in optics, is a motion of the rays, whereby, after impinging on the solid parts of bodies, or rather, after a very near approach thereto, they recede or are driven therefrom.

The reflection of the rays of light from the surfaces of bodies, is the means whereby bodies become visible.

And the disposition of bodies to reflect this or that kind of rays most copiously, is the cause of their being of this or that colour.

The reflection of light from the surfaces of mirrors, makes the subject of catoptrics.

The reflection of light, Sir Isaac Newton has shewn, is not effected by the rays striking on the very parts of the bodies; but by some power of the body equally diffused throughout its whole surface, whereby it acts upon the ray, attracting or repelling it without any immediate contact.

This power he shews to be the same whereby, in other circumstances, the rays are refracted; and whereby they are at first emitted from the lucid body.

The arguments he produces to prove this are as follow—
1°. Because the surfaces of polished glasses, which to the eye appear smooth, are yet in reality very rugged and uneven; (polishing being nothing but the grating, scratching and breaking off the coarser protuberances, by means of sand, glass, putty or tripoly.) If the rays of light, therefore, were reflected by striking on the solid parts of the glass, the reflections would never be so accurate as we find they are; but the rays would even be as much scattered by the most polished glass, as by the roughest.—It remains, therefore, a problem how glass polished by fretting substances can reflect light so regularly as it does, which problem is scarce otherwise to be solved than by saying, that the reflection of a ray is effected, not by a single point of the reflecting body, but by some power of the whole body, evenly diffused all over its surface, and by which it acts on a ray without immediate contact: for that the parts of bodies do act upon light at a distance, is already shewn under the article INFLECTION.

2°. If the colours separated by a prism placed at the entrance of a beam of light into a darkened room, be successively cast on a second prism placed at a greater distance from the former, in such manner as that they all fall alike, or with an equal obliquity upon it; the second prism may be so inclined to the incident rays, that those which are of a blue colour shall be all reflected by it; and yet those of a red colour pretty copiously transmitted.—Now, if the reflection were caused by the parts of the air or glass, we would ask, why, at the same obliquity of incidence, the blue should wholly impinge on those parts so as to be all reflected, and yet the red find pores enough to be in a great measure transmitted.

3°. Where two glasses touch one another, there is no sensible reflection, and yet we see no reason why the rays should not impinge on the parts of the glass, as much when contiguous to other glass, as when contiguous to air.

4°. When the top of a water-bubble, by the continual sub-

siding

siding and exhaling of the water, grows very thin, there is such a little, and almost insensible, quantity of light *reflected* from it, that it appears intensely black; whereas round about that black spot, where the water is thicker, the *reflection* is so strong, as to make the water seem very white—Nor is it only at the least thickness of thin plates or bubbles that there is no manifest *reflection*, but at many other thicknesses gradually greater and greater. For, in one of our author's observations, the rays of the same colour were, by turns, transmitted at one thickness, and *reflected* at another thickness, for an intermediate number of successions; and yet in the superficies of the thinned body, where it is of one thickness, there are as many other parts for rays to impinge on, as where it is of any other thickness.

5°. If the red and blue rays, separated by a prism, fall successively on a thin plate of any pellucid matter, whose thickness increases in continual proportion, (such as a plate of air between two glasses, the one plain, and the other a little convex) the same plate will, in the same part, *reflect* all the rays of one colour, and transmit all those of the other; but, in different parts, will *reflect* the rays of one and the same colour at one thickness, and transmit them at another; and thus alternately, and *in infinitum*—Now, it can never be imagined, that at one place the rays, which, for instance, exhibit a blue colour, should have the fortune to strike on the solid parts, and those which exhibit a red, to hit on the void parts of the body; and at another place, where the body is either a little thicker, or a little thinner, that, on the contrary, the blue should hit on the pores, and the red upon the solid parts.

6°. In the passage of light out of glass into air, there is a *refraction* as strong as in its passage out of air into glass, or rather a little stronger, and by many degrees stronger than in its passage out of glass into water.

Now, it seems improbable, that air should have more *reflecting* parts than water or glass: but it that should be supposed, yet it will avail nothing; for the *refraction* is as strong, or stronger, when the air is drawn from the glass by the air-pump, as when it is adjacent to it—If any should here object, on Des Cartes's hypothesis, that, tho' the air be drawn away, there is a subtle matter remaining to supply its place, which being of a denser kind, is better fitted for the *refraction* of light than any other body: besides that, we have elsewhere shewn such subtle matter to be fictitious; and that, supposing its existence, and its *reflecting* power, no light could ever have been propagated, but must have been all *reflected* back to the lucid body; immediately after it was first emitted. The following experiment does evidently convict it of fallacy.

7°. If light, in its passage out of glass into air, strike more obliquely than at an angle of 40 or 41 degrees, it is then wholly *reflected*; if less obliquely, it is in great measure transmitted—Now, it is not to be imagined, that light at one degree of obliquity should meet with pores enough in the air to transmit the greater part of it, and at another degree should meet with nothing but parts to *reflect* it wholly; especially considering, that, in its passage out of air into glass, how oblique soever be its incidence, it finds pores enough in the glass to transmit a great part of it. If any suppose, that it is not *reflected* by the air, but by the outmost superficial parts of the glass, there is still the same difficulty: besides, that such a supposition is unintelligible, and will also appear to be false, by applying water behind some part of the glass, instead of air: for so, in a convenient obliquity of the rays, suppose of 45 or 46 degrees, at which they are all *reflected*, where the air is adjacent to the glass, they shall be in great measure transmitted where the water is adjacent to it; which argues, that their *reflection* or transmission depends on the constitution of the air and water behind the glass, and not on the striking of the rays upon the parts of the glass, the rays not being *reflected* until they have reached the last part of the surface, and are begun to go out. For if, in going out, they fall upon a surface of oil and water, they proceed, the attraction of the glass being balanced by an equal force the contrary way, and prevented from having its effect by the attraction of the liquor adhering to it: but if the rays, in passing out of this last surface, fall into a vacuum, which has no attraction, or into air, which has but little, not enough to counter-balance the effect of the glass; in this case, the attraction of the glass draws them back, and *reflects* them.

This will appear still more evident, by laying two glass prisms, or the object glasses of two telescopes, the one plane, and the other a little convex, upon each other, so as they may neither touch, nor yet be too far a-part; for that light, which falls on the hind surface of the first glass, where the glasses are not above $\frac{1}{1000}$ of an inch a-part, will be transmitted through the surface, and through the air or vacuum between the glasses, and will pass into the second glass: but, if the second glass be taken away, then the light passing out of the second surface of the first glass into the air or vacuum, will not proceed, but will return into the first glass, and be *reflected*.

Whence it follows, that the rays are drawn back again by

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some force in the first glass, there being nothing else to occasion their return—And hence too it follows, that the *reflection* is not effected by means of any subtle matter contiguous to the hind surface, according to the principle, of Des Cartes; since that matter ought to *reflect* them when the glasses were nearly contiguous, as well as when the second glass is quite removed.

Lastly, If it be asked, how some of the rays come to be *reflected*, and others transmitted; and why they are not all alike *reflected*, supposing the *reflection* owing to the action of the whole surface? the same great author shews, that there are, both in the rays of light, and in the bodies themselves, certain vibrations, (or some such property) impressed on the rays, by the action either of the luminary that emits them, or of the bodies that *reflect* them; by means whereof it happens, that those rays, in that part of their vibration which conspires with the motion of the parts of the body, enter the body, are refracted and transmitted; but those in a contrary part of their vibration, are reflected.

Add, that every ray of light, in its passage through any refracting surface, is put into a certain transient confusion or state, which, in the progress of the rays, returns at equal intervals, and disposes the rays, at each return, to be easily transmitted through the next refracting surface; and between each return, to be easily *reflected* by it.

These alternate dispositions, which Sir Isaac Newton calls *fits of easy reflection*, and of *easy transmission*, he accounts for by supposing, that the rays of light, in impinging on bodies, excite vibrations therein, which happening to move faster than the rays, when a ray is in that part of the vibration which conspires with its motion, it passes through; but when in the contrary part of the vibration, it is beat back again: whence every ray is successively disposed to be easily *reflected*, or easily transmitted, by every vibration which overtakes it.

REFLECTION, in catoptrics, is the return of a ray of light from the polished surface of a speculum or mirror, as driven thence by some power residing therein.

The ray thus returned is called a *reflex*, or *reflected ray*, or a *ray of reflection*; and the point of the speculum, whence the return commences, is called the *point of reflection*.

Thus the ray A B (*Tab. Optics*, fig. 26.) proceeding from the radiant A, and striking on the point of the speculum B, being returned thence to C, B C represents the *reflected ray*, and B the *point of reflection*; in respect whereof A B represents the *incident ray*, or *ray of incidence*, and B the *point of incidence*. See POINT and RAY.

Again, a line C G drawn from any point, as C of the *reflected* ray B C, perpendicular to the speculum, is called the *cathetus of reflection*, or *cathetus of the eye*: as a line A F, drawn from the radiant perpendicular to the speculum, is called the *cathetus of incidence*.

Of the two angles which the *reflected ray* B C makes with the mirror, the smallest, C B E, is called the *angle of reflection*: as of the two angles the incident ray makes with the speculum, the smallest, A B D, is called the *angle of incidence*.

If the mirror be either concave, or convex, the smallest angles the ray makes with a tangent to the point of *reflection* and incidence, are the *angles of reflection* and incidence.

The angle C B H, which the *reflected ray* makes with a perpendicular to the point of *reflection*, is called the *inclination of the reflected rays*: as the angle A B H is called the *inclination of the incident ray*.

General laws of REFLECTION.—I. If a ray of light be *reflected* from a speculum of any form, the angle of incidence is ever equal to the angle of *reflection*.—This law obtains in percussions of all kinds of bodies, and consequently must do so in those of light. See LAWS of PERCUSSION, see also ANGLE.

It might therefore be here assumed as an axiom: but it is of that importance, and its demonstration so beautiful, that we cannot omit it—Suppose, then, D C (*fig. 54.*) an incident ray, propagated from the radiant D: here, though the motion of the ray be simple, yet its determination in the line D C being oblique with respect to the obstacle, is really compounded of two determinations; the one along D E, the other along D G. See COMPOUND motion.

The force along D C, therefore, is equal to the two forces along D G and D H. But the oblique G F only opposes one of the determinations, viz. that along D G, (for it cannot oppose a determination parallel to itself, as D E;) therefore only the force along D G will be lost by the stroke, that along D H or G C remaining entire—But a body perfectly elastic, (such as we suppose the ray of light) will recover by its elasticity the force it lost by the shock.

The ray, therefore, will recover the force D G, or C H: thus, retaining both its forces, and both its former determination H C and C F, after percussion, it will be impelled along C F and C H by the same forces as before along D H and D G. By its compound motion, therefore, it will describe the right line C E, and that in the same time as D C;

DC; and HE and DH will be equal, as being described by the same force. Now, the two triangles DCH and CHE are equal, and consequently their similar angles are equal. Since then, $HCA = HCF$; DCA the angle of incidence, is equal to ECF the angle of reflection. *Q. E. D.*

This law is confirmed in light by an easy experiment. For a ray of the sun falling on a mirror, in a dark room, through a little hole; you will have the pleasure to see it rebound, so as to make the angle of reflection equal to that of incidence. See CAMERA obscura.

The same may be shewn various other ways: thus, *e. gr.* placing a semicircle F i G (*Tab. Optics, fig. 26.*) on a mirror DE, its centre on B, and its limb perpendicular to the speculum; and assuming equal arches, F a and G e; place an object in A, and the eye in C: then will the object be seen by a ray reflected from the point B. And if B be covered, the object will cease to be seen.

Hence, 1^o. If a ray of light, as HB, fall perpendicularly on the surface of a speculum DE, it will be reflected back upon itself.

2^o. From the same point of a speculum, several rays cannot be reflected to the same point; for in that case all the several angles of reflection would be equal to the same angle of incidence; which is absurd.

3^o. One ray as AB cannot be reflected to two or more points; for in that case all its angles of reflection would be equal to the same angle of incidence; which is as absurd as before.

II. Each point of a speculum reflects rays falling on it, from each part of an object—Hence since several rays coming from several parts of a radiant object, cannot be reflected from the same point of a speculum to the same point; the rays that flow from different points of the object, are separated after reflection: and hence each ray shews the point whence it proceeded.

On this principle it is that the rays reflected from mirrors or looking-glasses, exhibit the appearances of objects placed before them.

And hence we easily conceive why rough bodies exhibit no images; in regard they reflect the light in such manner, as to confound rays which proceed from different points, by means of their eminences and cavities, or their alternate ridings and fallings—But for this, all hard bodies would be mirrors.

III. If the eye C, and the radiant point A change places; the point will continue to radiate upon the eye, in the same course or path as before.

For if the object be removed from A to C, it will still radiate on its former point of reflection B; but there can be but one right line drawn between the two points G and D; and the rays are right lines. Therefore that which was before the ray of reflection, will now be the ray of incidence, and since it will be reflected under the same angle as that under which it fell, that which was before the ray of incidence, will now be the ray of reflection. So that the object removed to C will radiate on the eye placed in A, by the right lines CB and BA. *Q. E. D.*

Hence, an object is seen by the reflected ray AB, with the eye placed in A, the same, as if the eye were in A C, and the object in A.

The truth of this theorem is so easily confirmed by experiment, that some, with Euclid, assume it as a principle; and demonstrate the great law of reflection therefrom—Thus; suppose the angle of incidence a little greater than the angle of reflection; then will the angle ABF be greater than that CBE. Wherefore, changing the places of the eye and the object, the angle CBE will become the angle of incidence; and therefore CBE greater than ABF, by the supposition. So that the same angle ABF will be both greater and smaller than the other CBE; which being absurd, ABE cannot be greater than CBE.—The same absurdity will follow, if you suppose the angle of incidence less than the angle of reflection—Since then the angle of incidence can neither be greater nor less than that of reflection, it must be equal to it.

IV. The plane of reflection, that is, the plane wherein the incident and reflected rays are found, is perpendicular to the surface of the speculum; and, in spherical specula, it passes through the centre.

Hence the cathetus, both of incidence and reflection, is in the plane of reflection.

That the plane of reflection is perpendicular to the speculum, is assumed by Euclid, Alhazen, and others, as a principle, without any demonstration; as being evident from all observation and experiment.

V. The image of an object seen in a mirror, is in the cathetus of incidence—This the antients assumed as a principle; and hence, since the image is certainly in the reflected ray, they inferred it must appear in the point of concurrence of the reflected ray with the cathetus of incidence; which indeed holds universally in plane and spherical mirrors, and usually also in con-

cave ones; a few cases only excepted, as is shewn by Kepler. For the particular laws of REFLECTION, arising from the circumstances of the several kinds of specula, or mirrors, plane, concave, convex, &c. see them laid down under the article MIRROR.

Point of REFLECTION. See the article POINT.

REFLECTION of the moon, is a term used by some authors, for what we otherwise call her variation; being the third inequality in her motion, whereby her true place out of the quadratures differs from her place twice equated.

REFLECTION is also used in the Copernican system, for the distance of the pole from the horizon of the disk; which is the same thing as the sun's declination in the Ptolemaic system.

REFLECTION is also used figuratively for an operation of the mind, whereby, turning as it were back upon itself it makes itself and its own operation its object; and considers or contemplates the manner, order, and laws which it observes in perceiving, reasoning, willing, judging, doubting, believing, &c. and frames itself new ideas of the relations discovered therein.

REFLEX, REFLECT, in painting, is understood of those places in a picture which are supposed to be illuminated by a light reflected from some other body represented in the same piece. See LIGHT.

Or, reflexes may be defined those places which, beside the general light that illumines the whole piece, receive some particular light, from their situation with respect to some more illuminated polished body that reflects part of the rays it receives upon them.

Reflexes are scarce sensible except in the shadowed parts—The management of the reflexes requires a world of accuracy and skill—All reflected light is supposed to carry with it part of the colour of the body which reflects it; so that those places which receive this light, must have their colour mixed or tinged with that colour. But the same place may receive reflexes from different objects differently coloured, and those again receive reflexes, from others—The painter therefore must have a view to every circumstance of the colour, light and position of each figure; he must consider what effect each has on others, and pursue nature through all the variety of mixtures.

REFLEX vision, or REFLECTED vision, is that performed by means of rays reflected from the polished surfaces of objects to the eye.

Reflex vision is the subject of catoptrics—Under Reflex vision come all the phenomena of specula or mirrors of all kinds.

REFLEXIBILITY of the rays of light, is that property whereby they are disposed to be reflected. See REFLECTION. Or, it is their disposition to be turned back into the same medium, from any other medium on whose surface they fall—Hence those rays are said to be more or less reflexible, which are returned back more or less easily under the same incidence. See RAY.

Thus if light pass out of glass into air, and by being inclined more and more to the common surface of the glass and air, begins at length to be totally reflected by that surface; those sorts of rays which at like incidences are reflected most copiously; or the rays which by being inclined begin soonest to be totally reflected, are the most reflexible rays.

That rays of light are of different colours, and endued with different degrees of reflexivity, was first discovered by Sir Isaac Newton; and is shewn by the following experiment—Applying a prism DFE, (*Tab. Optics, fig. 55.*) whose angles are each 45°, to the aperture C of a darkened room, in such manner as that the light is reflected from the base in G: the violet rays are seen first reflected in HG; the other rays continuing still refracted in IK—After the violet, the blue are all refracted, the green, &c. See PRISM. Hence it appears, that the differently coloured rays, differ in degree of reflexivity.

From other experiments it appears, that those rays which are more reflexible, are also most refrangible.

REFLEXION. See the article REFLECTION.

REFLUX of the seas, the ebbing of the water; or its return from the shore. It is thus called, as being the opposite motion to the flood, or flux.

REFORM, a re-establishment, or revival of former neglected discipline; or a correction of some reigning abuses therein.

The term is much used in a monastic sense, for the reducing an order or congregation of religious to the ancient severity of the rule from which it had gradually swerved; or even for the improving on the ancient rule and institution itself, and voluntarily making it more severe.

In this sense the order of St. Bernard is said to be only a reform of that of St. Benedict. See BERNARDIN and BENEDICTIN. To REFORM, in a military sense, is to reduce a company, regiment,

regiment, or other body of men, either by disbanding the whole, or only breaking a part, and retaining the rest; or sometimes by incorporating them in other regiments—Hence, **REFORMADO**, or **REFORMED officer**, one whose troop or company is suppressed in a *reform*, and he continued either in whole or half pay, doing duty in the regiment. A *reformed* captain of foot follows the company, and assists the standing officer as a second; but he still maintains his degree and precedence.

REFORMATION, **REFORMATIO**, the act of *re-forming*, or correcting an error, or abuse in religion, discipline, or the like.

The *reformation* of the Roman calendar by Pope Gregory, was effected in the year 1582, chiefly by the advice of Aloysius Lilius, and Clavius.

The *reformation of religion*, called by way of eminence, the *reformation*, was begun by the elector of Saxony, at the solicitation of Luther, about the middle of the sixteenth century.

King Henry VIII. of England, happening to have then a pique against pope Clement VII. by reason of his persisting in not allowing of his divorce from queen Catherine of Austria, fell in with the torrent, abolished the pope's supremacy, seized the monasteries, and other religious houses, and divided their lands among the nobility and gentry.

In every thing else he persevered a papist—So that the *Reformation* went on but lamely in his time—Under his son Edward VI. it went much farther; but was all undone again by his successor queen Mary, who fully re-established the ancient superstitions.

But the executions of above 500 people, who were burnt for the protestant faith in the five years of her reign, so alienated the people from popery, that queen Elizabeth, her sister, found it no hard matter to carry the *reformation* to its full length, and to settle it on the foot whereon it now stands among us.

Right of REFORMATION, *ius REFORMATIONIS*, is a right which the princes of Germany claim to *reform* the church in their respective territories; as being invested with the spiritual as well as the temporal power.

The *ius reformationis* is annexed to the sovereignty; by this they have the power of conscience, the disposition of ecclesiastical revenues, &c. as they enjoyed the same at the treaty of Munster in 1624.

REFORMED calendar. } See the articles } **CALENDAR.**
REFORMED church. } **CHURCH.**
REFORMED officer. } **REFORMADO.**

REFRACTED dial, are such as shew the hour by means of some *refracting* transparent fluid.

If a pin or stick be set up, or any point be assigned in a concave bowl or dish, for the centre of the dial, and a horizontal dial be applied over the same, assigning the meridian line on the edges of the bowl, and marking out the rest of the hour lines also on the edges of the bowl; then taking away the horizontal dial, and elevating a string or thread from the end of the said pin over the meridian line, as much as is the latitude or elevation of the pole of the place—Then, by bringing the thread to cast a shadow on any hour-point formerly marked out on the edges of the bowl, by a candle or the like; that shade in the bowl is the true hour-line; and if the bowl be full of water, &c. when this is done, it will never shew the true hour by the shadow of the top of the pin but when it is filled again with the same liquor.

REFRACTED ray, or *ray of REFRACTION*. See **RAY** and **REFRACTION**.

REFRACTED vision. See the article **VISION**.

REFRACTION, **REFRACTIO**, in mechanics, the deviation of a moving body from its direct course, by reason of the different density of the medium it moves in; or a flexion and change of determination, occasioned by a body's falling obliquely out of one medium into another of a different density.

Thus a ball A, (*Tab. Mechanicæ*, fig. 52.) moving in the air in the line A B, and falling obliquely on the surface of the water C D, does not proceed straight to E, but deviates or is inflected to F—Again, if the ball moving in water in the same line A B should fall obliquely on a surface of air C D; it will not proceed straight to E; nor yet defect to F, but to G. Now the deflection in each case is called the *refraction*; and the two cases are distinguished by means of the perpendicular M I; that, B G being called *refraction towards the perpendicular*, or to the axis of *refraction*; and the other B F, *refraction from the perpendicular*, or from the axis of *refraction*.

These *refractions* are supposed to arise hence, that the ball arriving at B, in the first case, finds more resistance or opposition on the side O, i. e. from the side of the water, than it did from the side P, or that of the air; and in the latter more resistance from the side P, which is now the side of the water, than the side O which is that of the air.

The *great law of refraction*, then, which holds in all bodies, and all mediums, is, that a body passing obliquely out of a

medium which resists it more into another, which resists it less, is refracted towards the perpendicular; and in passing out of a medium which opposes it less into another which opposes it more, it is refracted from the perpendicular.

Hence the rays of light falling out of air into water are refracted towards the perpendicular; whereas a ball thrown into the water is refracted from it; by reason water, which resists the motion of light less than air, resists that of the ball more: or, to speak more justly, by reason water, by its greater attraction, accelerates the motion of the rays of light more than air does; for that this is the true cause of *refraction*; at least in light, shall be shewn under **REFRACTION of light**.

To have a body *refracted*, it is necessary it fall obliquely on the second medium.—In perpendicular incidences there is no *refraction*.

Vossius indeed, and Snellius, imagined they had observed a perpendicular ray of light undergo a *refraction*; a perpendicular object appearing in the water nearer than in reality it was; but this was to attribute that to a *refraction* of the perpendicular rays, which was owing to the divergency of the oblique rays after *refraction*, from a nearer point:

Yet there is a manifest *refraction* even of perpendicular rays found in island crystal. See **Island CRYSTAL**.

Rohault adds, that though an oblique incidence be necessary in all other mediums we know of; yet the obliquity must not exceed a certain degree—If it do, the body will not penetrate the medium, but will be *reflected*, instead of being *refracted*—

Thus cannon balls in sea engagements, falling very obliquely on the surface of the water, are observed to mount a-loft again, and frequently to sweep the men from off the opposite decks; and the like happens to the little stones wherewith children make their ducks and drakes.

The antients confounded *refraction* with *reflection*; and it was Sir Isaac Newton who first taught us the just difference between them—He shews withal, that there is a good deal of analogy between them; and particularly in the case of light.

The laws of *refraction* of the rays of light in mediums differently terminated, i. e. whose surfaces are plain, concave, convex, &c. make the subject of dioptrics.

By *refraction* it is, that convex glasses, or lenses collect the rays, magnify objects, burn, &c. and hence the foundation of microscopes, telescopes, &c.

By *refraction* it is, that all remote objects are seen out of their real places; particularly; that the heavenly bodies are apparently higher than they are in reality, &c.

REFRACTION of light, in optics, is an inflexion or deviation of the rays from their rectilinear course upon falling obliquely out of one medium into another, of a different density.

The *refraction* of light Sir Isaac Newton shews is not performed by the rays falling on the very surface of bodies; but it is done without any contact, by the action of some power in bodies equally diffused throughout their surfaces; by which same power acting in other circumstances, they are also emitted and reflected.

The same arguments whereby we have proved that *reflection* is performed without immediate contact, go a great way towards demonstrating the same of *refraction*: to which may be added the following ones.

1^o. Because if when light falls out of glass into air, with the utmost obliquity it will be transmitted at, it be then made to fall a little more obliquely, it becomes wholly reflected—For, the power of the glass after it has refracted light emerging as obliquely as possible, supposing the rays to fall still more obliquely, will be too strong to let any of the rays pass; consequently instead of being *refracted* they will be all reflected.

2^o. Because in thin lamellæ, or plates of glass, light is reflected and *refracted* several times alternately, as the thickness of the lamellæ increases in arithmetical progression—For here it depends on the thickness of the lamina which of the two the glass shall do; whether reflect it, or let it be transmitted.

3^o. Because whereas the power of other bodies both to reflect and refract light are very nearly proportional to their densities; yet unctuous and sulphurous bodies are found to reflect more strongly than according to their mere densities—For as the rays act more strongly on those bodies to kindle them, than on others; so do they again, by their mutual attraction, act more strongly on the rays to *refract* them.

Lastly, Because not only those rays transmitted through glass are found to be *refracted*, but also those passing in the air, or in a vacuum near its extremities, or even near the extremes of many opaque bodies, a. gr. the edge of a knife, undergo a similar inflection, from the attraction of the body.

The manner wherein *refraction* is performed by meer attraction,

traction, without contact, may be thus accounted for—Suppose HI (Tab. Optics, fig. 56.) the boundary of two mediums, N and O; the first the rarer, *e. gr.* air; the second the denser, *e. gr.* glass; the attraction of the mediums here will be as their densities—Suppose P S to be the distance to which the attracting force of the denser medium exerts itself within the rarer.

Let now a ray of light A a fall obliquely on the surface which separates the mediums, or rather on the surface P S, where the action of the second and more resisting medium commences. All attraction being performed in lines perpendicular to the attractive body, as the ray arrives at a, it will begin to be turned out of its rectilinear course by a superior force, wherewith it is attracted by the medium O, more than by the medium N, *i. e.* by a force wherewith it is driven towards it in a direction perpendicular to its surface—Hence the ray is bent out of its right line in every point of its passage between P S and R T, within which distance the attraction acts. Between those lines, therefore, it describes a curve A B b; but beyond R T, being out of the sphere of attraction of the medium N, it will proceed uniformly in a right line, according to the direction of the curve in the point b.

Again, suppose N the denser and more resisting medium, O the rarer, and HI the boundary, as before; and let R T be the distance to which the denser medium exerts its attractive force within the rarer: even when the ray has passed the point B, it will be within the sphere of superior attraction of the denser medium; but that attraction acting in lines perpendicular to its surface, the ray will be continually drawn from its straight course BM perpendicularly towards H I: thus, having two forces or directions, it will have a compound motion, whereby, instead of BM, it will describe Bm; which Bm will in strictness be a curve.

Lastly, After it has arrived in m, being out of the influence of the medium N, it will persist uniformly, in a right line, in the direction wherein the extreme of the curve leaves it.

Thus we see how refraction is performed, both towards the perpendicular, and from it.

But note, the attraction of the denser medium, *e. gr.* N, is continually diminishing as the ray proceeds from B, towards the limit of attraction R T; in regard fewer and fewer parts still come to act; at I H, *e. gr.* all the parts between that and P S attract, but at R T, none but those in the line H I—Note, also, that the distance between P S and R T being small, when we consider refractions, no notice is taken of the curve part of the ray; but we consider it as consisting of two straight lines, C B, A B, or m B, A B.

REFRACTION, in dioptrics, is the inflection or bending of the rays of light, in passing the surfaces of glasses, lenes, and other transparent bodies of different densities.

Thus a ray, as A B, (Tab. Optics, fig. 56.) falling obliquely from the radiant A, upon a point B, in a diaphanous surface, H I rarer or denser than the medium along which it was propagated from the radiant; it has its direction there altered by the action of the new medium, and instead of proceeding to M it deviates, *e. gr.* to C.

This deviation is called the *refraction of the ray*: B C the *refracted ray*, or *line of refraction*; and B the *point of refraction*.

The line A B is called the *line of incidence*, or *ray of incidence*; and in respect hereof B is also called the *point of incidence*.

The plane wherein both the incident and refracted rays are found, is called the *plane of refraction*; a right line B E drawn in the refracting medium perpendicular to the refracting surface in the point of refraction B, is called the *axis of refraction*—And a right line D B drawn perpendicular to the refracting surface, in the point of incidence B, along the medium through which the ray fell, is called the *axis of incidence*.

The angle A B I included between the incident ray, and the refracting surface, is called the *angle of incidence*; and the angle A B D included between the incident ray, and the axis of incidence, is called the *angle of inclination*—The angle M B C which the refracted ray makes with the incident, is called the *angle of refraction*; and the angle C B E which the refracted ray makes with the axis of refraction, is called the *refracted angle*.

General laws of REFRACTION—1^o. A ray of light in its passage out of a rarer, into a denser medium, *e. gr.* out of air into glass, is refracted towards the perpendicular, *i. e.* towards the axis of refraction.

Hence, the refracted angle is less than the angle of inclination; and the angle of refraction less than that of incidence; as they would be equal, were the ray to proceed straight from A to M. Hence, also a ray perpendicular to the refracting surface, will pass through without being refracted; as it cannot be refracted to the perpendicular. The physical cause thereof is, that the attraction of the denser medium, which in an incidence oblique to its surface acting perpendicular to that surface, draws the ray out of its course: this attraction, we say, in a perpendicular incidence, acts in the direction of the ray.

2^o. The ratio of the sine of the angle of inclination, to the sine of the refracted angle, is fixed and constant; *viz.* if the refraction be out of air into glass, it is found greater than as 114 to 76; but less than 115 to 76; that is, nearly as 3 to 2.

This ratio, assigned by Huygens, agrees with another of Sir Isaac Newton, who makes the sine of the angle of inclination to the sine of the refracted angle, as 31 to 20; which is, likewise, nearly as 3 to 2—Indeed there is some difference in the quantity of refraction, in different kinds of glass; but in physical matters, preciseness is not necessary—In rain water, Des Cartes found, the ratio of the sine of the angle of inclination, to the sine of the refracted angle, as 250 to 187, that is, nearly as 4 to 3; which agrees with Sir Isaac Newton's observation, who makes it as 529 to 396—in spirit of wine, the same great author makes the ratio as 100 to 73; which is not far from the sesquialterian ratio—In air he makes it as 3851 to 3850.

Whence the different refractive power in different fluids arises, is not determined—Clear water, of all fluids, refracts the least; and if impregnated with salts, its refraction is increased in proportion to the quantity of salt. Sir Isaac Newton shews, that in many bodies, *e. gr.* glass, chrysol, a selenites, pseudo-topaz, &c. the refractive power is proportionable to their densities; only in sulphurous bodies, as camphire, oil, olive, amber, spirit of turpentine, &c. the power is two or three times greater than in other bodies of equal density; yet even these have the refractive power with respect to each other nearly as their densities—As to air, he shews that a ray of light in traversing quite through the atmosphere, is refracted the same as it would be were it to pass with the same obliquity out of a vacuum into air of equal density with that in the lowest part of the atmosphere.

From the law just laid down, it follows that one angle of inclination, and its corresponding refracted angle being found by observation; the refracted angles corresponding to the several other angles of inclination, are easily computed—Now, Zahnus and Kircher have found, that if the angle of inclination be 70°, the refracted angle will be 38°, 50'; on which principle Zahnus has constructed a table of refractions out of air into glass, for the several degrees of the angle of inclination; a specimen whereof follows:

Ang. of Inclination.	Refracted Angle.	Ang. of Refraction.	Ang. of Inclination.	Refracted Angle.	Ang. of Refraction.
10	0° 40' 6"	10° 19' 55"	100	6° 39' 16"	3° 20' 44"
2	1 20 6	10 39 54	20	13 11 35	6 48 25
3	2 0 3	10 59 50	30	19 29 29	10 30 31
4	2 40 5	11 19 55	45	28 9 19	16 50 41
5	3 20 3	11 39 57	50	31 51 40	18 8 20

Hence it appears that if the angle of inclination be less than 20°, the angle of refraction out of air into glass is almost 3 of the angle of inclination: and therefore a ray is refracted to the axis of refraction, by almost a third part of the quantity of its angle of inclination—And on this principle it is that Kepler and most other dioptrical writers, demonstrate the refractions in glasses.

The constant ratio of the sines of the angles of inclination and the refracted angles was first discovered by Willeb. Snellius—It is vulgarly attributed however to Des Cartes; who having seen it in Snellius's MS. first published it in his dioptrics, without naming Snellius; as we are informed by Huygens. Indeed, as the rays of light are not all of the same degree of refrangibility, this constant ratio must be different in different kinds—The ratio therefore observed by authors is to be understood of rays of the mean refrangibility, *i. e.* of green rays. The difference of refraction between the least and most refrangible rays, that is between violet and red rays, Sir Isaac Newton shews is about 1/2 part of the whole refraction of the mean refrangible; which difference he owns is so small that there seldom needs to be any regard paid to it.

3^o. When a ray passes out of a denser into a rarer medium, *e. gr.* out of glass into air, it is refracted from the perpendicular, or from the axis of refraction—And hence the angle of refraction is greater than the angle of inclination.

Hence, also, if the angle of inclination be less than 30°; M B C is nearly equal to 1/2 of M B E—Therefore M B C is one half of C B E: consequently, if the refraction be out of glass into air; and the angle of inclination less than 30°; the ray is refracted from the axis of refraction by almost one half part of the angle of inclination—And this is the other dioptrical principle used by most authors after Kepler, to demonstrate the refractions of glasses.

If the refraction be out of air into glass, the ratio of the sine of inclination to the sine of the refracted angle is as 2 to 3; if out of air into water, as 4 to 3; therefore, if the refraction be the contrary way, *viz.* out of glass or water into air, the ratio of the sines in the former case, will be as 2 to 3, and in the latter as 4 to 3.

4^o. A ray falling on a curve surface, whether concave or convex, is refracted after the same manner as if it fell on a plane which is a tangent to the curve in the point of incidence.

For the curve and plane surface touching it, have an infinitely small part common to them both, (each being originally generated by the flux of a point.) But a ray is *refracted* in such a little part; therefore it is, the same as if it were *refracted* in such a plane.

5°. If a right line EF (fig. 57.) cut a refracting surface GH at right angles; and if, from any point in the denser medium as D, be drawn DC parallel to the incident ray AB: this will meet the refracted ray in C; and will be to it as the sine of the refracted angle to the sine of the angle of inclination.

Hence, if BC pass out of glass into air, it is in a subsequalterate ratio to CD; if, on the other hand, it passes out of air into glass, it is in a sequalterate ratio to CD.

Hence also, if light pass out of water into air, CB is in a subsequalterate ratio to CD; if out of air into water, in a sequalterate. See fig. 57. and 58.

Laws of REFRACTION in plane surfaces—1°. If parallel rays be refracted out of one transparent medium into another of a different density, they will continue parallel after refraction.

The physical reason is, that being parallel, their obliquity, or angle of incidence, is the same: but, at equal obliquities, we have shewn the refraction is equal; consequently the parallelism, which they had before the refraction, will be retained after it.

But this may be also demonstrated geometrically: thus, if the rays be perpendicular to the refracting surface, they will pass without any refraction; consequently, being parallel before their passage, they will be so after it. If they fall obliquely, as AB and DC, the angles of incidence ϕ and ψ , and consequently also the angles of inclination x and y , will be equal. But the sines of the angles of inclination x and y have the same ratio to the sines of the refracted angles m and n ; therefore the refracted angles m and n are also equal; consequently the refracted rays are parallel.

Hence a glass, plain on both sides, being turned directly to the sun, the light passing through it will be propagated after the same manner as if the glass were away: for the rays being perpendicular, will pass without refraction. If the glass be turned obliquely to the sun, the light after refraction will be of the same intensity as before, the intensity depending on the spissitude or closeness of the rays, and on the angle wherein they strike the object, or the eye; both which are here unvaried.

2. If two rays CD and CP, (fig. 59.) proceeding from the same radiant C, and falling on a plane surface of a different density, so as the points of refraction D and P are equally distant from the cathetus of incidence GK, the refracted rays DF and PQ have the same virtual focus, or the same point of dispersion G.

Hence, 1°. Since, in rays very near each other, the distance from the cathetus is the same as to sense, very near rays will diverge from the same point G; i. e. they will have the same virtual focus G—And hence 2°. When refracted rays falling on the eye placed out of the cathetus of incidence, are either equally distant from the cathetus, or very near each other, they will flow upon the eye, as if they came to it from the point G; consequently the point C will be seen by the refracted rays as in G.

3. If a ray CD fall obliquely out of a thinner into a denser medium, having a plane surface, the distance of the radiant point CK will have a less ratio to the point of dispersion, or virtual focus KG, than the sine of the refracted angle to the sine of the angle of inclination—But if the distance of the point of refraction from the cathetus of incidence KD be less than the eleventh or nineteenth part of the distance of the radiant point CK; and if in the former case the tenth, and in the latter the hundredth part thereof be so small, that it cannot be assigned, or need not be minded, then will CK be to KG, as to sense, in the ratio of the sine of the refracted angle, to the sine of the angle of inclination.

Hence, 2°. If the refraction be out of air into glass, the distance of the point of dispersion of rays near the cathetus is sequalterate of the radiant point; of more remote rays greater than sequalterate.

Hence, 2°. If the eye be placed in a dense medium, objects in a rarer will appear more remote than they are; and the place of the image in any given case may be determined from the ratio of the refraction.—Thus, to fishes swimming under water, objects out of the water must appear further distant than in reality they are.

4. If a ray DG fall obliquely out of a denser into a rarer medium AB, the distance of a radiant point GK has a greater ratio to the distance of the point of dispersion KC, than the sine of the refracted angle has to the sine of the angle of inclination.—In the other case of the preceding theorem, KG will be to KC, as to sense, in the ratio of the sine of the refracted angle, to the sine of the angle of inclination.

Hence, 1°. If the refraction be out of glass into air, the distance of the point of dispersion of rays near the cathetus of incidence is sequalterate of the distance of the radiant

point; that of the more remote rays is less than subsequalterate.

But, 2°. If the refraction be out of water into air, the distance of the point of dispersion of rays near the cathetus is subsequalterate; of those more remote less than subsequalterate.

And, 3°. The eye therefore being placed in a rarer medium, objects placed in a denser, appear nearer than they are; and the place of the image may be determined in any given case by the ratio of refraction—Hence the bottom of a vessel full of water is raised by refraction to a third part of its height, with respect to an eye perpendicularly over the refracting surface; and hence fishes, and other bodies under water, appear nearer than they really are.

5. If the eye be placed in a rarer medium, an object seen in a denser medium, by a ray refracted in a plane surface, will appear larger than it really is—If the object be in a rarer, and the eye in a denser medium, the object will appear less than it is—And in each case, the apparent magnitude is to the real one in a ratio compounded of the distance of the point to which the rays tend before refraction, from the refracting surface FL (fig. 60.) to the distance of the eye GL, from the same, and of the distance of the object from the eye GM, to its distance from a point to which the rays FM tend before refraction.

Hence, 1°. If the object AB be very remote, FM will be physically equal to GM; and therefore the real magnitude MB to its apparent one MH, as GL to FL, or the distance of the eye G from the refracting plane to the distance of the point of convergence F from the same plane.

Hence, 2°. Objects under water, to an eye in the air, appear larger than they are; and to fishes under water, objects in the air appear less than they are.

Laws of REFRACTION in spherical surfaces, both concave and convex—1. A ray of light DE (fig. 61.) parallel to the axis of a denser sphere, after a single refraction in E, falls in with the axis in the point F, beyond the centre C.

For the semidiameter CE, drawn to the point of refraction E, is perpendicular to the surface KL, and is therefore the axis of refraction; but a ray out of a rarer into a denser medium, we have shewn, is refracted towards the perpendicular, or the axis of refraction; therefore the ray DE will converge to the axis of the sphere AF, and will, therefore, at length concur with it, and that beyond the centre C, in F, because the angle of refraction FEH is less than the angle of inclination CEH.

2. If a ray DE fall on a spherically convex surface of a denser medium, parallel to its axis AF; the semidiameter CE will be to the refracted ray EF in the ratio of the sine of the refracted angle, to the sine of the angle of inclination: but the distance of the focus, or point of concurrence, from the centre CF is to the refracted ray FE, in the ratio of the sine of the refracted angle to the sine of the angle of inclination.

3. If a ray DE fall on a denser spherical convex surface KL, parallel to the axis AF, the distance of the focus from the refracting surface FB must be to its distance from the centre FC, in a ratio greater than that of the sine of the angle of inclination to the sine of the refracted angle—But if the rays be very near the axis, and the angle of inclination BCE be only of a few degrees, the distances of the focus from the surface, and the centre FB and FC, will be nearly in the ratio of the sine of the angle of inclination to the sine of the refracted angle.

Hence, 1°. If the refraction be out of air into glass; in the case of rays near the axis, BF : FC :: 3 : 2. And in the case of the rays remote from the axis, BF : FC :: 3 : 2. Consequently in the former case, BC : BF :: 1 : 3; and in the latter BC : CF :: 1 : 3.

And, 2°. If the refraction be out of air into water; in the former case, BF : FC :: 4 : 3; and in the latter, BF : FC :: 4 : 3. Consequently in the former, BC : BF :: 1 : 4; and in the latter BC : BF :: 1 : 4.

Hence, 3°. Since the sun's rays are parallel as to sense, if they fall on the surface of a solid glass sphere, or of a sphere full of water, they will not concur with the axis within the sphere: so that Vitellio was mistaken, when he imagined, that the sun's rays falling on the surface of a crystalline sphere, refracted to the centre.

4. If a ray DE (fig. 62.) parallel to the axis FA, fall out of a denser into a rarer spherical medium, after refraction, it will diverge from the axis; and the distance of the point of dispersion, or the virtual focus from the centre of the sphere, FC, will be to its semidiameter CE in the ratio of the sine of the refracted angle to the angle of refraction; but to the portion of the refracted ray drawn back, FE, it will be in the ratio of the sine of the refracted angle to the sine of the angle of inclination.

5. If a ray ED fall parallel to the axis AF on the spherically convex surface KL of a rarer medium, out of a denser, the distance of the point of dispersion from the centre FC, is to its distance from the surface FB, in a ratio greater than that of the sine of the refracted angle to the sine of the

angle of inclination.—But if the rays DE be very near the axis FA, the ratio will be very nearly the same with that of the *refracted* angle to the sine of the angle of inclination.

Hence, 1^o. If the *refraction* be out of glass into air; in the case of rays near the axis, $FC : FB :: 3 : 2$. Consequently $BC : FB :: 1 : 2$. Therefore in the case of rays more remote from the axis, $BC : FB :: 1 : 2$.

2^o. If the *refraction* be out of water into air; in the former case $FC : FB :: 4 : 3$. Consequently $BC : FB :: 1 : 3$; in the latter case, therefore, $BC : FB :: 1 : 1$.

3^o. Since then the point of dispersion F is more remote from the *refracting* surface KL, if the rays proceed out of water, than if they pass out of glass into air; parallel rays are less dispersed in the former case than in the latter.

6. If a ray HE (fig. 61.) fall parallel to the axis FA, out of a rarer, on the surface of a spherically concave denser medium; the *refracted* ray EN will be driven from the point of the axis F; so as FE will be to FC in the ratio of the sine of the angle of inclination, to the sine of the *refracted* angle.

7. If a ray EH fall parallel to the axis FB on the concave surface KL of a spherically denser medium, from a rarer; the distance of the point of dispersion from the *refracting* surface FB; is to its distance from the centre, FC, in a ratio greater than that of the sine of the angle of inclination, to the sine of the *refracted* angle. But if the rays be very near the axis, and the angle BCE be very small; BF will be to CF very nearly in the ratio of the sine of the angle of inclination, to the sine of the *refracted* angle.

Hence, 1^o. If the *refraction* be out of air into glass; in the case of rays near the axis, $FB : FC :: 3 : 2$; in the case of rays more remote from the axis $FB : FC :: 7 : 3$; consequently in the former, $BC : C :: 1 : 2$. And hence, in the latter $BC : FC :: 1 : 2$.

Hence also 2^o. If the *refraction* be out of air into water; in the case of rays near the axis; $FB : FC :: 4 : 3$. In the case of rays more remote from the axis $FB : FC :: 7 : 4$; consequently in the first case, $BC : FC :: 1 : 3$. And hence, in the latter, $BC : FC :: 7 : 1$.

And hence 3^o. since the point of dispersion F, is farther from the centre C, if the *refraction* be in water than in air; the rays will be less dispersed in the latter case than in the former.

8. If the ray HE (fig. 62.) fall parallel to the axis AF, from a denser, upon the surface of a spherically concave rarer medium, the *refracted* ray will concur with the axis AF, in the point F; so as the distance of the point of concurrence from the centre CF, may be to the *refracted* ray FE in the ratio of the sine of the *refracted* angle, to the sine of the angle of inclination.

REFRACTION in a glass prism—If a ray of light DE (fig. 62 n^o. 2.) fall obliquely out of air on a prism ABC; being *refracted* towards the perpendicular, instead of proceeding to F it will decline to G, i. e. towards a line HI, drawn perpendicular to the surface AB in the point of *refraction* E.—Again, since the ray EG passing out of the glass into air falls obliquely on CB; it will be *refracted* to M: so as to recede from the perpendicular NGO. And hence arise the various phenomena of the prism.

REFRACTION in a convex lens—If parallel rays AB, CD, and EF. (fig. 63) fall on the surface of a lens 2 B 3 K; the perpendicular ray AB will pass unrefracted to K, where emerging into air perpendicular, as before, it will proceed straight to G. But the rays CD and EF falling obliquely out of air into glass, in D and F, will be *refracted* towards the axis of *refraction*, (i. e. towards lines HI and LM drawn perpendicular to the *refracting* surface in the points of *refraction* F and D;) and decline to P and Q.—Again, emerging obliquely out of the glass into the surface of the air, they will be *refracted* from the perpendicular; and therefore DQ will not proceed to X but to G; and FP, not to V but to G: thus likewise might all the other rays falling on the surface of the glass, be shewn to be *refracted* so as to meet the rest about the point G. See Focus.

Hence the great property of convex glasses; viz. that they collect parallel rays, or make them converge into a point.

REFRACTION in a concave lens—Parallel rays AB, CD, and EF. (fig. 64.) falling on a concave lens GBHMK the ray AB falling perpendicular on the glass at B, will pass unrefracted to M; where being still perpendicular, it will pass into the air, without *refraction*, to L. But the ray CD falling obliquely on the surface of the glass, will be *refracted* towards the perpendicular NDO, and proceed to Q, and the ray DQ, again, falling obliquely out of the glass upon the surface of air, will be *refracted* from the perpendicular RQS, and proceed to V. After the same manner might the ray EF be shewn to be *refracted* to Y, and thence to Z.

Hence the great property of concave glasses, viz. That they disperse parallel rays, or make them diverge.

REFRACTION in a plane glass—If parallel rays EF, GH, IL, (fig. 65.) fall obliquely on a plane glass ABCD; the obliquity being the same in all, by reason of their parallelism, they will be all equally *refracted* towards the perpendicular: and accordingly being still parallel at M, O, and Q, they will pass out into the air equally *refracted* again, from the perpendicular, and still parallel.

Thus will the rays EF, GH, and IL, at their entering the glass, be inflected towards the right; and in their going out as much inflected to the left; so that the first *refraction* is here undone by the second; though not so as that the object is seen in its true place.—For the ray BQ being produced back again, will not coincide with the ray LI; but will fall to the right thereof; and this the more as the glass is thicker: however as to matter of colour, the second *refraction* does really undo the first.

REFRACTION in island crystal—The laws of *refraction* in island crystal differ very much from those laid down in other substances; for here is a double *refraction*, contrary ways, whereby not only oblique rays are split or divided into two, and *refracted* to opposite parts, but even perpendicular rays, are also split, and one half of them are *refracted*.—For the theory hereof see island CRYSTAL.

The particular laws of **REFRACTION in the several kinds of lenses**, see under LENS.

REFRACTION, in astronomy, or REFRACTION of the stars, is an inflection of the rays of those luminaries, in passing through our atmosphere; whereby the apparent latitudes of the heavenly bodies are increased.

This *refraction* arises hence, that the atmosphere is unequally dense in different stages or regions; rarest of all at the top and densest of all at bottom; which inequality in the same medium, makes it equivalent to several unequal mediums.

Sir Isaac Newton has shewn that a ray of light in passing from the highest and rarest part of the atmosphere, down to the lowest and densest, undergoes the same *refraction* that it would do in passing immediately, at the same obliquity, out of a vacuum into air of equal density with that in the lowest part of the atmosphere.

The effect of this *refraction* may be thus conceived. Suppose ZV (Tab. Astronom. fig. 57. n^o. 2.) a quadrant of a vertical circle described from the centre of the earth T, under which is AB a quadrant of a circle on the surface of the earth, and GH a quadrant of the surface of the atmosphere: and suppose SE a ray of light emitted by a star at S, and falling on the atmosphere at E.—This ray coming out of the aetherial medium, which is much rarer than our air, or perhaps out of a perfect vacuum, and falling on the surface of the atmosphere, will be *refracted* towards the perpendicular: and since the upper air, again, is rarer than that near the earth, and grows still denser as it approaches us: the ray, in its progress will be continually *refracted*, so as to arrive at the eye in the curve line EA.

Supposing, then the right line AF to be a tangent to the arch in A, the ray will enter the eye A, according to the direction of AF.—And since objects are always seen in that line, according to the direction whereof the rays enter the eye, the star will appear in AF; that is, in the heavens at Q, which is nearer the zenith than the star really is.

Hence arise the phenomena of the crepusculum, or twilight.

And hence also it is that the moon is sometimes seen eclipsed, when she is really below the horizon, and the sun above it.

That there is a real *refraction* of the stars, &c. is deduced not only from physical considerations, and from arguments a priori, and a similitudine; but also from precise astronomical observations; thus,

The distance of the two stars, Spica Virginis, and the Lion's Tail, when near the meridian, or even when near the west, is constantly found 35^o. 2'. But when the Lion's Tail is risen in the east 34^o. 0', high, Spica Virginis is observed to be in almost the same vertical circle—According to this, an observation of the Dutch, who wintered at Nova Zembla in 1597, from whom the sun totally disappeared on the 14th of November; and again began to appear on the 24th of January, which was six days sooner than he should have returned, according to astronomical calculations; as is observed in the acta Eruditorum, A. 1697.—Nor must it be omitted that Charles XI. King of Sweden, being in 1694 in Tornou, in West-Bothnia, in the latitude of 65^o. 33', observed that the sun never set between the 14th and 15th day of June, but was visible in the middle of the night: the following year he appointed two mathematicians, Bilembergius and Spolius, to observe the same more accurately; who accordingly found that at Tornou in the middle of the night, between the 10th and 11th of June the sun was $\frac{1}{2}$ of his diameter above the horizon: and

on the 14th of June at Kangis, in the latitude of 66° , $15'$, they found the sun at midnight, two diameters above the horizon.

Hence it is argued, that as light is propagated in right lines, no rays could reach the eye from a luminary below the horizon, unless they were deflected out of their course at their entrance into the atmosphere: it is evident therefore, that the rays are *refracted* in passing through the atmosphere. Hence the stars appear higher by *refraction* than they really are; so that to bring the observed or apparent altitudes to the true ones, the quantity of *refraction* must be subtracted. And hence, as the ancients were unacquainted with the *refraction*; reckoning upon too great altitudes, it is no wonder they sometimes committed considerable errors.

From the doctrine of *refractions* it appears that we never see the real sun rising or setting, but only a phantom, or image thereof; the sun himself being at that time hid below the horizon.

And from the observations just mentioned, it follows, that the *refractions* are greater nearer the pole, than at lesser latitudes; doubtless from the greater density of the atmosphere, and the greater obliquity of the incidence.

M. de la Hire assures us, he could never find any difference in the meridian altitudes of the stars: so that the *refractions* re-

main always the same—Though he owns, near the horizon; the different constitution of the air, &c. may occasion some variations in the *refractions*.

Stars in the zenith are not subject to any *refraction*—Those in the horizon have the greatest of all—From the horizon the *refraction* continually decreases to the zenith: all which follows hence, that in the first case the rays are perpendicular; in the second their obliquity is the greatest; and in the third, it is continually increasing.

At the same altitudes, the sun and stars all undergo the same *refraction*; for at equal altitudes the incident rays have the same inclinations: but the sines of the *refracted* angles are as the sines of the angles of inclination, &c.

Indeed Tycho Brahe, who first deduced the *refractions* of the sun, moon, and fixed stars from observation; makes the solar *refractions* greater than those of the fixed stars; and the lunar *refractions* sometimes greater than those of the stars; and sometimes less—But the theory of *refractions* (which we have observed is owing to Snellius) was not fully understood in his age—De la Hire and Cassini, find the *refraction* the same in all.

M. de la Hire gives us a table of the *refractions* of the stars, in their several degrees of altitude; deduced from the surest and most accurate observations, as follows:

Table of the REFRACTIONS of the heavenly bodies, at the several degrees of altitude.

Alt.	Refract.	Alt.	Refract.	Alt.	Refract.	Alt.	Refract.	Alt.	Refract.	Alt.	Refract.
0	32' 0"	16	3' 26"	30	1' 51"	46	1' 9"	61	0' 40"	77	0' 17"
1	26 35	17	3 23	31	1 47	47	1 7	62	39	78	15
2	20 43	18	3 12	32	1 43	48	1 6	63	37	79	14
3	15 44	19	3 1	33	1 40	49	1 4	64	35	80	12
4	12 26	20	2 51	34	1 36	50	1 2	65	33	81	11
5	10 26	21	2 44	35	1 33	51	1 0	66	32	82	10
6	9 8	22	2 38	36	1 30	52	0 58	67	31	83	8
7	8 2	23	2 31	37	1 27	53	56	68	30	84	7
8	7 1	24	2 24	38	1 24	54	54	69	28	85	6
9	6 17	25	2 18	39	1 22	55	52	70	26	86	4
10	5 41	26	2 12	40	1 19	56	50	71	25	87	3
11	5 11	27	2 7	41	1 17	57	48	72	24	88	2
12	4 46	28	2 3	42	1 15	58	46	73	23	89	1
13	4 25	29	1 59	43	1 13	59	44	74	21	90	0
14	4 7	30	1 55	44	1 11	60	42	75	20		
15	3 51			45				76	18		

Tycho Brahe will have the *refractions* of the sun to vanish at the altitude of 46° , those of the moon at 45° , and those of the fixed stars at 20° ; but Cassini has found that they reach even to the zenith—Indeed Tycho represented all the *refractions* less than they are; except the horizontal one, which he made too great; for he makes the horizontal *refraction* in the sun $34'$, in the moon $33'$, in the fixed stars $30'$. De la Hire and Cassini make it $32'$ in all the heavenly bodies. Tycho again, makes the *refraction* of the sun at 33° altitude, to be $55'$; but Cassini $1' 43''$.

Fa. Laval in 1710, 22^d Jan. observed the meridian altitude of the sun to be 70° , $25'$, $50''$; and on the 23^d of June, he observed the same to be 70° , $16'$, $0''$, which is $10'$ more, that should be less—Having met with some like observations before, he takes occasion to suspect the *refraction* to be varied according to the different winds which blow from the different quarters—When the north-west wind blows, he thinks the *refraction* is the greatest; and adds, from observations made at St Baume and St Pilon, that the *refraction* at 24 fathoms above the surface of the sea, is double that at 600 fathoms. Huygens long ago observed the *refraction* to be changed every hour; though his experiments were made at very little altitudes, and in terrestrial objects.

The *refraction* diminishes the right and oblique ascensions of a star, and increases the descensions; it increases the northern declination, and diminishes the southern.

Refraction, in the eastern part of the heavens, diminishes the longitude of a star, but it increases the same in the western part of the heavens; it diminishes the southern latitude also, and increases the northern.

The *refraction* therefore, is by no means to be overlooked in astronomy—It is absolutely necessary to the determining of the phenomena of the heavenly motions, to any degree of accuracy; so that the ancient astronomy, where no regard was had to it, must of necessity have been exceedingly defective on this very account.

To observe the REFRACTION of a star, &c.—1^o. Observe the meridian altitude of a star near the zenith; whence the latitude of the place being known, the true declination of the star is easily had, the star being now void of any sensible *refraction*. 2^o. Observe the altitude of the same star in any other degree, and note the time by a pendulum. 3^o. For the given time of observation, from the declination of the star compute its true altitude.

This being thus found less than the altitude observed; subtract the one from the other; and the remainder is the *refraction* for that moment, in that degree.

REFRACTION of altitude, is an arch of a vertical circle, as Ss , (Tab. Astronomy, fig. 28.) whereby the altitude of a star SE , is increased by the *refraction*.

REFRACTION of declination, is an arch of a circle of declination, as SI , whereby the declination of a star DS is increased or diminished by the *refraction*.

REFRACTION of ascension and descension, is an arch of the equator Dd , whereby the ascension and descension of a star, whether right or oblique, is increased or diminished, by means of the *refraction*.

REFRACTION of longitude, is an arch of the ecliptic Tt , fig. 29. whereby the longitude of a star is increased or diminished by means of the *refraction*.

REFRACTION of latitude, is an arch of a circle of latitude LI , whereby the latitude of a star TS , is increased or diminished by means of *refraction*.

REFRACTION, in commerce, is a term sometimes used by merchants, where there has been an oversight in an account, to the prejudice of a person, who thereupon demands restitution of so much, added or omitted by mistake.

You must make me a *refraction* of five pounds forgot in your account—I will deduct or make you a *refraction* of 30 s. charged inadvertently in my bill.

REFRANGIBILITY of light, the disposition of the rays to be refracted.

A greater or less *refrangibility* is a disposition to be more or less refracted, in passing at equal angles of incidence, into the same medium.

That the rays of light are differently *refrangible*, is the foundation of Sir Isaac Newton's whole theory of light and colours—The truth of the principle will appear from the following experiments.

1^o. A ray of light being received through a little round hole into a dark room, upon a glass prism, ABC , (Tab. Optics, fig. 65. n^o. 2.) in such manner as to pass through it near the angle C ; the various colours of the rainbow will be seen painted in all their splendor on a white paper, EF ; viz. the red in E , then the yellow, then green, blue, and at last purple, or violet; and on whatever body you receive the light, still the colours will be the same.

Yet,

Yet this coloured light is still propagated, like other light, in right lines; it is reflected, too, like other light, from a mirror, and refracted through a lens; yet it retains its colours both after refraction and reflection.—When collected into a focus, the rays degenerate into a very bright white; but upon diverging again from the focus, they resume their former colours.

Hence, 1°. Since nothing here happens to the rays in passing the prism, but that they are refracted, both in entering, and in quitting it: (See PRISM.) Light is converted into those colours by mere refraction.

2°. Since the coloured rays are still propagated in right lines, both when reflected from mirrors, and when refracted in lenses; they still retain all the properties of light, and therefore are still light.

3°. Since the several coloured rays decussated and mixed together in the focus, appear white; but after separation, beyond the focus, recover their former colours; therefore red, yellow, green, blue, and purple rays mixed together in a convenient proportion, constitute a resplendent white.

Note, The experiment will succeed if the room be not dark, only the colours will be less vivid.

2. A prism DEF (fig. 66.) being so disposed as that the refractions of the rays both at their entrance and exit, are equal; (which is obtained, by turning it slowly round its axis till the coloured light, which now rises, and now falls, appear stationary between the two.) In the middle space between the prism and the coloured light painted on the wall, place another prism GH to receive the coloured light LM. After a second refraction in this second prism the coloured light painted on the wall, IK, will be inclined to a like light NO, then there, even when the prism GH is removed; so as the blue extremities N and I will be further apart than the red ones K and O.

Hence, 1°. The blue rays must of necessity be more refracted than the red ones; and there is, likewise, an unequal refraction in the intermediate rays.

Hence, therefore, the sun's rays are not all of the same refrangibility; consequently, not of the same nature.

3. Those rays are most refrangible, which are most reflexible. See this proved under REFLEXIBILITY.

The difference between refrangibility and reflexivity was first discovered and published by Sir Isaac Newton in 1675, in the *Phil. Transact.* and from that time vindicated by him, from the objections of several authors; particularly F. Pardies, M. Mariotte, Fr. Linus, or Lin, and other gentlemen of the English college at Liege: and at length it was more fully laid down, illustrated, and confirmed by great variety of experiments in his immortal optics.

But, further, as not only those colours of light produced by refraction in a prism, but also those reflected from opaque bodies, have their different degrees of refrangibility and reflexivity; and as a white light arises from a mixture of the several coloured rays; the same great author concluded all homogeneous light to have its proper colour, corresponding to its degree of refrangibility, and not capable of being changed by any reflexions, or any refractions; that the sun's light is composed of all the primary colours; and that all compound colours arise from a mixture of the primary ones, &c.

The different degrees of refrangibility, he conjectures to arise from the different magnitude of the particles whereof the different rays consist.—Thus the most refrangible rays, i. e. the red ones, he supposes to consist of the largest particles; the least refrangible, i. e. the violet rays, of the smallest particles; and the intermediate rays, yellow, green, and blue, of particles, of intermediate sizes.

REFRESHMENT, quarters of. See QUARTERS.

REFRET, in music. See the article RITORNELLO.

REFRIGERATIVE, in medicine, a remedy, which refreshes the inner parts by cooling them.—Such, usually, are pitans, clysters, &c.

REFRIGERATORY, REFRIGERATORIUM, in chemistry, a vessel, filled with cold water, placed about the head of an alembic, to cool and condense the vapours raised thither by the fire, and to convert them into a liquor, to be discharged thence through the beak.

The water in the refrigerator is to be changed from time to time, as it begins to grow warm.

Sometimes they content themselves with wrapping a wet cloth about the head of the alembic, instead of a refrigerator; but the more usual method now is, to supply the place of the refrigerator by a worm or spiral pipe running through a tub of cold water.

Distillation chiefly consists in evaporation and refrigeration.

REFUGEE, REFUGIUM, in our old customs, a sanctuary or asylum. See SANCTUARY and ASYLUM.

At Paris there is an hospital called the *refuge*, wherein dissolute women are shut up.

REFUGEES, French-protestants, who by the revocation of the edict of Nantz, in 1685, have been constrained to quit their country, and retire for *refuge* into Holland, Germany, England, &c. to save themselves from the necessity of abandoning their religion.

REGAL, REGIUS or REGALIS, something belonging to a king.

Regal is of the same import with *royal*; the former being formed of the Latin *rex*; the other of the French, *roy*, king. See ROYAL.

REGAL fibres. See the article ROYAL fibres.

REGAL suit. See the article SUIT.

REGALE, in the French jurisprudence, is a right belonging to the king over all benefices in that kingdom.

The *regale* consists in enjoying the revenues of bishoprics during the vacancy of their fees, and of presenting to the benefices dependant thereon, which become vacant during that time, and till a successor have taken the oath of fidelity, and have procured letters patents, to secure him from the *regale*.

The enjoyment of the fruits of the see is called the *temporal regale*; that of presenting the benefices, the *spiritual regale*. Some refer the origin of the *regale* to the time of Clovis, and say the clergy granted this privilege to the king, upon his defeating the Visigoths; others alledge, that pope Adrian I. gratified Charlemaign with it, in a council held at Rome.—It is observed by others, that the *regale* was originally no more than a ward, or administration; and that the kings were only depositaries of the fruits of the vacant bishoprics, and appointed economi to look to them during the vacancy.

It is added, that the kings of the first and second race never enjoyed any such privilege, and that it was only introduced in the twelfth century, in favour of investitures.

REGALE, REGALIO, a magnificent treat or entertainment, given to ambassadors, or other persons of distinction, to entertain or do them honour.

In Italy, it is usual at the arrival of any traveller of eminence, to send him a *regale*; that is, a present of fruits, sweet-meats, &c. by way of refreshment.

REGALIA, in law, the royal rights, or prerogatives of a king.

These are reckoned by civilians to be six; 1°. power of jurisdiction. 2°. power of life and death. 3°. power of war and peace. 4°. masterless goods. 5°. assisments. 6°. minting of money.

REGALIA is also used for the several parts of the apparatus of a coronation; as the sceptre with the cross; sceptre with the dove; St Edward's staff: four several swords; the globe; and the orb with the cross, &c. used at the coronation of our kings.

REGALIA, of the church, are those rights and privileges which cathedrals, &c. enjoy by grants, and other concessions of kings.

Regalia is sometimes also used, for the patrimony of a church: as, *regalia sancti Petri*.—And more particularly, for such lands and hereditaments as have been given by kings to the church.

Cepimus in manum nostram baroniam & regalia quæ archiepiscopus Eborum de nobis tenet. Pryn. lib. Ang.

These *regalia*, while in possession of the church, were subject to the same services as all other temporal inheritances; and after the death of the bishop they reverted to the king, till he invested another with them; which in the reigns of William the conqueror, and some of his immediate successors, was frequently delayed, and as oft did the bishops make complaint thereof as appears from Malmesbury, Neubregensis, &c.

This last author says, that great complaint was made against Henry II. *Quod episcopus vacantes, & provenientia perciperet commoda, diu vacare voluit, & ecclesiasticis patius usibus applicanda in fisco redegit.*

REGALIA facere, is used for a bishop's doing homage or fealty to the king, when he is invested with the *regalia*.

Thus Malmesbury, in Anselm. *Regalia pro more istius temporis faciens principi 7 kalend. octobris, Cantuariæ assedit.*

REGALITIES. See the article ROYALTIES.

REGARD, of the forest, the over-sight, or inspection thereof; or the office, and province of the *regarder*; which is to go through the whole forest, and every bailiwick thereof, before the holding of the sessions of the forest, or justice seat; to see and enquire of the trespasses therein. *See FOREST.

* *Ad videndum, ad inquirendum, ad certificandum, &c.* See REGARDER.

REGARD is also used for the extent of the *regarder's* charge; i. e. for the whole forest, or all the ground that is parcel thereof.

REGAR-

REGARDANT, in heraldry, is understood of a lion, or other beast of prey, borne in a posture of looking behind him, with his face toward his tail.

Others apply it to a beast which only shews the head, and some part of the neck, as moving from out of some division of the coat into another. He bears azure, three bends or, in a chief argent, charged with a lion regardant gules.

Villain REGARDANT, or **REGARDANT to the manor**, denotes an ancient servant or retainer to the lord; thus called, because charged to do all base services within the manor, to see the same freed of all filthy and loathsome things that might annoy it, &c. *Coke on Littletons, fol. 120.*

REGARDER of a forest, **REGARDATOR forestæ**, an ancient officer of the king's forest, whose business was every year, upon oath, to make a *regard*, i. e. to take a view of the forest limits; also to inquire of all offences and defaults committed by the foresters within the forest, and of all the concealments of them; and whether all the other officers did execute their respective duties, or not.

Manwood refers this institution to King Henry II. but Spelman thinks the name, at least, was given since; and that they were the same with those officers called *custodes venationum*.

REGE, *querela coram*. See **QUERELA**.

REGEL, or **RIGEL**, a fixed star of the first magnitude, in Orion's left foot. Its longitude, latitude, &c. see among the rest of the constellation **ORION**.

REGENERATION, in theology, the act of being born again by a spiritual birth, or becoming a child of God.

Regeneration is performed by the washing of the Holy Spirit, whereof baptism is the sign. When an infidel is converted, baptism is always administered as a sign of *regeneration*.

REGENT, **REGENS**, a person who governs a kingdom during the minority or the absence of a king.

In France, the queen mother has the regency of the kingdom, under the title of *queen regent*, while the king is a minor. Some have urged, that women being incapable of succeeding to that crown, were incapable of the *regency*; but custom has declared in their favour.

REGENT is also used for a professor of arts or sciences, who holds a class, or set of pupils, in a college.

The foreign universities are generally composed of doctors, professors, and *regents*.—*Regent* and scholar are relative terms. See **TUTOR**.

Regent is generally restrained to the lower classes, as *regent of rhetoric*, *regent of logic*, &c. those of philosophy are rather called *professors*.

REGIA aqua. } See the articles { **AQUA**;
Vin REGIA. } **VIA**.
Vitis REGIA. } **VILLA**.

REGICIDE, **REGICIDA**, a king-killer.—The term is also used for the act itself of murdering a king: of *rex*, king, and *cado*, I slay.

Regicide is chiefly used with us in speaking of the persons concerned in the trial, condemnation, and execution, of king Charles the first.

REGIFUGE, **REGIFUGIUM**, a feast held in ancient Rome on the sixth of the calends of March, i. e. on our 24th of February, in memory of the expulsion of their king, particularly of Tarquin's flying out of Rome on that day.

Some will have the feast to bear this name from the *rex sacrorum*, king of the sacrifices, flying out of the comitia, or place of assembly, as soon as the sacrifice was over, in imitation of the flight of Tarquin the proud.

Some critics and antiquaries will have *regifugium* the same with *fugalia*; others hold them to be different.

REGIMEN*, in medicine, a rule or course of living, with regard to eating, drinking, clothing, and the like, accommodated to some disease, and to the particular course of medicine the patient is under.

* The word is pure Latin, and signifies government, or rule.

It is doubted whether the hot or cold *regimen* be most convenient in fevers.—The hot *regimen*, which antiently obtained in the small-pox, begins to be disused.—The *regimen* is very different in different countries. Bartholin says, a slice of Bacon in Denmark is an usual dish for a person in a high fever.

REGIMEN, in chymistry and alchymy, is the method of ordering and conducting any thing, that it may answer its intention.

Thus, *regimen of fire*, is the manner of making and ordering fire, and the degrees thereof. See **FIRE** and **DIGREE**.

REGIMEN of the work, that is, of the philosopher's stone, called the *work of patience*, is the rule and conduct to be observed to attain projection.

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There are three things, they say, to be chiefly regarded in the *regimen of the work*.—The first to administer a gentle, easy heat at the beginning of the coction.

The second to continue this external heat according to the season of the work, always observing four seasons, as in the common and astronomical year; the beginning being the winter, the progress the spring, then summer, and, lastly, autumn, which is the time of maturity and perfection of the stone; in all which the heat is to be augmented in proportion to the augmentation observed in nature.

It is to be added, that the work may not be begun in any season; but regard is to be had to the seasons of nature, lest the winter of the work be found in the summer of the year, &c. Which, however, is to be understood of the day wherein the mercury is put in the ovum philosophicum, not of that when it is begun to be set at liberty from the prisons which nature had inclosed it in.

The third is that in augmenting the fire, the augmentation be not of a whole degree at once, the spirits being unable to bear such violence; but a degree is to be divided into four parts, and one part is to be taken at a time.

All the operations of the first *regimen* are occult and invisible: in the second *regimen* comes putrefaction, which, they say, is the first sensible change, shewing itself by its black colour.

REGIMEN, or *government*, in grammar, is that part of syntax or construction, which regulates the dependency of words, and the alterations which one occasions in another.

Thus, we say, the *regimen* of a verb active is an accusative, i. e. a verb active governs an accusative; or requires, that the noun, which receives its action, be in the accusative case.

Prepositions have a *regimen*, i. e. they require certain cases in the nouns they are prefixed to; by which they are distinguished from adverbs; which have none.

The *regimen*, or construction of government, is entirely arbitrary, and differs in all languages; one language forming its *regimen* by cases, as the Latins and Greeks; others by particles in lieu thereof, as the English by *of*, *to*, &c. the French, Spaniards, and Italians, by *des*, *a*, *da*, &c.

There are, however, some general maxims, which hold good in all languages,—as, 1^o. That there is no nominative case in any sentence but has a reference to some verb, either expressed or understood.

2^o. That there is no verb but has its nominative case, either expressed or understood.—Indeed, in languages which have proper accusatives, as the Latin, before infinitives there is an accusative, not a nominative case; as *scio Petrum esse doctum*.

3^o. That there is no adjective but has a relation to some substantive.

4^o. That there is no genitive case but is governed by some other noun; inasmuch as that case always expresses the possessor, which must be governed by the possessed.—This rule does not hold so apparently in the modern as it does in the ancient languages; in regard the particles *of*, *des*, &c. which are the proper signs of the genitive case, are frequently used as prepositions. See **GENITIVE**.

5^o. That the *regimen* of verbs is frequently laid on different kinds of relations, according to custom or usage; which yet does not change the specific relation of each case, but only shews, that custom has made choice of this or that; according to fancy.—Thus, the Latins say, *juvare aliquem*, & *opulari alicui*, to help one.—So the French say, *servir quelqu'un*, & *servir a quelqu'un*, to serve one.—Thus the English say, *fight one*, or *fight with one*.—And thus, in Spanish, most of the verbs active govern indifferently either a dative or an accusative. Sometimes, also, the verb admits of several *regimens*; as *prestare alicui*, or *alicui*, *cripare morti alicui*, or *alicui* *a morte*.

Indeed, the different *regimen* sometimes makes an alteration in the sense; in which, particular regard is to be had to the usage of the language.—Thus, the Latin *cavere alicui* signifies to watch, or be careful of the preservation of any one: *cavere alicui* signifies to beware of him.

There is one very common fault in *regimen*, which our accurate writers should be careful to avoid; viz. the using of two verbs that require different cases together, as only governing one case; as in this example; after embracing and giving his blessing to his son; where embracing requiring an accusative, and giving a dative case, the *regimen* or construction of the first verb with the noun is irregular: embrace to a son.

The same may be observed in nouns; as I conjured him by the memory and the friendship he bore my father; where *memory* does not agree with the verb *he bore*.

REGIMENT, in war, a body consisting of several troops of horse, or companies of foot, commanded by a colonel.

The number of men in a *regiment*, is as undetermined as that of the men in a troop, or company.

There are *regiments* of horse, that have not above 300 men; and there are some in Germany of 2000; and the *regiment* of Picardy in France consists of 120 companies, or 6000 men.

The French *regiments* of horse are not commanded by a colonel, as those are, but by a *maître de camp*.

Some observe, that there were no *regiments* of horse before the year 1637. Till then the troops were loose and independent of each other, and not incorporated into a body or *regiment*.

REGIO a Regis, is a writ whereby the king gives his royal assent to the election of a bishop. See **BISHOP**.

REGION, **REGIO**, in geography, a country, or particular division of the earth; or a tract of land inhabited by people of the same nation.

The modern astronomers divide the moon into several *regions* or provinces, to each whereof they give its proper name. See **MOON**.

REGION in physiology—Authors divide the atmosphere into three stages, called the *upper, middle, and lower regions*. See **ATMOSPHERE**.

The *lowest REGION* is that wherein we breathe; and is bounded by the reflection of the sun's rays, that is, by the height to which they rebound from the earth.

The *middle REGION*, is that wherein the clouds reside, where meteors are formed, &c. extending from the extremity of the *lowest*, to the tops of the highest mountains.

The *upper REGION*, commences from the tops of the mountains, and reaches to the utmost limits of the atmosphere—In this reigns a perpetual, equable calmness, clearness, and serenity. See **AIR**.

Some authors use the term *elementary REGION* for the space of the whole atmosphere, from the earth to the sphere or heaven of the moon; because within this are contained the four elements, and all elementary bodies.

Ætherial REGION is used for the whole extent of the universe, including the orb of the fixed stars, &c. See **UNIVERSE**.

REGION, in anatomy, denotes also a division of the human body. See **BODY**—Anatomists divide the body into three *regions*, or *venters*.

The *upper region* is that of the head; reaching as low as the first vertebra; and comprehending the animal organ, the brain, &c. See **HEAD**, &c.

The *middle region* is that of the thorax or breast, which Hippocrates calls the upper venter, and which reaches from the clavicles to the diaphragm; in this are contained the vital parts, as the heart, lungs, &c. See **HEART**, **LUNGS**, &c.

The *third or lower region* is the abdomen or belly, &c. containing the natural parts, destined for digestion, purgation, and generation. See **ABDOMEN**.

Epiphora REGION. } See the articles } **EPICOLIC.**
Epigastri REGION. } **EPIGASTRIC.**
Umbilical REGION. } **UMBILICAL.**

REGIONARY, **REGIONARIUS**, in ecclesiastical history, a title given from the fifth century, to persons who had the charge and administration of the church affairs within a certain district or *region*.

At Rome there were antiently seven *regional deacons*, who presided over a kind of hospitals, and looked to the distribution of alms.

There were also *regional subdeacons*, and *regional notaries*, as also *regional bishops*, &c.

A *regional bishop* was properly a missionary invested with an episcopal character, but without being attached to any particular see; that he might be at liberty to go preach, and perform other functions of his ministry, whithersoever the Spirit of God, and the wants of the people should call him.

REGIS pendus. } See } **PONDUS.**
REGIS villa. } **VILLA.**

REGISTER*, **REGISTRUM**, a publick book serving to enter and record memoirs, acts, and minutes, to be had recourse to, occasionally, for the justifying of matters of fact, &c.

* *Menage* derives the word by corruption, from *registro*, a book containing extracts of several books, &c. collected together: *Dicitur registro quia ita non gestum*—Others derive it from the old French *gisto*, to lie down in a bed, &c.

The law of Scotland is rendered very easy and regular, by means of the great number of *registers*, for recording the conveyances of lands, &c. of private persons—Of these there are two kinds: the one general, fixed at Edinburgh, under the direction of the *lord registers*, who before the union was the fifth officer of state, and besides the *registry*, was clerk of the parliament, treasury, exchequer, and session.

The other is particularly kept in the several shires, stewardries, and regalties.—The clerks hereof are obliged to

transmit the *registers* of their respective courts to the general *register*; and the notaries their protocols: and here they are so disposed, that, on demand, the lieges can have a view of any writs, which the law requires to be *registered*, or which parties, for their security, have thought fit to record.

The *registers* were first set on foot by act of parliament under king James VI. to the unspeakable advantage of the subject.

No man can have a right to any estate, but it must be *registered* within forty days of his becoming seized of it, otherwise it is null; and by this means all secret conveyances are cut off.

REGISTER, **REGISTRARIUS**, is also used for the clerk or keeper of a *register* or *registry*.

Of these we have several, denominated from the *registers* they keep—as *register of the high court of delegates*; *register of the arches court of Canterbury*; *register of the court of admiralty*; *register of the prerogative court*; and *register of the garter*; who is always dean of Windsor.

REGISTER of a parish church is a book, wherein the yearly baptisms, marriages, and burials of each parish are orderly registered.

This practice was laudably instituted by that great but unfortunate person Thomas Cromwell, earl of Essex, anno 1538, while he was vicar-general to king Henry VIII.

REGISTER is also the title of a book, containing the forms of most of the writs used in common law. This is called the *register of writs*.

This *register*, Coke on Littleton observes, is one of the most antient books of the common law.

REGISTER ships, or *ships of REGISTER*, in commerce, are vessels to which the king of Spain, or the council of the Indies, grants permissions to go and traffick in the ports of the Spanish West-Indies.

They are thus called, because the ships are to be *registered* before they set sail from Cadiz, which is the place where they usually load for Buenos Ayres.

These vessels, by the tenor of the cedula or permit, are not to exceed three hundred tons; but there is that good understanding between the merchants and the council of the Indies, that ships of five or six hundred tons frequently pass un-noted.

The permissions cost thirty thousand pieces of eight each: but were they to cost an hundred thousand, the merchants would be gainers, and the king of Spain a loser.—For though the quantity and quality of the merchandizes on board be always exprest; yet, by force of presents, the officers both there and in the Indies, allow them to load and unload vastly more than the permission expresses—Vessels, whose certificate only mentions twelve thousand skins, and an hundred thousand pieces of eight, have been known to have on board above four millions in gold and silver, twenty-six thousand skin, &c. so that the king of Spain's fifth, and his other dues, were almost nothing to what they should be.

Add to this, that in the years 1702, 1703, &c. these *register* vessels, countenancing and backing each other, sold their commodities for above three hundred per cent. profit—At that time a hat was sold for 18 pieces of eight; an ell of ordinary cloth for 12 pieces of eight, &c.

Among the *register* vessels may be reckoned a ship of five hundred tons, which the king of Spain allows the English South Sea Company to send each year to the fairs held at Porto Bello, Carthage, and Vera Cruz, &c.

REGISTER, among letter founders, is one of the inner parts of the mould wherein the printing types are cast. See **LETTER**.

Its use is to direct the joining of them justly together again, after opening them to take out the new cast letter.

REGISTER, in chymistry, are holes, or chinks, with stopples to them, contrived in the sides of furnaces, to regulate the fire, i. e. to make the heat immediately more intense, or remiss, by opening them to let in the air, or keeping them close to exclude it.

REGISTER, in printing, the disposing the forms of the press so as that the lines and pages printed on one side of the sheet, meet exactly against those on the other; which is done by means of two points in the greater or outward tympan.

REGISTRY, **REGISTRUM**, comprehend the office, books, and rolls, wherein the proceedings of chancery, or any spiritual court, are *registered*, or recorded.

REGIUS-professors—King Henry VIII. founded five lectures in each of our universities; viz. of Divinity, Hebrew, Greek, Law, and Physic; the readers of which lectures are in the university statutes, called *regii professores*. See **PROFESSOR**.

REGIUS morbus. See the article **JAUNDICE**.

REGLET

REG

REGLET*, or **RIGLET**, in architecture, a little flat narrow moulding, used chiefly in compartments, and panels, to separate the parts or members from one another, and to form knots, frets, and other ornaments—See *Tab. Archit. fig. 1. fig. 26. lit. y. fig. 28. lit. l. m. fig. 32. lit. m. fig. 24. lit. N. z.*

* The word is a diminutive of the French, *regle*, rule.

The *reglets*, according to Daviler, differs from the *fillet* and *lytle*, in that it projects equally, like a ruler.

REGLETS, or **RIGLETS**, in printing, are thin rulers, or slips of wood of different dimensions, placed in the chase, between the pages, and at the extremes thereof, to keep them asunder and to hold them tight.

The *reglets* make the chief part of what they call the *furniture of the chase*. See *CHASE*.

They are particularly denominated from the place they hold in respect of the pages, *head-sticks, feet-sticks, gutter-sticks*, &c.

The term **REGLET** is also used abroad for a ruler of metal, $\frac{3}{4}$ of an inch long, but which may be lengthened out by joining several together; used to separate the columns, in books that have several in the same page; as also for lines to place the notes on in printing of music.

REGLET, is also used for a little thin slip of wood used by some compositors for the press to take off the lines from the compositors-stick, and place them on the galley, as fast as composed.

REGNANT queen. See the article *QUEEN*.

REGRATER, **REGRATARIUS**, a law word, formerly used for one that bought wholesale, or by the great, and sold again by retail. See *ENGROSSER*, &c.

The term is now chiefly used to denote one that buys any wares or victuals, and sells them again in the same market or fair, or within five miles of it. See *FORESTALLING*.

REGRATER is also used for a person who furberishes up old moveables, to make them pass for new. See *FRIPE-REY*.

Among mafons, &c. to **REGRAF**, is to take off the outer surface of an old hewn stone, with the hammer and ripe, in order to whiten and make it look fresh again.

REGRESSION, or *retrogradation of curves*, &c. See *RETROGRADATION*.

REGULA. See the article *RULE*.

REGULA, in architecture. See the article *REG-LETT*.

REGULAR, **REGULARIS**, denotes the relation of any thing that is agreeable or conformable to the rules of art.

In this sense the word stands opposed to *irregular*, or anomalous.

Thus we say, a *regular* proceeding, a *regular* building, *regular* poem, *regular* verb, &c.

REGULAR figure, in geometry, is a figure which is both equilateral and equiangular; i. e. whose sides, and consequently its angles, are all equal.

The equilateral triangle and square are *regular figures*. See *SQUARE* and *TRIANGLE*—All other *regular* figures consisting of more than four sides, are called *regular polygons*.

Every *regular* figure may be inscribed in a circle. See *CIRCLE*—For the *dimensions, properties*, &c. of *REGULAR figures*, see *POLYGON*.

REGULAR body, called also *platomic body*, is a solid terminated on all sides by regular and equal planes, and whose solid angles are all equal.

The *regular* bodies are five in number; viz. The *cube*, which consists of six equal squares; the *tetrahedron* of four equal triangles; the *octahedron* of eight; the *dodecahedron* of twelve; and the *icosaedron* of twenty; see each under its proper article. Besides these five there can be no other *regular* bodies in nature.

To measure the surface and solidity of the five *REGULAR bodies*—The solidity, &c. of the cube is shewn under the article *CUBE*—The tetrahedron being a pyramid, and the octahedron a double pyramid; and the icosaedron consisting of twenty triangular pyramids; and the dodecahedron of twelve quinquangular ones, whose bases are in the surface of the icosaedron and dodecahedron, and their vertices meeting in a centre; the solidities of these bodies are all found from what we have shewn under the article *PYRAMID*.

Their surface is had by finding the area of one of the planes, from the lines that bound it; and multiplying the area thus found by the number from which the body is denominated; e. gr. for the tetrahedron by 4; for the hexahedron or cube, by 6; for the octahedron, by 8; for the dodecahedron, by 12; and for the icosaedron, by 20—The product is the superficial area.

REG

Proportions of the sphere, and of the five REGULAR bodies inscribed therein: the diameter of the sphere being 2.

The circumference of a great circle is	6.	28318
Surface of a great circle,	3.	14159
Surface of the sphere,	12.	56637
Solidity of the sphere,	4.	18859
Side of the tetrahedron,	1.	62299
Surface of a tetrahedron,	4.	6188
Solidity of a tetrahedron,	0.	15132
Side of a cube or hexahedron,	1.	1547
Surface of the hexahedron,	8.	
Solidity of the hexahedron,	1.	5396
Side of an octahedron,	1.	41421
Surface of the octahedron,	6.	9282
Solidity of the octahedron,	1.	33333
Side of the dodecahedron,	0.	71304
Surface of the dodecahedron,	10.	51462
Solidity of the dodecahedron,	2.	78516
Side of the icosaedron,	1.	05146
Surface of the icosaedron,	9.	57454
Solidity of the icosaedron,	2.	53615

If one of these bodies be required to be cut out of the sphere of any other diameter; say, as the diameter of the sphere 2, is to the side of any one solid inscribed in the same, (suppose the cube 1. 1547.) so is the diameter of any other sphere (suppose 8.) to 9. 2376, the side of the cube inscribed in this latter sphere.

Let *dr*, then, (*Tab. Geometry*, fig. 81.) be the diameter of any sphere, and *da* $\frac{1}{2}$ of it, $= a = b = cr$. Erect the perpendiculars *ae*, *ef*, and *bg*; and draw *de*, *df*, *er*, *fr*, and *gr*; then will (1) *re* be the side of the tetrahedron; (2) *df* the side of the hexahedron; (3) *de* the side of the octahedron. (4.) And cutting *de* in extreme and mean proportion in *b*, *db* will be the side of the dodecahedron. (5) Setting the diameter *dr* up perpendicularly at *r*; from the centre *c*, to its top, draw the line *cg*, cutting the circle in *g*—Let fall the perpendicular *gb*; so is *br* the side of the icosaedron.

REGULAR curves, are such whose curvity proceeds continually in the same uniform geometrical manner—Such are the perimeters of the conic sections. See *CURVE*, *CONIC section*, &c.

Such as have a point of inflection, or regression, and which being continued to a certain point, turn themselves a contrary way are called *irregular curves*—Such are the conchoid, and the solid parabola, which has a square for its parameter. See *FLEXION* and *RETROGRESSION*.

REGULAR architecture, fortification, &c. See *ARCHITECTURE* and *FORTIFICATION*.

REGULAR Bastion. See the article *BASTION*.

REGULAR Place. See the article *PLACE*.

REGULAR, in the monastic sense, denotes a person who has made the vows in some religious house. See *RELIGIOUS* and *VOW*.

Under *regulars* are comprehended the whole body of monks, friars and mendicants, &c.

The denomination of *regulars*; in this case, arises hence, that they are bound to observe the regula or rule of the order they are entered into. Hence,

REGULAR priest is used for a priest who is in some religious order, in opposition to a *secular* priest, who lives in the world, or at large.

A cardinal is reputed both *regular* and *secular* and is entitled to the privileges of both states.

Regulars may be promoted to bishoprics and archbishoprics, as well as seculars; but their promotion secularizes them; the episcopal dignity dispensing them from the observation of the rule whereof they had before made profession.

REGULAR abbot. See the article *ABBOT*.

REGULAR benefices, are such as can only be held by monks or religious: or at least, *per cupientem profiteri*, by a person desirous to embrace the monastic life. See *BENEFICE*.

It is a maxim in the Romish canon law,—*regularia regularibus*, i. e. *regular* benefices are to be conferred on *regular* priests—The abbies that are chiefs of their respective orders are all *regular*, and can only be served by monks and cardinals. See *ABBY*—All benefices are presumed to be secular, unless they be proved *regular*.

Antiently, the *regular* benefices were almost all conferred by way of administration or curacy; the religious incumbents being always *ad manum* of their superiors, who displaced them at pleasure—Hence the common maxim among the canonists, *omne beneficium regulare manuale*.

The benefices appropriated to *regulars* are abbies, conventual priories, simple priories, and claustral offices—They may be conferred on seculars in commendam.

REGULAR canons. See the article *CANON*.

REGULAR places, are those within the boundary or inclosure of the convent; as the cloister, dormitory, chapter, and refectory

tory.—In opposition to those destined for guests, and for the necessities of the house, which are reputed without the inclosure.

REGULAR corporation. See the article CORPORATION.

REGULAR fiscal rev. See the article FOX.

REGULATION, a rule or order prescribed by a superior, for the uniform and orderly management of some branch of policy, justice, or the like.

REGULATOR of a watch, is a small spring belonging to the balance; serving to adjust the going, and to make it go either faster or slower.

RÉGULO, a title given to the sons of the emperors of China.—The emperor's eldest son, whom we call the *first regulo*, was the only one of all his children not in favour; till, of a sudden, matters took a new face. From some new intelligences, the emperor learnt the innocence of the hereditary prince whom he had deposed, and the artifices that had been used to ruin him: particularly, that the second *regulo*, to succeed therein, had had recourse to magic, and at the infatigation of certain lamae, or Tartar priests, had procured a statue to be buried in Tartary; accompanying the ceremony with several magical operations. Upon this, orders were instantly sent to seize the lamae, and to dig up the statue: the *regulo* had his palace assigned him for a prison. *Let. Edif. & Cur.*

REGULUS, *petty king*, in our antient customs, is a term frequently used in the Saxon councils, for comes or count.

Hence *sub-regulus*, was also used for a vice-comes or viscount.—Though in many places the two seem used indifferently for the same dignitary.—Thus in the archbishops of the cathedral of Worcester, Uthredus sometimes styles himself *regulus*, and sometimes *sub-regulus* of the city of Worcester.

But in other places we find a distinction—*Offa rex Merciorum; Uthredus, regulus; Aldredus, subregulus, &c.*

REGULUS, in chymistry, denotes the finest and purest part of a metal or mineral, which sinks or precipitates to the bottom of the crucible or furnace, in melting the mineral or ore.

To procure the *regulus*, that is, the mercurial parts of metals, &c. flux powders are commonly used; as nitre, tartar, &c. which purge the sulphurous part adhering to the metal, by attracting and absorbing it to themselves.

Regulus is principally used for that of antimony, which is a ponderous metallic mass, that upon fusing some of the mineral in its crude state, sinks to the bottom, leaving the scoria or impurities at the top.

The alchemists will have this matter called *regulus*, i. e. little king, as being the first born of the royal metallic blood; which is, as they express it, really a son, but not a perfect man, i. e. not yet a perfect metal for want of time and proper nourishment.

Antimony purified by simple fusion, is called *regulus of antimony*; or *regulus antimonii philosophorum*.—But the more common way of reducing it into a *regulus*, is with the addition of flux powders, as tartar and nitre. See FLUX powder.

The scoria found at the top of this *regulus* is violently emetic, as well as the *regulus* itself, whereof if cups or drinking vessels be cast, the wine put into them will become strongly vomitive.

Of this *regulus* cast in moulds are made those commonly called the *antimonial pills*, weighing about eight or ten grains each, one of which being swallowed, will operate considerably both by vomit and stool.

These pills having thus performed their office, and been discharged the body, will serve the same purpose again and again; whence they have obtained the name of *perpetual pills*.—The virtue of this *regulus* is not however inexhaustible, as has been imagined; for by repeated infusions in wine, though the liquor be made violently emetic at first, yet by degrees it loses its force, and at length ceases to be vomitive.

Martial REGULUS of antimony, is made by a mixture of little bits of iron, as the nails of horses shoes melted with the *regulus*.

In this operation the iron dissolving and absorbing the sulphurous parts of the antimony, more strongly than the fluxes in the former case, and turning it into a crocus, the antimony is hereby brought to a greater degree of purity, and rendered more efficacious than in the common *regulus*.

This *regulus* is sometimes further purified by repeated fusions and detonations, with the addition of fresh antimony, and more nitre, alternately: in which case it becomes *regulus antimonii stellatus*, or the *starry regulus of antimony*.

REGULUS of arsenic. See the article ARSENIC.

REGULUS, in astronomy, is a star of the first magnitude, in the constellation *leo*; called also from its situation, *cor leonis*: or the lion's heart; by the Arabs, *alabor*: and by the Chaldeans, *kabbeled*, or *kabbeledid*, from an opinion of

its influencing the affairs of the heavens; as is observed by Theon.

The longitude of *regulus*, as fixed by Mr Flamsteed, is 25°, 31', 20"; and its latitude 0°, 26', 38" North. See LEO.

REHABILITATION, *REHABILITATIO*, in the civil and canon law, an action whereby a prince or pope, by dispensations or letters patent, restores a delinquent to the condition he was in before his delinquency. See DEGRADATION.

The king alone can *rehabilitate* an officer noted, condemned and degraded; or a gentleman who has derogated from his rank.

The pope alone pretends to *rehabilitate*, i. e. to render capable of benefices and orders, such as had fallen into heresy, or other irregularities.

In Romish countries, an ecclesiastic who assists at the execution of a sentence of death, is to be *rehabilitated*, by an abolition, called a *sevis*.

REHEARSAL, in music and the drama, an essay, or experiment of some composition, which is made in private, previous to the representation or performance thereof in public; to habituate the actors or performers, and make them more ready and perfect in their parts.—There is a new tragedy in *rehearsal*—the *rehearsal* of the anthem, &c.

REI domesticæ domesticus. See DOMESTICUS.

REIMBURSEMENT, in commerce, the act of repaying, or returning what monies a person had received, by way of advance, &c. or what another has disbursed or paid for us, A person who gives a bill of exchange in payment, is to *reimburse* it, if it come to be protested, for want of being accepted or paid.

REIMBURSING is also used for paying the price a commodity costs its owner.—Thus, he has *reimbursed* me the lot of merchandise adjudged to him at the *London*, by the directors of the East-India company, on condition of *reimbursing* the price of the purchase, with the expences of carriage, and a profit of 5 per cent.

REINFORCED, or **REINFORCED**, *rings*, of a cannon, is that next after the trunnions, betwixt them and the muzzle hole.

REINFORCEMENT, in war, a supply, or new provision of men, arms, ammunition, &c.

REINTEGRATION. See the article REDINTEGRATION.

REINS*, in anatomy, the kidneys; or that part of an animal whereby the urine is separated from the blood. See KIDNEYS.

* The word, according to Varro, is formed from the Greek, *ῥέειν*, *quasi rivus effluens humeris ab his oriantur*—The Greeks call the *reins*, *νεῖα*, from the verb, *νεῖν*, to rain, flow, &c.

In the manage they say, a horse should have *double reins*; that is, he should have them a little more elevated on each side of the back-bone, than upon it; so that passing your hand along it, you find it large, well furnished and double, by the hollow that goes all along the back-bone.—The back should be firm, and not hollow, or bending from the withers to the croup, but straight.

REINS, of a bridle, also denote two straps of leather meeting in the bridle-hand of the horseman, in order to make the bit bear, and keep the horse under subjection. See BRIDLE.

False REINS is a lath of leather, passed sometimes through the arch of the banquet, to bend the horse's neck.

REINS of a vault. See the article VAULT.

REINSTATING, the restoring of a person or thing to its former state or condition, from whence it had been disturbed or displaced. See REHABILITATION.

REJOINTING, or **REJOYNTING**, in architecture, the filling up the joints of the stones in old buildings, &c. when worn hollow by course of time, or by weather.

Rejointing is to be performed with the best mortar; as that of lime, and cement; sometimes, also with plaster, as in the joints of vaults, &c.

REJOYNDER, in law, the defendants answer to the plaintiff's replication.

The order in the court of chancery is thus—First, the defendant puts in an answer to the plaintiff's bill, which is sometimes also called an *exception*: the plaintiff's answer to this is called a *replication*; and the defendant's answer to that, a *rejoinder*; answering to what the civilians call *duplicatio*. See CHANCERY, &c.

REIS, **RE**, or **RES**. See the article REE.

REITERATED grafting. See ENGRAFTING.

REITERATING, in printing. See PRINTING.

REITERATION, the act of repeating a thing, or doing it a second time.

The church does not allow of the *reiteration* of baptism. See BAPTISM.—St Gregory observes, that it is no *reiteration* when there are wanting proofs of the thing's having been regularly done before.

In pleurisy, the physicians order the bleeding to be *reiterated* six or seven times.

REITTERS, an ancient title given the German cavalry—The word is originally High Dutch, and signifies a horseman, cavalier; or even knight.

RELAPSES, a return or back-sliding into a danger or evil, out of which a person had escaped.

Fever, dropsies, &c. are diseases into which *relapses* are very frequent and dangerous—Such a person is *relapsed* into a heresy he had abjured.

RELATION*, **RELATIO**, in philosophy, the mutual respect of two things; or what each is with regard to the other.

* The word is formed a *referendo*; relation consisting in this, that one thing is *referred* to another; whence it is also called *respect*, *habitude*, and *comparison*.

The idea of *relation* we acquire, when the mind so considers any things, that it doth, as it were, bring it to, and set it by, *an* *other*, and carry its view from the one to the other—Hence the denominations given to things intimating this respect, are called *relatives*; and the things so brought together, are said to be *related*.

Thus, when I call Caius *husband*, or this wall *whiter*, I intimate some other person or thing in both cases, with which I compare *him* or *it*—Hence the wall is called by the schoolmen the *subject*, the thing it exceeds in whiteness the *term*, and the whiteness the *foundation* of the *relation*.

Relation may be considered two ways; either on the part of the mind referring one thing to another: in which sense *relation* is only a mode or affection of the mind, whereby we make such comparison: or on the part of the things referred, which being no other than ideas, *relation*, in this sense, is only a new idea resulting or arising in the mind upon considering of two other ideas—So that *relation*, take it as you will, is only in the mind, and has nothing to do with the things themselves.

Any of our ideas, Mr Lock observes, may be the foundation of *relation*—Though, where languages have failed to give correlative names, the *relation* is not easily taken notice of; as in concubine, which is a *relative* name, as well as wife.

There is, in effect, no idea but is capable of an infinite number of *relations*: thus, one single man may at once sustain the *relations* of father, brother, son, husband, friend, subject, general, European, Englishman, islander, master, servant, bigger, less, &c. to an almost infinite number; he being capable of as many *relations* as there can be occasions of comparing him to other things in any manner of agreement or disagreement, or any respect whatsoever.

The ideas of *relations* are much clearer and more distinct than those of the things *related*; because the knowledge of one simple idea is oftentimes sufficient to give the notion of a *relation*; but, to the knowing of any substantial being, an accurate collection of several ideas is necessary.

The perception we have of the *relations* between various ideas wherein the mind acquiesces, makes what we call *judgment*—Thus, when I judge 2 times 2 make 4, or does not make 5, I only perceive the equality between 2 times 2 and 4, and the inequality between 2 times 2 and 5.

The perception we have of the *relations* between the *relations* of various things, constitutes what we call *reasoning*—Thus, when from this, that 4 is a smaller number than 6; and that twice 2 is equal to 4, I gather, that twice 2 is a less number than 6, I only perceive together the *relation* of the numbers twice 2 and 4, and the *relation* of 4 and 6.

The ideas of cause and effect, we get from our observation of the vicissitude of things, while we perceive some qualities or substances begin to exist, and that they receive their existence from the due application and operation of other beings—That which produceth, is the cause; that which is produced, is the effect.

Thus, fluidity in wax is the effect of a certain degree of heat, which we observe to be constantly produced by the application of such heat.

The denominations of things taken from time, are, for the most part, only *relations*—Thus, when it is said, that queen Elizabeth lived sixty-nine, and reigned forty-five years, no more is meant, than that the duration of her existence was equal to sixty-nine, and of her government to forty-five, annual revolutions of the sun; and so are all words answering to how long.

Young and old, and other words of time, that are thought to stand for positive ideas, are indeed *relative*, and intimate a *relation* to a certain length of duration, whereof we have the idea in our minds—Thus, we call a man young or old, that hath lived little or much of that time, which men usually

attain to: and thus a man is called young at twenty, but as horse old at the same period.

There are other ideas, that are truly *relative*, which we signify by names that are thought positive and absolute; such as great and little, strong and weak—The things thus denominated, are referred to some standards, with which we compare them: thus, we call an apple *great*, which is bigger than the ordinary sort of those we have been used to; and a man *weak*, that has not so much strength or power to move as men usually have, or as others of his own size have.

Authors give various divisions of *relations*—The school philosophers commonly divide them into those of *origination*, under which are comprehended the *relations* of cause and effect; those of *negation*, which are between opposite things; and those of *affirmation*, which are *relations* of agreement between whole and part, the sign and thing signified, the adjunct and subject—This division is founded upon this; that the mind can only compare things three ways, *viz.* by inferring, denying, and affirming.

Others divide *relations* into those of *origination*; those of *agreement*, *e. gr.* similitude, parity, &c. those of *diversity*; and those of *order*, as priority, posteriority, &c.

Others divide them into *predicamental* and *transcendental*—Under the first come those *relations* between things that belong to the same predicament, *e. gr.* between father and son. To the latter belong those which are more general than the predicaments, or are of different predicaments; as the *relations* of substance and accident; of cause and effect; and of creator and creature.

Mr Lock gives us a distribution of *relations* on a different bottom—All simple ideas, he observes, wherein are parts or degrees, afford an occasion of comparing the subjects, wherein they are to one another in respect of those simple ideas; as whiter, sweeter, more, less, &c.—These, depending on the equality and excess of the same simple idea, in several subjects, may be called *proportional relations*.

Another occasion of comparing things being taken from the circumstances of their origin, as father, son, brother, &c.; these may be called *natural relations*.

Sometimes the foundation of considering things is some act, whereby any one comes by a moral right, power, or obligation, to do something: such are general, captain; burgher; these are *instituted* and *voluntary relations*, and may be distinguished from the natural, in that they are alterable and separable from the persons to whom they sometimes belonged, though neither of the substances so related be destroyed.

But *natural relations* are not alterable, but are as lasting as their subjects.

Another *relation* is the conformity or disagreement of mens voluntary actions to a rule, to which they are referred, and by which they are judged of: these may be called *moral relations*.

It is this conformity or disagreement of our actions to some law (whereby good or evil is drawn on us from the will and power of the law-maker, and is what we call *reward* or *punishment*) that renders our actions morally good or evil.

Of these moral rules or laws there seem to be three sorts, with their different enforcements. First, the divine law: secondly, civil law: thirdly, the law of opinion or reputation. By their *relation* to the first, our actions are either sins or duties; to the second, criminal or innocent; to the third, virtues or vices.

RELATION, in logic, is an accident of substance, accounted one of the ten categories or predicaments.

Each substance admits of an infinity of *relations*—Thus, the same Peter, considered with regard to Henry, is in the *relation* of a master; with regard to John, in that of a tenant; with regard to Mary, in that of a husband, &c. Again, with regard to one person he is rich; with regard to another poor; with regard to another he is far, near, tall, short, a neighbour, stranger, learned, unlearned, good, bad, equal, &c. It is disputed among the school philosophers, whether or no the *relation* be a thing formally and really distinct from the foundation of the substance.

RELATION is also used, in the school theology, to denote certain of the divine perfections, called *personal ones*; in regard, by these one divine person is referred to another, and distinguished from it.

Hence they teach, that in God there is one nature, two processions, three persons, and four *relations*.

These *relations* are paternity, filiation, active spiration, and passive spiration. See **PATERNITY**.

RELATION, in geometry, arithmetic, &c. is the habitude or respect of two quantities to one another, with regard to their magnitude—This we more usually call *ratio*, or *reason*. See **RATIO**.

The equality or sameness of two such *relations* we call *proportion*.

RELATION, in grammar, is the correspondence which words have to one another in construction.

Faulty and irregular *relations* are the things chiefly to be guarded against, in writing correctly; they make the sense obscure, and frequently equivocal.—Thus: the orator was attended to with a coldness, which was the more remarkable, as the audience were under some emotion before he began—Here *coldness* being put indeterminate, the *relation* which can have no just and regular *relation* thereto.

RELATION is also frequently used for analogy, or what several things have in common.

In painting, architecture, &c. a certain *relation* of the several parts and members of the building or picture, constitutes what we call *symmetry*.

RELATION *inharmenical*, in musical composition, is that whose extremes form a false, or unnatural interval, incapable of being sung.

This is otherwise called a *false relation*, and stands opposed to a *just or true relation*.

RELATION, in law, is where two things, as times, &c. are considered as if they were one; the thing subsequent being considered as taking effect, by *relation*, at the time preceding.

As if A deliver a writing to B, to be delivered to C, as the deed of A; the writing shall be deemed to be delivered to C, at the time when it was given to B, by *relation*.

So bills in parliament to which the king assents on the last day of parliament shall relate, and be of force from the first day thereof. Coke calls this *fictio juris*.

RELATIVE *propositions*, are such as include some relation and comparison.

Thus, where the treasure is, there will the heart be—As much as thou hadst, to much thou art worth, &c. are *relative propositions*.

RELATIVE *gravity*. See GRAVITY.

RELATIVE *levity*. See LEVITY.

RELATIVE *motion*. See MOTION.

RELATIVE *necessity*. See NECESSITY.

RELATIVE *place*. See PLACE.

RELATIVE *space*. See SPACE.

RELATIVE *time*. See TIME.

RELATIVE *velocity*. See VELOCITY.

RELATIVE *terms*, in logic, are words which imply a relation, or a thing considered as compared to another.

Relative terms include a kind of opposition between them; yet so, as that the one cannot be without the other.

Such are *father and son, husband and wife, king and subjects*, &c.

RELATIVE, in grammar, is a word or term which in the construction answers to some word foregoing, called the *antecedent*.

Pronoun RELATIVE, which Buffier chuses rather to call *modificative or determinative*, is a participle added after a noun, or personal pronoun, with which it has an affinity, to that without them it signifies nothing; its only use being to express in what view they are considered.

Of this kind, in the Latin, are *quis, quæ, quod*, &c. in the English, *who, which, whom*, &c. As in the book *which* you are reading; the man *whom* you seek; he *who* told it, &c. —Where *which, whom, and who* only follow the noun or pronoun, to refer or determine them to some particular thing; as to seeking, reading, &c.

Frequently, the noun or pronoun wherewith the *relative* is joined, is understood: as *I know who* did that. Where it is evident I mean, I know the person who did, &c.

RELAXATION, RELAXATIO, in medicine, &c. the act of loosening or slackening the tone or tension of the fibres, nerves, muscle, &c.

The *relaxation* of a muscle is supposed to be effected, either by the perspiration of the nervous spirits, or the regress of the spirits, blood, &c. which inflated its fibres; or by the contraction of the air, in the globules of blood before expanded by the sudden influx and admixture of the spirits, &c.

RELAXATION, in chirurgery is a preternatural extension, or straining of a nerve, tendon, muscle, or the like; either through violence, or weakness.

Hernias are descents or *relaxations* of the intestines, &c. From the same cause arise descents or prolapsions of the anus, &c.

RELAXATION, in law, is used for a *releasing*. See RELEASE.

In this sense we say the *relaxation* of an attachment in the court of admiralty.

The tenor of indulgences is a *relaxation*, or diminution of the pains of purgatory.

RELAY, a fresh equipage, horse, &c. sent before, or appointed to be ready, for a traveller to change; to make the greater expedition: as in riding post.

The term is borrowed from the French, *relais*, which signifies the same thing.—In France, the general of the posts entitles himself superintendent of the *relays*.

RELAYS, in hunting, are fresh sets of dogs, or horses, or both, disposed here and there for readiness, in case the game come that way, to be cast off, or to mount the hunters in lieu of the former, which are supposed to want respite.

RELAY, in tapestry, is an opening left in a piece of tapestry, where the colours or figures are to be changed; because, on those occasions, the workmen are changed; or else the places are left to be filled up till the rest of the work is done. See TAPESTRY.

RELEASE, RELAXATIO, in law, denotes an instrument, whereby estates, rights, titles, entries, actions, and other things, are sometimes extinguished and annulled, sometimes transferred, sometimes abridged, and even sometimes enlarged. A *Release* is either in fact or in law.—A *release in fact* is that which the very words do expressly declare.

A *release in law* is that which acquits by way of consequence, or intendment of law.

RELEGATION, RELEGATIO, a kind of exile or banishment, wherein the obnoxious person is commanded to retire to a certain place prescribed, and to continue there till he be recalled.

Lord Coke calls *relegation* a banishment for a time only: Courtin more adequately defines *relegation* a banishment to a certain place for a certain term.

In Rome, *relegation* was a less severe punishment than deportation, in that the *relegated* person did not thereby lose the rights of a Roman citizen, nor those of his family, as the authority of a father over his children, &c. See BANISHMENT.

RELICKS, RELIQUÆ, in the Romish church, certain remains of the body or clothes of some saint or martyr, devoutly preserved in honour to his memory, carried at processions, killed, revered, &c.

The abuses of that church in point of *relics* are very flagrant: F. Mabillon, a Benedictin, complains of the great number of suspected *relics* exposed on altars: he owns, that, were there to be a strict inquiry into the *relics*, vast numbers of spurious ones would be found offered every-where to the piety and devotion of the faithful; and adds, that bones are frequently consecrated, so far from belonging to saints, that, in all probability, they do not belong to christians.

The catacombs are an inexhaustible fund of *relics*; yet it is still disputed who were the persons interred therein.

In the eleventh century, a method was introduced of trying supposed *relics* by fire—Those which did not consume in the fire, were reputed genuine; the rest not.

It is an ancient custom, which still obtains, to preserve the *relics* in the altars whereon mass is celebrated—To this purpose, a square hole is made in the middle of the altar, big enough to receive the hand; and herein is the *relic* deposited, being first wrapped in red silk, and included in a leaden box.

The Romanists alledge a good deal of antiquity in behalf of their *relics*—The Manichees, it seems, out of hatred to the flesh, which they held an evil principle, are recorded as refusing to honour the *relics* of saints; which is esteemed a kind of proof, that the catholics did it in the first ages.

Indeed, folly and superstition got into religion but too early.

—Even the touching of linen cloths on *relics*, from an opinion of some extraordinary virtue derived therefrom, appears to be as ancient as the first ages, there being a hole made in the coffins of the forty martyrs at Constantinople, expressly for this purpose.

RELICT, RELICTA, in law. See the article WINDOW.

RELICTA *verificatio*, in law, is when a defendant relinquishes his proof or plea, and thereupon judgment is entered for the plaintiff.

RELIEF, RELEVUM, levamen, in law, a fine paid to the chief lord, by a person at his coming to the inheritance of land held in capite, or by military service.

This was said *relevare hereditatem caducam*, and the money thus paid was called *relevamen, relevum, or relief*—Relief is usually to the value of a year's rent or revenue.

The origin of the custom is thus—A feudatary or beneficiary estate in lands, being at first only granted for life, after the death of the vassal, it returned to the chief lord; and was hence called *feudum caducum*, q. d. fallen to the lord by the death of the tenant.

In course of time, these feudatary estates being converted into inheritances by the connivance and consent of the lord; when the possessor of such estate died, it was called *hereditas caduca*, q. d. an inheritance fallen to the lord, from whom it was to be recovered, by the heirs paying a certain sum of money.

This

This *relief* was established after the conquest—For till that time *harvots* were paid the lord, at the death of his tenant; consisting of horse, arms, &c.

But upon the conquest the poor people being deprived of all such things by the Normans, a form of money was substituted in lieu thereof, which was called a *relief*; and this continues in some places to this day—However, it is true, that *relief* and *harvot* are frequently confounded in antient writers.

RELIEF *reasonable*, called also *lawful*, and *antient relief*, is that enjoined by some law, or fixed by antient custom; and which does not depend on the will of the lord.

Thus in a charter of king John, mentioned by Matt. Paris—*Si quis comitum vel baronum nostrorum sine aliorum tenentium de nobis in capite per servitium militare, mortuus fuerit & cum decesserit, haeres suus plene aetatis fuerit & relevium debet, habet levationem suam per antiquum relevium.*

What this was may be seen in the laws of William the Conqueror, &c.—Bracton says, this fine was called a *relief*, *quia hereditas quae jurem fuit per antecessoris decessum relevatur in manus baronum*, &c.

A *relief* is also paid in socage tenure, or petit serjeanty; where a rent or other thing is paid by rendering as much as the rent or payment reserved.

By the custom of Normandy, *relief* is due for lands held in villinage, as well as in fee—By the custom of Paris, *relief* is not due on inheritances in the direct line.

The quantity of the *relief* is very different; there are *single reliefs*, *double reliefs*, &c. The quality, too, is diverse; there are *reliefs of property*, paid by the heir: *reliefs of bail*, or *tutorage*, paid by a guardian for his minor, or by the husband for the fees of his wife, &c. *Relief of horse and arms*, &c.

By the laws of king Canutus, the *relief* of an earl, paid to the king, was eight war-horses with their bridles and saddles, four cuirasses, four helmets, four swords, four hunting-horses and a palfrey—The *relief* of a baron or thane was four horses, &c.

RELIEF, in chancery, denotes an order sued out for the dissolving of contracts, and other acts, on account of their being unreasonable, prejudicial, grievous, or from some other nullity, either *de jure*, or *de facto*.

Minors obtain *relief* against acts passed in their minority—Majors have *relief* in cases of enormous damage, deceit, violence, over-reaching, extravagant bargains, &c.

Among the Romanists it is a rule, that the church obtains *relief* any time, and against all acts passed in its prejudice; no prescription prevailing against it.

Relief. See the article **AID**.

RELIEF of a hare, among hunters, is the place where she goes to feed in the evening.

RELIEF, in sculpture. See the article **RELIEVO**.

RELIEVE, in the military sense—To *relieve* is to take the post of another body—Hence, to *relieve* the guard, to *relieve* the trenches, &c. is to bring fresh men upon the guard, or to the trenches, and to send those to rest who have been upon duty before. They also say, *relieve* a sentinel, *relieve* the freer-man, &c.

RELIEVO, or **RELIEF**, *imboisement*, is applied to a figure which projects or stands out, prominent, from the ground or plane whereon it is formed, whether that figure be cut with the chisel, moulded or cast. There are three kinds of *relievo*: viz. *alto*, *bas*, and *semi-relievo*.

ALTO-RELIEVO, *haut relief*, or *high relieve*, is when the figure is formed after nature, and projects as much as the life.

BASSO-RELIEVO, *bas-relief*, or *low relieve*, is when the work is but raised a little from its ground, as we see in medals, and in the frontispieces of buildings, particularly the histories, festoons, foliage, and other ornaments in friezes.

SEMI-RELIEVO is when one half of the figure rises from the plane, i. e. when the body of a figure seems cut in two, and one half is clapped on a ground—When in a *basso relieve* there are some parts that stand clear out, detached from the rest, the work is called a *semi-basse*.

RELIEVO, in architecture, denotes the fall or projecture of any ornament.

This, Daviler observes, is always to be proportioned to the magnitude of the building it adorns; and the distance at which it is to be viewed.

If the work be insulate and terminated on all sides, it is called a *figure in relieve*, or a *round imboisement*. Such are statues, acroters, &c.

RELIEVO in painting, denotes the degree of force or boldness whereby a figure seems, at a due distance, to stand out from the ground of the painting, as if really imboised.

The *relievo* depends much on the depth of the shadow, and the strength of the light; or on the height of the different colours bordering on one another; and particularly on the

difference of the colour of the figure from that of the ground.

When the light is well chosen, to make the nearest parts or figures advance; and well diffused on the masses, still diminishing insensibly, and terminating in a large specious shadow, brought off insensibly; the *relievo* is said to be *bold*, and the *claire-obscur*, *well understood*.

RELIGION, **RELIGIO**, that worship or homage due to God, considered as creator, preserver, and, with Christians, as redeemer of the world.

The foundation of all *religion* is, that there is a God, and that he requires some service at the hands of his creatures—From the different manners wherein we arrive at the knowledge of this service *religion* is divided into *natural* and *revealed*.

Natural RELIGION is whatever we desire to be due and meet by the mere dictates of natural reason; as to love and honour God, not to abuse his creatures, &c.

Revealed RELIGION is what we learn to be due by some supernatural means; as by an express declaration of God himself, by the mouths of prophet, &c.

The first flows immediately from the relation between the creature and the creator; the latter does not follow from such a relation, but is super-added from the mere will and pleasure of the creator.

The first we ordinarily call *morality*, or *ethics*; because immediately conversant about the manners and duties of men towards one another; and towards themselves, considered as creatures of that being.

The latter we call by way of eminence *religion*, as being the rule of our duty immediately to God himself.

The first supposes a God, a providence, a future state, rewards and punishments; the latter likewise supposes an immediate mission from God himself, attested by miracles, &c.

RELIGION is more particularly used for that special-system of faith and worship, which obtains in this or that country; in this or that sect; this or that age, &c.

In this sense we say the *Romish religion*, the *Reformed religion*, the *religion* of the Greeks, the *Mahometan religion*, the *Jewish religion*, &c. See **JUDAISM**, **MAHOMETANISM**; and the rest, under their proper heads.

The Siamese hold the diversity of *religions*, i. e. the different manners of honouring God, to be pleasing to him; inasmuch as they have all the same object, and all tend to the same end, though by different means. *Claude*.

This sentiment of these idolaters is doubtless more just than that of our zealots, who hold all but those of their own religion odious to God—These several sects in *religion* see under their proper articles; see also **SECT**.

The *religion* of the ruling part of the world—You may find a lively description of it in a chorus in Seneca's *Troas*, at the end of the 2d act; beginning thus: *Verum est, an timidas fabula decipit? Umbras corporibus vivere conditis*, &c. This, according to Patin, is the religion of princes, and great men, of magistrates, monastic superiors, and even some physicians and philosophers. M. du Maine, head of the leaguers in France, used to say, that princes have no religion till after they are turned of 40—*Cum numine nobis mors instans majore facit*. Patin. Lett. Choif. 106.

RELIGION, again, is applied to a military order, consisting of knights who live under some certain rule, &c.

In this sense we say the *religion* of *Malta*, &c. See **MALTA**.

RELIGION, is sometimes also used for a convent—Thus we say, there are *religions* of men, i. e. monks; *religions* of women, i. e. nuns—There are new *religions* established every day, i. e. there are continually new monasteries built.

The **RELIGION** used absolutely denotes the reformed in France—Thus, they say, d'Abzacourt and Dacier were of the *religion*. See **HUGUENOT**.

RELIGIOUS, in a general sense, something that relates to *religion*.

We say, a *religious* life, *religious* society, &c. See **SOCIETY**.

Churches and church-yards are *religious* places—A *religious* war is also called a *crusade*.

RELIGIOUS, is more particularly used for a person engaged by solemn vows to the monastic life; or a person shut up in a monastery, to lead a life of devotion and austerity, under some rule or institution.

The male *religious* we popularly call *monks* and *friars*; the female, *nuns* and *canonesses*. See **NUN**, **MONK**, **CANON**, &c.

M. Nicole observes, that some domestic chagrins, and a certain pride, which leads people to abscond when they cannot make a figure to their mind, makes as many *religious* as real piety—He adds, that a girl must often be made a *religious* for no other reason, but because she cannot be married answerable to her condition.

A *reli-*

A *religious* cannot make any will.—By the council of Trent, a *religious* may reclaim his vows within five years. See RECLAIM.

Antiently the *religious* were all laymen, and it was even prohibited them to take up orders.—In 1557 the parliament of Paris made a difficulty of receiving a bishop of Laon to the oath of a duke and peer; by reason of his being a *religious*: yet a *religious* being promoted to a bishopric, is thenceforth secularized or dispensed from the observance of his rule.

In ancient deeds and conveyances of lands, we often find the seller refrained from giving or alienating it, *viris religiosis vel Judæis*, to *religious* or to Jews; to the end the land might not fall into mortmain.

In a memorial directed by king John to his viscounts, they are ordered to proclaim through their respective counties, that no body, as they love their bodies and cattle, injure the *religious* or clerks, either in word or deed; on penalty of being hanged up on the next oak.—*Nulli sicut diligunt corpora & catalla sua malum faciant vel dicant viris religiosis vel clericis—Si quem inde attingere possimus ad proximam quercum eum suspendi faciemus.*

RELIGIOUS order. See the article ORDER.

Most military orders pretend, likewise to be *religious*; as those of Malta, who make vows, &c. See MALTA.

RELIQUA, the remainder or debt, which a person finds himself debtor in, upon the balancing and liquidating an account.

Hence, *reliquitary*, the debtor of a *reliqua*; as also a person who only pays piece-meal.—The term *reliqua* is pure Latin.

RELIQUARY, a shrine or casket, in which the relics of a dead saint are kept.

RELIQUE, RELICKS, in antiquity, the ashes and bones of the dead, which remained after burning their bodies; and which they very religiously gathered and put in urns, and afterwards deposited in tombs.

REMAINDER, REMANENTIA, in law, an estate limited in lands, tenements, or rents, given to a person at second hand, to be enjoyed after the decease of another, to whom the same is given immediately, or at first hand.

A man grants lands to one for term of life, the *remainder* to another for the term of his life; which *remainder* may be either for a certain time, or in fee simple, or fee tail.

Spelman makes the difference between a *remainder* or *reversion* to consist in this; that by a reversion, after the appointed term, the estate returns to the donor, or his heirs, as the proper fountain; whereas by *remainder* it goes to some third person, or stranger.

Glanville observes, that bishops and abbots, in regard their baronies are the king's alms, cannot give any part thereof by way of *remainder*.

REMAINDER, in mathematics, is the difference; or that which is left after the taking a lesser number, or quantity, from a greater.

RE-MARRYING, the repeating of a marriage; or the going through the solemnities of a second marriage. Clandestine and uncanonical marriages are deemed null; and the parties are to be re-married in form; at least it had always better be so to avoid disputes.

It was antiently expressly forbid to re-marry in the first year of viduity.—M. Bayle observes, that a person who does not re-marry, is answerable to the public for all the time lost in his viduity, or widowhood.

REMEDY, REMEDIUM, in physic, a medicine, or preparation applied either internally or externally, for the cure of a disease.

Emplasters, unguents, cataplasms, &c. are *topical remedies*.—Mercury and the bark are *specific remedies*. Mineral waters, and asses milk, and country-air, are usually the *last remedies*.—Salivation is sometimes called by way of eminence, the *remedy*.

When *remedies* are stuffed with too many ingredients, they load the stomach with a slimy mucilage, which swells, obstructs, and does more hurt than good.

REMEDIES appended. See the article APPENDED.

REMEMBRANCE, is when the idea of something formerly known, recurs again to the mind, without the operation of a like object, on the external sensory. See MEMORY, REMINISCENCE, and RECOLLECTION.

REMEMBRANCERS of the exchequer, are three officers, or clerks therein, formerly called *clerks of the remembrance*.

They are now distinguished by the appellations of the *king's remembrancer*, the *lord treasurer's remembrancer*, and the *remembrancer of the first fruits*.—Their business is to put the lord treasurer and justices of the court in remembrance of such things as are to be called upon, and dealt in for the king's benefit.

The king's REMEMBRANCER enters into his office all recognizances taken before the barons, for any of the king's

debts, for appearance; or for observing orders; and makes out process against the collectors of customs, subsidies, and fifteenths, for their accounts.—All informations upon penal statutes are entered in this office, and there all matters upon English bills in the exchequer-chamber remain.—He makes the bills of composition upon penal laws, takes the statement of debts; has delivered into his office all manner of indentures, fines, and other evidences whatsoever that concern the assuring of any lands to the crown: he every year in *crastino annuarum*, reads, in open court, the statute for election of sheriffs, and gives them their oath, and reads the oath of all the officers of the exchequer, when they are admitted.

The *lord treasurer's* REMEMBRANCER, is charged to make process against all sheriffs, escheators, receivers, and bailiffs, for their account: process of fieri facias, &c. extent for any debts due to the king, either in the pipe, or with the auditors, and process for all such revenues as are due to the king, by reason of his tenures.—He also makes record, whereby it appears whether sheriffs, or other accountants, pay their profits due to Easter and Michaelmas.—He makes another record, whether sheriffs or other accountants keep their days of prefoxion: all extorts or fines, illuses, and amerciaments, set in any of the courts of Westminster, or at the assizes or sessions, are certified into his office, and are by him delivered to the clerk of the extorts to write process upon them, &c.

The REMEMBRANCER of the first fruits takes all compositions and bonds for first-fruits and tenths; and makes process against such as do not pay the same.

REMINISCENCE, REMINISCENTIA, is that power of the human mind, whereby it recollects itself, or calls again to its remembrance such ideas or notions as it had really forgot: in which it differs from *memory*, which is a treasuring up of things in the mind, and keeping them there, without forgetting them.

Hence *memory* may be considered as a continual *remembrance*; and *reminiscence*, as an interrupted *memory*.

How near a-kin soever the two faculties may seem, yet they are generally found separated; so that they who excel in the one, are usually defective in the other.

The antient Platonists were of opinion, that all learning and knowledge consisted in the *reminiscence* or recollection of notions which had been in the soul before its union with the body.

REMINISCERE, the second Sunday in Lent; antiently thus called from the first word of the introit of the mass said for that day, *reminiscere miserationum tuarum*.

REMISIT—*Recto quando dominus* REMISIT. See RECTO.

REMISSION, REMISSIO, in physics, the abatement of the power or efficacy of any quality.—In opposition to the increase of the same, which is called its *intension*.

In all qualities capable of intension and remission, the intension decreases reciprocally as the squares of the distance from the centre of the radiating quality increase.

REMISSION, in medicine, is when a distemper abates, but does not quite off, before it returns again; as is common in fevers which do not quite intermit.

REMISSION, in law, &c. denotes the pardon of a crime, or the giving up the punishment due thereto.

REMIT, in commerce.—To remit a sum of money, bill, or the like, is to send a sum of money, &c.

To remit is also used among bankers for what is accustomed to be given a banker, or, as it were, discounted with him, for his giving a bill of exchange.

To remit is also to give up part of one's due to a debtor; as, I would remit you a fourth of what you owe on condition of paying me the rest in hand.

REMITTANCE, in commerce, the traffic or return of money from one place to another, by bills of exchange, orders, or the like.

A *remittance* is properly a bill of exchange, or the like, sent to a correspondent, and the content thereof to be received by him or some other person, on whom it is drawn.

Such a merchant has *remitted*, or made a *remittance* of five thousand pounds in bank notes, to his correspondent at London.—I will remit you, or make you a *remittance* of five hundred crowns in three bills of exchange, drawn on N. banker in your city, and payable at sight.

By means of these *remittances*, large sums of money are returned from one city to another, without danger, without carriage, &c.

In London it is easy getting *remittances* upon any city in the world; in the country it is more difficult. *Remittances* are not easily had upon Copenhagen.

Book of REMITTANCES. See the article BOOK.

REMITTANCE is also used in speaking of the payment of a bill of exchange.—Thus, I have received an hundred pistoles on your *remittance*.—Mr. N. banker in your city, should have paid you two hundred crowns on my *remittance*.

REMIT-

REMITTANCE also denotes the due or fee allowed the banker, both of his wages, and the different value of the species in the place where you pay the money, and where he remits it.

The remittance at London is very high—This remittance is more usually called *change* and *recharge*. See **RECHANGE**.

REMITTER, in law—Where a man has two titles to land, and is seized by the latter, and that proving defective, he is remitted or referred to the former more ancient title: this is called a *remitter*, from the Latin, *remittere*, to send back.

If land defend to him that had right to it before, he shall be remitted to his better title, if he please.

REMITTING fever. See the article **FEVER**.

REMONSTRANCE, an expostulation, or humble supplication, addressed to a king, or other superior, to beseech him to reflect on the inconveniences, or ill consequences, of some order, edict, or the like.

The parliament of Paris went in a body to make humble remonstrances to the king, on the subject of such a declaration.

REMONSTRANCE is also used for an expostulatory council or advice; or a gentle and handsome reproof, made either in general or particular, to apprise or to correct some fault—A mother makes remonstrances to her daughter, &c.

REMONSTRANTS, **REMONSTRANTES**, a title given to the Arminians, by reason of the remonstrance they made in 1610, against the synod of Dort, wherein they were condemned.

Episcopius and Grotius were at the head of the remonstrants. See **CONTRA-REMONSTRANTS**.

REMORA, in natural history, the sucking fish; a little fish, resembling a herring, called by the Greeks *echeneis*, famous for sticking to the sides of ships.

It is much talked of by the ancients, who, as we find from *Pliny*, lib. 32. c. 1. unanimously believed it had the force to stop a vessel in full sail, or a whale in swimming; and hence called it *remora*, a *remorando*.—But Mr. Cateby observes, that even several of those fishes together can do no more than shells or corals, and other foulnesses of the same bulk, which make a ship sail somewhat the slower.—And in the same manner only they may be some small hindrance to a whale. The author last-mentioned assures us he has taken five of them off the body of a shark. Vide *Philos. Trans.* N^o. 438. p. 113. See **Supplement** article **REMORA**.

REMORA, among surgeons, is also an instrument to set broken bones withal.

REMOUNT, in war—To **REMOUNT** the cavalry, is to furnish troopers or dragoons with fresh horses, in lieu of such as have been killed or disabled in the service.

REMPLY, in heraldry, something filled up—The term is chiefly used to denote, that the chief is quite filled up with a square piece of another colour, leaving only a bordure of the proper colour of the chief about the said piece.

RENAL, **RENALIS**, something belonging to the reins or kidneys.

RENAL glands, **glandule RENALES**, in anatomy, are glands thus called, because situate near the reins or kidneys, first discovered by Bar. Eustachio, native of San Severino in Italy.

They are also called *capsule atrabilaris*, in regard their cavity is always found full of a blackish liquor; and by others *renes succenturiati*, because resembling kidneys in form. See **RENES succenturiati**.

RENCOUNTER*, in the military art, the encounter of two little bodies or parties of forces.

* The word is formed from the French, *rencontre*, meeting.

In which sense, *rencounter* is used in opposition to a pitched battle—It was no battle; it was only a *rencounter*.

RENCOUNTER, in single combats, is used by way of contradistinction to duel.

When two persons fall out, and fight on the spot, without having premeditated the combat, it is called a *rencounter*—It is no duel, it is a *rencounter*. See **DUEL**.

RENCOUNTER, or **RENCENTRE**, in heraldry, is applied to animals when they shew the head in front, with both eyes, &c. or when the face stands right forward, as if they came to meet the person before them.

Indeed, in deer, this is called *massacrè*; and, in the leopard, it is the natural situation—He bears sable, in *rencounter*, a golden fesse.

RENDER, in law, a term used in levying a fine—A fine with *render*, is that whereby something is rendered back again by the cognizance to the cognisor.

The lawyers also say, there are certain things in a manor, which lie in *render*, i. e. which may be taken by the lord, or his officers, when they please, without the tenant's leave; and others which lie in *render*, that is, must be rendered or answered by the tenant, as rents, reliefs, heriots, and other services. See **PRENDER**—Some service consists in seigniorie, some in *render*. *Perkins*.

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RENDERING, in building. See **PARGETTING**.

RENDEZ-VOUS, or **RENDEVOUS**, a place appointed to meet in at a certain day and hour.

The word is French, and is found so commodious, that most nations use it in its purity, for want of a word of equal import in their respective languages—The virtue of a woman is already shaken when she grants a *rendezvous*. St. Evremont.

A general *rendezvous* of the army—The regiments have their particular *rendezvous*, called *quarters of assembly*.

RENEGATE, **RENEGADO**, a person who has apostatized, or renounced the christian faith, to embrace some other religion, particularly Mahometanism.

It is the *renegados* who prove the most barbarous to the christians when they fall into their hands—The *renegade* is thus called, *quasi re-ne-gat-Christum*—Hoveden mentions this in the year 1192, under the name of *reneer*, from the French, *renier*, to deny again.

RENES succenturiati, in anatomy, are glands thus called, as resembling the figure of kidneys; and hence accounted a kind of *secondary reins*; *succenturiatus* signifying something in the place of another.

They are also called *capsule renales*, and *glandule renales*.

RENEWING of leaves and lives. See **REVERSION**, **ANNUITY**, **POLITICAL arithmetic**, &c.

RENITENCY, **RENITENTIA**, or **RENISUS**, among philosophers, that force in solid bodies, whereby they resist the impulse of other bodies; or re-act as much as they are acted on.

RENNET. See the article **RUNNET**.

RENT*, **REDDITUS**, in law, a sum of money, or other consideration, issuing yearly out of lands or tenements, alienated on that condition.

* It is thus called from the corrupt Latin, *rendita*, for *reddita*, of *redditus*; because, as *Fleta* tells us, *retrahit & quatinus reddit*.

The *rents* of all the lands of England and Wales appear, by the computations of Dr Davenant and Mr King, from the late land-tax, to be nearly ten millions per annum; those of the houses, not let with the lands, two millions more; and those of all other hereditaments two millions more: in all fourteen millions.

The lawyers ordinarily reckon three sorts of *rent*; viz. *rent-service*, *rent-charge*, and *rent-sock*.

RENT-service is where a man holds lands of his lord by fealty, and certain rent, or by fealty-service, and certain rent; or that which a man making a lease of lands to another for term of years, reserveth to be yearly paid for them.

RENT-charge is where a man makes over his estate to another by deed indented, either in fee, or fee-tail, or for term of life; yet reserves to himself, by the same indenture, a sum of money yearly to be paid to him, with a cause of distress for non-payment.

RENT-sock, or **Dry-RENT**, is that which a man making over his estate by a deed indented, reserveth yearly to be paid to him, without any cause of distress mentioned in the indenture.

RENTS of assize are the certain rents of freeholders, and ancient copyholders; thus called, because assized and certain, in opposition to *redditus mobiles*.

RENTS resolute are reckoned among the fee-farm *rents* to be sold by the Stat. 22. Car. II. being such *rents* or *tithes* as were antiently payable to the crown from the lands of abbeys, and other religious houses; which lands, upon the dissolution of abbeys, being demised to others, the said *rents* were still reserved and made payable to the crown.

Assart RENTS.

Chauntry RENTS.

Gild RENTS.

Paschal RENTS.

Quit RENTS.

White RENTS.

RENTER-warden, an officer in most of the companies of London; whose business is to receive the rents or profits belonging to the company.

RENTERING* and **FINE-DRAWING**, in the manufactures, the sewing of two pieces of cloth, edge to edge, without doubling them; so that the seam scarce appears at all: hence it is called *fine-drawing*.

* The word is formed from the French, *rentreire*, which signifies the same thing; and which Menage, after Salmasius, derives from the Latin *retrahere*, of *re*, in, and *trahere*, by reason the seam is drawn out of sight, and covered.

Serges, &c. are to be sewed; cloths *fine-drawn*.—The author of one of the *Lett. Edif. & Cur.* speaking of the great dexterity of the *fine-drawers* in the East-Indies, assures us, that, if you tear a piece of fine muslin, and give it one of them to mend, it shall be impossible for you to discover the

to R

place

place where it is rejoined, even though you had made a mark to know it by.

The dexterity of our own *fine-drawers* though inferior to that above mentioned is nevertheless such, as puts them in a condition to defraud the king, by fowling a head or slip of English cloth on a piece of Dutch, Spanish, or other foreign cloth; or a slip of foreign cloth on a piece of English, so as to pass the whole, as of a piece; and by that means avoid the duties, penalties, &c. This trick was first discovered in France, by M. Savary, author of the *Diction de Commerce*.

To *reuter* in tapestry, is to work new warp into a piece of tapestry damaged, eaten by the rats, &c. and on this warp to restore the ancient pattern, or design—The warp is to be of woollen, not linen—Among the titles of the French tapestry-makers, is included that of *reuters*.

FINE-DRAWING is particularly used for a rent, or hole happening in the dressing or preparing of a piece of cloth, artfully sewed up or mended with silk.

All *fine-drawings* are reputed defects or blemishes; and ought to be allowed for in the price of the piece—Hence, M. Savary establishes it as a rule, which is certainly founded on natural equity, that every manufacturer mark the *fine-drawings* of his cloths with a piece of packthread tied to the left; to direct the draper to the spot: and that the draper apprise the tailor or other person, to whom he sells it, of the same; that he may not come to damage in the cutting; there being instances of drapers condemned to take back their cloth, when cut to pieces, for omitting to mention the *fine-drawings*, and other flaws.

On this occasion M. Savary extolls the procedure of an English merchant, who sending a piece of cloth damaged in one spot, to his correspondent at Paris, put a piece of gold in the damaged place, to make up the damage—But as this example is perhaps the only one of its kind, that author recommends it to the merchant or draper to unfold all the pieces intirely; as they come to him; to discover the *fine-drawings* and other flaws, in order to make the clothier accountable for them.

RENVERSE, *inverted* in heraldry, is when any thing is set with the head downwards, or contrary to its natural way of standing.—Thus a chevron *renversé* is a chevron with the point downwards.

The same term they also use when a beast is laid on its back.

RENVERSED *volt.* } See the articles { **VOLT.**
RENVERISING. } **RENVERISING.**

RENUENTES, in anatomy, a pair of muscles of the head, thus called as being antagonists to the annuents; and serving to throw the head backward, with an air of refusal.

From their situation they are also called *rectus capitis, major & minor*. See **RECTUS capitis**.

RENUNCIATION, **RENUNCIATIO**, the act of renouncing, abdicating, or relinquishing any right, real or pretended.

Renunciations are sometimes *expres*; as by contracts, &c. sometimes *tacit*, as by contrary acts.

Dioclesian *renounced* the empire, to live as a philosopher.

—The late king Philip of Spain, by the treaty of Utrecht, was obliged to *renounce* the succession of the crown of France; to which he was heir presumptive: and has since by a voluntary act *renounced* his own crown, in favour of his son—*Renunciations* of kings are always suspected of some view or motive not to be avowed.

To *renounce* an inheritance, a community, &c. is to pass a solemn act before a notary, or public officer, whereby a person declares he will not intermeddle in an inheritance, or profit in a company; but surrenders his part, and quits all pretensions.

REORDINATION, **REORDINATIO**, the act of conferring orders on one already ordained.

The ceremony of ordination impresses what the divines call an indelible character; and cannot, therefore, be repeated: yet is *reordination* practised in England, with regard to the dissenting ministers, who conform to the church; the bishops pretending that they alone have right to confer holy orders; and that every priest or minister who does not receive them at their hands has no lawful or regular vocation.

This proves a great obstacle to the re-union of those ministers to the church of England; many of whom, otherwise disposed to conform, have scrupled to be *reordained*; inasmuch as *reordination* implies their former vocation to be null; that they had administered the sacraments without any right thereto; and that all their ministerial acts were invalid.

In the eleventh century, the crime of simony having been very flagrant; many people fell into the error to believe that the simoniacal bishops could not ordain validly; and that those who had received orders at their hands should be *reordained*—The people of this opinion made a party

of themselves; and were distinguished by the title of *reordinantes*.

REPAIRING, in building, &c. See **REPARATION**, and **RESTAURATION**.

The repairing of large walls, doors, cieling, coverings, &c. belongs to the proprietor or landlord—The tenant is only charged with small repairs, as glass windows, locks, &c. by the French called *locative repairs*.

To **REPAIR** a statue, or other piece of sculpture, is to touch up a statue, &c. (cast in a mould) with a chisel, graver, or other instrument; to finish the pieces which have not come well off.

To **REPAIR** a cast, figure or the like, they clear off the barbs, and what is redundant in the joints and projectures. See **STATUE**.

To **REPAIR** a medal, is to retouch it: so as from rusty and defaced as it was, to render it clean, neat and perfect—In order to this, they take off the rust with a graver, touch up the letters, polish the ground, and raise and restore the figures which before were sometimes scarce seen.

When the figures are eroded or broke, they fit a piece of cement on the spot; and on this cut with a graver so dexterously that the figures appear entire and well kept—Yet nothing spoils medals so much as *repairing* them. See **MEDAL**.

REPAIRERS, artificers who chase figures, and beautify sword hilts, &c.

REPAIRS, in hunting, are the haunts and places which the hare runs to.

REPARANDIS pontibus. See the article **PONTIBUS**.

REPARATION, **REPARATIO**, the act of repairing, re-establishing, retrieving, or mending a building, or other work, damaged or gone to decay.

The enemy repaired the breach as soon as it was made—The establishment of turn-pikes is for repairing of the roads.—An ecclesiastical patron is by ancient custom obliged to repair the choir or chancel of a church, and the parishioners the nave.

REPARATIONE faciendis, is a writ which lies in divers cases; e. gr. where there are tenants in common, or joint tenants of an house, &c. which is fallen to decay, and the one being willing to repair it, the other two will not: in this case the party willing shall have this writ against the other two.

REPARTEE. See the article **REPARTY**.

REPARTITION, **REPARTITIO**, a dividing or sharing a thing a second time.

There are so many deficiencies found this year in the taxes of this parish, that there must be a *repartition* on the inhabitants; or a new imposition.

REPARTY*, or **REPARTEE**, a ready, smart reply; especially in matters of wit, humour, or raillery—It is dangerous attacking this lady, her *reparties* are so keen.

The word in the original French, *repartie*, has the same signification.

Wicquefort observes a world of difference between a free, sprightly *reparty*, and an offensive sarcasm. See **SAR-CASM**.

REPAST, **REPASTUM**, a meal, or refectory, taken at a stated hour.

In old law-books **REPAST** is particularly used for a meal's-meat given to servile tenants, while at work for their lord.

The French call their meal, *repast*; the Latins, *pastus*; the Italians and Spaniards, *pasto*—The *repasts* whereof the scripture has preserved the memory, shew that the ancient Hebrews were not very delicate in their eating—Abraham, a man of wealth and eminence, entertaining the angels, serves them with cakes baked under the ashes, a fattened calf hastily dressed, and milk and butter—But the quantity makes amends for the quality: three measures of flower, and a whole calf, for three persons!

Joseph to shew his respect to his brother Benjamin, ordered him a portion of meat five times as big as that of his other brothers.

In antiquity the *repasts* were frequently sacrifices; for which reason we find them often prepared by kings themselves.

REPEALING, in law, the revoking or annulling of a statute, deed, or the like. See **ABROGATION**, **REVOCATION**, &c.

No act of parliament shall be *repealed* in the same session it was made in. A deed or will may be *repealed* for a part, and stand good for the rest.

Brook uses the word *repellance* in the same sense.

REPEAT, in music, a character shewing that what was last played or sung, must be *repeated*, or gone over again.

The *repeat* serves instead of writing the same thing twice over.

—There are two kinds of *repeats*; the *great* and the *small*. The *great REPEAT*, is only a double bar, dotted on each side; or two parallel lines drawn perpendicular across the staff; with dots

dots on either hand. See its form under CHARACTERS of music.

This mark shews that the preceding strain is to be repeated; that is, if it be near the beginning of the piece, all hitherto sung or played is to be repeated; or if towards the end of a piece all from such another mark.

In gavots, we usually find the repeat at about the third part of a piece—in minuets, bores, courants, &c. towards the end.

Some make this a rule, that if there be dots on each side the bar, they direct to a repetition both of the preceding and the following strain; if there be only dots on one side; then only the strain on that side is to be repeated.

The small REPEAT is where only some of the last measures of a strain are to be repeated—This is denoted by a character set over the place where the repetition begins, (see CHARACTERS in music) and continues to the end of the strain.

When the song ends with a repetition of the first strain, or part of it, instead of a repeat, they use the word *da capo*, i. e. from the beginning.

REPEATING notes. See the article WATCH.

REPELLENT*, REPELLENS, in medicine, a remedy which repels or drives back a morbid humour into the mass of blood, from which it was unduly secreted.

Repellents are medicines which prevent such an afflux of the fluids to any particular part, as might raise it into a tumour, or drive them back when they are collected.

* The greek name, given by some writers, to what (from the latin) are called repellents; is *aperisphics*, *απερυσφικα*, compounded of *απερ*, from; and *ρυσφικα*, to beat.

To form an idea of the manner of their operation, it may be observed, that all tumors arise either from an increase in the velocity or quantity of the fluids; or a weakness in some particular part, though sometimes both concur—Now an increase in the velocity of the fluids makes them more forcibly push against, and distend all the parts in their circuit; if therefore any part be unequally pressed or relaxed by external injuries, that will be more elevated than any other; and for want of equal resistance with the rest of the body, it will at length receive such a quantity of fluid, as will raise it into a tumor, especially if any of its vessels be obstructed, because the protusion of fresh matter, *a tergo*, will continue to add thereto, till the part is to the utmost stretch, and can hold no more.

In this case all those means are said to be repellent, which check the growth of the tumor, and assist the reflux blood in taking up the obstructed matter, and washing it again into the common stream.

This intention is chiefly favoured by evacuation and revulsion; for whatsoever lessens the quantity of the fluid, will diminish the force upon the tumefied part—But it concerns us most to know how external application to the part itself helps this affair.

Herein a medicine comes to be repellent, by consisting of such subtle parts, as may transmit some of them through the pores, and help to render the obstructed matter more fluid, so that it comes the more easily to be loosened, and fall again into the circulating current—But in this case there is a hazard of such things likewise putting the obstructed humour into a ferment, whereby it turns sooner into pus, and then they come under the denomination of *suppuratives* or *ripeners*.

What, therefore, in the most strict sense is to be reputed a repeller, is that which affrings and strengthens the part, so as to make it resist any such lodgment.

These are such whose qualities are most manifest in their coldness and drying properties; but there are so few instances wherein bandage is not better than any such application, that very little comes to be used for that purpose. In hemorrhages and oozings out of serum, so as to deform the skin, temples of this nature mostly take place; which answer their ends in affrings the fibres, whereby their apertures are so closed as not to admit through them afterwards any such fluid.

Some things also answer this end only by stimulating the fibres of the tumefied part, so as to give them sudden and forcible twitches, whereby the obstruction is sometimes loosened and shook away, as it were, into the reflux current—Such a sort of motion will be occasioned by the sudden application of any thing extremely cold, as common water; but the practice is seldom safe, because if the first efforts which the fibres are put upon by those means, do not succeed in breaking away the inclosed matter, they will be strained, and not able afterwards to repeat their natural vibrations; the consequence of which is weakening the part, which will render the tumor more obstinate.

REPELLING power, *Vis REPELLENS*, in physics, is a

certain power or faculty residing in the minute particles of natural bodies, whereby under certain circumstances they mutually fly from each other.

This power is the reverse of the attractive power.

Sir Isaac Newton having established the attractive power of matter from observation and experiment, argues, that as in algebra, where positive quantities cease, there negative ones commence; so in physics, where the attractive force ceases, there a repelling force must begin, and adds, that there is such a force does likewise appear from observation.

As the repelling power seems to arise from the same principle as the attractive, only exercised under different circumstances; it is governed by the same laws: now the attractive we find is stronger in small bodies than in great ones, in proportion to the masses—Therefore the repelling is so too. But the rays of light are of all others the most minute bodies we know of; therefore of all others their repelling force must be the greatest.

Sir Isaac Newton computes that the attractive force of the rays of light is above 100000000000000 times as strong as the force of gravity on the surface of the earth; hence arises that inconceivable velocity wherewith light must move, to reach from the sun to our earth in seven minutes. For the rays emitted from the body of the sun by the vibrating motion of its parts are no sooner got without the sphere of attraction of the sun, than they come within the action of the repelling power.

The elasticity, or springiness of bodies, or that property whereby, after having their figure altered by an external force, they return to their former figure, follows from the repelling power.

REPERCUSSION, in mechanics. See REFLECTION.

REPERCUSSION, in music, a frequent repetition of the same sounds.

This often happens in the modulation; where the essential chords of each mode, or of the harmonical trial, are to be struck oftener than the rest; and of these three chords the two extremes, i. e. the final and the predominant one, (which are properly the *repercussions* of each mode) oftener than the middle one.

REPERTORY, REPERTORIUM, a place wherein things are orderly disposed, so as to be easily found when wanted.

The indices of books are *repertories*, shewing where the matters sought for are treated of. Common places are a kind of *repertories*, very useful to the learned.

REPERTORIUM *anatomicum*, denotes a large hall near an amphitheatre of dissections, where skeletons, both human and brutal, are orderly preserved—Such is the *repertory* in the French king's garden at Paris.

REPETITION, REPETITIO, the reiterating of an action. See REITERATION.

Habits are acquired by the frequent repetition of actions. See HABIT—Musicians and comedians make several repetitions or rehearsals of their concerts and comedies, before they perform them for good.

School philosophers call the repetition of the same numerical effect in another place, the replication of that effect.

REPETITION, in music, denotes a reiterating or playing over again of the same part of a composition, whether it be a whole strain, a part of a strain, or a double strain.

The repetition is denoted by a character, called a repeat, which is varied so as to express the various circumstances of the repetition.

When the song ends with a repetition of the first strain, or a part of it, the repetition is denoted by *da capo*, that is, from the beginning.

REPETITION, REPLY, is also used in music, when after a little silence, one part repeats or runs over the same notes, the same intervals, the same motions, in a word, the same song, which a first part had already gone over during the silence of this.

REPETITION, REPLY, is also a doubling or trebling, &c. of an interval, or a reiteration of some concord or discord.

Thus a fifteenth is a repetition of the octave, i. e. a double octave or second octave.

REPETITION, in rhetoric, is a figure whereby the orator rehearses the same word or phrase over again.

Of this there are two kinds—In the first, the word is repeated precisely in the same sense; As, *Ob, Jerusalem, Jerusalem, who killest the prophets, &c. my God, my God, why hast thou forsaken me.*

Such repetitions have the same effect in discourse, with second strokes of the pencil in painting; they render the colours more strong and lively.

Sometimes the orator begins again and again with the same word, of which we have an instance in the beginning of Cicero's

Cicero's first oration against Cataline: *nihilne te nocturnum presidium pollet, nihil urbis vigilet, nihil timor populi, nihil censeus laqueum omnium, nihil hic munitionibus habendi senatus locus, nihil horum ora vultusque moveant!* Where the word *nihil* so often reiterated gives an admirable force and vehemence to the discourse—Again, the same author: *quem senatus damnavit, quem p.ulus R. damnavit, quem omnium ex-istimatio damnavit, eum vos sententia vestris abjolveris?* again, *non feram, non patiar, non sinam.*

The second kind of repetition, called *anaphora*, places a repetition of the same word, in the same phrase; but in such a manner as that some new idea or character is added to the word, in the second, which it had not in the first.

As Corydon is always Corydon: *ex illo Corydon, Corydon est tempore nobis*; by which we signify that Corydon is no ordinary person; and that nothing can distinguish him but the repetition of his own name: as if we should say, *he is Corydon, that is enough*—By the same figure our Saviour speaks, when he says: *let your language be yea, yea, and nay, nay.*

REPLANTING, in gardening, the act of planting a second time. See **PLANTING**.

The gardeners use to displant their tulips every year, and re-plant them—Lettices must be replanted and replanted yearly, to make them head and knit—If strawberries, &c. be not displanted and replanted once in a few years, they degenerate.

It is a proverb among gardeners, that if the devil were to re-plant his wife, he would cut off her head.

REPLEADER, **REPLACITARE**, in law, is to plead over again what was once pleaded before.

REPLEGIARE *de averiis*, a writ brought by one whose cattle are distrained, and put in a pound by another; upon security given the sheriff to pursue, or answer the action at law against the distrainer.

REPLETION, in medicine, a plenitude, or plethora. See **PLETHORA**.

Repletion is more dangerous than inanition—Bleeding and diet are the great resources when a person is incommode with a repletion.

REPLETION is sometimes also used where the stomach is overladen, with too much eating or drinking—The physicians hold all repletion prejudicial; but that of bread is of all others the worst.

REPLETION, in the canon law, is where the revenue of a benefice or benefices is sufficient to fill or occupy the whole right or title of the graduate who holds them.

When there is a repletion, the party can demand no more by virtue of his degrees—In England, where benefices are not appropriated to degrees, repletion, strictly speaking, has no place.

In France, 600 livres, or 45*l.* sterling per annum, make a repletion, when the benefice is obtained otherwise than by a degree; and 30*l.* per annum, when it is obtained by virtue of a degree.

REPLEVIN, **PLEVINA**, a remedy granted on a distress; being a re-deliverance of the goods distrained to the first possessor, on security or pledges given by him to try the right with the distrainer, and answer him in the course of law.

If a person distrain another's goods or cattle for rent, or damage feint, &c. the owner, upon giving security to the sheriff that he will prosecute his action against the party distraining, and return the goods or cattle again, if the seizure shall be adjudged good; may have a writ of *replevin* or *replegiari facias*. See **DISTRESS**.

REPLEVISH, in law, is to let one to mainprise, upon surety. See **MAINPRISE**.

REPLEVY, **REPLEVIE**, in law, (from the Latin *replegiare*, to re-deliver to the owner upon pledges of surety) is the bringing of a writ of *replevin*, or *replegiari facias*, by him whose cattle or goods are distrained by another upon any cause; having first given security to the sheriff, that on the delivery of the thing distrained, he will prosecute the action against the person who made the distress.

In the Stat. 24 of Henry VIII. we read of *canes replegiari* hounds *replevied*, in a case between the abbot of St Albans, and Geoffrey Childwic.

Goods may be *replevied* two ways; viz. by writ, which is that used by the common law—And by *plaint*; which is that by statute law, for the more speedy having again the cattle and goods, and is brought in the sheriff's court.

REPLICATION, **REPLICATIO**, in logic, the assuming or using the same term twice in the same proposition: otherwise called *reduplication*.

Some philosophers use the phrase *replicatio mundi*, replication of the world, for its conversion, or turning round—The human soul is said to be in a place *replicatively*, *replicatio*, when conceived to be all in the whole, and all in every part thereof.

REPLICATION, in law, is an exception of the second degree, made by the plaintiff to the plea or first answer of the defendant.

The replication is particularly that which the plaintiff replies to the defendant's answer in chancery; and which is either *general* or *special*—The *special* is grounded upon matter arising out of the defendant's answer, &c. The *general* is so called from the general words therein used.

REPORT, the relation made upon oath, by officers or persons appointed to visit, examine, state or estimate any thing.

Damages, repairs, &c. are judged from the reports of experienced persons—Provision for persons wounded are only granted on the reports of chirurgeons, &c.—In cases of rapes a report of matrons is to be had.

REPORT in law, is a public relation, or bringing to memory of cases judicially argued, debated, resolved, or adjudged in any of the king's courts of justice, with the cause and reason of the same delivered by the judges.

When the chancery, or any other court, refers the stating of some case, or comparing an account, &c. to a master in chancery, or other referee, his certificate therein is also called a report.

Pinion of REPORT. See the article **PINION**.

REPOSE, in poetry, &c. See the articles **REST**, **PAUSE**, &c.

REPOSE in painting, is applied to certain masses, or large systems or assemblages of light and shade; which being well conducted, prevent the confusion of objects and figures; by engaging and taking up the eye so as it cannot attend to the other parts of the painting, for some time: and thus leading it to consider the several groups gradually, and at its work to proceed from stage to stage.

REPOSITION of the forest, an act whereby certain grounds before made purview, are upon a second view laid to the forest again.

* The word is formed from the Latin *re* and *ponere*, to lay again.

REPOSITION in surgery, the reduction of a bone. See **REDUCTION**.

REPOSITORY, **REPOSITORIUM**, a store-house or place where things are laid up, and kept—In which sense we say the repository of the royal society, &c. See **MUSEUM**.

REPRESENTATION, **REPRESENTATIO**, in the drama, the exhibition of a theatrical piece; including the scenes, machines, recitation, &c.

Sir Richard Steel's principle is, that the design of a play is not to be read but *represented*; so that it is on the stage, not in the press, it is to be judged of: and the pit, not the public, are the proper judges.

REPRESENTATIVE, one that personates, or supplies the place of another; and is invested with his right, and authority.

The word *representative* is equivalent to procurator or proxy.

Thus we say the king is the *representative* of God on earth; magistrates are *representatives* of the king.

—The commons are the people's *representatives* in parliament.

There is this defect in the constitution of our parliament; that whereas all Englishmen who have considerable estates, ought not to be taxed without their own consent in parliament, by themselves or their *representatives*; copy-holders, whereof some have a thousand pounds a year, have no voice in the election of knights of the shire. *Chamberl.*

REPRIVE, or **REPRIVE**, in law, a suspending or deferring the execution of the law upon a prisoner, for the present time.

A *reprieve* is properly a warrant from the king, for suspending the execution of a person condemned—The king cannot pardon a condemned person without the concurrence of parliament, but he frequently *reprieves* him for 99 years.

REPRIMAND, a sharp authoritative reproof—Such a person was *reprimand* in court by the bench, &c.

REPRISALS*, or **REPRIZALS**, **REPRISALIA**, in the civil law, a right which princes have to retake from their enemies, such things as they justly detain from them; or other things equivalent thereto.

* The word is formed from the Italian, *reprisaglia*, which signifies the same thing.

When a place is taken or held from a prince, he seizes another by way of *reprisal*—Sometimes he takes men of the opposite party, by right of *reprisals*.

The Romans called this *clarigatio*: and the Greeks had something like it under the name of *androlepsia*. See **CLARIGATIO** and **ANDROLEPSIA**.

REPRISALS is also used for a letter or permission which a prince sometimes gives a subject, upon a full cognizance of the cause; authorizing him to retake from the first persons he meets

meets withal of the opposite party, as many effects as make an equivalent to what have been violently forced from him, and for which the opposite prince has refused to do him justice.

These permissions are also called *letters of mark*, or *mart*, and in the Stat. 27 Edw. III. *law of marque*; in regard a person denied justice in another man's territory, redresses himself by goods belonging to men in that territory.

This merchant has seized the effects of the Spaniard don—by way of *reprisal*, because the Spaniards had seized his, and no redress could be had at the court of Madrid.

REPRISE*, or REPRIZE, in the commerce by sea, a merchant ship, which having been taken by a corsair, privateer, or other enemy, is retaken or recovered by a vessel of the contrary party.

* The word is French, and signifies a *re-sumption* or *re-taking*.

When a vessel thus retaken has been 24 hours in the hands of the enemy, it is deemed a lawful prize.—If the *reprise* have been made within 24 hours, the vessel is to be restored to the proprietor, with every thing therein, upon his allowing one third to the vessel who made the *reprize*.

If the *reprize* have been abandoned by the enemy, either in a tempest, or from any other cause, before it have been led into any port, it is to be restored to the proprietor.

REPRIZES, in law, are deductions, drawbacks, or duties paid yearly out of a manor, or lands.—Such are rent-charges, pensions, fees of stewards or bailiffs, &c.—The manor of Dell yields 40 l. per annum, *ultra reprizas*, besides all *reprises*.

REPRIVE. See the article REPRIVE.

REPROBATION, REPROBATIO, in theology, a decree or resolve, which God has taken from all eternity to punish sinners, who shall die in impenitence.

Reprobation stands in direct opposition to *election*.

Divine: hold it a symptom of *reprobation* when a sinner is hardened so as not to feel any farther remorse or misgivings of conscience.

The casuists distinguish two kinds of *reprobation*, *positive* and *negative*.

Positive REPROBATION is that whereby God is supposed to create men with a positive and absolute resolution to damn them eternally.

This opinion of *reprobation* is countenanced by St Augustine, and others of the fathers, and is strongly maintained by Calvin, and most of his followers.—Something like it is also found in the XXXIX articles of the church of England; but it is now generally exploded, as injurious to the justice of God.

Negative or *conditional* REPROBATION is that whereby God, though he creates all men with a sincere desire to save them, and furnishes them with the necessary means thereto, so as all may be saved if they will; yet sees there are several who will not do it, with the aids he shall afford them, how powerful soever; and sees, at the same time, they would do it with certain other aids, which he sees, but will not give them.—*O altitudo! &c.*

REPRODUCTION, REPRODUCTIO, the act whereby a thing is produced anew, or grows a second time.

When the stock of an oak, a fruit-tree, or the like, is cut off short, it *reproduces* an infinity of young shoots.

By *reproduction* is usually understood the restoration of a thing before existing, and since destroyed.

The *reproduction* of several parts of lobsters, crabs, &c. makes one of the greatest curiosities in natural history.—That, in lieu of an organic part or an animal broken off, another shall arise perfectly like it, may seem inconsistent with the modern system of generation, where the animal is supposed to be wholly formed in the egg.

Yet has the matter of fact been well attested by the fishermen, and even by several virtuoso's, who have taken the point into examination, particularly M. de Reaumur, and M. Perrault, whose skill and exactness in things of this nature will hardly be questioned.—The legs of lobsters, &c. consist each of five articulations: now, when any of the legs happen to break by any accident, as in walking, &c. which frequently happens, the fracture is always found to be in a part near the fourth articulation; and what they thus lose, is precisely *reproduced* in some time afterwards; that is, a part of a leg shoots out, consisting of four articulations, the first whereof has two claws as before: so that the loss is entirely repaired.

If a lobster's leg be broken off by design at the fourth or fifth articulation, what is thus broken off, always comes again.—But it is not so if the fracture be made in the first, second, or third articulation. In those cases, the *reproduction* is very rare, if things continue as they are.—But what is exceedingly surprising is, that they do not; for, upon visiting the lobster maimed in these barren and unhappy articulations,

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at the end of two or three days, all the other articulations are found broken off to the fourth; and it is supposed they have performed the operation on themselves, to make the *reproduction* of a leg certain.

The part *reproduced* is not only perfectly like that retrenched, but also, in a certain space of time, grows equal to it.—Hence it is, that we frequently see lobsters, which have their two big legs unequal; and that in all proportions.—This shows the smaller leg to be a new one.

A part thus *reproduced* being broke, there is a second *reproduction*—The summer, which is the only season of the year when the lobsters eat, is the most favourable time for the *reproduction*. It is then performed in four or five weeks: whereas it takes up eight or nine months in any other season.

The small legs are sometimes *reproduced*, but more rarely, as well as more slowly, than the great ones: the horns do the same. Vide Mem. Acad. R. Scienc. ann. 1712. p. 295. Hist. p. 45. seq. item ann. 1718. p. 31. The experiment is most easily tried on the common crab. See Supplement article REPRODUCTION.

REP-SILVER, money antiently paid by servile tenants to their lord, to be quitted of the duty of reaping his corn.

REPTILES* in natural history, a kind of animals, so denominated from their creeping or advancing on the belly.—Or, *reptiles* are distinctly a genus of animals and insects, which, instead of feet, rest on one part of the body; while they advance forward with the rest.

* The word is formed from the Latin, *repto*, I creep.

Such are earth-worms, snakes, &c.—Indeed, many of the ordinary class of *reptiles* have feet, only those very small, and the legs short in proportion to the bulk of the body.

Naturalists observe a world of artful contrivance for the motion of *reptiles*.—Thus, particularly in the earth-worm, Dr Willis tells us, the whole body is only a chain of annular muscles; or, as Mr Derham says, it is only one continued spiral muscle, the orbicular fibres whereof, by being contracted, render each ring narrower and longer than before; by which means it is enabled, like the worm of an auger, to bore its passage into the earth.—Its *reptile* motion may also be explained by a wire wound on a cylinder, which when slipped off, and one end extended and held fast, will bring the other nearer it. So the earth-worm having shot out or extended its body, (which is formed with a wreathing) it takes hold by those small feet it hath, and so contracts the hinder part of its body.—Dr Tyson adds, that, when the fore-part of the body is stretched out, and applied to a plane at a distance, the hind-part relaxing and shortening, is easily drawn towards it as a centre.

The little feet of this creature are disposed in a quadruple row the whole length of the worm; with which, as with so many hooks, it fastens down sometimes this, and sometimes that, part of the body to the plane, and at the same time stretches out, or drags after it, another.

The creeping of serpents is effected after a somewhat different manner, there being a difference in their structure; in that these last have a compages of bones articulated together.

The body here is not drawn together, but, as it were, complicated, part of it being applied on the rough ground, and the rest ejaculated and shot from it; which being set on the ground in its turn, brings the other after it.—The spine of the back, variously wreathed in these creatures, has the same effect in leaping, as the joints of the feet in other animals; they making their leaps by means of muscles that extend the plices, or folds.

REPTILE is likewise used, abusively, for plants which creep on the earth, or on other plants, as wanting strength of stalk to sustain themselves.

Such are cucumbers, melons, &c. such also are ivy, the vine, and bryony.

REPUBLIC, RESPUBLICA, *communis calis*, a popular state or government: or a nation where the people have the government in their own hands.

This amounts to the same with what we otherwise call a *democracy*.

The celebrated *republics* of antiquity, are those of Athens, Sparta, Rome, and Carthage.—At present, there is scarce any such thing as a real *republic*, i. e. a strictly popular state.—Indeed, the Venetians and Genoeise call their states *republics*; but their government is apparently *oligarchia*.

The Dutch come the nearest to the character of a *republic*; yet they are very defective, at least in the sense and severity wherewith Rome, Carthage, &c. were *republics*. See STATES-general.

It is a remark of M. St Evremont, that, if the Dutch love the *republican* form, it is more for the sake of their trade than of their liberty.

REPUBLIC of letters is a phrase used in speaking collectively of the whole body of the people of study and learning.

There is a journal begun in Holland by M. Bayle, and continued by M. Bernard, consisting of extracts of books printed in the course of the year, called *nouvelles de la republique des lettres*, news from the republic of letters.

REPUDIATION, REPUDIUM, in the civil law, the act of divorcing.

REPULSION, REPULSIO, in physics, the act of a repelling power, whereby natural bodies, under certain circumstances, mutually fly from each other. See **REPELLING-power**.

Repulsion is the counter part to **attraction**—Attraction only reaches to a little distance; where that terminates, there **repulsion** commences.

Indeed, we meet with many obvious instances of **repulsion** among bodies, as between water and oil, and, in general, between water and all unctuous bodies; between mercury and iron, as also between the particles of dust, &c.

Thus, if a fat body, lighter than water, be laid on the surface thereof, or if a piece of iron be laid on mercury, the surface of the fluid will be depressed about the bodies laid on it. This is a plain indication of **repulsion**; as the rising up of the fluid about the surfaces of other incumbent bodies, is of attraction.

In the latter case, the fluid is suspended, by an attractive power, above the level, and kept from falling by its gravity: in the former, a depression is made by the repelling power, which the liquor, notwithstanding its gravity, cannot run down into, and fill up.

Upon this depend all the phenomena of very light glass bubbles floating on water, about which, when clean, the water rises; but when greased, the water sinks into a channel all around them—Hence also it is, that, in a glass vessel of water, the fluid stands higher all about the edges near the glass than towards the middle; but, when the glass is filled till the water run down on all sides, then it stands higher at the middle than at the sides—Hence also, in a glass not full of water, a clean glass bubble always runs to the side, by reason the pressure, which is upon it towards the middle, is partly taken off by the attractive force wherewith the water is raised near the edge. If the glass be so full as to be ready to run over, the bubble returns from the side towards the middle, the force wherewith the water is raised in the middle, taking off part of the pressure.

Just the reverse happens, if the bubble be greasy; in regard, there the force, whereby the water and the bubble repel each other, is greatest where the water is highest. Two clean bubbles, and two greasy ones always run towards each other, as being attracted; and a greasy and a clean one always fly each other, as being repelled.

REQUEST, in law, a supplication or petition preferred to a prince, or a court of justice, begging relief in some con- fessionable cases, where the common law grants no immediate redress.

The term **request** is now, since the institution of chancery, much disused; together with the court of **requests**, where **requests** were cognizable.

The Court of **REQUESTS** was an antient court of equity, instituted about the 9th year of Henry VII. of like nature, though inferior authority, with the court of chancery; being appointed chiefly for the relief of petitioners, who, in con- siderable cases, should address themselves, by way of **request**, to his majesty.

The chief judge of this court was the lord privy seal, assisted by the **masters of requests**, who corresponded to our masters of chancery.

In the 40th and 41st year of queen Elizabeth, it was adjudged, upon solemn argument in the court of common pleas, that the court of **requests** was then no court of equity.

In France, *requetes civiles*, civil requests, still obtain for the annulling of contracts, &c. made by surprize.

They have eighty **masters of requests** to take cognizance of causes between the officers of the crown, the servants of the household, &c.

REQUEST, in hunting, is when the dogs have lost the quest or track of the beast, and must **request**, or **quest** it again.

See **QUEST**—They say, to call to the **request**, come to the **request**, &c.

To **request** the game is chiefly used, when, after having run it down the night before, they seek it again the next morning with the blood-hound, or the like.

REQUIEM, a mass sung in the Romish church for the rest of the soul of a person deceased.

It is thus called, because the introit begins with *Requiem aeternam dona eis domine*, &c.

RE-REWARD, arriergarde. See **REAR** and **GUARD**.

RES, things. See **REALITY**, **ENS**, **ESSE**, **SUBSTANCE**, &c.

RES Mancipi. See **ABALIENATION**.

RES Naturales.

RES Non Naturales, &c. } See { **NATURALS**.

RES Non Naturales, &c. } See { **NON NATURALI, &c.**

RESCUIT, RECEPTIO, in law, an admission or receiving of a third person to plead his right, in a cause formerly commenced between other two.

As, where an action is brought against a tenant for life or years, and he makes default; in such case he in the reversion may come in and pray to be **received**, to defend the land, and to plead with the demandant.

RESCUIT is sometimes also applied to an admittance of plea, though the controversy be only between two—He in reversion may come into court and pray to be **received** in a suit against his particular tenant.

RESCUIT of homage, RECEPTIO homagii, denotes the lord's receiving homage of his tenant, at his admission to the lands.

RESCISSIO*, **RESCISSIO**, in the civil law, an action intended for the annulling or setting aside of any deed, contract, or the like.

* The word is formed from the Latin, *re* and *scindo*, q. d. I cut or divide again.

A thing's being found damaged or fold at above double the just value, is a good cause of **rescission**.

The deed or contract thus annulled or **rescinded**, is sometimes called a **rescissory**: though that denomination be more properly given to the action brought for **rescinding** or setting it aside: which is properly called **actio rescissoria**.

RESCOUS, or RESCUE, RESCUSSUS, in law, an illegal taking away and setting at liberty a distress taken, or a person arrested, by process, or course of law.

This is properly a **rescous in fact**—If one distrain beasts for damage feasant in his ground, and as he drives them along the highway towards the pound, they enter into the owner's house, and he withholds them there, and will not deliver them upon demand: this detainer is a **rescous in law**.

Rescous, in matters relating to treason, is deemed treason; and in matters concerning felony, is felony.

—He that commits such a **rescue** or **rescous**, is called the **rescissor**.

RESCOUS is also used for a writ which lies for this fact, called *breve de rescussu*.

RESCRIPT, RESCRIPTUM, an answer delivered by an emperor, or a pope, when consulted by particular persons, on some difficult question or point of law, to serve as a decision thereof.

The civil and canon laws are full of such **rescripts**.

When the **rescript** was made in answer to the inquiry of a community, it was called a **pragmatic sanction**.

The papal **rescripts** are a kind of bulls or monitories, beginning with these words, *significavit nobis dilectus filius*, &c.

They never obtained either in England or France, when contrary to the liberties of the English and Gallican churches; but were declared abusive.

Among the Romans the contending parties, and even the magistrates themselves, frequently consulted the emperor on the measures they were to take in certain nice and difficult cases; and the answers returned by the emperors on such consultations, were called **rescripts**—These had not, indeed, the full force of laws, but they were deemed a strong prejudice or presumption.

Justinian has inserted a great number of them in the Code; and by that means given them the authority they before wanted.

The author of the life of the emperor Macrinus observes of that prince, that he would have his officers judge by laws, not by **rescripts**; as esteeming it absurd to admit the wills of ignorant men, such as Commodus, and Caracalla, for rules of judging; and because Trajan never gave any **rescripts** at all, as being loth to countenance a custom, where what is frequently granted as a favour, in particular cases, might be afterwards pleaded as a precedent—T^o added, that Macrinus had a design to strip the **rescripts** of all their authority.

M. Schulting, in his dissertations, does not at all approve of this design; and to the emperor's reasons answers, that indeed all **rescripts** are not to be admitted; that those which appear dictated out of favour, are to be thrown aside: but those which appear founded in reason, and natural equity are, with Justinian, to be allowed—He adds, that it cannot be denied but the worst emperors have frequently made good laws, and useful **rescripts**.

As to what is urged of the emperor Trajan's never giving any **rescripts**; it appears but ill supported—For what is it but a **rescript** that he delivers to Pliny on the subject of the Christians, *lib. 10. epist. 28*? Or that on the Isefastic, *lib. 10. epist. 120*? The Digest, and Pliny's epistles, need only to be opened and compared, to find **rescripts** of Trajan.

RESCUE. See the article **RESCOUS**.

RESEANTISSA, or RESEANTISA, in law. See **ESSOIN**.

RESEARCH*, a diligent search or inquiry into any thing.

* The word is formed of the French, *recherche*, and literally denotes a second search.

RE-

RESEARCH, in music, is a kind of prelude or voluntary, played on the organ, harp, lute, violin, &c. Wherein the composer seems to search or look out for the strains and touches of harmony, which he is to use in the regular piece to be played afterwards.

This is usually done off-hand, and consequently it requires a master's skill.—When in a motetto the composer takes the liberty to use any thing that comes in his head, without applying any words to it, or subjecting himself to the sense or passion thereof; the Italians call it *fantasia ricercata*; the French *recherche*, and the English *research* and voluntary.

RESEARCHING, in sculpture, the repairing of a cast figure, &c. with proper tools; or the finishing it with art and exactness, so as that the minutest parts may be well defined.

RESEISER, **RESEISIRE**, in law, a taking of lands into the king's hands, where a general livery, or ouster le main, was formerly misused, contrary to order of law.

RESEMBLANCE. See the article **SIMILITUDE**.

RESERVATION, **RESERVATIO**, in law, an action or clause whereby something is reserved, i. e. is retained, kept or secured to one's self.

Thus when a man lets his land, he reserves a rent to be paid to himself for his maintenance, &c.

William the conqueror getting all the lands of England, except those belonging to the church and religious houses, into his hands by right of conquest, bestowed a great part thereof among his followers, reserving some retribution of rents and services to him and his heirs; which reservation is now, as it was before the conquest, called the tenure of the lands.

Sometimes reservation signifies as much as an exception; as, when a man lets an house, and reserves to himself one room, that room is excepted out of the demise.

Mental RESERVATION is a proposition which, strictly taken, and according to the natural import of the terms, is false; but if qualified with something reserved or concealed in the mind, becomes true.

Mental reservations are the great refuge of religious hypocrites, who use them to accommodate their consciences with their interests; the Jesuits are zealous advocates for mental reservations; yet are they strictly all real lies, as including an intention to deceive.

RESERVE, in law, the same with reservation.

He has settled the whole estate on his son, and has not made any reserve.—Benefices are sometimes resigned with reserve of a pension.—By the canon law, no person may reserve to himself a pension out of a benefice, unless he hath served it ten years.

In the Romish church, the ordinary priests have only a power to absolve, in reserve of certain cases, hence called *reserved cases*, as being reserved to the bishop.

The court reserves the cognizance of such an affair to itself.—The lawyers say, that no prince ever grants such a power by his letters or patents, but that he reserves to himself a greater.

Body of RESERVE, **corps de RESERVE**, in war, the forces disposed in the third or last line of an army drawn up for battle.

They are thus called, because reserved, or destined to sustain the rest as occasion requires; and not to engage but in case of necessity.

RESERVED cases. See the article **CASE**.

RESERVOIR, **RECEPTACLE**, a place where water is collected and reserved, to be conveyed occasionally, through pipes, &c. or to be spouted up, &c.

The reservoir in a building is a large basin, usually of wood, lined with lead, where water is kept to supply the occasions of the house.—At Cannons, the late noble seat of the duke of Chandos, there was a very large reservoir at the top of the house, to which the water was raised by a very curious engine contrived for the purpose.—This reservoir was of such capacity, as that besides supplying all parts of the house by means of pipes and cocks, it likewise turned a mill.

The reservoir is sometimes also a large basin of strong masonry, clayed or paved at the bottom, where the water is reserved to feed jets d'eau or spouting fountains.

Such is that huge one on the top of Marly, called *trou d'enfer*, hell-mouth, whose surface, Daviler tells us, contains fifty acres, and its depth is such, as under that superficies to contain a hundred thousand cubic fathom of water.

RESERVOIR, in anatomy. See the article **RECEPTACLE**.

RESET, in law, the receiving or harbouring an outlawed person. Hence a receiver of an outlawed person, is called a *resetter*.

RESIANCE, **RESIDENTIA**, in law, a man's abode or continuance in a place.

The word has the same signification with regard to lay-men as residence with regard to ecclesiastics.

Glanville observes, that in the antient law, *resiance* properly signified a disface, whereby the person was disabled from stirring out of doors.—Whence their *essoin de resiantia*, was the same as our *essoin de malo lecto*.

RESIDENCE, **RESIDENTIA**, in canon and common law, the abode of a parson or incumbent upon his benefice; and his assiduity in attending on the same.

The default of residence, called *non-residence*, unless where the party has a dispensation for the same, with us is the forfeiture of ten pounds for each month.

By the canon law, beneficiaries are obliged to residence, under pain of deprivation of their benefices.—The original reason is, that in the primitive church none were promoted to holy orders, but such as had a benefice in promptu; which they were obliged to serve; so that this service was necessarily attached to the orders; and whoever was honoured therewith, at the same time was obliged to personal service.

But this strict discipline was not observed long.—The beneficiaries by degrees got dispensations from serving their benefices themselves; and thus pluralities very soon got footing.

France, of all other countries, seems to be that where residence is the most strictly regarded.—All their cures, or ministers who have cures of souls, are obliged to actual residence; and the parliaments have declared all the dispensations granted by popes, &c. abusive, as esteem the obligation of residence to be jure divino.

Under Charles IX, there was even a design to re-establish the primitive discipline in all its severity; and in 1651, a declaration was registered, appointing all bishops to reside, conformably to the antient canons, in their bishoprics.—The same parliament also forbade the bishops to assume the quality of councillors of the king; in regard such a quality was deemed inconsistent with the indispensable obligation they were under to reside in their bishoprics.

Du Pin adds, that the procureur general, or attorney general Buordin, even seized the temporalities of such bishops as continued in Paris fifteen days after this declaration; having first certified them, that if they had any business there, he would undertake the management thereof.

RESIDENCE, in chymistry, &c. the settling or what remains of a liquor or other substance in the vessel, after the chief part of it has been poured or taken out; to change the manner of the operation on what is left.

RESIDENT, a public minister, who manages the affairs of a king in the court of a prince, or petty state; or the affairs of a prince or petty state, in the court of a king or prince.

Thus the king of England has residents in the courts of the electors, and other princes of Germany and Italy; at the republics of Genoa and Lucca; and they, reciprocally, have residents in the court of Great Britain.

Residents are a class of public ministers inferior to ambassadors and envoys; but like them they are under the protection of the law of nations.

RESIDENT, **RESIDENS**, in our antient customs, was a tenant who was obliged to reside on his lord's land, and not to depart from the same; called also *homme levant and couchant*, and in Normandy *ressant du fief*.*

* *Quantumque de olis teneat ei magis obnoxius est, & ejus residens esse debet ejus legius est. Leg. H. 1.*

RESIDENTIARY, **RESIDENTIARIUS**, a canon installed to the privileges and profits of residence.

RESIDUAL figure, in geometry, the figure remaining after subtraction of a lesser from a greater.

RESIDUAL root, is a root composed of two parts or members, only connected together with the sign—

Thus, $a-b$, or $5-3$, is a residual root; and is so called, because its true value is no more than its residue or difference between the parts a and b , or 5 and 3 .

RESIDUE, **RESIDUUM**, the remainder or reliqua of an account, debt or obligation.

St Paul, in his epistle to the Romans, speaks of a residue according to the election of grace; meaning a remnant or small number of people preserved from idolatry by an effect of the grace of God.

RESIGNATION, **RESIGNATIO**, in the canon law, the surrender or giving up of a benefice into the hands of the collator or bishop.

Resignation is of equal import with surrender; only the former is restrained to spiritual benefices, and the latter to temporal offices or employments.

Resignations are either *simple*, or *conditional*.

Simple or *pure* *RESIGNATIONS* are those, whereby the incumbent strips himself of all his right, absolutely, and without any conditions or reserve of pension.—These are made to the bishop, or collator.

RESIGNATIONS in *favour*, or *conditional RESIGNATIONS*, are such as are only made on condition that such other persons shall be invested therewith; so that the *resignations* are null, unless the conditions be punctually executed.

These *resignations* in favour are not of above 200 years standing.—Strong opposition was at first made to them, they being esteemed a kind of succession or transmission of benefices, as of patronies belonging to a family. Accordingly, these *resignations* are not made into the hands of the ordinary, or collator, as *pure resignations* are; but to the collator paramount, who in the R. m. church is the pope, there being a suspicion of simony, or other unlawful paction therein, where admitted of in prejudice to the lay-patron.

RESIGNEE, in law, the party to whom a thing is resigned.

RESIN, *RESINA*, a fat, viscid, sulphurous juice, oozing either spontaneously, or by incision, from several kinds of trees, particularly the pine, fir, &c.

Camphor is a kind of *resin*.—Mastic is the *resin* of the lentisk.—The best of all the class of *resins* is turpentine.—The coarsest is what we commonly call *resin*.

Resin is properly a juice of the bark of a tree only.

Boerhaave will have it to be the oil of the bark farther infiltrated by the heat of the sun, &c. so as to become friable. He adds, that *resin* may be produced from any vegetable oil, by boiling it much and long.

If turpentine be set over a gentle fire, it first dissolves and becomes an oil, then a balsam, then pitch, and then *resin*; in which state it is friable in the cold, fusible by fire, and with all inflammable and combustible, and dissoluble in spirit of wine, but not in water, which are all the characters of a *resin*.

There are two kinds of *resins*, the one *liquid*, the other *dry* and *hard*.—The first is the natural *resin* as it flows from the tree.—The second only differs from the first in that it is condensed by the heat of the sun, or by that of a culinary fire.

Resins will incorporate with oil, or rectified spirits, but not with an aqueous menstruum.

The difference between *resins* and *gums*, consists in this, that *resins* are more sulphurous, and *gums* more aqueous; so that the first dissolve in oil or spirit of wine, and the last readily in water.

M. Tournefort makes a kind of intermediate class of vegetable juices which he calls *gum-resins*; which dissolve partly in spirit of wine, partly in water.—Such are *galbanum*, *bedellium*, *opopanax*, *sisyampneum*, &c.

The *resins* of several vegetables which abound with *resinous* particles, but not so as to yield any by incision, as jalap, benzoin, scammony, turbit, &c. are thus obtained.—The vegetable being grossly powdered, is put into a matras, and rectified spirit of wine is poured on it, to the height of four fingers above the matter. Then the neck of another matras being luted into the former, to make a double vessel, the matter is digested three or four days in a sand heat, till it have given a good tincture to the spirit of wine. Then the dissolution is filtrated, and two thirds of the clear liquor evaporated off, and the remainder poured into a large vessel of water, where it turns into a kind of milk; whence the *resin*, in time, precipitates to the bottom in form of a white powder.—This when washed and dried in the sun, grows into the ordinary consistence of a *resin*.

RESISTENCE, or *RESISTING-FORCE*, in physics, any power which acts contrarily to another, so as to destroy or diminish its effect.

Of *resistances*, there are various kinds, arising from the various natures and properties of the *resisting* bodies, and governed by various laws: As, the *resistance* of solids, the *resistance* of fluids, the *resistance* of the air, &c. The doctrine of each whereof will be seen under the following articles.

RESISTENCE of *solids*, in mechanics, is the force wherewith the quiescent parts of solid bodies oppose the motion of others contiguous therewith.

Of this there are two kinds.—The first, where the *resisting* and the *resisted* parts, *i. e.* the moving and quiescent bodies, are only contiguous, and do not cohere; *i. e.* where they constitute separate bodies or masses.

This *resistance* is what M. Leibnitz calls *resistance of the surface*; and we, properly, *friction*; the consideration whereof, being of the last importance in the doctrine of machines, see its laws under the article *FRICTION*.

The second case of *resistance* is where the *resisting* and *resisted* parts are not only contiguous but cohere, *i. e.* are parts of the same continued body or mass.—This *resistance* is what we may properly call *cohesiveness*; and was first considered by Galileo.

Theory of the RESISTENCE of the fibres of solid bodies.—To

conceive an idea of this *resistance* or *cohesiveness* of the parts, suppose a cylindrical body suspended vertically by one end.—Here, all its parts being heavy, draw downwards; and tend to separate the two contiguous planes, where the body is the weakest; but all the planes *resist* this separation by the force wherewith they cohere, or are bound together: here then are two opposite powers; *viz.* the weight of the cylinder which tends to break it, and the force of cohesion of the parts which *resists* the fracture.

If the base of the cylinder be increased, without increasing its length; it is evident the *resistance* will be encreased in the same ratio as the base; but the weight also encreases in the same ratio; whence it is evident that all cylinders of the same matter and length, whatever their bases be, have an equal *resistance*, when vertically suspended.

If the length of the cylinder be encreased without increasing the base, its weight is increased without increasing its *resistance*; consequently the lengthening it weakens it.—To find the greatest length a cylinder of any matter may have without breaking, there needs nothing but to take any cylinder of the same matter, and fasten to it the greatest weight it will sustain before it break; and then see how much it must be lengthened by the addition of its weight, till it equals its former weight with the addition of a foreign weight.—By this means Galileo found a copper-wire, and of consequence any other cylinder of copper, might be extended to 4801 braccio's or fathoms of six foot each.

If one end of the cylinder were fixed horizontally into a wall, and the rest suspended thence, its weight and *resistance* would then act in a different manner; and if it broke by the action of its weight, the rupture would be at the end fixed into the wall. A circle or plane contiguous to the wall, and parallel to the base, and consequently vertical, would be detached from the contiguous circle within the plane of the wall, and would descend. All the motion is performed on the lowest extremity of the diameter, which remains immovable, while the upper extremity describes a quadrant of a circle, and till the circle which before was vertical become horizontal: *i. e.* till the cylinder be entirely broken.

In this fracture of the cylinder it is visible two forces have acted, and the one has overcome the other: the weight of the cylinder, which arose from its whole mass, has overcome the *resistance* which arose from the largeness of the base; and as the centres of gravity are points wherein all the forces arising from the weights of the several parts of the same bodies, are conceived to be united, one may conceive the weight of the whole cylinder applied in the centre of gravity of its mass, *i. e.* in a point in the middle of its axis; and the *resistance* of the cylinder applied in the centre of gravity of its base, *i. e.* in the centre of the base: it being the base which *resists* the fracture.

When the cylinder breaks by its own weight, all the motion is on an immovable extremity of a diameter of the base.—This extremity therefore, is the fixed point of a lever, whose two arms are the radius of the base, and half the axis; and of consequence the two opposite forces do not only act of themselves, and by their absolute force, but also by the relative force they derive from their distance with regard to the fixed point of the lever.

Hence it evidently follows, that a cylinder, *e. gr.* of copper, which, vertically suspended, will not break by its own weight if less than 480 fathom long, will break with a less length in a horizontal situation; in regard the length in this latter case contributes two ways to the fracture; both as it makes it of such a weight, and as it is an arm of a lever to which the weight is applied.—Hence, also, the smaller the base is, the less length or weight will suffice to break it; both because the *resistance* is really less, and because it acts by a less arm of a lever.

If two cylinders of the same matter, having their bases and lengths in the same proportion, be suspended horizontally; it is evident that the greater has more weight than the lesser, both on account of its length, and of its base. But it has less *resistance* on account of its length, considered as a longer arm of a lever, and has only more *resistance* on account of its base.—Therefore it exceeds the lesser in its bulk and weight, more than in *resistance*; and consequently it must break more easily.

Hence we see why upon making models and machines in small, people are apt to be mistaken as to the *resistance* and strength of certain horizontal pieces, when they come to execute their designs in large; by observing the same proportions as in the small.—Galileo's doctrine of *resistance* therefore is no idle speculation, but becomes applicable in architecture and other arts.

The weight required to break a body, placed horizontally, being always less than that required to break it in a vertical situation; and this weight being to be greater or less according to the ratio of the two arms of the lever: the whole theory is always reducible to this; *viz.* to find what part of the absolute weight the relative weight is to be, supposing the figure of the body known; which indeed is necessary, because it

is the figure that determines the two centres of gravity, or the two arms of the lever.—For if the body, *e. gr.* were a cone, its centre of gravity would not be in the middle of its axis, as in the cylinder; and, if it were a semi-parabolical solid, neither its centre of gravity would be in the middle of its length or axis, nor the centre of gravity of its base in the middle of the axis of its base. But still, wheresoever these centres fall in the several figures, it is these that regulate the two arms of the lever.

It may be here observed, that, if the base, whereby the body is fastened into the wall, be not circular, but, *e. gr.* parabolical, and the vertex of the parabola be at the top, the motion of the fracture will not be on an immoveable point, but on a whole immoveable line; which may be called the *axis of equilibrium*: and it is with regard to this that the distances of the centres of gravity are to be determined.

Now, a body horizontally suspended, being supposed such, as that the smallest addition of weight would break it, there is an equilibrium between its positive and relative weight; and of consequence those two opposite powers are to each other reciprocally as the arms of the lever to which they are applied.—On the other hand, the *resistance* of a body is always equal to the greatest weight which it will sustain in a vertical situation, without breaking, *i. e.* is equal to its absolute weight. Therefore, substituting the absolute weight for the *resistance*, it appears, that the absolute weight of a body suspended horizontally, is to its relative weight, as the distance of its centre of gravity from the axis of equilibrium is to the distance of the centre of gravity of its base from the same axis.

The discovery of this important truth, at least of an equivalent hitherto, and to which this is reducible, we owe to Galileo.—From this fundamental proposition are easily deduced several consequences.—As, for instance, that, if the distance of the centre of gravity of the base from the axis of equilibrium be half the distance of the centre of gravity of the body, the relative weight will only be half the absolute weight; and that a cylinder of copper horizontally suspended, whose length is double the diameter, will break, provided it weigh half what a cylinder of the same base 4801 fathoms long weighs.

On this system of *resistance* of Galileo, M. Mariotte made a very subtle remark, which gave birth to a new system—Galileo supposes, that, where the body breaks, all the fibres break at once; so that the body always *resists* with its whole absolute force, *i. e.* with the whole force that all its fibres have in the place where it is to be broke.—But M. Mariotte finding, that all bodies, even glass itself, bend before they break, shews, that fibres are to be considered as so many little bent springs, which never exert their whole force till stretched to a certain point, and never break till entirely unbent. Hence, those nearest the axis of equilibrium, which is an immoveable line, are stretched less than those farther off; and of consequence employ a less part of their force.

This consideration only takes place in the horizontal situation of the body: in the vertical, the fibres of the base all break at once; so that the absolute weight of the body must exceed the united *resistance* of all its fibres: a greater weight is therefore required here than in the horizontal situation, *i. e.* a greater weight is required to overcome their united *resistance*, than to overcome their several *resistances* one after another.—The difference between the two situations arises hence, that, in the horizontal, there is an immoveable point or line, a centre of motion, which is not in the vertical.

M. Varignon has improved on the system of M. Mariotte, and shewn, that, to Galileo's system, it adds the consideration of the centre of percussion.—The comparison of the centres of gravity with the centres of percussion, afford a fine view, and set the whole doctrine in a most agreeable light.

In each system, the base, whereby the body breaks, moves on the axis of equilibrium, which is an immoveable line in the same base; but in the second, the fibres of this base are continually stretching more and more, and that in the same ratio, as they recede farther and farther from the axis of equilibrium; and of consequence are still exerting a greater and greater part of their whole force.

Their unequal extensions, like all other forces, must have some common centre where they all meet, and with regard to which they make equal efforts on each side; and as they are precisely in the same proportion as the velocities which the several points of a rod moved circularly would have to one another, the centre of extension of the base, whereby the body breaks, or tends to break, must be the same with its centre of percussion—Galileo's hypothesis, where fibres stretch equally, and break all at once, corresponds to the case of a rod moving parallel to itself, where the centre of extension or percussion does not appear, as being confounded with the centre of gravity.

The base of traction being a surface, whose particular nature determines its centre of percussion, that is necessary to be first known, to find on what point of the vertical axis of that base

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it is placed, and how far it is from the axis of equilibrium.—Indeed, we know in the general, that it always acts with so much the more advantage as it is farther from it; in regard it acts by a longer arm of a lever; and of consequence it is the unequal *resistance* of the fibres in M. Mariotte's hypothesis, which produces the centre of percussion; but this unequal *resistance* is greater or less, according as the centre of percussion is placed more or less high on the vertical axis of the base, in the different surfaces of the base of the fracture.

To express this unequal *resistance*, accompanied with all the variations it is capable of, regard must be had to the ratio between the distance of the centre of percussion from the axis of equilibrium, and the length of the vertical axis of the base.—In which ratio, the first term, or the numerator, is always less than the second, or the denominator; so that the ratio is always a fraction less than unity; and the unequal *resistance* of the fibres in M. Mariotte's hypothesis is so much the greater, or, which amounts to the same, approaches so much nearer to the equal *resistance* in Galileo's hypothesis, as the two terms of the ratio are nearer to an equality.

Hence it follows, that the *resistance* of bodies in M. Mariotte's system is to that in Galileo's, as the least of the terms in the ratio is to the greatest.—Hence also, the *resistance* being less than what Galileo imagined, the relative weight must also be less; so that the proportion already mentioned between the absolute and relative weight, cannot subsist in the new system, without an augmentation of the relative weight, or a diminution of the absolute weight; which diminution is had by multiplying the weight by the ratio, which is always less than unity. This done, we find that the absolute weight, multiplied by the ratio, is to the relative weight, as the distance of the centre of gravity of the body from the axis of equilibrium is to the distance of the centre of gravity of the base of fracture from the same axis; which is precisely the same thing with the general formula given by M. Varignon for the system of M. Mariotte. In effect, after conceiving the relative weight of a body, and its *resistance* equal to its absolute weight, as two contrary powers applied to the two arms of a lever, in the hypothesis of Galileo, there needs nothing to convert it into that of M. Mariotte, but to imagine, that the *resistance*, or the absolute weight, is become less, every thing else remaining the same.

We have here only considered bodies as to be broke by their own weight.—It will amount to the same, if we suppose them void of weight themselves, and to be broken by a weight applied to their extremities: only it is to be observed, that a foreign weight acts by an arm of a lever equal to the whole length of a body; whereas their own weight being all united in their centre of gravity, is only the distance of that centre from the axis of equilibrium.

One of the most curious, and perhaps the most useful, questions in this research is, to find what figure a body must have, that its *resistance* may be equal in all its parts, whether it be conceived as loaden with a foreign weight, or as only sustaining its own weight.—We shall here only consider the latter case, from which the former will be easily determined.

For a body, then, suspended horizontally, to resist equally in all its parts, it is necessary, some part of it being conceived as cut off in a plane parallel to the base of fracture of the body, the weight of the body retrenched be to its *resistance* in the same ratio as the weight of the whole to its *resistance*; these four powers acting by arms of levers peculiar to themselves.—Now, the weight of any body thus conceived, is its whole weight multiplied by the distance of the centre of gravity of the body from the axis of equilibrium; and the *resistance* is the plane of the base of fracture multiplied by the distance of the centre of gravity of the base from the same axis; consequently these four quantities are to be proportional in the whole, and in each part, of a solid of equal *resistance*.

From this proportion, M. Varignon easily deduces two solids, which shall *resist* equally in all their parts. Galileo had found one before: that discovered by M. Varignon is in form of a trumpet, and is to be fixed into a wall at its greater end; so that its bigness and weight is always diminished in proportion as its length, or the arm of the lever whereby its weight acts, increases. It is added, (which seems very remarkable) that, howsoever different the two systems may be, the solids of equal *resistance* are the same in both.

For the *RESISTANCE* of a solid supported at each extreme, as of a beam between two walls, see BEAM.

RESISTANCE of fluids, in hydrostatics, is the force wherewith bodies, moving in fluid mediums, are impeded and retarded in their motion.

Laws of *RESISTANCE* of the fluid mediums.—A body moving in a fluid, is *resisted* from two causes; the first, the cohesion of the parts of the fluid.—For a body, in its motion,

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separating the parts of a liquid, must overcome the force with which those parts cohere.

The second is the inertia, or inactivity of matter, whereby a certain force is required to move the particles from their places, in order to let the body pass.

The retardation from the first cause is always the same in the same space, the same body remaining, be the velocity what it will. Hence, the *resistance* increases as the space run through; in which ratio the velocity also increases; and therefore the *resistance* is as the velocity itself.

The *resistance* from the second cause, when the same body moves through different fluids with the same velocity, follows the proportion of the matter to be removed in the same time, which is as the density of the fluid.

When the same body moves through the same fluid with different velocities, this *resistance* increases in proportion to the number of particles struck in an equal time; which number is as the space run through in that time, that is, as the velocity. But farther, it increases in proportion to the force with which the body strikes against every part; which force is also as the velocity of the body; and therefore, if the velocity be triple, the *resistance* is triple, from a triple number of parts to be removed. It is also triple from a stroke three times stronger against every particle; therefore the whole *resistance* is ninefold, that is, as the square of the velocity. Hence, a body moved in a fluid, is resisted partly in a ratio of the velocity, and partly in a duplicate ratio of it.

The *resistance* from the cohesion of parts in fluids, except glutinous ones, is not very sensible in respect of the other *resistance*, which increases in the ratio of the squares of the velocities; but the first in the ratio of the velocity itself. By how much the velocity increases, by so much more do these *resistances* differ; wherefore, in swifter motions, the *resistance* alone is to be considered, which is as the square of the velocity.

If a fluid be included in a vessel of a prismatic figure, and there be moved along in it, with equal velocity, and in a direction parallel to the sides of the prism, two bodies, the one spherical, the other cylindric, so that the diameter of the base of the latter be equal to the diameter of the sphere, and the cylinder be moved in the direction of its axis, these bodies will suffer the same *resistance*.

To demonstrate this, suppose the bodies at rest, and that the fluid moves in the vessel with the same velocity that the bodies had; by this, the relative motion of the bodies and the fluid is not changed; consequently the actions of the bodies on the fluid, and of the fluid on the bodies, are not changed.

The retardation, which the liquor suffers in passing by the body, arises only from this, that, in that place, it is reduced to a narrower space; but the capacity of the vessel is equally diminished by each body; therefore each body produces an equal retardation. And because action and re-action are equal to one another, the fluid acts equally upon each body; wherefore also each body will be equally retarded; when the bodies are moved, and the fluid is at rest.

Resistance and retardation are used indifferently for each other, as being both in the same proportion; and the same *resistance* always generating the same retardation. But, with regard to different bodies, the same *resistance* frequently generates different retardations; the *resistance* being the quantity of motion, and the retardation the celerity.—For the difference and measure of the two, see RETARDATION.

The retardations from this *resistance* may be compared together, by comparing the *resistance* with the gravity.—It is demonstrated, that the *resistance* of a cylinder, which moves in the direction of its axis, (to which the *resistance* of a sphere of the same diameter is equal) is equal to the weight of a cylinder of that fluid through which the body moves, having its base equal to the body's base, and its height equal to half the height, from which a body falling in vacuo, may acquire the velocity with which the cylinder moves through the fluid.

From the given celerity of the body moved, the height of the fluid cylinder is found, as also the weight of it from the known specific gravity of the liquid, and diameter of the body.—

Let a ball, for instance, of three inches diameter be moved in water with a celerity wherewith it would go sixteen feet in a second: from experiments on falling bodies, and others made on pendulums, it has been found, that this is the celerity which a body acquires in falling from a height of four feet; therefore the weight of a cylinder of water of three inches diameter, and two feet high, that is, a weight of about six pounds and three ounces is equal to the *resistance* of the aforesaid ball. See DESCENT.

Let the *resistance* so discovered, be divided by the weight of the body which determines its quantity of matter, and you will have the retardation.

RESISTENCE of fluid mediums to the motion of pendulums—

The arch described by a pendulum oscillating in vacuo with the celerity it has acquired in descending, is equal to the arch described by the descent; but the same does not happen

in a fluid, and there is a greater difference between those arches, the greater the *resistance* is; that is, the greater the arch is which is described in the descent.

Let the *resistance* of the fluid be in proportion to the velocity; and let two pendulums, entirely alike, oscillating in a cycloid, perform unequal vibrations, and begin to fall the same moment: they here begin to move by forces that are as the arches to be described. If those impressions alone, which are made the first moment, be considered; after a given time the celerities will be in the same ratio, as at the beginning: for the retardations, which are as the velocities themselves, cannot change their proportions, the ratio between quantities not being changed by the addition and subtraction of quantities in the same ratio. Therefore in equal times, however the celerities of bodies are changed in their motion by the *resistance*, the spaces gone through, are as the force, in the beginning; that is, as the arches to be described by the descent: therefore, after any times the bodies are in the correspondent point of those arches. But in these points the forces generated are in the same ratio as in the beginning, and the proportion of the celerities, which is not varied by the *resistance*, suffers no change from the gravity. In the ascent, gravity retards the motion of the body; but in correspondent points, its actions are in the same ratio as in descents. And therefore every where in correspondent points, the celerities are in the same ratio. But as in the same moments the bodies are in their correspondent points, it follows that the motion of both is destroyed in the same moment, that is, they finish their vibrations in the same time. The spaces run through in the time of one vibration, are as the forces by which they are run through; that is, the arches of whole vibration are as the arches described by the descent, the doubles whereof are the arches to be described in vacuo. The deficiencies of the arches to be described in fluids, from the arches to be described in vacuo, are the differences of quantities in the same ratio, and are as the arches described in the descent.

RESISTENCE of fluid mediums to the motion of falling bodies

—The *resistances* are as the squares of the celerities, and therefore every where in correspondent points, as the squares of the arches described by the descent; in which ratio also, the retardations are: but as each of them retain the same proportion in correspondent points, the sums of them all will be in the same proportion; that is, the whole retardations, which are the defects of the arches described in the fluid, from the arches to be described in vacuo, or which is the same, the difference between the arches described in the descent, and the next ascent. Therefore these differences, if the vibrations are not very unequal, are nearly as the squares of the arches described by the descent: which is also confirmed by experiments in greater vibrations; for in these the proportion of *resistance*, here considered, obtains.

A body freely descending in a fluid is accelerated by the respective gravity of the body, which continually acts upon it, yet not equally, as in a vacuum: the *resistance* of the fluid occasions a retardation, that is, a diminution of acceleration, which diminution increases with the velocity of the body. Now there is a certain velocity, which is the greatest a body can acquire by falling: for if its velocity be such that the *resistance* arising from it becomes equal to the respective weight of the body, its motion can be no longer accelerated; for the motion here continually generated by the respective gravity, will be destroyed by the *resistance*, and the body forced to go on equally. A body continually comes nearer and nearer to this greatest celerity, but can never attain to it.

When the densities of a fluid body are given, the respective weight of the body may be known; and by knowing the diameter of the body, it may be found from what height a body falling in vacuo, can acquire such a velocity, as that the *resistance* in a fluid shall be equal to that respective weight, which will be that greatest velocity above mentioned.—If the body be a sphere, it is known that a sphere is equal to a cylinder of the same diameter, whose height is two third parts of that diameter; which height is to be increased in the ratio wherein the respective weight of the body exceeds the weight of the fluid, in order to have the height of a cylinder of the fluid, whose weight is equal to the respective weight of the body; but if you double this height, you will have a height from which a body falling in vacuo, acquires such a velocity as generates a *resistance* equal to this respective weight, and which therefore is the greatest velocity which a body can acquire by falling in a fluid from an infinite height. Lead is eleven times heavier than water, wherefore its respective weight is to the weight of water as ten to one: therefore a leaden ball, as it appears from what has been said, cannot acquire a greater velocity in falling in water, than it would acquire in falling in vacuo, from an height of $13\frac{1}{3}$ of its diameters.

A body lighter than a fluid, and ascending in it by the action of the fluid, is moved exactly by the same laws as

an heavier body falling in the fluid. Wherever you place the body, it is sustained by the fluid, and carried up with a force equal to the difference of the weight of a quantity of the fluid of the same bulk as the body, from the weight of the body. Therefore you have a force that continually acts equally upon the body; by which not only the action of gravity of the body is destroyed, so that it is not to be considered in this case, but the body is also carried upwards by a motion equally accelerated; in the same manner as a body heavier than a fluid descends by its respective gravity; but the equality of the acceleration is destroyed in the same manner by the *resistance*, in the ascent of a body lighter than the fluid, as it is destroyed in the descent of a body heavier.

When a body specifically heavier than a fluid is thrown in it, it is retarded upon a double account, on account of the gravity of the body, and on account of the *resistance* of the fluid; consequently, a body rises to a less height than it would rise to in a vacuum with the same celerity. But the defects of the height in a fluid from the height to which a body would rise in a vacuum with the same celerity, have a greater proportion to each other than the heights themselves; and in less heights the defects are nearly as the squares of the heights in a vacuum.

RESISTANCE of the air, in pneumatics, is the force wherewith the motion of bodies, particularly of projectiles, is retarded by the opposition of the air or atmosphere. See AIR and PROJECTILE.

The air being a fluid, the general laws of the *resistance* of fluids obtain therein; only the different degrees of density in the different stages or regions of the atmosphere, occasion some irregularity.

Different RESISTANCE of the same medium to bodies of different figures—Sir Isaac Newton shews, that if a globe and a cylinder of equal diameters be moved with equal velocity in a thin medium, consisting of equal particles, disposed at equal distances, according to the direction of the axis of the cylinder; the *resistance* of the globe will be less by half than that of the cylinder.

Solid of the least RESISTANCE—From the last proposition the same author deduces the figure of a solid, which shall have the *least resistance* of any containing the same quantity of matter and surface.

The figure is this—Suppose DNFG (Tab. Mechanicæ, fig. 57.) to be such a curve, as, that if from any point N, be let fall a perpendicular NM, to the axis AB; and from a given point G, be drawn a right line GR, parallel to a tangent to the figure in N, and cut the axis when continued, in R: MN be to GR as GR cub. to 4 BR x GBg: a solid described by the revolution of this figure about its axis AB, moving in a medium from A towards B, is less resisted than any other circular solid of the same area, &c. *Newt. Princ. p. 300.*

RESISTANCE of a globe, perfectly hard and in a medium, whose particles are so too; is to the force wherewith the whole motion may either be destroyed or generated which it has at the time, when it has described four thirds of its diameter, as the density of the medium, to the density of the globe—Hence also Sir Isaac Newton infers, that the *resistance* of a globe, ceteris paribus, in a duplicate ratio of its velocity. Or its *resistance* is, ceteris paribus, in a duplicate ratio of its diameter. Or, ceteris paribus, as the density of the medium. Lastly, that the actual *resistance* of a globe is in a ratio compounded of the duplicate ratio of the velocity, and of the duplicate ratio of the diameter, and of the ratio of the density of the medium.

In these articles the medium is supposed to be discontinuous, as air probably is; if the medium be continuous, as water, mercury, &c. where the globe does not strike immediately on all the particles of the fluid generating the *resistance*, but only on those next it, and those again on others, &c. the *resistance* will be less by half. And a globe in such a medium undergoes a *resistance* which is to the force wherewith the whole motion it has after describing eight thirds of its diameter, might be generated or taken away, as the density of the medium to the density of the globe.

RESISTANCE of a cylinder moving in the direction of its axis is not altered by any augmentation or diminution of its length, and therefore is the same with that of a circle of the same diameter moving with the same velocity in a right line perpendicular to its plane.

The *resistance* of a cylinder moving in an infinite unelastic fluid, arising from the magnitude of a transverse section, is to the force wherewith its whole motion while it describes four times its length may be taken away or generated, as the density of the medium to that of the cylinder, very nearly.

Hence, the *resistances* of cylinders moving length-wise, in infinitely continued mediums, are in a ratio compounded of the duplicate ratio of their diameters, the duplicate ratio of their velocities, and the ratio of the density of the mediums.

The *resistance* of a globe in an infinite unelastic medium is to the force wherewith its whole motion while it describes eight thirds of its diameter, might be either generated or taken away, as the density of the fluid, to the density of the globe, quam proximè.

Mr. James Bernouilli demonstrates the following theorems.

RESISTANCE of a triangle—If an isosceles triangle be moved in a fluid according to the direction of a line perpendicular to its base; first, with the vertex foremost, and then with its base; the *resistances* will be as the legs, and as the square of the base, and as the sum of the legs.

The **RESISTANCE of a square** moved according to the direction of its side, and of its diagonal, is as the diagonal to the side.

The **RESISTANCE of a circular segment**, less than a semicircle carried in a direction perpendicular to its basis, when it goes with the base foremost, and when with its vertex foremost, (the same direction and celerity continuing) is as the square of the same diameter, to the same, less; of the square of the base of the segment—Hence the *resistances* of a semicircle when its base and when its vertex go foremost, are to one another in a sesquialterate ratio.

RESISTANCE of a parabola—A parabola moving in the direction of its axis, first with its basis, and then its vertex foremost, has its *resistances* as the tangent to an arch of a circle whose diameter is equal to the parameter, and the tangent equal to half the basis of the parabola.

The *resistance*, if the vertex go foremost, may be thus computed—Say, as the sum (or difference) of the transverse axis and latus rectum is to the square of the diameter of a certain circle, in which circle apply a tangent equal to half the basis of the hyperbola or ellipsis—Then say again, as the sum (and difference) of the axis and parameter is to the parameter, so is the aforesaid tangent to another right line. And farther, as the sum (or difference) of the axis and parameter is to the axis; so is the circular arch corresponding to the aforesaid tangent to another arch. This done, the *resistance* will be as the tangent to the sum (or difference) of the right line thus found, and the arch last mentioned.

In the general, the *resistances* of any figure whatever, going now with its base foremost, and then with its vertex, are as the figures of the base to the sum of all the cubes of the element of the base, divided by the squares of the element of the curve line.

All which rules may be of use in the construction of ships, and in perfecting the art of navigation universally; as also for determining the figures of the balls of pendulums for clocks, &c.

RESOLUTION, RESOLUTIO or SOLUTIO, in physics, the reduction of a body into its original or natural state, by a dissolution or separation of its aggregated parts.

Thus snow and ice are said to be resolved into water; and a compound is resolved into its ingredients, &c. Water resolves into vapour by heat; and vapour is again resolved into water by cold.

Some of the modern philosophers, particularly Mr Boyle, M. Mariotte, Boerhaave, &c. maintain, that the natural state of water is to be congealed, or in ice; inasmuch as a certain degree of heat, which is a foreign and violent agent, is required to make it fluid; so that near the pole, where this foreign force is wanting, it constantly retains its fixed or icy state. On this principle, the resolution of ice into water, must be allowed an improper expression.

RESOLUTION, in chymistry, is the reduction of a mass or mixed body into its component parts, or first principles, by a proper analysis.

The resolution of bodies is performed variously, by distillation, sublimation, dissolution, fermentation, &c. See each operation under its proper article.

RESOLUTION, in logic, is a branch of method, called also analysis.

The business of resolution is to investigate or examine the truth or falshood of a proposition by ascending from some particular known truth, as a principle, by a chain of consequences, to another more general one in question.

Resolution, or the analytic method, stands in direct opposition to composition, or the synthetic method; in which last we descend from some general known truths to a particular one in question.

For an instance of the method of resolution—Suppose the question this; whether on the supposition of man's existence, we can prove that God exists?

To resolve this, our method is thus—"Mankind did not always exist. It is evident from a thousand considerations, the species had a beginning; and that according to all history not 6000 years ago; but if it had a beginning, there must be some cause of its beginning; something to induce

"dure it to exist then more than it did before; in effect there must be a cause or author of its existence, for from nothing, nothing arises: this cause, whatever it is, must at least have all the faculties we find in ourselves; for none can give more than he has: nay, he must have others which we have not, since he could do what we cannot do, *i. e.* create, make man exist, &c.—Now, this cause either exists still, or has ceased to do so: if the former, he did not exist from eternity; for what is from eternity is necessary, and can neither by itself nor any other cause be reduced to nothing: if the latter, it must have been produced from some other; and then the same question will return upon the producer—There is then some first cause; and this cause has all the properties and faculties we have; nay more, has existed from eternity, &c. Therefore, from the supposition of man's existence, it follows there is a "God".

RESOLUTION, or SOLUTION, in mathematics, is an orderly enumeration of the several things to be done, to obtain what is required in a problem.

Wolffius makes a problem to consist of three parts—The *proposition*, (which is what we properly call the *problem*) the *resolution*, and the *demonstration*.

The general tenor of all problems is, those things being done which are enjoyed by the *resolution*; the thing is done which was to be done.

As soon as a problem is demonstrated, it is converted into a theorem; whereof the *resolution* is the hypothesis; and the proposition the thesis.

The process of a mathematical *resolution*, see in the following article.

RESOLUTION, in algebra, or algebraical, is of two kinds; the one practised in numerical problems, the other in geometrical ones.

To resolve a given numerical problem algebraically, the method is thus: 1^o. distinguish the given quantities from the quantities sought; and note the former with the first letters of the alphabet, and the latter with the last.

2^o. Find as many equations as there are unknown quantities: if that cannot be, the problem is indeterminate; and one or more of the sought quantities may be assumed at pleasure—The equations, unless they be contained in the problem itself, are found by theorems relating to the equality of quantities.

3^o. Since, in an equation, the unknown quantities are mixed with the known; it must be reduced, in such manner as that only one unknown quantity be found on one side, and none but known quantities on the other—This reduction is performed by adding the subtracted quantities, dividing the multiplied quantities, and multiplying the divided ones, extracting the roots out of powers, raising roots to their powers, &c. so as that the equality may be still preferred.

To resolve a geometrical problem algebraically—The process in the former article is to be observed throughout: but as it rarely happens we come at an equation in geometrical problems by the same means as in numerical ones, there are some farther things to be noted: first then, suppose the thing done which was proposed to be done—2^o. Examine the relations of all the lines in the diagram, without any regard to known or unknown; in order to find which depend on which; and from which being had, what others are had, whether by similar triangles, or rectangles, &c.—3^o. To obtain the similar triangles, or rectangles, the lines are to be frequently produced, till they become either directly or indirectly equal to given ones, or intersect others, &c. Parallels and perpendiculars to be frequently drawn: points to be frequently connected; and angles to be made equal to others.

If thus you do not arrive at a neat equation; examine the relations of the lines in another manner—Sometimes it is not enough to seek the thing directly, but another thing must be sought, whence the first may be found.

The equation being reduced, the geometrical construction is to be deduced therefrom, which is done in various manners in the various kinds of equations.

Problematical RESOLUTION. See **PROBLEMATICAL**.

RESOLUTION, in medicine, that coction, or alteration of the crude, peccant matter of any disease, either by the natural strength of the patient, or of its own accord, or by the application of remedies; whereby its bulk, figure, cohesion, &c. are so far changed, as that it ceases to be morbid, and becomes laudable.

This, the learned Boerhaave observes is of all others the most perfect cure, where it is effected without any evacuation; as supposing the matter favourable, the constitution excellent, and the medicines good.

RESOLUTION, in music, is when a canon or perpetual fugue is not wrote all on the same line, or in one part; but all the voices that are to follow the guida, or first voice, are wrote separately, either in score, *i. e.* in separate lines,

or separate parts, with the pauses each is to observe, in the beginning, and in the tone proper to each.

RESONANCE, RESOUNDING, in music, &c. a sound returned by the air inclosed in the bodies of string-musical-instruments; as lutes, &c. or even in the bodies of wind-instruments, as flutes, &c.

Elliptic and parabolic vaults *resound* strongly, *i. e.* they strongly reflect or return the sound.

The mouth, and the parts thereof, as the palate, tongue, teeth, nose, and lips, Mons. Dodart observes, contribute nothing to the tone of the voice; but their effect is very great as to the *resonance*.

Of this we have a very sensible instance in that vulgar instrument called the *Jeu-harp*, or *trappe de Bearn*: for, if you hold it in your hand, and strike the tongue or spring thereof, which yields all the found of the instrument, it scarce makes any noise at all. But, holding the body of the instrument between the teeth, and striking the spring as before, it makes a musical buzz, which is heard to a good distance, and especially in the lower notes.

So also in the hautboys, the tone of the reed is always the same; being a sort of drone: the chief variety is in the tone of the *resonance*, produced in the mouth by the greater or less aperture, and the divers motions of the lips.

RESOLVENTS, RESOLVENTIA, in medicine, remedies proper to resolve and dissipate tumours and gatherings, to soften indurations, and by their tenacity and warmth, evacuate redundant or peccant humours through the pores.

Under this class come various unguents, emplasters, &c.

RESORT. See the article **RESSORT**.

RESPECTU *computi vicecomitis habendo*, a writ for the respite a sheriff's account, upon just occasion, directed to the treasurer and barons of the exchequer.

RESPECTUANDO homagia. See **HOMAGIO**.

RESPIRATION, RESPIRATIO, the act of *respiring*, or breathing the air.

Respiration is an involuntary motion of the breast, whereby the air is alternately taken in and thrown out: it therefore includes two contrary motions; the one called *inspiration*, whereby the fluid is received into the cavity of the lungs—The other, *expiration*, whereby it is again expelled.

The principal organs of *respiration* are the lungs, trachea, larynx, &c. the descriptions whereof see under their proper articles, **LUNGS**, **TRACHEA**, and **LARYNX**.

For the manner wherein *RESPIRATION* is performed—It is to be observed, that the lungs, when suspended in the open air, by the contractive power of the muscular fibres which tie together the squamous parts of the bronchia, are reduced to less space than they possessed while in the cavity of the thorax: and when thus contracted, if a quantity of new air be injected through the glottis, they again become distended, so as to possess an equal, yea a greater space, than that assigned them in the thorax.

Hence it appears, that the lungs by their proper force, are always endeavouring to contract themselves into less compass than they possess when inclosed in the thorax; and that therefore they are always in a state of violent dilatation while the man lives—For the air that encompasses them in the thorax, shut up between their external membrane and the pleura, is not of equal density with common air.

In effect, the ingress of the air through the glottis into the lungs, is always free, but that on the out-side wherewith they are compressed, is impeded by the diaphragm, so as it cannot enter the thorax in quantity sufficient to make an equilibrium.

Since then, in inspiration, the air enters the lungs in greater quantity than it was before; it will dilate them more, and will overcome their natural force—The lungs therefore are wholly passive in the matter: what it is that acts must be learnt from the phenomena.

1^o. Then, it is observed, that in inspiration, the nine upper ribs articulated to the vertebrae and the sternum, rise archwise towards the clavicles; and the three lower are turned downwards; and the eighth, ninth, and tenth, are drawn inwards.

2^o. That the abdomen is dilated. And,

3^o. The thorax enlarged.

4^o. The diaphragm is brought from its convex and sinuous position to a flat figure.

Now, as these are the only visible actions in inspiration, the cause of the operation must be referred to them, or rather to the muscles of these parts, which are the intercostals, the sub-clavian, &c.

The capacity of the thorax being enlarged by the action of these muscles on the ribs, &c. a space is left between the pleura and the surface of the lungs; so that the air entering the glottis inflates them till such time as they become contiguous to the pleura and diaphragm—In this case, now, the air

air presses the lungs as much as the thorax refills them. And hence the lungs become at rest; the blood palies less freely, and is forced in less quantity into the left ventricle of the heart, and so less comes into the cerebellum, and its nerves, and the arterial blood acts less on the intercostal muscles and diaphragm.

The causes, therefore, which, at first, dilated the thorax, grow weaker, consequently the ribs become depressed. the distended fibres of the muscles of the abdomen reitor themselves; the viscera thrust the diaphragm up ag in into the thorax, the space whereof being thus contracted, the air is drove out of the lungs; and thus is *expiration* performed.

Immediately, the blood being quickened in its motion, begins to flow stronger and more plentifully to the cerebellum and muscles; and thus the causes of the contraction of the intercostals and diaphragm being renewed, inspiration is repeated—Such is the true, immediate, adequate, manner of vital *respiration*.

For the uses and effects of *respiration*, they are greatly disputed among anatomists.—The learned Boerhaave takes the principal use thereof to be the farther preparation of the chyle, its more accurate mixture with the blood, and its conversion into a nutritious juice proper to repair the decays of the body.

Borelli takes the great use of *respiration* to be the admission and mixture of air with the blood in the lungs, in order to form those elastic globules it consists of, to give it its red florid colour; and to prepare it for many of the uses of the economy; but how such admission should be effected, is hard to say.—It is impossible it should be done in the pulmonary arteries; nor can it be proved in the pulmonary veins.—In effect, such a communication must be hindered and obstructed by the air's distending the vesiculae, and compressing the veins in inspiration, and by the slimy humour that lubricates the membrane lining the inside of the trachea. Add to this, the difficult passage of air through such small pores as will admit water, and the ill effect which air ordinarily has when admitted into the blood.

As to the arguments for such communication; *viz.* the florid colour which the blood here first assumes, and the absolute necessity of *respiration* to life, they are both well accounted for otherwise.

Other authors, as Sylvius, Etmuller, &c. take a great use of *respiration* to be, by the neighbourhood of the cold nitrous air, to cool the blood, coming reeking hot out of the right ventricle of the heart through the lungs, and to act as a refrigeratory.

Mayow, and others, assert one grand use of expiration to be, to throw off the fuliginous vapours of the blood along with the expelled air; and for inspiration, he asserts, that it conveys a nitro-aerial ferment to the blood, to which the animal spirits, and all muscular motion, are owing.

But Dr Thurston rejects all these from being principal uses of *respiration*, which he shews to be, to move or pass the blood from the right to the left ventricle of the heart, and so to effect the circulation.

Whence it is that persons hanged, drowned, or strangled, so suddenly die; *viz.* because the circulation of the blood is stopped; and for the same reason it is, that animals die so speedily in the air-pump.

He instances an experiment made by Dr Croon before the royal society; who, after strangling a pullet, so as not the least sign of life appeared, yet, by blowing into the lungs through the trachea, and so setting the lungs a playing, he brought the bird to life again.—Another experiment of the same kind is that of Dr Hook, who, after hanging a dog, cut away the ribs, diaphragm, and pericardium, as also the top of the wind-pipe, that he might tie it on to the nose of a pair of bellows; and thus, by blowing into the lungs, he restored the dog to life, and then ceasing to blow, the dog would soon fall into dying fits, but recover again by blowing; and thus alternately, as long as he pleased.

This use of *respiration* Dr Drake not only confirms, but carries farther, making it the true cause of the distole of the heart; which neither Borelli, Dr Lower, nor Mr Cowper, had well accounted for.

The weight of the incumbent atmosphere, he shews, is the true antagonist to all the muscles, serving both for ordinary inspiration, and the contraction of the heart.—As in the elevation of the ribs, that author observes, the blood, by the passage opened for it, is, in a manner, solicited into the lungs, so in the depression thereof by the subsidence of the lungs, and the contraction of the blood vessels consequent thereof, the blood is forcibly driven through the pulmonary vein into the left ventricle of the heart; and this, together with the general compression of the body by the weight of the atmosphere, is that power which causes the blood to mount in the veins, after the force impressed on it by the heart is spent, and which forces the heart itself from its natural state of contraction to that of dilatation.

The reciprocal dilatation and contraction of the superficial dimensions of the body consequent on *respiration*, are so necessary.

cessary to animal life, that there is no animal so imperfect as to want it.

Though most kinds of fishes and insects want both lungs and moveable ribs, and consequently have no dilatable thorax, yet that want is made up to them by an analogous mechanism. Fishes, for instance, have gills, which do the office of lungs, receiving and expelling alternately the water, whereby the blood-vessels suffer the same alteration of dimensions as they do in the lungs of more perfect animals.

Insects having no thorax or separate cavity for the heart and lungs, or air-vessels, have the latter distributed through the whole trunk of their bodies; by which they communicate with the external air, through several spiracles or vent-holes, to which are fastened so many little tracheae, or wind-pipes, which send their branches to all the muscles and viscera, and seem to accompany the blood-vessels all over the body, as they do in the lungs only, of the more perfect animals.—By this disposition, in every inspiration, the whole body of these little animals is inflated, and in every expiration compressed; and consequently the blood-vessels must suffer a vicissitude of extension and compression.

The only animal exempted from this necessity of breathing, is a fetus; but this, while included in the womb, seems to have little more than a vegetative life, and ought scarce to be reckoned among the number of animals: it is rather a graft on, or a branch of, the mother.

The laws of RESPIRATION are of the last importance to a right understanding of the animal economy; for which reason, a computation of the force of the *respiring* organs, and of the fires and pressure of the air upon the same, may not be unacceptable.—It may therefore be observed, that, by blowing into a bladder, a considerable weight will be raised by the mere force of the breath: for, with a bladder that is oblong, nearly of a cylindrical figure, and tied at both ends, if a pipe be fixed at one end, and a weight at the other, and the pipe fastened at such a distance from the ground, as just allows the weight to rest upon the ground, the bladder, by an easy inspiration, will raise seven pound weight, and by the greatest inspiration of a pretty strong man, twenty-eight pound weight. Now, the force by which the air enters this pipe, is that force by which it is driven out of the lungs; if therefore the force, by which the air enters the pipe, can be determined, we shall have the force by which the air is drove into the trachea.—But the pressure of air upon the bladder is equal to twice the weight it can raise; because the upper part of the bladder being fixed, it resists the force of the air just as much as the weight at the other end. And again, since the air presses every way equally, the whole pressure will be to that part of it which presses on the orifice of the pipe, as the whole surface of the bladder is to the orifice of the pipe; that is, as the surface of a cylinder, whose diameter, for instance, is four inches, and axis seven, is to the orifice of the pipe.

Thus, if the diameter of the pipe be 0.28, and its orifice 0.616, the surface of the cylinder will be 88. Therefore, as 88 : 0.616 :: 14. double the least weight raised, to 0.098, which is almost 2 ounces; and, in raising the greatest weight, it is near 7 ounces.

These, therefore, are the forces by which the air is drove through the trachea in an easy and strong inspiration.—Now, if we consider the lungs as a bladder, and the larynx as a pipe, the pressure upon the orifice of the trachea, when the air is drove out, will be to the pressure upon the lungs, as the whole surface of the lungs is to the orifice of the trachea.

Suppose, *a. gr.* the diameter of the larynx to be 5; the orifice of the larynx will be 0.19, and suppose the two lobes of the lungs to be two bladders, or spheres, whose diameters are each six inches, their surfaces are each 113 inches, and the pressure on the larynx will be to the pressure upon the whole external surface as 0.19 to 226, which is as 1 to 1189; and therefore, if the pressure upon the larynx in an ordinary breathing be two ounces, the pressure upon the whole external surface of the lungs will be 148 pounds; and the utmost force, when the pressure upon the larynx is seven ounces, will be equal to 520 pounds.—But the lungs are not like an empty bladder, where the air presses only upon the surface; for they are full of vesicles, upon the surface of each of which the air presses, as it would upon the surface of an empty bladder: and therefore, to know the whole pressure of the air, we must determine the internal surfaces of the lungs.

To do this, suppose that $\frac{1}{4}$ part of the lungs is taken up with the branches of the trachea, that another third part the blood-vessels fill, and the remainder is vesicles, where we suppose the chief pressure upon the blood-vessels to be made: now, both lobes of the lungs contain 226 solid inches, of which one third, or 75 inches, are full of vesicles.—Let the diameter of each vesicle be $\frac{1}{75}$ part of an inch, the surface of a vesicle will be .001256, and the solidity 0.000043, by which sum if we divide 75 (the space filled by the vesicles) the quotient gives us 17441860 for the number of vesicles

in both lobes of the lungs—This number multiplied by .01255, the surface of a vesicle gives the sum of the surfaces of all the vesicles, to wit, 21906.976 inches. And therefore the pressure upon the larynx will be to the pressure upon the whole surface of the lungs, as 0.19 to 21906.976; and consequently, when in an ordinary expiration the pressure upon the larynx is two ounces, the pressure on the whole internal surfaces of the lungs will be 14412 pound weight; and the utmost force of the air in breathing, when the pressure upon the larynx is seven ounces, will be 50443 pound weight. Though these seem to be prodigious weights, yet it must still be understood, that the pressure upon each part of the surface of the lungs equal to the orifice of the larynx is not greater than it is at the larynx; and that these vast weights arise from the vast extent of the surfaces of the vesicles upon which it was necessary that the blood should be spread in the smallest capillary vessels, that each globule of blood might, as it were, immediately receive the whole force and energy of the air, and by that be broke into smaller parts fit for secretion and circulation.

And hence we may learn the mechanical reason of the structure of the lungs: for, since the whole blood of the body was to pass through them in order to receive the effect of the air, and that this could not be unless the blood were diffused in small capillary vessels; it was necessary that the surfaces upon which they were to be spread, should be proportioned to their number: which is admirably well provided for by the wonderful fabric of the lungs.

If the gravity of the air was always the same, and if the diameter of the trachea, and the time of every expiration were equal in all; this weight upon the lungs would be always the same. But since we find by the barometer, that there is three inches difference between the greatest and the least gravity of the air, which is a tenth part of its greatest gravity; there must be likewise the difference of a tenth part of its pressure upon the lungs at one time and another: for the momenta of all bodies, moved with the same velocity, are as their gravities.

This is a difference which such as are asthmatic must be very sensible of; especially if we consider that they likewise breathe thicker, that is, that every expiration is performed in less time; if in half the time, and the same quantity of air be drawn in, then the weight of the air upon the lungs must be 57648 pounds, of which a tenth part is 5764 pounds: and consequently asthmatic people upon the greatest rise or fall of the barometer, feel a difference of the air, equal to above one third of its pressure in ordinary breathing. See ASTHMA, WEATHER, &c.

Again, if the trachea be small, and its aperture narrow, the pressure of the air increases in the same proportion as if the times of expiration were shorter; and therefore a shrill voice is always reckoned among the prognostic signs of a consumption, inasmuch as that proceeds from the narrowness of the larynx or trachea; and consequently increases the pressure of the air upon the lungs, which upon every expiration beats the vessels so thin, that at last they break, and a spitting of blood comes on.

RESPIRE,* RESPECTUS, in law, &c. a delay, forbearance, or prolongation of time, granted any one for the payment of a debt, or the like.

* Menage derives the word *respite* from the Latin, *respietas*; as *dispite* from *dispectus*—Du Cange will rather have it come from *respirare*, to breathe; *respite* being, in effect, a breathing-while, granted a debtor, &c.

Letters of RESPIRE, or **CREDIT**, are instruments anciently granted by sovereign princes to honest, but unfortunate debtors, to screen them from their too rigorous creditors.

These still obtain in France—They were first introduced by pope Urban II. in favour of the Croisades, i. e. of persons who went to the holy war.

S. Louis granted three years *respite* to all who made the voyage of the holy land with him.—In the customary of Normandy, *respite* is a judicial delay, or demur, given to procedures.

RESPIRE of homage, is a forbearance of the homage due from the vassal or tenant holding by homage, or by knight-service to his lord.

Antiently those who held by these tenures, paid a small sum every fifth year into the exchequer, to be *respired* doing their homage or service.

By Stat. 12. Car. II. this *respite* of homage is taken away, as a charge arising from knight-service; which is thereby likewise annulled.

RESPONDEAT superior, a law phrase.—Where the sheriffs are removable, as in London, for insufficiency; *respondeat superior*, that is, the mayor and commonalty are to answer for them.

For the insufficiency of a bailiff of a franchise, *respondeat superior*; that is, the lord of the franchise, is to answer.

RESPONDENT, RESPONDENS, in the schools, a person who maintains a thesis in any art or science.

He is thus called as being to answer all objections proposed by the opponent or impugner, &c.

The *respondent's* business is to see whether the opposition made by the contrary party be just and legitimate; or whether some of the laws and conditions of opposition be not broke, which is called *ignoratio elenchis*.—He is also to examine the moods and figures of the syllogisms, to see whether the premises be just, &c. And through the whole to answer rather by distinction than by direct negation.

RESPONDENT,* in law, a person who undertakes to answer for another; or binds himself as security for the good behaviour of another.

* The word is formed from the Latin, *respondere*, to answer; q. d. *pro alio spondere*, to promise for another.

The *respondent* is to answer for the damages done by the person for whom he *responds*.—There are four ordinances of the kings of France, whereby the citizens are expressly forbid to take servants without *respondents*, bound in writing.

RESPONSALIS, in law, he who appears for another in court at a day assigned.

Fleta makes this difference between *responsalis attornatus*, and *effinator*: that the *effinator* came only to alledge the cause of the party's absence, be he demandant or tenant; whereas *responsalis* came for the tenant, not only to excuse his absence, but to signify what trial he means to undergo, the combat or the country.

RESPONSARY song, an anthem in which the choristers sing by turns.

RESPONSE, RESPONSA, RESPONSIUM, an answer, reply, or repartee.

The word is chiefly used in speaking of the answers made to the priest, by the people, in the litany, the psalms, and other parts of the office.

It has its use too in speaking of the opinions or answers of the ancient jurists; when consulted on points of law.

The fifty books of the *digest* are composed of *responsa prudentum*, the *responses* of Papinian, Ulpian, Scævola, &c. collected by Justinian, who afterwards gave them the force of laws.

The *responses* of the emperors were more properly called *rescripts*.

RESPONSIONS, RESPONSES, a term used in the military orders for certain pensions or charges which the knights, or the commanderies they held, paid to the order.

Such a knight-templar paid a *responsion* of fifty pounds *per annum* to his order, on account of such a commandery. See **COMMANDERY** and **CONVENTUAL**.—In *Rot. Parl.* 9 Richard II. it is written *responsaries*.

RESSAULT*, in architecture, the effect of a body which either projects or falls back; i. e. stands either more out or in than another; so as to be out of the line, or range therewith.

* The term is French; and but little used in English; though the want of a word of equal import pleads for its naturalization.

RESSORT, or RESORT, a term purely French, yet frequently used by our late writers, to signify the jurisdiction or authority of a court.

The word in its popular meaning signifies *spring*, or the force of elasticity.—Hence it is also used for a jurisdiction, and the extent or district thereof; as, when we say such a thing belongs to his *ressort*, a judge out of his *ressort* has no authority. But its chief use among us is in speaking of a court or tribunal, where appeals are judged; or of a court or person who judges finally and ultimately, and whence there is no appeal.

The house of lords judge in the last *ressort*, *en dernier ressort*.—Presidials judge in the last *ressort* of all criminals prosecuted by the provosts of the marshals.

RESSORT, or RESORT, is also used in a writ of aye or coucenage, in the same sense, as *descent* in a writ of right.

RESSOURCE,* a term purely French, yet used by English writers, to denote a means or foundation of a man's recovering himself from his fall or ruin; or an after-game for the repairing his damages.

* Skinner derives the word from the French *ressoudre*, to resolve a resource strictly and literally expresses a means which presents itself a-fresh.

This merchant has credit and friends still left; he has great *ressources*.—His last *ressource* was to throw himself into a convent.—The jargon of a distinction, is the ordinary *ressource* of a divine at a pinch.

REST, quies, in physics, the continuance of a body in the same place: or its continual application or contiguity to the same parts of the ambient and contiguous bodies. See **SPACE**. *Rest* is either *absolute*, or *relative*; as place is. See **PLACE**. Some define *rest*, the state of a thing without motion; and hence,

hence, again, *rest* becomes either absolute or relative, as motion is.

Sir Isaac Newton defines true or absolute *rest* to be the continuance of a body in the same part of absolute and immovable space; and relative *rest* to be the continuance of a body in the same part of relative space.

Thus, in a ship under sail, relative *rest* is the continuance of a body in the same region of the ship, or the same part of its cavity—True, or absolute *rest* is its continuance in the same part of universal space, wherein the ship with its cavity and contents are all contained.

Hence, if the earth be really and absolutely at *rest*, the body relatively at *rest* in the ship, will really and absolutely move; and that with the velocity wherewith the vessel moves—But if the earth do likewise move, there will then arise a real and absolute motion of the body at *rest*, partly from the real motion of the earth in absolute space; and partly from the relative motion of the ship on the sea—Lastly, if the body be likewise relatively moved in the ship, its real motion will arise partly from the real motion of the earth in immovable space, and partly from the relative motion of the ship on the sea, and of the body in the ship.

Thus, if that part of the earth where the ship is, move eastward with a velocity of 1000 parts; and the vessel be carried by the wind westward 10 parts; and at the same time a seaman aboard walk with a velocity of 1 part; the seaman will be moved really and absolutely in immovable space eastwards, with 1001 parts of velocity; and relatively on the earth, with nine parts of velocity westwards.

It is an axiom in philosophy, that matter is indifferent as to *rest* or motion. Hence, Sir Isaac Newton lays it down as a law of nature, that every body perseveres in its state either of *rest* or uniform motion; except so far as it is disturbed by external causes.

The Cartesians will have firmness, hardness, or solidity of bodies to consist in this, that their parts are at *rest*, with regard to each other; and this *rest* they establish as the great nexus, or principle of cohesion, whereby the parts are connected together.

Fluidity, they add, consists in a perpetual motion of the parts, &c.—But the Newtonian philosophy furnishes us with much better solutions. See SOLIDITY, FLUIDITY and COHESION.

REST, *repos* or *paufe*, in poetry, is used for the caesura, which in Alexandrine verses falls on the sixth syllable; and in verses of ten or eleven syllables, on the fourth.

This verse is naught, there wants a *rest* or pause in it—The *rest* should never fall on a monosyllable, whereon the voice may not dwell. It is called *rest*, because the ear, and the pronunciation have both a repose or respite.

REST, in music, is a cause or interval of time, during which there is an intermission of the voice or sound.

Rests are sometimes used in melody, that is, in music of a single part, to express some simple passion, or even for variety sake; but more frequently in harmony, or compositions of several parts, for the sake of the pleasure of hearing one part move on while another *rests*; and this interchangeably.

Rests are either for a whole bar, or more than a bar, or but for a part of a bar—When the *rest* is for a part, it is expressed by certain signs corresponding to the quantity of certain notes of time; as minim, crotchet, &c. and is accordingly called *minim-rest*, *crotchet-rest*, &c.

The characters or figures whereof, see under CHARACTERS of music; where the notes and corresponding *rests* are found together.

When any one of those characters occurs either on a line or space, that part is always silent for the time of a minim, or crotchet, &c.—Sometimes a *rest* is for a crotchet and quaver together; or for other quantities of time, for which there is no particular note: In which case the signs of silence are not many *rests*, but such silence is expressed by placing together as multiplied; of different time, as make up the designed *rest*.

When the *rest* is for a whole bar, the semibreve *rest* is always used—If the *rest* be for two measures, it is marked by a line drawn a-croś a whole space—For three measures it is drawn a-croś a space and a half; and for four measures a-croś two spaces. But to prevent ambiguity, the number of bars is usually writ over the sign.

Some of the more ancient writers in music make these *rests* of different value in different species of time—E. gr. The character of a minim-*rest*, in common time, say they, expresses the *rest* of three crotchets in triple time, in that of the triples $\frac{3}{2}$, $\frac{3}{4}$, $\frac{3}{8}$, it always marks an half measure, how different soever these may be among themselves.

They add, that the *rest* of a crotchet in common time is a *rest* of three quavers in the triple $\frac{3}{2}$; and that the quaver *rest* of common time is equal to three semi-quavers in the triple $\frac{3}{2}$. But this variety in the use of the same character is now laid aside.

RESTAUR, RESTOR, in ancient customs, the remedy of recourse which asurers have against each other, according to the date of their assurances; or against the masters, if the average arise through their default, as through ill loading, want of caulking, or want of having the vessel tight.

The word is also used for the remedy or recourse a person has against his guarantee or other person, who is to indemnify him from any damage sustained—Hence *refraurant* and *refruration*—In the lower Latin they also use the words *reflor* and *reflaur*.

RESTAURATION, RESTAURATIO, RESTORATION, the act of re-establishing, or settling a thing in its former good estate.

Thus we say, the *refruration* of a minor to the possession of his effects, alienated in the time of his minority. In the French laws is an ancient formula; used for the *refruring* a person to his good name; after he has been wrongfully accused and condemned.

Sour and decayed beer and ale are *refrured* various ways.—By a handful of wheat thrown into the vessel, or by falt made from the ashes of barley straw, put into the vessel and stirred.

Glauber commends three or four handfuls of beech ashes applied in the same manner—Chalk scraped into it renders it drinkable immediately. The same effect is also produced by calcined oyster-shells, burnt egg-shells; sea-shells, or crab's eyes. In England we say, the *RESTAURATION*, by way of eminence, for the return of king Charles II. in 1660; after the civil wars.

The 29th of May is an anniversary festival held in commemoration of the *refruration*; the *refruration* of regal and episcopal government.

RESTAURATION, in architecture, the act of repairing all the parts of a building gone to decay, either through the course of time, or other injuries; in such manner, as that it is not only re-established in its first form, but considerably augmented.

It is evident from the plinths of the corinthian columns of the Pantheon, which are almost wholly under ground, that the pavement of this temple is only a *refruration* made in the time of Septimius Severus. Daviler.

The temple of concord, behind the capitol at Rome, having been burnt long after it was built, and having angular bases different from the *rest*, seems to have been *refrured* from the ruins of several ancient buildings.

RESTAURATION, in sculpture, is the repairing of a mutilated statue, &c. See REPAIRING.

Most of the antique statues have undergone a *refruration*; as the Farnese Hercules, the Faunus in the Villa Borgheze at Rome, the wretches in the gallery of the great duke of Florence, the Venus of Arles in the gallery at Versailles—But these *refrurations* have all been made by the ablest sculptors. Daviler.

RESTINCTION, RESTINCTIO, in chymistry, the quenching of a metal or mineral in some liquor, in order either to correct, or to exalt it, by giving it some new quality, power, &c.

RESTITUTION, RESTITUTIO, in physics, the returning of elastic bodies forcibly bent to their natural state, by some called the *motion of restitution*. See ELASTICITY.

Contraction being the proper and natural action of muscular fibres, some authors ascribe dilatation to a motion of *restitution*; but the expression, as well as the idea, are very faulty.

RESTITUTION, in a moral and legal sense, is the act of restoring a person to his right; or of returning something unjustly taken or detained from him.

Restitution is reducible to commutative justice; and till it be made, the casuists determine the party all the while guilty of theft.

The illegal incumbents of benefices are condemned to a *restitution* of the fruits of the benefices—In the Romish church usurers, &c. are obliged to a *restitution* of their ill-gotten goods, otherwise the priest has no authority to give them absolution.

RESTITUTION in integrum, is used for what is otherwise called *rescission*.

Religious obtain *restitution* against their vows, i. e. they are freed from their obligation, when they protest against them within five years of their profession.

In the history of Germany for the XVIIth century, the first day of January 1624 is called the *term of restitution*; because by the peace of Munster, then concluded, the Lutheran and Calvinist princes were obliged to *restitute*, restore what they had taken from the Roman catholic churches in their territories till that day.

RESTITUTIONS of medals, or RESTITUTED medals, is a phrase used by antiquaries, for such medals as were struck by the

the emperors, to renew or retrieve the memory of their predecessors.

Hence it is that in several medals we find the letters REST.—Claudius was the first who began this practice, by striking a-trestl several medals of Augustus. Nero did the same; and Titus, after the example of his father, struck *restitutions* of most of his predecessors.

Gallienus struck a general *restitution* of all the preceding emperors in two medals, the one bearing an altar, the other an eagle, without the REST.—F. Joubert chafes rather to call them *conversations* than *restitutions*; as being done quite a-new.

RESTITUTIONE *extracti ab ecclesia*, a writ antiently granted for the restoring a man to the church or sanctuary from which he had been forced away.

RESTITUTIONE *temporalium*, a writ which lies where a man is elected and confirmed bishop of a diocese; for the recovery of the temporalities or barony of the said bishoprick.

It is directed from the king to the escheator, or rather sheriff of the county.

RESTIVE, or **RESTY**, a term applied to a horse, &c. that stops, or runs back, instead of advancing forwards.

In the manage, a *restive* horse is a rebellious, refractory, ill-broken horse; which only goes where it will, and when it will.—The word is formed from the Latin, *restitio*, which signifies the same thing.

RESTOR. See the article RESTAUR.

RESTORATION. See the article RESTAURATION.

RESTORATIVE, in medicine, a remedy proper for the restoring and recovering of strength and vigour.

Restoratives belong to the class of balsamics; and are otherwise called *analpists*.

The medicines that come under this denomination are of an emollient, softening nature, but nutritive withal; and are rather administered to repair the wastes of the constitution, than to alter and rectify its disorders.

Such are the leaves of white, and black maiden-hair, rocket, cruck, scabius, colts-foot; bohea-tea; chick-peas; hops; chocolate; pistachia-nuts; balsam of Tolu; bdellium; benzoin; storax; eryngo; iris; satyrion, &c.

RESTRAINT, is when an action is hindered or stopped, contrary to volition, or the preference of the mind.

RESTRICTION, the act of modifying, limiting, or restraining a thing to narrower bounds.

General laws always bear some *restriction*.—In contracts 'tis usual to have *restrictive clauses*, which bind the covenants down to certain bounds.

Mental RESTRICTION. See RESERVATION.

RESTRICTION, among logicians, is understood of the limiting a term, so as to make it signify less than it usually does.

In which sense the name Philosopher is *restrained* to Aristotle; Great to Alexander; City to Rome, &c.

It is observed to be good arguing affirmatively from a non-restrained to a restrained term; but not contrarily: And negatively, from a restrained to a non-restrained term; but not contrarily.

RESTRICTIVE proposition. See the article PROPOSITION.

RESTRICTIVE future. See the article SUTURE.

RESTRINGENT, in medicine. See ASTRINGENT.

RESTY. See the article RESTIVE.

RESULT, what is gathered from a conference, an inquiry, meditation, discourse, or the like; or the conclusion and effect thereof.

The assembly was so tumultuous that there was no knowing the *result*.—The usual *result* of disputes, Mr Bayle observes, is that each person remains more attached to his own opinion.

RESUMMONS, **RESUMMONITIO**, a second summons, or calling a man to answer an action where the first summons is defeated, or suspended by any accident; as the death of a party, &c.

RESUMPTION, **RESUMPTIO**, in a law sense, signifies the taking again into the king's hands such lands or tenements as before, upon false suggestions, or other error, he had delivered to the heir, or granted by letters patent to any man.

RESUMPTION, in the schools, a summary repetition, or running over of an argument, or of the substance thereof, in order to refute it.

The respondent *resumed* all the points of the objection, and answered them one by one.

RESUMPTION is also used by logicians for the reduction of some figurative or quaint proposition, to a more intelligible and significant one.

As, Peter is half-seas over; that is, he is half fuddled.—The meadows smile; that is, they look pleasant.

RESUMPTIVE, in pharmacy, an epithet given to a kind of unguent, used to recruit and restore arid languishing constitutions, and to dispose the dry body to receive nourishment.—It is called in Latin, *unguentum resumptivum*.

RESURRECTION, **RESURECTIO**, **RESUSCITATION**, the act of returning, to a new, or second life, after having been dead.

The great argument for the truth of christianity, and that urged with the most force and conviction for the same, is drawn from the *resurrection* of our Saviour.—The circumstances thereof are such as almost admit of a demonstration; which has accordingly been attempted on the strict principles of the geometricians. See Ditton on the *resurrection*.

The christians generally believe the *resurrection* of the same identic body, the very same flesh and bones at the day of judgment.—The two principal philosophical objections against it are these.

1^o. That the same piece of matter or substance may happen to be a part of two or more bodies.—Thus a fish feeding on a man, and another man afterwards feeding on the fish; part of the body of the first man becomes first incorporated with the fish, and afterwards in the fish, with the last man. Again, instances have been known of one man's feeding immediately on another; and among the cannibals of the West-indies the practice is frequent.

Now, where the substance of one is thus converted into the substance of another, each cannot arise with his whole body; and to which shall the common part be allotted?

To this objection some answer, that as all matter is not fit or disposed to be assimilated to the body, and incorporated with it: human flesh may very probably be of this kind, and therefore what is thus eaten, may be again excreted and carried off.—But Mr Leibnitz's answer seems the more solid.—All that is essential to the body, he urges, is the original *flamen*, which existed in the semen of the father; nay, and on the footing of the modern theory of generation, which existed in the semen of the first man. This we may conceive as the most minute speck or point imaginable, and therefore not to be separated, or tore asunder, and any part of it united with the *flamen* of any other man. All this bulk we see in the body, is only an accretion to this original *flamen*; an addition of foreign matter, of new juices to the primary, solid *flamen*. There is therefore no reciprocation of the proper matter of the human body.

The second objection is this.—The human body, we know by the late discoveries in the animal œconomy, is continually changing: a man has not entirely the same body, to day as he had yesterday; and it is even computed, that in less than seven years time, his whole body undergoes a change, and not a particle of the same body remains. Which of those many bodies, then, which the same person has in the course of his life, is it that shall rise? or does all the matter that has ever belonged to him, rise again? or does only some particular system thereof? the body, *e. gr.* he had at 20, at 30, or at 60 years old? if only this or that body arise, how shall it be rewarded or punished for what was done by the other? with what justice does one person suffer, &c. for another?

To this it may be answered, on Mr Lock's principles, that personal identity, or the sameness of a rational being, consists in self-consciousness; in the power of considering it self the same thing in different times and places.—By this every one is to himself what he calls *self*; without considering whether that self be continued in the same or divers substances. So far reaches the identity of that person. It is the same self now it was then, and it was by the same self which now reflects on an action, that action was performed.

Now, it is this personal identity that is the object of rewards and punishments, which we have observed may exist in different successions of matter; so that to render the rewards and punishments just and pertinent, nothing needs but that we rise again with such a body as that we retain the consciousness of our past actions.

RESUSCITATION. See RESURRECTION and REVIVIFICATION.

RETAIL, in commerce, &c. the buying of goods in the great, or by wholesale, and selling them out again in small parcels.—*Qui rem integrum ementes, per minores eam partes distrabant.*

To **RETAIN**, spoken of mares, signifies to hold, *i. e.* to conceive after covering.

RETAINER, in law, a servant not menial or domestic, that is, not continually dwelling in the house of his lord or master, but only wearing his livery, and attending on special occasions.

This livery was antiently given by a great man, and frequently for the maintenance of quarrels; whence it was justly prohibited.

hibited by several statutes; as under Richard II. on pain of imprisonment, and grievous forfeiture to the king.

It was farther prohibited by other statutes of the succeeding kings, whereby the delinquents were subjected to make ransom at the king's pleasure; and knights and esquires hereof duly attainted, were to lose their said liveries, and forfeit their fees for ever.

Edward IV. added a special penalty of five pounds per month on every man that gave such livery, and as much on every person so retained, either by writing, word, or oath.—But most of these statutes are repealed by a statute 3 Car. I.

RETAINING-fee is the first fee given in any cause to a serjeant or counsellor at law, whereby to make him sure, that he shall not be on the contrary side.

RETALIATION, **RETALIATIO**, the act of returning like for like. See **TALIONIS lex**.

RETARDATION, **RETARDATIO**, in physics, the act of *retarding*; that is, of delaying the motion or progress of a body, or of diminishing its velocity.

The *retardation* of moving bodies arises from two great causes, the *resistance* of the medium, and the *force* of gravity.

The *RETARDATION* from the *resistance* is frequently confounded with the *resistance* itself; because, with respect to the same moving body, they are in the same proportion.

With respect to different bodies, however, the same resistance often generates different *retardations*.—For, if bodies of equal bulk, but different densities, be moved thro' the same fluid with equal velocity, the fluid will act equally on each; so that they will have equal resistances, but different *retardations*: and the *retardations* will be to each other as the velocities which might be generated by the same forces in the bodies proposed; that is, they are inversely as the quantities of matter in the bodies, or inversely as the densities.

Suppose, then, bodies of equal density, but of unequal bulk, to move equally fast through the same fluid, their resistances increase according to their superficies; that is, as the squares of their diameters. But the quantities of matter are increased in proportion to the cubes of the diameters: the resistances are the quantities of motion; the *retardations* are the celerities arising from them; and dividing the quantities of motion by the quantities of matter, you will have the celerities: therefore the *retardations* are directly as the squares of the diameters, and inversely as the cubes of the diameters; that is, inversely as the diameters themselves.

If the bodies be equal, move equally swift, and are of the same density, but moved through different fluids, their *retardations* are as the densities of those fluids.

And when bodies equally dense, and of bulk equal, are carried through the same fluid with different velocities, the *retardations* are as the squares of the velocities.

The *RETARDATION* from gravity is peculiar to bodies projected upwards.—A body thrown upwards, is *retarded* after the same manner as a falling body is accelerated; only, in the one case, the force of gravity conspires with the motion acquired; and in the other, it acts contrary to it.

As the force of gravity is uniform, the *retardation* from that cause will be equal in equal times.

Hence, as it is the same force which generates motion in the falling, and diminishes it in the rising body, a body rises till it has lost all its motion; which it does in the same time wherein a body falling would have acquired a velocity equal to that wherewith the body was thrown up.

Thus also, a body thrown up, will rise to the same height from which falling it would acquire the velocity wherewith it is thrown up; therefore the heights which bodies thrown up with different velocities can rise to, are to each other as the squares of the velocities.

Hence, the *retardations* of motions may be compared together: for they are, first, as the squares of the velocities; secondly, as the densities of the fluids through which the bodies are moved; thirdly, inversely, as the diameters of those bodies; lastly, inversely, as the densities of the bodies themselves.

The numbers in the ratio compounded of these ratios, express the proportion of the *retardations*; multiplying the square of the velocity by the density of the fluid, and dividing the product by the product of the diameter of the body multiplied into its density; and working thus for several motions, the quotients of the divisions will have the same compound ratio to one another.

Law of RETARDATION of motion.—1°. If the motion of a body be uniformly retarded, that is, if its celerity be diminished equally in equal times, the space it passes over is one half of that it would pass over in the same time by a uniform motion.

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2°. The spaces described in equal times by an uniformly retarded motion, decrease according to the uneven numbers 9, 7, 5, 3, &c.—See further under **ACCELERATION**.

RETCHING, or **REACHING**, the effort or endeavour to vomit. See **NAUSEA**.

RETE mirabile, in anatomy, a small plexus of net-work of vessels in the brain, surrounding the pituitary gland.

The *rete mirabile* is very conspicuous in brutes; but it is either not existent in man, or is so very minute, that its existence has been doubted.

Willis will have it to consist of arteries, veins, and nerves; Vieussens of arteries only; and others of arteries and small veins.

Vieussens asserts, with many other anatomists, that there is no *rete mirabile* in man, in the horse, dogs, &c. But that it is found in the calf, sheep, goat, &c.

It was observed and described by Galen; who, upon finding it in some brutes, concluded it to be likewise in man; but all we see like it in man is, that on the sides of the pituitary gland, where its place should be, the carotid arteries make a double flexure, in form of *cs*, before they penetrate the dura mater.

The use of the *rete mirabile* Galen takes to be for concocting and elaborating the animal spirits; as that of the epididymides is for elaborating the seed. See **SPIRIT** and **SEED**.

Dr Willis thinks, with more probability, it may serve to bridle the too rapid incursions of the blood into the brain of those creatures, whose head hangs down much; to separate some of the superfluous serous parts of the blood, and send them to the salivary glands, as the blood enters the brain; and to obviate obstructions which may happen in the arteries.

RETE penny, in antient records, a customary due of one penny for every person to the parish-priest.

RETEINER or **RETAINER**. See **RETAINER**.

RETENTIO, **RETINENTIA**, in our law books, is sometimes used to signify *retinue*. See **RETINUE**.

RETENTION, **RETENTIO**, a faculty of the human mind, whereby, in order to a farther progress in knowledge, it keeps or retains those simple ideas, which it before received by sensation or reflection.

This is done two ways.—First, by keeping the idea which is brought into the mind for some time actually in view. This is called *contemplation*.

Secondly, by reviving those ideas in our minds, which have disappeared, and have been, as it were, laid out of sight. This is *memory*, which is, as it were, the repository of our ideas.

Our ideas being nothing but actual perceptions in the mind, which cease to be any thing when there is no perception of them, this laying up of our ideas in the repository of the memory amounts to no more than this, that the mind has a power, in many cases, to revive perceptions it once had; with this additional perception annexed to them, that it has had them before.

It is by the assistance of this faculty that we are said to have all those ideas in our understanding, which we can bring into sight, and make the objects of our thoughts, without the help of those sensible qualities, which first imprinted them there.

Attention and repetition help much to the fixing ideas in our memories; but those which make the deepest and most lasting impressions, are such as come accompanied with pleasure and pain—Ideas but once taken, and never again repeated, are soon lost; such are those of colours in such as lose their sight when very young.

The memory in some men is tenacious, even to a miracle; but yet there seems to be a constant decay of all our ideas, even of those which are struck deepest, and in the minds the most *retentive*; so that, if they be not sometimes renewed, the print wears out, and at last there remains nothing to be perceived of it.

Those ideas, which are often renewed by a frequent return of the objects or actions that produce them, fix themselves best in the memory, and remain longest there: such are the original qualities of bodies; viz. solidity, extension, figure, motion, &c. and those that almost constantly affect us, as heat and cold; and those that are the affections of all kinds of beings, as existence, duration, and number; which are seldom quite lost, while the mind retains any ideas at all.

RETENTION is also used in medicine, &c. for the state of contraction in the solids, or vascular parts of the body, which makes them hold fast their proper contents.

In this sense, *retention* stands opposed to *evacuation* and *excretion*.

Retention and excretion make two of the non-naturals.

RETENTION is also frequently considered as a disorder, and

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defined

defined the art of retaining the excrements, humours, &c. so as they cannot be voided out of the body.
It is the *retention* of peccant humours which causes such a disease—A *retention* of urine is very painful and dangerous.

RETILIARI*, in antiquity, a kind of gladiators, thus denominated from a net, which they made use of against their antagonists, who were called *jectatores*, and sometimes *mirumillones*. See GLADIATOR.

The word is formed from the Latin, *rete*, net; or perhaps from *reticulum*; for they called their net *jaculum*, and sometimes in one word *retijaculum*.

This net they carried under their buckler, and, when opportunity served, cast it over the head of their antagonist, and, in this condition, killed him with a trident, which they bore in the other hand.
Lupinus and others observe, that they fought in tunics, and were furnished with sponges to wipe off the sweat, blood, &c. and to stop their wounds.

RETICENCY, RETICENTIA, a figure in rhetoric, whereby we make oblique mention of a thing, in pretending to pass it over unmentioned.

Thus: *To say nothing of the nobility of his ancestors: I forbear to speak of his courage, and pass over the severity of his morals.*

RETICULA, RETICULE, in astronomy, a contrivance for the exact measuring the quantity of eclipses, introduced about fifty years ago by the royal academy of Paris. See ECLIPSE.

The *reticule* is a little frame, consisting of thirteen fine silken threads, equidistant from each other, and parallel; placed in the focus of object glasses of telescopes; that is, in the place where the image of the luminary is painted in its full extent—Of consequence, therefore, the diameter of the sun or moon is hereby seen divided into twelve equal parts or digits; so that, to find the quantity of the eclipse, there is nothing to do, but to number the luminous and the dark part.

As a square *reticule* is only proper for the diameter, not for the circumference of the luminary, it is sometimes made circular, by drawing six concentric equidistant circles. This represents the phases of the eclipse perfectly.

But it is visible, that the *reticules*, whether square or circular, ought to be perfectly equal to the diameter or circumference of the sun or star, such as it appears in the focus of the glass, otherwise the division cannot be just.

Now, this is no easy matter to effect, by reason the apparent diameter of the sun and moon differ in each eclipse; nay, that of the moon differs from itself in the progress of the same eclipse.

Another imperfection in the *reticule* is, that its bigness is determined by that of the image in the focus; and of consequence it will only fit one certain magnitude.

But M. de la Hire has found a remedy for all these inconveniences, and contrived, that the same *reticule* shall serve for all telescopes, and all altitudes of the luminary in the same eclipse—The principle whereon his invention stands, is, that two object glasses applied against each other, having a common focus, and there forming an image of a certain magnitude, this image will increase in proportion as the distance between the two glasses is increased, as far as a certain limit.

If then a *reticule* be taken of such a magnitude, as just to comprehend the greatest diameter the sun or moon can ever have in the common focus of two object glasses applied to each other, there need be nothing to remove them from each other, as the star comes to have a less diameter, to have the image still exactly comprehended in the same *reticule*.

Another improvement is, that whereas the silken threads are subject to swerve from the parallelism, &c. by the different temperature of the air; a *reticule* may be made of a thin looking-glass, by drawing lines or circles thereon with the fine point of a diamond; which shall be safe from any alteration of the air.

RETICULAN body, corpus RETICULARE, in anatomy, a body of vessels lying immediately under the cuticle or scarfskin.

These vessels contain a mucous liquor, from the tincture whereof Malpighi imagines the colour of the skin to be derived; founding his conjecture on this, that the cutis, as well as cuticle of blacks, is white; and that they differ in no other circumstance from those of Europeans, but in this particular.

RETICULAR plexus, plexus RETICULARIS, sometimes denotes the choroides, which is thus called, because its fibres are interwoven like a net. See CHOROIDES.

RETICULUM, the caul, or omentum; a name sometimes given this part from its net-like structure. See OMENTUM.

RETIFORMIS laxis, in anatomy, the same with rete mirabile. See RETE.

RETINA, in anatomy and optics, one of the tunics of the eye; called also *amphiblestroides*, *retiformis*, and *reticularis tunica*, as being woven in manner of a net.

The *retina* is the last or innermost of the coats of the eye, lying immediately under the choroides.

It is formed of an expansion of the medullary part of the optic nerve; whence it is very thin, soft, white, &c. resembling the substance of the brain, with the transparency of the horn of a lantern.—When separated from the choroides, it runs into a mucous mass, or lump.

The *retina* is usually supposed to be the great organ of vision, which is effected by means of the rays of light reflected from each point of objects, refracted in their passage through the aqueous, vitreous, and crystalline humours, and thus thrown on the *retina*; where they paint the image of the object; and where they make an impression, which is continued thence, by the fine capillaries of the optic nerves, to the sensory. See VISION.

Indeed, whether the *retina* or the choroides be the principal organ of vision, and that whereon the images of objects are represented, has been much controverted between several members of the royal academy; particularly Mess. Mariotte, Pecquet, Perrault, Mery, and de la Hire—Mariotte first stood up for the choroides, and was seconded by Mery: the rest asserted the cause of the *retina*.

The *retina* was always judged to have all the characters of the principal organ—It is situate in the focus of the refraction of the humours of the eye; and of consequence receives the vertices of the cones of rays, proceeding from the several points of objects. It is very thin, and consequently very sensible. It has its origin from the optic nerve, and is itself wholly nervous, and it is the common opinion that the nerves are the vehicles of all sensations. Lastly, it communicates with the substance of the brain, where all sensations terminate.

As to the choroides, its use was supposed to be to stop the rays, which the extreme tenuity of the *retina* should let pass; and to do the same office to the *retina* which the quicksilver does to a looking-glass; especially in those animals wherein it is black.

But from an experiment of a cat plunged into water, M. Mery conceived a different opinion—He observed the *retina* to disappear absolutely on that occasion, as well as all the other humours of the eye; while the choroides still appeared distinctly, and even with all the lively colours which it has in that animal—Hence he concluded, that the *retina* was as transparent as the humours, but the choroides opaque: consequently the *retina* was not a proper instrument to terminate and stop the cones of rays, or to receive the images of objects: but that the light must pass through it, and could only be stopped on the choroides; which therefore would become the principal organ of vision. The black colour of the choroides in man is extremely favourable to this opinion: the principal organ should seem to require that the action of the light should terminate on it, as it arrives; which it is certain it here does in the black that absorbs all the rays, and reflects none; and it should also seem necessary that the action of the light should be stronger on the organ of sight than any where else: now, it is certain that the light being received and absorbed in a black body, must excite a greater vibration there than any where else; and hence it is that black bodies are kindled by a burning glass much sooner than white ones.

The situation of the choroides behind the *retina* is another circumstance on its side; M. Mery having observed the same position of the principal organ behind a mediate organ in the other senses: which makes a happy analogy—Thus the cuticle extended over the skin, is the mean organ of feeling, but the cutis underneath is the principal organ. The like is observed in the ear, nose, &c.

The *retina*, therefore, should seem a kind of mediate or secondary organ, serving to break the too strong impression of the light on the choroides, or to preserve it; which is the use ascribed to the cuticle—Add to all this, that the *retina* is insensible, as having its origin from the medullary substance of the brain, which is so too; and the choroides, on the contrary, is very sensible, as arising from the pia mater, which is certainly sensible in a great degree.

This last argument being doubted of, M. Mery was engaged to prove it; which he did before the royal academy, where he shew'd that the optic nerve is not composed like the other nerves, of fibres; that it is only a train of the medulla inclosed in a canal, out of which it is easily separable.

This structure of the optic nerve, hitherto unknown, shews that the *retina* can be no membrane; it is only a dilatation of the

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the medulla, inclosed under two membranes, and a pith or medulla seem no proper substance to be the seat of sensation—It can scarce serve for any thing but to filtrate the spirits necessary for the action of vision—The vibration whereby the sensation itself is effected, must be made on a part more solid, more firm, and more susceptible of a brisk impression.

RETINUE, RETINENTIA, the attendants or followers of a prince, or person of quality, chiefly in a journey.

In law, those persons are properly said to be of a nobleman's *retinue* who belong to him in quality either of servants or retainers.

RETIRADE, in fortification, a kind of retrenchment made in the body of a bastion, or other work, which is to be disputed inch by inch, after the first defences are dismantled.

It usually consists of two faces, which make a re-entering angle—When a breach is made in a bastion, the enemy may also make a *retirade*, or a new fortification behind it.

RETIRE D flank, in fortification. See **FLANK**.

RETORNO falso brevium. See the article **FALSO**.

RETORT, RETORTA, in chymistry, a kind of crooked matrass, or a round-bellied vessel, either of earth or glass, with a slender crooked beak or nose to which the recipient is to be fastened. See **MATRASS**.

When the *retort* is of glass, it is usually covered with a lute of loam, &c. an inch thick, to enable it to bear the fire the better.

The *retort* serves to draw spirits and oil from woods, gums, minerals, earths, and other matters which require a strong fire.

The *retort* is a kind of compendium or improvement on the cucurbit and bolt-head; answering all the purposes of both, without the assistance of a capital or head, which the other require.

RETRACTATION, RETRACTATIO, the act of unsaying what a person had said or wrote.

Galileo made a public *retraction* of his doctrine of the world, *de mundi*, after its being censured and condemned by the pope. Among St Augustin's works is a book of *retractions*; where, however, the word is to be understood in a new sense; not as if he recanted or unsaid any thing he had taught, but only treated of the same matter, or handled the same subject a second time—This sense the word will very well bear; being a compound of *re*, again, and *tracto*, I handle, treat of.

RETRACTION, * RETRACTIO, in anatomy, the contraction or shortening of a part.

* The word is formed from the Latin, *retrahere*, to draw back.

A *retraction* of the nerves takes away the use of the limbs.

RETRACTS, among horsemen, pricks in a horse's feet, arising from the fault of the farrier in driving nails that are weak, or in driving them ill-pointed or amiss.

These, unless timely prevented, fester, and prove very dangerous—When the farrier, in shoeing, perceives the horse to shrink at every blow on the nail; it is a sign of a *retract*, and the nail is to be pulled out again, which is done without any harm.

When the horse halts immediately after he is shod, it is concluded some of the nails press the veins, or touch him in the quick.

To find where the grievance lies, they knock the nails round with a hammer, till the horse's shrinking upon hitting a particular nail discovers the place.

Some farriers give this as a rule, that throwing water on the hoof, the place where he is hurt will be dry sooner than any of the rest. The places where the horses are most usually pricked, are the heel in the fore-foot, and the toe in the hind-foot.

RETRACTOR alæ nasi, in anatomy, a muscle called also *elevator labii superioris*. See **ELEVATOR**.

RETRAHENS auriculæ, in anatomy, a muscle of the external ear, consisting of a parcel of fleshy fibres, which in some bodies are divided into three distinct muscles, arising from the os temporale, and fixed to the hind part of the concha.

But these muscles are so small in men, that the auricle is seldom moveable at all. See **EAR**.

RETRAXIT, in law, is where the plaintiff comes into court in person, alone, or with the defendant; and declares he will proceed no further in his action.

A *retraxit* is peremptory, and a perpetual bar, and may be pleaded as such to the plaintiff in the same action for ever.

RETREAT, in war, the retiring or moving back again of an army or part thereof.

We say, to sound a *retreat*, secure a *retreat*, &c. What they call a *retreat* in the armies, is really a flight; only a flight made by design, and with conduct.

The skill and ability of the general is known by his *retreats*,

more than his engagements—The *retreat* of the ten thousand Greeks under the command of Xenophon, has been admired in all antiquity.

RETREAT or RELAY, in masonry, denotes a little reced or diminution of the thickness of a wall, rampart, &c. in proportion as it is raised.

The *retreat* is properly the diminution of a wall, without side, or the contraction of its upper courses more than the foundation—Where the foundation is very large, they usually make two or three *retreats*—Parapets are always built with *retreats*.

RETRENCHMENT*, literally signifies something cut off, or taken from a thing: In which sense it coincides with subtraction, diminution, &c.

* The word is French, *retrenchement*, formed of *re* and *trancher*, to cut.

By a gradual *retrenchment* of the ordinary quantity of food, a man may bring himself to a surprising degree of abstinence.

The reformation of the calendar in 1582, occasioned a *retrenchment* of ten days which had crept into the account more than there should have been.

The frugality so much boasted of among the ancient Romans St Evremont observes, did not so much consist in a voluntary abstinence or *retrenchment* of things superfluous, as a coarse and fordid way of employing or using them.

RETRENCHMENTS, in architecture, carpentry, &c. is used not only for what is cut off from a piece when too large, in order to a better proportioning it, or some other convenience; but also for the projections taken out of streets, public ways, &c. to render them more even, and in a line.

RETRENCHMENT, in war, denotes any kind of work cast up to strengthen or defend a post against the enemy.

Such are ditches with parapets, gabions, fascines, &c. for a covering, &c.

The enemy came with design to oblige them to raise the siege, but could not force the *retrenchments*.

RETRENCHMENT is more particularly used for a simple *retirade* made on a horn-work or bastion, when it is intended to dispute the ground inch by inch. See **RETIRADE**.

It is usually a re-entering angle, whose faces flank each other, and is fortified with ditches, parapets, gabions, &c.

RETRIBUTION, RETRIBUTIO, a handsome present, gratuity or acknowledgment, given in lieu of a formal salary or hire, to persons employed in affairs that do not so immediately fall under estimation, nor within the ordinary commerce in money.

Those who ministered at the altar anciently lived of *retributions*, which they received for the services they did the church. But these *retributions* were afterwards judged proper to be fixed to precise sums.

RETRIEVE, RETROUVER, to recover, get again, or repair a thing lost or damaged.

To *retrieve* in falconry, signifies to spring or find partridges again which have been once sprung before.

RETROACTIVE, * in law, that which has an influence or effect on time past.

* The word is compounded of the Latin, *retro*, backwards, and *ago*, I act.

New laws and statutes, we say, have no *retroactive* effect; that is, they have no force or effect as to what is already passed; nor can be alledged as rules for any thing done before their promulgation—Their authority is wholly as to what is to come.

Indeed we have some instances of laws that have a retrospect or *retraction*, i. e. are made with express design to extend to things already passed—These we usually call laws *ex post facto*.

RETROCESSION, RETROCESSIO, the act of going backward, more usually expressed by *retrogression* or *retrogradation*.

RETROCESSION of the equinox. See **PRECESSION**.

RETROCESSION of curves, &c. See **RETROGRADATION**.

RETROGRADATION or RETROGRESSION, the act or effect of a thing moving backwards.

RETROGRADATION, in astronomy, is an apparent motion of the planets, wherein they seem to go backwards in the ecliptic, and to move contrary to the order or succession of the signs.

When a planet moves in *consequentia*, i. e. towards the following signs, or according to the order of the signs, as from Aries to Taurus, from Taurus to Gemini, &c. that is, from west to east, it is said to be direct.

When it appears for some days in the same point of the heavens, it is said to be *stationary*.

And when it goes in *antecedentia*, i. e. towards the antecedent signs, or contrary to the order of the signs, viz. from east to west, it is said to be *retrograde*.

The sun and moon always appear direct.—Saturn, Jupiter, Mars, Venus, and Mercury, sometimes direct, sometimes stationary, and sometimes *retrograde*.

The superior planets are *retrograde* about their opposition with the sun; the inferior ones about their conjunction.

The intervals of time between two *retrogradations* of the several planets, are unequal.—In Saturn it is a year and 13 days; in Jupiter a year and 43 days; in Mars two years 50 days; in Venus one year and 220 days; and in Mercury 115 days. Again, Saturn continues *retrograde* 140 days, Jupiter 120, Mars 73, Venus 42, Mercury 22: yet are not the several *retrogradations* of the same planet constantly equal.

These changes of the courses and motions of the planets are not real, but only apparent: when viewed from the centre of the system, *i. e.* from the sun, they appear always uniform and regular.—The inequalities arise from the motion and position of the earth whence they are viewed, and are thus accounted for:

Suppose PNO (Tab. *Astronomy*, Fig. 58.) a portion of the zodiac, ABCD the earth's orbit, and EMGHZ the orbit of a superior planet, *e. gr.* Saturn; and suppose the earth in A, and Saturn in E, in which case he will appear in the zodiac at the point O.—If now Saturn remained without any motion, when the earth arrives at B, he would be seen in the point of the zodiac L, and would appear to have described the arch OL, and to have moved according to the order of the signs from west to east. But because while the earth is passing from A to B, Saturn likewise moves from E to M, where he is seen in conjunction with the sun, he will appear to have described the arch OQ greater than that OL. In this state the planet is direct, and its motion is from west to east, or according to the order of the signs. And its motion, now that it is in conjunction with the sun, and most remote from us, is quicker than at any other time.

The earth arriving at C, while Saturn describes the arch MG, he will be observed in the zodiac at R. But the earth being advanced to K, and Saturn to H, so as the line KH joining the earth and Saturn, be for some time parallel to itself, or nearly so, Saturn will be seen all that time in the same point of the zodiac at P, and with the same fixed stars; and is therefore at this time stationary.

But the earth being come to D, and Saturn arrived in opposition to the sun in Z, he will appear in the zodiac in V, and will seem to have been *retrograde*, or to have gone backwards through the arch PV.—Thus the superior planets, on optical considerations, are always *retrograde*, when in opposition to the sun.

The arch which the planet describes while thus *retrograde*, is called the *arch of retrogradation*.

The arches of *retrogradation* of the several planets are not equal.—That of Saturn is greater than that of Jupiter; that of Jupiter than that of Mars, &c.

RETROGRADATION of the nodes, is a motion of the line of the nodes, whereby it continually shifts its situation from east to west, contrary to the order of the signs; completing its *retrograde* circulation in the compass of about 19 years: after which time, either of the nodes having receded from any point of the ecliptic, returns to the same again.

RETROGRADATION of the sun—When the sun is in the torrid zone, and has his declination AM, (Tab. *Astronomy*, fig. 59.) greater than the latitude of the place AZ, but either northern or southern as that is, the sun will appear to go backwards, or to be *retrograde* both before and after noon.

For, draw the vertical circle ZGN to be a tangent to the sun's diurnal circle in G, and another ZON through the sun rising in O.—It is evident all the intermediate vertical circles cut the sun's diurnal circle twice: first, in the arch GO, and the second time in the arch GL. Wherefore, as the sun ascends through the arch GO, it continually arrives at farther and farther verticals. But as it continues its ascent through the arch GL, it returns to its former verticals; and therefore is seen *retrograde* for some time before noon.—The same, it may be shewn after the same manner, it does for some time after noon.

Hence, as the shadow always tends the opposite way to that of the sun, the shadow will be *retrograde* twice every day in all places of the torrid zone, where the sun's declination exceeds the latitude.

RETROGRADATION, or RETROGRESSION, in the higher geometry, is the same with what we otherwise call *contrary flexion*. See *Contrary FLEXION*.

The *retrogression* of curves may be thus conceived.—Suppose a curve line AFK, (Tab. *Geometry*, fig. 82.) to be partly concave, partly convex, in respect of the right line AB, or in respect of the determinate point B, the point F, which separates the concave part of the curve from the convex, or which makes the end of one, and the beginning of the other, is called the *point of contrary flexion*, when the curve is con-

tinued from F towards the same side as before.—When the curve is continued backwards towards A, then is F the point of *retrogression*.

RETROGRADE*, **RETROGRADUS**, something that goes backwards, or in a direction contrary to the natural one.—Such is sometimes the motion of the gryllotalpa or mole cricket.

* The word is formed from the Latin, *retro*, backwards, and *gradior*, I go.

If the eye and the object move both the same way, but the eye much faster than the object, the object will appear to be *retrograde*, *i. e.* to go back, or to advance the contrary way from what it really does.

Hence it is that the planets in some parts of their orbits appear to be *retrograde*.

RETROGRADE order, in matters of numeration, is when in lieu of accounting 1, 2, 3, 4, we count 4, 3, 2, 1.

RETROGRADE verses are such as give the same words, whether read backwards or forwards; called also *reciprocal verses*, and *recurrents*.

Such is—*Signa te signa tenebre me tangis et angis.*

RETROGRESSION, or RETROCESSION, the same with *retrogradation*. See *RETROGRADATION*.

RETROMINGENTS*, in natural history, a class or divisions of animals, whose characteristic is, that they stifle, or piss backwards; both males and females.—Such are lions, cats, &c.

* The word is compounded of the Latin, *retro*, backwards and *mingo*, I make water.

RETROPANNAGIUM*, **RETROPANNAGE**, in our ancient law-books, *afterpannage*; or what is left when the beasts have done, or eat the best. See *PANNAGE*.

* *Et debent habere retropannagium a fisco sancti Martini usque festum pur. beate Marie. Petit. in parl. temp. Edw. III.*

RETROSPECT, a look or view backwards. See *RETROACTIVE*.

RETURN, RETURNA or RETORNA, in law, hath divers acceptations.—A

RETURN of writs by sheriffs and bailiffs is a certificate made to the court by the sheriff, bailiff, &c. of what is done with regard to the execution of the writ directed to them.

Such also is the *return of a commission*, which is a certificate, or answer of what is done by the commissioners, to whom such commissions, precepts, mandates, or the like, are directed.

RETURN is also used in case of a replevin. If a man distrain cattle for rent, &c. and afterwards justify or avow his act, so as it is found lawful, the cattle before delivered unto him that was distrained, upon security given to prosecute the action, shall now be *returned* to him that distrained them.

RETURNS, RETURN-day, or days in bank, are certain days in each term, peculiarly set apart for the several kinds of proceedings in any cause to be determined.

Hillary term has four such *returns*—*viz.* *octabis hillarii*, eight days after hillary day; *quindena hillarii*, fifteen days; *evastina purificationis*, the day after the purification; and *octabis purificationis*, eight days after, inclusive.

Easter term has five *returns*, *viz.* *quindena pasche*, fifteen days after easter; *tres pasche*, three weeks after; *mensis pasche*, the day-month after easter; *quinque pasche*, the day five weeks from easter; and *crastina ascensionis domini*, the day after ascension-day.

Trinity term has four *returns*; *viz.* *crastina trinitatis*, the day after trinity; *octabis trinitatis*, eight days after, inclusive; *quindena trinitatis*, fifteen days after; and *tres trinitatis*, three weeks after.

Michaelmas term has six *returns*; *viz.* *tres michaelis*, three weeks after michaelmas; *mensis michaelis*, the day-month after michaelmas; *crastina annorum*, the day after all-fouls; *crastina martini*, the day after martinmas day, *octabis martini*, eight days after, inclusive; and *quindena martini*, fifteen days after.

RETURN, in building, denotes a side, or part that falls away from the forefile of any straight work.

RETURNS of a trench, in fortification, are the turnings and windings which form the lines of a trench.

RETURNO habendo, or **RETURNUM averiorum**, a writ which lies for him who has avowed a distress made of cattle, and proved his distress to be lawfully taken; for the *return* of the cattle distrained unto him, which before were replevied by the party distrained, upon surety given to pursue the action.

The same writ is granted when the plaint or action is removed by recordare, or accedat ad curiam, into the court of common-pleas; and he whose cattle were distrained, makes default, and does not prosecute his action.

RETURNUM irrepugnabile, a judicial writ, sent out of the common-pleas to the sheriff, for the final restitution or return

return of cattle to the owner, unjustly distrained damage-fendant, and so found by the jury before justices of assize in the county, or otherwise through default or profecution.

REVEE, ***REEVE**, or **GREVE**, in ancient customs, the bailiff of a franchise, or manor; thus called, especially in the western parts.

* M. du Cange derives the word from the Latin, *regare*, of *regare*, to rule; and the word formerly signifying a tribute anciently granted princes at their request, as a free-gift.

Hence, *shire-reeve*, sheriff, *port-greve*, church-reeve, &c. See **SHERIFF**, **PORT-GREVE**, &c.

REVEE, **REVA**, is also used in ancient customs for a duty or imposition on merchandizes imported.

REVEALED religion. See **RELIGION** and **REVELATION**.

REVEALED theology. See the article **THEOLOGY**.

REVEILLE*, a beat of drum in the morning, intended to give notice that it is day-break; and that the soldiers are to rise, and the centries forbear challenging.

* The word is French, formed of the verb *revueillir*, to awake.

REVELATION*, **REVELATIO**, the act of revealing, or making a thing public which before was a secret, or unknown.

* The word is formed from the Latin, *revelo*, of *re* and *velum*, *g. d.* to unvail.

The *revelation* of a confession made by the confessor is adjudged, in the Romish church, to deserve the most exemplary punishment.

REVELATION is used, by way of eminence, for the discoveries made by God to his prophets, &c. and by them to the world.

The Romanists have two huge volumes of the *revelations* of St Bridget.

REVELATION is more particularly used for the discovery which God has made to the world, by the mouths of his prophets, of certain points of faith and duty, which they could not learn from natural reason.

Religion is divided into natural religion and *revelation*, or *revealed religion*.

The Christian *revelation* is that made by Christ, and his apostles, in the new testament.—The Jewish *revelation* is that made by Moses and the prophets, in the old testament.

A late author observes, somewhat invidiously, that it is the common method of all new *revelations*, to be built on precedent ones.—Thus, the mission of Moses to the Israelites, supposes a former *revelation* to Abraham, &c. The mission of Christ supposes that of Moses; and the pretended mission of Mahomet supposes the mission of Christ. The mission of Zoroaster to the Persians supposes the religion of the Magi, &c.

The general foundation of all *revelation* is this, that God is pleased man should know something relating to himself, his own nature, dispensation, &c. which the natural faculties he was pleased to create him withal could not attain to; and that he requires some duty or service at our hands more than what necessarily follows from the relation we are under to him as our creator, preserver, &c.

Particular or occasional *revelations* have their particular genius's, characteristics and designs.—That made by Moses and the prophets chiefly related to the nation of the Jews, considered as the descendants of Abraham; its design seems to have been to rescue that people from their slavery; to settle them in a new plantation; to give them a set of laws; to new form their manners; to support them under difficulties and dangers of their enemies, from an opinion of their being under the immediate direction and appointment of God; to keep them from intermixing again with their neighbours, from an opinion of their being a chosen people, and of a Messiah to be born among them; and to lay a foundation for a restoration, in case of their being oppressed, from the opinion of a deliverer.—To some or other of these ends do all the old testament prophecies seem to tend.

The Christian *revelation* is founded on a part of the Jewish. The Messiah promised in the one is *revealed* in the other. All the rest of the Jewish *revelation*, which related peculiarly to the Jewish people, is here set aside, and only that part of it which was to affect the world in general, we mean that relating to the coming of the Messiah, is here built upon.

Indeed, it must be owned the Jews ever looked on this to be as peculiar to themselves as any of therest; the Messiah was promised to them; he was to be their deliverer, their restorer, &c.—But upon the taking place of this new *revelation*, a new scene was opened.—This part of the old *revelation*, it was shewn, was all typical or allegorical, and the prophecies relating hereto, were not to be understood in their primary or literal sense. The Messiah was not to be the restorer of the Jewish

sovereignty and liberties, which were now fallen into the hands of the Romans, but he was to restore and re-establish the world, who had lost their original righteousness, and were become slaves of sin; to preach repentance and remission; and at last to suffer death, that all who believed in him might not die, but have everlasting life.

Such is the tenor and design of the Christian *revelation*, which, in the event, was so far from being what it had been apprehended to be by the people to whom it was first promised, that it proved the very reverse, and instead of re-establishing and confirming the other branches of their *revelation*, it superseded, and set them all aside.—The pale was now broken down, and the being of the seed of Abraham ceased to be a privilege, all the world being invited on the same terms with the Jews.

The consequence was, that the Jews denying this to be the Messiah that had been promised to them, as not able to see the prophecies fulfilled in him, for want of the typical meanings thereof, were generally excluded from the privileges of that mission which had been supposed wholly intended for them; and had their ruin completed from the very means whence they expected their redemption.

REVELS*, entertainments of dancing, masking, gaming, acting comedies, farces, &c. antiently very frequent in inns of courts, at certain seasons, and in noble mens houses, &c. but now much disused.

* The word is formed from the French *revueillir*, to awake, as alluding to the night season, when they were chiefly held.

The officer who has the direction, or ordering of the *revells* at court, is called the *master of the revells*.

REVENUE*, the yearly rent or profits arising to a man from his lands, possessions, &c.

* The word is French, formed from *revenir*, to return.—Whence *revenue* is sometimes also used in antient authors for a return; as the *revenue* of Easter.

The *revenue* of this manor consists in tithes, rents, &c.

The *revenues* of the English clergy were first fixed by king Ethelwolf, anno 855; who granted them for ever the tithe of all goods, and the tenth part of all the lands of England, free from all secular service; taxes, impositions, &c.

The certain *revenues* of the king of England were antiently greater than those of any king in Europe; and till the time of the civil wars they enjoyed in domains and fee-farm rents almost enough to discharge all the ordinary expences of the crown, without any tax or imposition on the subject.

Upon the restoration, the crown *revenues* being found much alienated, and the crown charges increased, the parliament settled a yearly revenue of 1,200,000 l. upon the king; so much as the former crown *revenues* fell short of that sum, to be raised on goods exported and imported; and upon liquors and fire-hearths.

At the death of king Charles II. the *revenue* amounted to 1,800,200 l. per ann.—In king James the second's time, it was raised to 2,000,000 l. which was computed to be one tenth of the *revenues* of the whole kingdom.

At the same time the *revenues* of the king of France were computed at seven millions sterling; and those of the states of Holland, at three millions.—For more particulars of this kind, see **POLITICAL arithmetic**.

Auditors of the REVENUE. See **AUDITOR**.

REVENUE, **REVENTU**, in hunting; a fleshy mors or lump formed chiefly of a cluster of whitish worms on the heads of deer, and supposed to occasion them to cast their horns; by those worms gnawing the roots thereof.

The *revenue* distilled, is said to help women in travail.

REVENUE is also used for a new tail of a partridge, growing out after the loss of a former.—The *revenue* is measured by fingers; thus they say a partridge of two, three, four fingers *revenue*.

REVERBERATION*, **REVERBERATIO**, in physics, the act of a body repelling or reflecting another, after its impinging thereon.

* The word is formed from the Latin, *re* and *verbero*, *g. d.* I beat again.

In the glass-mens furnaces the flame *reverberates* or bends back again to burn the matter on all sides. Echoes are occasioned by the *reverberation* of sounds from arched obstacles.

Reverberation and *reflition* refer to the same action; only the one to the agent, the other to the patient.—A polished body *reverberates* the rays all around; the *reflition* of the rays does not arise from their striking against the solid parts of bodies. See **REFLECTION**.

REVERBERATION, in chymistry, denotes a kind of circulation of the flame, by means of a *reverberatory*; or the return of the flame from the top of the furnace back to the bottom, chiefly used in calcination.

Reverberation is of two kinds.—The first with a *close fire*; that

that is, in a *reverberatory* furnace, where the flame has no vent a-top; being covered with a dome, or capital, which repels its action back on the matter, or the vessel that contains it, with increased vehemence.

After this manner are refining, the distillation of acid spirits, &c. performed.

Reverberation with an open fire is that performed in a furnace or *reverberatory*, whose registers are all open; used in calcination, &c.

REVERBERATORY, or *REVERBERATING furnace*, is a chymical furnace built close all around, and covered at the top with a capital of brick or tiles, so as not to give any vent to the heat or flame, but to determine it to *reverberate* or turn back from the brick work with new force, upon the matters placed at bottom.

When the fire has no vent or passage a-top, it is a whole *reverberatory*; when the middle of the capital is open, and only the sides close, so that there is only a half circulation of the flame, it is called a *half reverberatory*.

The *reverberating* furnace is chiefly used in the fusion and calcination of metals and minerals, and on other occasions, where the most intense heat is required, as in assaying, &c. Whence it is also called the *melting furnace*, and *assaying furnace*.

REVEREND, *REVERENDUS*, a title of respect given to ecclesiastics.

The religious abroad are called *reverend* fathers; and abbesses, prioresses, &c. are called *reverend* mothers.

With us, bishops are *right reverend*; and archbishops *most reverend*.—In France, their bishops, archbishops, and abbots, are all alike *reverendissimes*, *most reverend*.

REVERIE, a term purely French, frequently used of late in English, to signify a delirium, raving, or distraction.—It is an ill sign in fevers when the patient falls into a *reverie*.

Hence also *REVERY* comes to be used for any ridiculous, extravagant imagination, action, or proposition, a chimera or vision.—Thus we say, authors obtrude abundance of their *reveries* upon us for solid truths.

But the most ordinary use of the word *revery* among English writers is for a deep, disorderly musing or meditation, equivalent to what we popularly call a *brown-study*.—Thus, a little distraction I would allow; but for that continued series of *reveries* some people are guilty of, who are ever absent from the place where you see them, and are never present any where, it is inexcusable.

REVERS, *Battery de REVERS*. See the article **BATTERY**.

REVERSATA arma. See the article **ARMA**.

REVERSE*, in law, &c.—To *reverse*, signifies to undo, repeal, or make void.

* The word is formed of the Latin, *re*, again, and *versus*, turned.

REVERSE, of a medal, coin, &c. denotes the second, or backside; in opposition to the head or principal figure.

F. Chamillart, a jesuit, has an express dissertation on this point, whether or no the *reverses* of medals have always a regard to the emperors or empresses whose heads are represented on the front-side of the medal? he says, that till of late the antiquaries have made no doubt of it, but that there are now several authors of another opinion.

REVERSE, in fencing, a back-stroke.

REVERSED, in heraldry, a thing turned backwards, or upside down.

REVERSED talon, in architecture. See **TALON**.

REVERSING, or *REVERSING*, in music, the inverting the order of the parts; that is, placing the higher part or treble, in the room of the lower part or bass.

Reversing is frequently practised in figurative counterpoint, where the bass serves as treble; and the treble, at the same time, as bass; and all this, in such manner, as that the harmony, though very different, is yet as correct as before the *reversing*, when the parts were in their natural order.

To know how to dispose the parts, so as that the *reversing* may not do any damage, is a secret, whereon M. Proffard has promised a treatise express.

A *reversed* fugue or counterfugue, called by the Italians, *per contrarii movimenti*, is when the guida falls, and the other, instead of imitating by falling, imitates by rising; or it is a figure *per arsin* and *thesin*.

REVERSION, *REVERSIO*, in law, is defined by Coke, a returning of lands, &c. into the possession of the donor, or his heirs, after the expiration of the term for which they were given or granted to another.

The word has a double acceptation.—The first is, *jus revertendi cum status possessionis defecerit*, which is no more than an interest in the land, when the occupation or possession of it shall fall.

The second is, when the possession and estate, which was parted with for a time, ceaseth, and is determined in the person of the alienees, assignees, grantees, or their heirs; or effectually returns to the donor, his heirs or assigns, whence it was derived.

This is the most proper signification of the word, which is derived from *revertor*: *Et aptè dici non potest reversio antequam revertatur in facta*. Little.

The difference between a *reversion* and a *remainder* consists in this, that a *remainder* is general, and may remain or belong to any man but him that granteth or conveyeth the land, &c. Whereas a *reversion* is to himself, from whom the conveyance of the land, &c. proceeded, and is commonly perpetual as to his heirs also.—And yet sometimes *reversion* is confounded with *remainder*.

For the values of *reversions*, or estates in *reversion*, the little book of tables for renewing and purchasing college and church leases, printed at Cambridge in 1700, and recommended by Sir Isaac Newton, furnishes us with a very useful table, which shews what one pound due at the end of any number of years to come, not exceeding 40, is worth in ready money, at 5, 6, 7, 8, and 10 per cent. *per annum*.

Suppose it required what 1 *l.* due a year hence is worth in ready money: to find this by the common operations, the method is this—Let 100 *l.* with the interest of a year added to it, be the first term in the rule of three, 100 *l.* the second; and 1 *l.* the third; (for as 100 *l.* with its interest going on to the end of the year, is to a bare 100 *l.* then due; so must 1 *l.* with its growing interest, be to the decrease of 1 *l.* at the year's end) then, at 6 *l.* *e. gr.* and 10 *l.* per cent. the work will stand thus:

As 106 : 100 :: 1 : 0.9433071, or 18 *s.* 10 *d.* 7.
110 : 100 :: 1 : 0.90909, or 18 *s.* 2 *d.*

Whence it appears, that 1 *l.* due a year hence, at 6 *l.* per cent. is worth 18 *s.* 10 *d.* 7.; and at 10 per cent. 18 *s.* 2 *d.* so that 18 *s.* 10 *d.* 7. ready money is worth 20 *s.* to be paid a year hence at 6 per cent. and 18 *s.* 2 *d.* ready money is worth 20 *s.* to be paid a year hence, at 10 per cent.

But this table shortens the work.—To find by it how to renew a lease of 21 years, that hath but one year lapsed, at the rate of 10 per cent. look into the same, and under the rate of interest mentioned, and right against 21 years, in the common angle of meeting, you have 2 *s.* 8 *d.* 1., which is the fine to be paid to renew one year lapsed in the said lease, supposing the rent to be 1 *l.* per annum: for it is 21 years before the lease is completed, in which time, the fine of 2 *s.* 8 *d.* 1. will amount to 20 *s.* and therefore, by paying that fine, the lease may fairly be made up again.

Suppose again, an estate in fee-simple, whose real value is 100 *l.* be mortgaged, or leased out for 20 years; what is the *reversion* of it now worth at 6 *l.* per cent. interest?—By the table you find, that 1 *l.* to be paid 20 years hence, is worth but 6 *s.* 2 *d.* 3., and multiplying that with 100, you will find 100 times 6 *s.* is 30 *l.* 00 *s.* 00 *d.* 100 times 2 *d.* or 200 *d.* make 00 *l.* 16 *s.* 8 *d.* and 100 times 3., or 300 *q.* make 00 *l.* 6 *s.* 3 *d.* the sum is 31 *l.* 2 *s.* 11 *d.* which is the present value of 100 *l.* to be paid 20 years hence.

A TABLE of *reversions*, shewing what *rl.* due any number of years hence, under 41, is worth in ready money, at 5, 6, 7, 8, and 10 per cent.

Years.	5 per Cent.			6 per Cent.			7 per Cent.			8 per Cent.			10 per Cent.		
	s.	d.	q.	s.	d.	q.	s.	d.	q.	s.	d.	q.	s.	d.	q.
1	19	0	2	18	10	1	18	8	0	18	6	0	18	2	0
2	18	1	2	17	9	1	17	5	2	17	1	3	16	6	1
3	17	3	1	16	9	2	16	3	3	15	10	1	15	0	3
4	16	5	1	15	10	0	15	3	0	14	8	1	13	8	0
5	15	8	0	14	11	1	14	3	1	13	7	1	12	5	0
6	14	11	0	14	1	0	13	4	0	12	7	0	11	3	2
7	14	2	2	13	3	2	12	5	1	11	8	0	10	3	0
8	13	6	1	12	6	2	11	7	2	10	9	2	9	4	0
9	12	10	2	11	10	0	10	10	2	10	0	0	8	5	3
10	12	3	1	11	2	0	10	2	0	9	3	0	7	8	2
11	11	8	0	10	6	1	9	6	0	8	6	3	7	0	0
12	11	1	2	9	11	1	8	10	2	7	11	1	6	4	2
13	10	7	1	9	4	2	8	3	2	7	4	0	5	9	2
14	10	1	0	8	10	0	7	9	0	6	9	2	5	3	0
15	9	7	2	8	4	0	7	3	0	6	3	2	4	9	1
16	9	2	0	7	10	2	6	9	1	5	10	0	4	4	1
17	8	1	2	7	5	0	6	4	0	5	4	3	3	11	1
18	8	4	0	7	0	0	5	11	0	5	0	0	3	7	0
19	7	11	0	6	7	0	5	6	1	4	7	1	3	3	0
20	7	6	1	6	2	3	5	2	0	4	3	2	2	11	2
21	7	2	0	5	10	2	4	10	0	3	11	3	2	8	2
22	6	10	0	5	6	2	4	6	0	3	8	0	2	5	2
23	6	6	0	5	3	0	4	2	2	3	4	3	2	2	3
24	6	2	1	4	11	1	3	11	1	3	1	3	2	0	1
25	5	10	3	4	8	0	3	8	1	2	11	0	1	10	0
26	5	7	1	4	4	3	3	5	1	2	8	1	1	8	0
27	5	4	1	4	1	3	3	2	2	2	6	0	1	6	1
28	5	1	0	3	10	3	3	0	0	2	3	3	1	4	2
29	4	10	1	3	8	1	2	9	2	2	1	3	1	3	0
30	4	7	2	3	6	1	2	7	2	1	11	3	1	1	3
31	4	5	1	3	3	1	2	5	1	1	10	0	1	1	0
32	4	2	1	3	0	2	2	3	2	1	8	1	0	11	1
33	4	0	0	2	10	1	2	1	2	1	6	3	0	10	1
34	3	9	2	2	8	3	2	0	0	1	5	1	0	9	1
35	3	7	2	2	6	2	1	10	2	1	4	0	0	8	2
36	3	5	1	2	5	1	1	9	0	1	3	0	0	7	3
37	3	3	1	2	3	2	1	7	2	1	2	0	0	7	0
38	3	1	2	2	2	0	1	6	2	1	1	0	0	6	1
39	2	11	3	2	0	0	1	5	0	1	0	0	0	5	3
40	2	10	0	1	11	0	1	4	0	0	11	0	0	5	1

REVERSION of *series*, in algebra, is a method of finding a natural number from its logarithm given; or the line from its arch; or the ordinate of an ellipsis from an area given to be cut off from any point in the axis.

REVERT, in law—A thing is said to *revert*, when it returns or falls back to its first owner.

All honours and royal fees, alienated, *revert* to the crown, or are *revertible*—Apanages, or portions of younger sons of kings, are granted on condition of *reversion*.

REVESTIARY, or **REVESTRY**.

REVIEW, in war, the shew or appearance of a body of troops ranged in form of battle, and afterwards made to file off, to see if the companies be complot as to number and good condition; or to receive their pay, or the like.

The general always *reviews* his troops before they go into winter-quarters, &c.

REVIEW, in chancery—A bill of **REVIEW** is, where the cause has been heard, and a decree therein signed and enrolled; but some error in law appears in the body of the decree, or some new matter is discovered in time after the decree made—A bill of *review* is not exhibited but by leave of the court.

REVISE, among printers, a second proof of a sheet to be printed, taken off after correcting the first.

REVIVER. See the article **REVIVOR**.

REVIVIFICATION, or **RESUSCITATION**, in chymistry, the art of restoring a mixed body to its first state, after it had been altered and disguised by dissolution, calcination, or the like.

Thus, cinnabar and other preparations of mercury are *revived*, or *revivified*, into fluid mercury—Olaus Borrichius assures us, that, having tormented mercury with several fires for the space of a whole year, having reduced it into water, into turbit, into ashes, &c. it *revivified*, and resumed its first

form in the middle of the flames, by the attraction of salt of tartar.

Gold, and other metals; it is said; may be recovered or *revivified* into running mercury, by the use of certain salts, which penetrating the substance of the metals; absorb the fixing sulphur or cement, by which the mercury was before bound into a malleable mass.

REVIVIFIED antimony. See the article **ANTIMONY**.

REVIVING, in law, a renewing of rents and actions after they had been extinguished.

REVIVOR, or **REVIVER**, in law—A bill of **REVIVOR** is where a bill has been exhibited in chancery against one who answers; but, before the cause is heard, or at least before the decree is enrolled, one of the parties dies.

In this case, a bill of *revivor* must be brought, praying the former proceedings may stand *revived*, and be put in the same condition as at the time of the abatement.

REVOCATION, **REVOCATIO**, in law, the act of *revoking*, calling back, or annulling; a power, grant; &c. made before.

The *revocation* of an offer, after it is accepted of, is invalid

—All preceding wills or testaments are *revoked* by the last

—A prior claustral is *revokable* at pleasure—The *revocation* of the edict of Nantz was fatal to the French protestants.

REVOLUTION *, in politics; denotes a grand turn or change of government.

* The word is formed from the Latin, *revolvere* to roll backwards.

There are no states in the world but have undergone frequent *revolutions*—The abbot de Vertot has furnished us with two or three good histories of the *revolutions* of Sweden, the *revolutions* of Rome, &c.

The **REVOLUTION**, used with us by way of eminence, denotes the great turn of affairs in England in 1688; when king James II. abdicating, the prince and princess of Orange were declared king and queen of England, &c.

REVOLUTION, in geometry. The motion of any figure quite round a fixed line; as an axis; is called the *revolution* of that figure; and the figure so moving, is said to *revolve*.

Thus, a right-angled triangle revolving round one of its legs, as an axis, generates, by that *revolution*, a cone.

REVOLUTION, in astronomy, denotes the period of a star, planet, comet, or other phenomenon; or its course from any point of its orbit, till it return to the same.

The planets have a twofold *revolution*—the one about their own axis, usually called their *diurnal rotation*, which constitutes what we call their *day*.

The other about the sun, called their *annual revolution* or *period*, constituting their year.

Saturn, according to Kepler, makes his *annual revolution* in the space of 29 years, 174 days, 4 hours, 58' 25" 34";

Jupiter in 11 years, 317 days, 14 hours, 40' 31" 56";

Mars in 1 year, 321 days, 23 hours, 31' 56" 49"; Venus in 224 days, 17 hours, 44' 55" 14"; and Mercury in 87 days, 23 hours, 14' 24".

REVULSION, **REVULSIO**, in medicine the turning a flux of humours from one part of the body to another, either neighbouring or opposite part.

In very dangerous wounds, where the loss of blood is great, and the stopping it speedily enough is impracticable, it is usual to open a vein in some remote part, to cause a *revulsion*; that is, to turn the course of the blood from the former part to that where the aperture is made.

Revulsions are also caused by cupping, friction, &c.

REVULSION is also used for a spontaneous turn or reflux of humours in the body.—Sudden diseases are occasioned by great *revulsions* of humours, which fall all at once on certain parts.

RHABDOIDES *, **Rhabdoides**, in anatomy, a name given the second true future of the skull, called also the *fontanelle*. See **SUTURE**.

* The word is formed from the Greek, *ῥαβδος*, rod, or staff, and *ειδος*, form.

RHABDOLOGY, or **RABDOLOGY**, in arithmetic, a name sometimes given to the method of performing the two most difficult and obscure rules, *viz.* multiplication and division, by the two easiest, *viz.* addition and subtraction, by means of two little rods or laminæ, whereon are inscribed the simple numbers, and which are to be shifted according to certain rules.

These rods are what we popularly call *Nepair's bones*, from their inventor, a Scottish baron, who likewise invented logarithms.—For their description and use, see **NEPAIR'S BONES**.

RHABDOMANCY *, an ancient method of divination, performed by means of rods or staves.

* Whence its name, from the Greek, *ῥαβδος*, rod, and *μαντις*, divination.

St Jerom makes mention of this kind of divination, in his commentary on Hoseah, chap. iv. 12, where the prophet says in the name of God, *my people ask council at their sticks; and their staff declareth unto them*: which passage that father understands of the Grecian *rhabdomancy*.

The same he finds over again in Ezekiel xxi. 21, 22, where the prophet says, *for the king of Babylon stood at the parting of the way, at the head of the two ways, to use divination; he made his arrows bright: or as St Jerom renders it, he mixed his arrows, he consulted with images, he looked in the liver*.

If it be the same kind of divination that is mentioned in the two passages, *rhabdomancy* must have been also the same superstition with *hepatomancy*.

In effect the two are ordinarily confounded—The seventy themselves translate the $\overline{\text{רָבִידִּים}}$ of Ezekiel by $\overline{\text{יָבִידִּים}}$, a rod; though in French it signifies an arrow.

This, however, is certain, the instruments of divination mentioned by Hoseah, are different from those of Ezekiel. In the former, it is, $\overline{\text{עֵצוֹ}}$, *ezzo*, $\overline{\text{מַקְלֵוֹ}}$, *maklo*, his wood, his staff: in the latter, $\overline{\text{קִיטִּים}}$, *kitim*, arrows. Though it is possible they might use rods, or arrows indifferently; or the military men might use arrows, and the rest rods.

It appears by the laws of the Fisiotes, that the ancient inhabitants of Germany practised *rhabdomancy*—The Scythians were likewise acquainted with the use hereof: and Herodotus observes, lib. iv. That the women among the Alani fought and gathered together fine straight rods or wands, and used them in the like superstition.

RHACHITIS, $\overline{\text{Ραχίτις}}$, in medicine. See RICKETS.

RHAGADES, $\overline{\text{Ραγάδες}}$, in medicine, a Greek term used for the chaps or clefts in the lips, hands, anus and other soft parts of the body.

Rhagades are a sort of fissures, and little chapped ulcers of the oedematous kind; formed of a sharp saline humour, and occasioning a great contraction and tightening of the part, which is by this means shrivelled up like a wet parchment when held to the fire.

They are chiefly found on the fundament, the neck of the wombs, the præputium, lips, &c. sometimes even in the mouth; in which case the patient is not able to speak, chew, or the like.

They are sometimes moist, and of a cancerous nature, eating deep, and difficult of cure; but they are more commonly of a less malignant tendency, being often in the anus the consequences of a diarrhoea, dysentery, or the like.

RHAGOIDES, $\overline{\text{Ραγώδης}}$, in anatomy, the second coat, or tunic of the eye; more usually called *veua*.

* It has its name *rhagoides*, as resembling a grape-stone.

In the tunica *rhagoides* is the hole called the *pupil*. See PUPIL.

RHAPONTICUM, a medicinal root, in form resembling rhubarb; and nearly of the same virtues, whence it is sometimes called Turkish *rhubarb*.

* It was called *rhaponticum*, q. d. root of Pontus; because chiefly produced in the country of Pontus in Asia.

It is frequently mixed with rhubarb by those who send that drug into Europe: the are distinguished by this, that the rhubarb is usually in roundish pieces, the internal streaks or lines whereof run transverse, and *rhaponticum* in longish pieces, having its streaks running lengthwise—Besides, that *rhaponticum* chewed in the mouth, leaves a viscosity behind it, which rhubarb does not.

The scarcity of the *rhaponticum* of the Levant occasions the mountain *rhaponticum*, or monk's rhubarb, to be frequently substituted for it, which is a wild sort of lapathum, by botanists called *alpinum*—They are distinguished by this, that the former is yellow without, and reddish within; but the latter blackish without and yellow within.

Quincy, however, confound the two, when he says, the *rhaponticum* grows plentifully in England; and that it is only used as an alterative, and does not come up to a cathartic.

It is certain, what now obtains in the shops, under the name of *rhaponticum*, is no other than the mountain *rhaponticum*, or monk's rhubarb; and is much inferior in virtue to the *rhaponticum verum*.

RHAPSODY, $\overline{\text{Ραψόδι}}$, RHAPSODISTS, in antiquity, persons who made a business of singing pieces of Homer's poems.

Cuper informs us, that the *rhapsodi* were clothed in red when they sung the Iliad; and in blue when they sung the Odyssey.

They performed on the theatres; and sometimes strove for prizes, in contests of poetry, singing, &c.

After the two antagonists had finished their parts, the two pieces, or papers they were wrote in, were joined together again; whence the name, viz. from $\overline{\text{ρᾶνν}}$, *rho*, I join together; and $\overline{\text{ὁδός}}$, *odos*, ode, song.

But there seem to have been other *rhapsodi* of more antiquity

than these; people who composed heroic poems, or songs in praise of heroes and great men, and sung their own compositions from town to town for a livelihood: of which profession was Homer himself.

Hence, some critics instead of the former origin, fetch the word *rhapsodist* from $\overline{\text{ῥαψῶν}}$, *to sing with a laurel rod in the hand*, which it seems was the badge of the primitive *rhapsodi*.

Philochorus, again, derives the word from $\overline{\text{ῥαψῶν}}$, *q. d. ῥαψῶν*, to compose songs or poems, as if they were the authors of the poems they sung. This opinion, to which Scaliger inclines, reduces these *rhapsodi* to the second kind.

In effect, it is probable that they were all of the same class, whatever distinction some authors may imagine among them; and that their business was to sing or rehearse poems, either of their own, or other people's composition, as might best serve their purpose, which was the getting of a penny—So that we do not apprehend it any injury to them, to set them on the foot of our ballad-singers: many of whom, no doubt, pen their own ditties. After Homer's time, it is no wonder they confined themselves altogether to his pieces, for which the people had the utmost veneration; nor is it surprising that they should erect stages, &c. and dispute the point of recitation in fairs and markets.

RHAPSODOMANCY, $\overline{\text{Ραψόδομαντία}}$, an ancient kind of divination performed by pitching on a passage of a poet at hazard, and reckoning on it as a prediction of what was to come to pass.

There were various methods of practising this *rhapsodomancy*—Sometimes they wrote several verses or sentences of a poet, on so many pieces of wood, paper, or the like: shook them together in an urn, and drew out one, which was accounted the lot.

Sometimes they cast dice on a table, whereon verses were wrote; and that whereon the die lodged, contained the prediction.

A third manner was by opening a book, and pitching on some verse, at first sight. This method they particularly called the *sortes præsentinae*, and afterwards, according to the poet thus made use of, *sortes homericae*, *sortes virgilianae*, &c.

RHAPSODY, $\overline{\text{Ραψώδης}}$, in antiquity, a discourse in verse, sung or rehearsed by a rhapsodist.

Others will have *rhapsody* properly to signify a collection of verses, especially those of Homer; which having been a long time dispersed in pieces and fragments, were at length by Pisistratus's order, digested into books, called *rhapsodies*: from the Greek $\overline{\text{ῥαψῶν}}$, *rho*, I sew; and $\overline{\text{ὁδός}}$, *odos*, song.

Hence among the moderns, *rhapsody* is also used for an assemblage of passages, thoughts, and authorities, raked together from divers authors, to compose some new piece.—Lupinus's politics makes such a *rhapsody*, wherein there is nothing of the author's own, but conjunctions, and particles.

RHETORIANS, RHETORII, a sect of heretics in Egypt, so denominated from their leader Rhetorius.

The distinguishing doctrine of this heresiarch, as represented by Philastrius, was, that he approved of all the heresies before him: and taught that they were all in the right.—But what Philastrius mentions of him appears so absurd and ridiculous, that St Augustine, *Haer. 7.* could not persuade himself it was true.

RHETORIC, RHETORICA, the art of speaking copiously on any subject, with all the advantages of beauty and force.

* The word is Greek, formed from $\overline{\text{ῥητορικός}}$, of $\overline{\text{ῥη}}$, *rho*, I speak; whence $\overline{\text{ῥητορ}}$, *rho*, speaker, orator, &c.

Lord Bacon defines *rhetoric*, very philosophically, to be the art of applying and addressing the dictates of reason to the fancy, and of recommending them there, so as to affect the will and desires.—The end of *rhetoric*, the same author observes, is to fill the imagination with ideas and images, which may assist nature, without oppressing it.

Vossius defines *rhetoric* the faculty of discovering what every subject affords of use for persuasion.—Hence, as every author must invent arguments to make his subject prevail; dispose those arguments thus found out in their proper places; and give them the embellishments of language proper to the subject; and if this discourse be to be delivered in public, utter them with that decency and force which may strike the reader: *rhetoric* becomes divided into four parts, *invention*, *disposition*, *elocution*, and *pronunciation*; each whereof see under its proper head.

Rhetoric and *oratory* differ from each other as the theory from the practice; the *rhetorician* being he who describes the rules of eloquence; and the orator he who uses them to advantage and speaks elegantly, &c.—Ordinarily, however, the two are used indifferently for each other.

Characters in RHETORIC. See the article CHARACTER.

RHETORICAL Numbers. See the article NUMBER.

RHEUM*, **RHEUMA**, *ῥευμα*, a thin serous humour, occasionally oozing out of the glands about the mouth and throat. See **HUMOUR**.

* The word is formed from the Greek, *ῥεω*, *flow*.

A fluxion of *rheum*, usually happening after taking cold, occasions excoriations and inflammations of the fauces, &c.

RHEUM is also used for a *catarrh*, or a defluxion of such humours on the trachea, and the neighbouring parts, occasioning a coughing, spitting, hoarseness, running at the nose, &c. The *rheum* is not caused from a pituita falling from the brain on these parts, as the antients imagined, there being no passage from the brain thither; but from a thin, sharp, serous humour oozing out of the extremities of the glands about the fauces and throat.

The most ordinary occasion of *rheums* is external cold, especially the being exposed to it when the body is much heated.

—And hence the disorder itself is popularly called a *cold*. *Rheums* falling on the breast, lungs, &c. are dangerous; others, not very violent, serve to clear the head, &c. The usual remedies for them are astringents, agglutinants, and absorbents. See **Supplement** article **CATARRH**.

RHEUMATISM, *ῥευματισμός*, in medicine, a painful disorder felt in various parts of the body, accompanied with heaviness, difficulty of motion, and frequently with a wandering fever.

A *rheumatism* is a pain usually wandering, but sometimes fixed in the muscular and membranous parts of the body, happening chiefly in autumn.

The proper seat of the *rheumatism* is supposed to be in the membrana communis of the muscles, which it renders rigid, and unfit for motion, without great pain.

The *rheumatism* is either *universal* or *particular*.

Universal RHEUMATISM is that which attacks all the parts of the body, even the internal ones.

Particular RHEUMATISM is that which is confined to particular parts.

In which case, the pains are usually erratic, passing from one side to another; but sometimes fixed. This is also called sometimes a *windy*, and sometimes a *febrile rheumatism*.

The *rheumatism* bears a great analogy to the gout; whence some call it the *universal gout*.—The difference between them consists chiefly in this, that the *rheumatism* attacks not only the joints, as the gout does, but also the muscles and membranes between the joints.

A fit of the *rheumatism* is frequently preceded by a fever of two or three days, and sometimes by a shivering.—The attack happens in various parts of the body, as the hands, arms, thighs, legs, feet, &c. a redness, swelling, and lameness often succeeding.

The pain sometimes fixing on the loins, and reaching as far as the os sacrum, this disorder is called *lumbago*, and bears a near resemblance to the nephritis, being only distinguishable therefrom by this, that the latter is attended with a vomiting, which the former is not.

The *rheumatism* is supposed to arise from a sharp, serous humour thrown on the sensible parts, and occasioning a pain by its vellication—Quincy says, it proceeds from the same cause as that whereby the mucilaginous glands become stiff and gritty in the gout.

Mulgrave takes it to be occasioned by a sharp alkaline salt, rather than an acid one; from this consideration, that the urine of *rheumatic* people does not afford above the thirtieth part of the alkaline salt found in that of healthful persons.

Hence, he conjectures, that the salt, which should go off this way, is retained in the blood, implicated and embarrassed in the pituita; by which means it forms a viscidifaction, which occasions all the pains and tumors of the *rheumatism*.

The exposing of the body too suddenly to the cold air, after having heated it to a great degree, is the most usual remote cause of *rheumatism*.—The cure is by evacuation; chiefly, according to Sydenham, by repeated phlebotomy, with a plentiful use of volatiles and diluters.—Schmitz recommends sudorifics; and Mulgrave, cathartics and emetics.

The *rheumatism* usually proves a tedious, lasting disease, holding for several months, sometimes years; not continually, but by paroxysms. In aged persons, and those of weak constitutions, and decayed viscera, it sometimes seizes the head. See **Supplement** article **RHEUMATISM**.

RHEXIS*, or **RHEGMA**, among oculists, denotes a rupture of the cornea of the eye.

* The word is formed from the Greek, *ῥήξις*, rupture, *ῥήγνμι*, *frange*, I break.

RHIME, or **RIME**, in poetry. See **RHYME**.

RHINE-GRAVE, in Germany, a count palatine of the Rhine. See **GRAVE** and **PALATINE**.

RHINE-LAND-Rod, in fortification, &c. a measure of two fathom, or 12 feet, used by the Dutch and German engineers, &c.

RHODIUM lignum, rhodian-wood. See **ASPALATHUM**.

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RHODON, in pharmacy, from *ῥόδον*, *rose*, a name applied to some compositions, wherein roses are the chief ingredient, as *diarrhodon*, &c.—Hence also **RHODOSACCHARUM**, *i. e.* *sugar of roses*, &c. See **ROSE**.

RHOMBOIDES, in geometry, a quadrilateral figure, whose sides and angles are unequal; but the opposite ones equal.

Or, *rhomboides* is a quadrilateral figure, whose opposite sides and angles are equal; but which is neither equilateral nor equiangular.

Such is the figure NOPQ. *Tab. Geometry*, fig. 24.

For the method of finding the area of a *rhomboides*, see **RHOMBUS**.

RHOMBOIDES, in anatomy, a muscle thus called from its figure.

—See *Tab. Anat.* (Myol.) fig. 6 v. n. 29.

It lies under the cucullaris, and arises from the two inferior spines of the neck, and four superior of the back; and is inserted fleshy into the whole basis of the scapula, which it draws backwards, and a little upwards.

RHOMBUS*, *ῥόμβος*, in geometry, an obliqueangular parallelogram; or a quadrilateral figure, whose sides are equal and parallel; but the angles unequal: two of the opposite ones being obtuse, and the other two acute.—Such is the figure ABCD, *Tab. Geometry*, fig. 83.

* The word is formed of the Greek, *ῥήμι*, of *ῥήμις*, to incompass or turn round.

To find the area of a rhombus, or rhomboides.—Upon CD, which is here assumed as a base, let fall a perpendicular Ae; which will be the altitude of the parallelogram: multiply the base by the altitude, the product is the area.—Thus, if CD be = 456, and Ae = 234, the area will be found 102704.

For it is demonstrated, that an obliqueangular parallelogram is equal to a rectangle upon the same base CD, fig. 25. and of the same altitude Ae. (See **PARALLELOGRAM**.) But the area of a rectangle is equal to the factum of the base into the altitude: therefore the area of an obliqueangular triangle is equal to the same. See **RECTANGLE**.

RHOMBUS, among surgeons, denotes a sort of bandage of a rhomboidal figure. See **BANDAGE**.

RHOPALIC verses, among the antients, a kind of verses which began with monosyllables, and were continued in words growing gradually longer and longer to the last, which was the longest of all.

They had their name from the Greek *ῥαπάλος*, a club, which, like them, begins with a slender tip, and grows bigger and bigger to the head.—Such is that verse of Homer *α μπάρος Ἀργυρῆς* *ῥαπάλος*, *αὐτοῦ βασιλῆως*.

And this Latin one of Aufonius; *Spes deus aeternae stationis conciliator*.

RHOPOGRAPHI*, *ῥωπογράφοι*, in antiquity, an appellation given to certain painters, who confined themselves to low subjects; such as animals, plants, landscapes, &c.

* The word is formed of the Greek, *ῥηπο*, *toys*, or odd ware, and *γράφω*, I write, I paint.

The same appellation has been also given to such as cut figures of men, &c. in box, phylaria, yew, &c. in gardens.

RHUBARB, **RHABARBARUM**, a medicinal root, large, compact, and heavy; yellow without; of a nutmeg colour within; of an astringent, bitterish taste; and an agreeable, aromatic smell: of great use in medicine as a purgative. Considering the mighty use of this drug, it is surprising we should know so little of the place where the plant grows that produces it.—Some say it comes from the kingdom of Boutan, in the extremities of India; others, that it is found in the province of Xenit and Suchen in China. Others will have it only grow in Persia; and others on the confines of Moulcovy; deriving its name from *rho*, the river among us called *Volga*, and *barbarum*, q. d. root found by the barbarians on the river *rho*.

Rhubarb, in Latin, *rhubarbarum officinarum*, was not known to the antients; and their *rhopoticum*, which indeed resembles it, is not the usual *rhubarb*.

Good *rhubarb* steeped in water, gives it a saffron colour; and when broke, looks bright, with somewhat of a vermilion cast.—Some druggists have the art of renewing their old roots of *rhubarb*, by dyeing them of a yellow hue; but the cheat is easily known by handling them, the powder wherewith they colour them sticking to the fingers.

Rhubarb is esteemed an excellent cathartic, and is proper in diarrhoeas, to fortify the stomach, and to create an appetite.

M. Boulduc informs us, in the memoirs of the royal academy, that he drew extracts from the *rhubarb* both with water and spirit of wine; but the purgative virtue, he says, was much more visible in the former than in the latter; which shews, that it consists more in a salt than an oil.—He observes, however, that *rhubarb* taken in substance has a still better effect; and adds, that, of all the operations he performed on it,

none gave any credit to the common opinion, which ascribes an ascribing quality to *rhubarb*.

Monks RHUBARB. See the article RHAPONTICUM.

White RHUBARB. See the article MECHOACAN.

RHUMB. *RUMB*, or *RUM*, in navigation, a vertical circle, of any given place; or the intersection of a part of such a circle with the horizon.

Rhumbs therefore coincide with *points* of the world, or of the horizon.

And hence the mariners distinguish the *rhumbs* by the same names as the *points*, and *winds*.

They usually reckon 32 *rhumbs*; which are represented by the 32 lines in the rose, or card of the compass.

Aubin defines a *rhumb* to be a line on the terrestrial globe, sea-compass, or sea-chart, representing one of the 32 winds which serve to conduct a vessel—So that the *rhumb* a vessel purues is conceived as its route, or course.

Rhumbs are divided, and subdivided like *points*—Thus, the whole *rhumb* answers to the cardinal point—The half *rhumb*, to a collateral point, or makes an angle of 45 degrees with the former—The quarter *rhumb* makes an angle of 22° 30' therewith—And the half-quarter *rhumb* makes an angle of 11° 15'.

A table of the *rhumbs*, or *points*, and their distances from the meridian. See under the article *WIND*.

RHUMB-LINE, *loxodromia*, in navigation, is the line which a ship, keeping in the same collateral point or *rhumb*, describes, throughout its whole course.

The great property of the *rhumb-line*, or *loxodromia*, and that from which some authors define it, is, that it cuts all the meridians under the same angle.

This angle is called the *angle of the rhumb*, or the *loxodromic angle*.

The angle which the *rhumb-line* makes with any parallel to the equator is called the *complement of the rhumb*. See *COMPLEMENT*.

An idea of the origin and properties of the *rhumb-line*, the great foundation of navigation, may be conceived thus—A vessel beginning its course, the wind wherewith it is driven makes a certain angle with the meridian of the place; and as it is supposed the vessel runs exactly in the direction of the wind, it makes the same angle with the meridian which the wind makes.

Supposing, then, the wind to continue the same; as each point or instant of the progress may be esteemed the beginning, the vessel always makes the same angle with the meridian of the place where it is each moment, or in each point of its course, which the wind makes.

Now, a wind, *e. gr.* that is north-east, and which of consequence makes an angle of 45°, with the meridian, is equally north-east wherewith it blows; and makes the same angle of 45°, with all the meridians it meets—A vessel therefore driven by the same wind, always makes the same angle with all the meridians it meets withal on the surface of the earth.

If the vessel sail north and south, it makes an angle infinitely acute with the meridian, *i. e.* it is parallel to it, or rather fails in it—If it run east and west, it cuts all the meridians at right angles.

In the first case it describes a great circle; in the second, either a great circle, *viz.* the equator, or a parallel to it.—If its course be between the two, it does not then describe a circle; since a circle drawn in such a manner would cut all the meridians at unequal angles, which the vessel cannot do.

It describes, therefore, another curve, the essential property whereof is, that it cuts all the meridians under the same angle.—This curve is what we call the *loxodromic curve*, *rhumb-line*, or *loxodromy*.

It is a kind of spiral, which, like the logarithmic spiral, makes an infinity of circumvolutions without ever arriving at a certain point to which it yet still tends, and towards which it approaches at every step.

This asymptotic point of the *rhumb-line* is the pole; at which were it possible for it to arrive, it would find all the meridians conjoined, and be lost in them.

The course of a vessel, then, except in the two first cases, is always a *rhumb-line*; which line is the hypotenuse of a rectangle-triangle, whose two other sides are the ship's way or distance run in longitude, and latitude. Now the latitude is usually had by observation, (see *LATITUDE*); and the angle of the *rhumb*, with one or other of the two sides, by the compass. See *COMPASS*.

All therefore that is required by calculation in sailings, is the value of the length of the *rhumb-line*, or the distance run.

But as such curve line would prove very perplexing in the calculation, it was necessary to have the ship's way in a right line; which right line however must have the essential property of the curve line, *viz.* to cut all the meridians at right an-

gles—The method of effecting which see under the article *CHART*.

If PA, PF, PG, &c. (Tab. Navigation, fig. 19.) be supposed meridians, AI the equator, and AE another great circle of the sphere: AO will represent a *rhumb-line*, the angles whereof with the several meridians, being less than those of the great circle; it follows, that the *rhumb* is not a great circle of the sphere—If a ship therefore be at first directed towards E, and constantly persist in the same *rhumb*, it will never arrive at the place E, but at the place O, which is further from the equator AI.

Hence, as on the surface of a sphere, the shortest way between A and O is an arch of a great circle between A and O; the *rhumb-line* is not the shortest way, or least distance from one place to another.

Use of the RHUMB-LINES in navigation. 1°. If the meridians PA, PC, PD, &c. (fig. 20.) be not very far apart, the *rhumb-line* AIHG is divided by the equidistant parallels BI, KH, FG, &c. into equal parts.

Hence 1°. the parts of the *rhumb* AI and AG, are as the latitudes AL and AN of the places I and G—2°. Since the arches AB, IK, HF, are equal in magnitude, and therefore unequal in number of degrees; the sum of the arches, called the *latus mecdynamicum*, or *miles of longitude*, is not equal to the difference of longitude AB of the places A and G.

2°. The length of the *rhumb-line* AG is to the change or difference of latitude GD, in the same ratio, as the whole sine to the co-sine of the angle of the *rhumb*.

Hence 1°. the *rhumb* failed on being given, together with the difference or change of latitude, turned into miles; the length of the *rhumb-line*, or the distance from the place A to the place G upon the same *rhumb*, is had by the rule of three—2°. The *rhumb* being given, together with the quantity of the ship's way on the same *rhumb*, *i. e.* the length of the *rhumb* AG; the difference of latitude DG, is had by the rule of three, in miles to be converted into degrees of a great circle—3°. The difference of latitude DG being given in miles, as also the length of the *rhumb-line* AG; the angle of the *rhumb*, and consequently the *rhumb* failed on is had by the rule of three—4°. Since the co-sine is to the whole sine as the whole sine to the secant, the difference of latitude GD, is to the length of the *rhumb-line* AG, as the whole sine to the secant of the angle of the *rhumb*.

3°. The length of the *rhumb-line*, or of the ship's way in the same *rhumb* AG, is to the *latus mecdynamicum* or *mecdynamice* side AB+IK+HF, as the whole sine to the sine of the *loxodromic* angle GAP.

Hence 1°. the *rhumb* or angle of the *rhumb* being given, as also the ship's way in the same *rhumb-line* AG, the *mecdynamice* side is had by the rule of three in miles; *i. e.* in the same measure wherein the length of the *rhumb* is given—2°. In like manner the *mecdynamice* side AB+IK+HF being given as also the *rhumb-line* or ship's way AG; the *rhumb* failed in is found by the rule of three.

4°. The change of latitude GD, is to the *mecdynamice* side AB+IK+HF; as the whole sine to the tangent of the *loxodromic* angle PAG or AIB.

Hence the *rhumb* or *loxodromic* angle PAG, and the change of latitude GD being given, the *mecdynamice* side is found by the rule of three.

5°. The *mecdynamice* side AB+IK+HF is a mean proportional between the aggregate of the *rhumb* AG, and the change of latitude GD and their difference.

Hence the change of latitude GD, and the *rhumb-line* AG being given in miles, the *mecdynamice* side is found in the same measure.

6°. The *mecdynamice* side AB+IK+HF being given, to find the longitude AD.

Multiply the change or difference of latitude GD by fix, which reduces it into parts of ten minutes each; divide by the product of the *mecdynamice* side; and the quotient gives the miles of longitude answering to the difference of latitude in ten minutes. Reduce these miles of longitude in each parallel into differences of longitude from a *loxodromic* table, and the sum of these is the longitude required.

7°. If a ship sail on a north or south *rhumb*, it describes a meridian; if on an east or west *rhumb*, it describes either the equinoctial or a parallel thereto.

8°. To find the *rhumb* between two places by calculation or geometrically. We have two canons, or proportions; the first.—As the radius is to the co-sine of the middle latitude, so is the difference of longitude to the whole departure from the meridian, in the course between the two places proposed.

The second.—As the radius is to the half sum of the co-sines of both latitudes, or (rather for geometrical schemes) as the diameter is to the sum of the co-sines of both latitudes, so is the difference of longitude to the departure from the meridian.

For an example of the former proportion—Let the *rhumb* be required between Cape Finisterre, latitude 43°, longitude 7° 20, and

25°, and St Nicholas Isle, latitude 38°, longitude 352°. The middle latitude is 40° 30', the complement 49° 30'; and the difference of longitude 15° 20'. Out of these lesser equal parts, prick down 15° from C to L, (fig. 21.) and describe the arch B D with 60° of the chords, and make it equal to 49° 30', and draw CD continued farther to A—From L take the nearest distance to A C which is equal to LM, and make it one leg of a right-angled triangle; make the other leg the difference of latitude 5°, which prick from the equal parts from L to B—Then the extent MB measured on the said parts, shews the distance to be 13° 24', which allowing 20 leagues to a degree, is almost 268 leagues—Then with the radius CB setting one foot at M, cross the rhumb triangle at G H; which extent measured on the greater chord is almost 22°, the complement whereof is 68°; and so much is the rhumb from the meridian between the two places, amounting to 6 points, and upwards of 80 minutes.

For an instance of the latter proportion—Let it be required to find the rhumb and distance between the Lizard and Bermudas. The latitude of the Lizard being 56° and that of Bermudas 32° 20', or 32° 41' centesims, and their difference of longitude 55 degrees; draw the lines AC and CD (fig. 21. N^o. 2.) at right angles, and with 60° of the lesser chords describe the quadrant H I, and prick the radius from I to D, so is CD the diameter; then count both latitudes from H to F and G, the nearest distance from F to C I, is the co-sine of Bermudas latitude, which prick from C to E: Again, the nearest distance from G to C I, is the co-sine of the Lizard's latitude, which place from C to S, so is CS the sum of both co-sines; draw D S, and prick down 55 degrees, the difference of longitude from C to V, out of the greatest equal parts, and draw V B parallel to D S, so is CB the departure from the meridian in the course between both places—Making that therefore one leg of a right-angled triangle, prick down 17°, 59 centesims, the difference of latitude between those places out of the same equal parts from C to L, and draw BL—This represents the course and distance between the Lizard and Bermudas, and the extent L B measured on the same equal parts, shews the distance to be 44° 31' centesims, which, allowing 20 leagues to a degree, is 886 leagues.

Then to find the course—With 60° of the chords, setting one foot in L, with the other make marks at Y and Z; then the extent Z Y, measured on the chord, shews the rhumb to be 66° 37' from the meridian. This proportion in the present example holds very just, according to Mercator's chart; whereas the former proportion, by the middle latitude, would have given the rhumb 67° 2' from the meridian, and the distance 902 leagues.

Again, making C A equal to C V, a line joining L A would be the course and distance according to the same longitudes and latitudes laid down on the plain chart, whereby the course should be 72°, 17' from the meridian, and the distance 1155 leagues.

RHYAS, *ῥέως*, in medicine, a diminution or consumption of the caruncula lachrymalis situate in the great canthus or angle of the eye.

* The word is formed from the Greek, *ῥαίνω*, to flow.

The *rhys* is used in opposition to the *encanthir*, which is an excessive augmentation of the same caruncle.

The cause of the *rhys* is a sharp humour falling on this part, and gnawing and consuming it away by degrees; though it is sometimes also produced by the too great use of cathartics in the fistula lachrymalis—It is to be cured by incarnatives.

RHYME, RHIME, RYME or RIME, in poetry, the similar sound, or cadence and termination of two words which end two verses, &c.

Or, *rhyme* is a similitude of sound between the last syllable or syllables of one verse, and the last syllable or syllables of a verse succeeding either immediately or at a distance of two or three lines.

Rhyme is a modern invention, and the product of a Gothic age: Milton calls it the *modern bondage*. Yet some authors will have it that the English, French, &c. borrow their *rhyme* from the Greeks and Latins—The Greek orators, say they, who endeavoured to tickle the ears of the people, affected a certain cadence of periods which ended alike, and called them *ῥυθμίαι*.

The Latins, who imitated them, called these chiming terminations, *similitudo desinentia*.

This affectation increased as the Latin tongue declined; so that in the later Latin writers, scarce any thing is more common than *rhyming* periods.

The French, and from them the English, &c. adopted this cadence of *rhymes*, which seemed to them more pretty and agreeable than the metrical verses of the Greek and Roman poets.

This kind of Latin poetry in *rhyme* was much in vogue in

the XIIIth century; and the verses thus running were called *Leonine verses*; for what reason Camden owns he does not know; (for a lion's-tail, says he, does not answer to the middle parts as these verses do) but doubtless they had their name from a canon called *Leoninus*, who first composed them with success, and of whom we have several pieces in them remaining, addressed to pope Adrian IV. and Alexander III. See *LEONINE verses*.

Camden has given us a collection of Latin *rhymes* of our ancient English writers; among whom Walter de Mapes, archdeacon of Oxford, in the time of king Henry II. makes a principal figure, especially for two pieces, the one in praise of wine, beginning

Mibi est propositum in tabernâ mori,

Vinum sit appositum morientis ori;

Ut dicant, cum venerint, angelorum chori,

Deus sit propitius huic potatori.

The other against the pope, for forbidding the clergy to have wives; beginning

Prisciani regula penitus cassatur,

Sacerdos per hic & hæc olim declinatur;

Sed per hic solummodo, nunc articulator;

Cum per nostrum præfulem hæc amoveatur.

Since the reformation of learning in the 16th century, attempts have been made to banish *rhyme* out of the modern poetry, and to settle the English and French verses on the footing of the ancient Greek and Latin ones, by fixing the quantities of the syllables, and trusting wholly to those and to the numbers or measure.

This Milton has done with great success in his *Paradise Lost*, and other pieces; and after him Philips, Addison, and some others—Verses of this kind we call *blank verses*.

The French have attempted the same, but not with the same success—Jodelet made the first essay, and after him Pasquier; but they both failed. Pasquier and Rapin followed them, and failed like them. Their hexameter and sapphic verses were neither imitated nor approved; and the cadence of *rhyme* was generally preferred to quantity, or the use of long and short syllables. Des Portes likewise made some essays of verses constructed of long and short lines without *rhyme*, but the attempt only served to convince the world that this kind of measure is inconsistent with the genius of the French tongue.

To succeed in such kind of verses there must be a liberty of varying the order of the words, or of changing their situation, as may best suit the occasions of the poet; or making the substantive either go before or follow after the verb, as the verse requires, &c. Now none of the modern tongues will admit of such an arbitrary situation of the words, equally with the antients; yet none will allow this more than the English, nor any less than the French.

Rhymes are either *single*, or *double* or *treble*, though the two last are now much disused.

Single RHYMES are divided into perfect or whole *rhymes*, and imperfect or half *rhymes*.

A *whole* or *perfect RHYME* is where there is a similitude of sound without any difference; or where a thorough identity of sound appears in the pronunciation of the two syllables, notwithstanding that there may be some difference in the orthography.

An *imperfect* or *half RHYME* is where there is a similitude with a difference either in respect of the pronunciation or the orthography, but chiefly the former.

In the time of S. Louis, the French began to be more exact in their verification; and to distinguish their *rhymes* into *masculine* and *feminine*; and to observe a regular mixture of the two in their verses—The invention of this mixture is usually attributed to Marot; however, it was Roufard who first practised it with success.

The *feminine RHYME* is that where the last syllable of the *rhyme* ends with an *e* mute or quiescent; as in *dove, belle*, &c. *Masculine RHYMES* are those of all other words.

Menage observes, that masculine *rhymes* close the periods better; but that feminine, being the softer and more languishing, end more agreeably, especially in mournful subjects.

Double RHYMES, by the French called *rich rhymes*, are those where the two words terminate alike through the whole two last syllables, as *squabble* and *rabble*, &c.

Plain RHYMES are those where the two *rhyming* verses succeed immediately to each other.

Cross RHYMES are those where the verses are so disposed as that the first *rhyme* with the third, and the second with the fourth, &c.

Assonant RHYMES. See the article *ASSONANT*.

RHYPTICS, RHPTICS, *ῥυπτικά*, in medicine, detergent remedies or cleansers. See *DETERGENT*.

RHYTHM, RHYTHMUS, *ῥυθμός*, in music, the variety in the movement as to the quickness or slowness, and length and shortness of the notes.

Or, the *rhythmus* may be defined more generally, the proportion which the parts of a motion bear to each other.

Aristides, among the ancient musicians, applies the word *ryth-*

mus three ways: viz. either to immovable bodies, when their parts are rightly proportioned to each other; as a well-made statue, &c. or to things that move regularly, as in handsome walking, in dancing, in the dumb shews of the pantomimes, &c. or thirdly, to the motion of sound, or the voice; in which, the *rhythmus* consists of long and short syllables or notes joined together in succession in some kind of order, so as their cadence on the ear may be agreeable.

This, in oratory constitutes what we call a *numerous style*, and when the tones of the voice are well chosen, an *harmonious style*.

In effect, *rhythmus* in the general is perceived either by the eye or ear; and may either be with or without metre: but the strict musical *rhythm* is only perceived by the ear, and cannot exist without it.—The first either exists without sound, as in dancing; or with sounds; it may be either without any difference of acute and grave, as in a drum, or with a variety of these, as in a song.

The *rhythmus* of the antients, Mr. Malcolm observes, was very different from that of the moderns.—The former was only that of the long and short syllables of the words and verses: it depended altogether on the poetry, and had no other forms or varieties than what the metrical art afforded. The changes therein are none but those made from one kind of metre to another, as from Iambic to Choriac, &c.

In the modern music, the constitution of the *rhythmus* differs from that of the verse, so far, that in setting music to words, the thing chiefly regarded is to accommodate the long and short notes to the syllables in such manner, as that the words, be well separated, and the accented syllable of each word so conspicuous, that what is sung may be distinctly understood.

Vossius in his book *de poematum cantu & viribus rhythmi*, extols the antient *rhythmus*.—Though he owns it was confined to the metrical feet; yet, so well did they cultivate their language, especially in what relates to the *rhythmus*; that the whole effect of the music was ascribed to it, as appears by that saying of theirs, *res mea magna potestas: sed metrum*. See Supplement article RHYTHMUS.

RHYTHM, RHYTHMUS, in the antient poetry, denotes the measure of the feet, or the number and combination of long and short syllables; called also *metre* and *quantity*.

Vossius attributes the whole force of the antient music to their happy *rhythmus*: but this is somewhat inconceivable, Mr. Malcolm rather takes it, that the words and sense of what was sung had the chief effect; and that hence it was that in all the antient music the greatest care was taken, that not a syllable of the words should be lost, lest the music should be spoiled.

Pancirollus seems of this opinion; and the reason he gives why the modern music is less perfect than the antient, is, that we usually hear sounds without words.

Vossius says, the *rhythm* which does not express the very forms and figures of things, can have no effect; and that the antient poetical numbers alone are justly contrived for this end.—He adds, that the modern languages and verse is altogether unfit for music; and that we shall never have any right vocal music till our poets learn to make verses capable of being sung, i. e. till we new model our language, restore the antient quantities and metrical feet, and banish our barbarous rhymes.

Our verses, says he, run all as it were on one foot; so that we have not any real *rhythmus* at all in our poetry: he adds, that we mind nothing farther than to have such a number of syllables in a verse, of whatever nature, and in whatever order. But this is an unjust exaggeration.

RHYTHMICA, RHYTHMICE, *ῥυθμικα*, in the antient music, that branch of music which regulated the *rhythmus*.

The *rhythmica* considered the motions; and regulated their measure, order, mixture, &c. so as to excite the passions, keep them up, augment, diminish, or allay them.

Aristides and other antient musical writers, divided artificial music into *harmonica*, *rhythmica*, and *metrica*. But the *rhythmica* with them likewise comprehended dumb motions, and in effect, all *rhythmical*, i. e. all regular motion. Porphyry divides music into *harmonica*, *rhythmica*, *metrica*, *organica*, *poetica*, and *hypocritica*.

The antients seem to have had no rhythm in their music beside the long and short syllables of their words and verses, which were sung, and always made a part of their music; so that the *rhythmica* with them was only the application of the metrical feet, and the various kinds of verses used by them.—The modern goes much farther.

RHYTHMOPŒIA, one of the musical faculties, as they are called, which prescribes rules for the motions, or *rhythm*.

The antient *rhythmopœia* is very defective.—We find nothing of it in the books of the antients but some general hints; which can scarce be called rules. In their explications there

appears nothing but what belongs to the words and verses of their songs, which is a strong presumption they had no other. See RHYTHMICA.

RIAL*, or RYAL, a Spanish silver coin; being the eighth part of the piafter or piece of eight. See PIECE of eight.

The word in the original Spanish, *rial*, signifies royal.

The *rial* is equal to about six pence $\frac{1}{2}$ sterling.

The silver *rial* is equal to 34 silver maravedis; the copper *rial* to 44 copper maravedis, which only amount to 18 silver maravedis.

There are also *rials* of eight, *rials* of four, *rials* of two, and half *rials*.—The *rials* of eight are the piafters; those of four, are half piafters, &c.

Great quantities of *rials*, or *rials* of eight, are carried into the East-Indies, where they are divided into three classes, and received on different footings, viz. the *old rial*, known by the chaplet around, whereof 100 are current for 215 rupees: the *second*, known by the largeness of its bead, current at 212 $\frac{1}{2}$ rupees for 100; and the *new* at 208 $\frac{1}{2}$ rupees for 100 *rials*. See RUPEE.

RIAL or ROYAL is also the name of a piece of gold, antiently current among us for ten shillings.

In 1 Henry VI. by indenture of the mint, a pound weight of gold of the old standard was coined into 45 *rials*, going for ten shillings a-piece, or a proportional number of half *rials*, going at five shillings a-piece: or *rial farthings*, which went at 2 s. and 2 d.

In 1 Henry VIII. the gold *rial* was ordered to go at 11 s. 3 d.—In 2 Elizabeth gold *rials* were coined at 15 s. a-piece, when a pound weight of old standard gold was to be coined into 48 *rials*.—In 3 James I. *rose rial* of gold were coined at 30 s. a-piece, and *spur-rials* at 15 s. See MONEY.

RIBBAND, or RIBBON, a narrow sort of silk, chiefly used for head ornaments, badges of chivalry, &c.

The knights of the garter wear a blue *ribbon*, those of the thistle, a green *ribbon*, &c. scarfwise. See COLLAR, GARTER, &c.

RIBBAND, or RIBBON, in heraldry, is the eighth part of a bend. See Tab. Herald. fig. 82. See also the article BEND.

It is born a little cut off from the out-lines of the escutcheon; thus; he beareth or, a *ribbon* gules.

RIBBING nails. See the article NAIL.

RIBS, *costæ*, in anatomy, certain long, arched bones; serving to form or sustain the inner sides of the thorax, or breast—See Tab. Anat. (Osteol.) fig. 7. lit. p. p. p. &c.

The *ribs* are in number 24; twelve on each side.—Their figure is an imperfect segment of a circle, they are harder, rounder, and more incurved towards their articulation with the vertebrae, than at the other extremity towards the sternum, which is thinner, broader, and more spungy.

The *ribs* are divided into *true* or genuine, and *spurious*.

The *true ribs* are the seven upper pair, which are thus distinguished, as forming the most perfect arches, and as having a strong articulation with the sternum—See Tab. Anat. (Osteol.) fig. 3. lit. a. a. &c.

The five lower are called *nothæ*, or *spurious ribs*, as being smaller, shorter, and more cartilaginous than the rest, and not reaching so far as the sternum, which makes their articulation very lax; in regard they terminate in long, soft cartilages, which bending upwards are joined to the upper ribs.—See Tab. Anat. (Osteol.) fig. 3. lit. c. c. &c.

On the inside of all the *true ribs*, except the lowest, and sometimes the next to it, runs a pretty deep sinus, reaching from the end next the spine, almost to its juncture with the cartilage.

All the *ribs*, together with the sternum, are raised by the respiratory muscles, in the action of inspiration; by which means, and by the descent of the diaphragm in that action, the cavity of the thorax is enlarged for the more commodious expansion of the lungs.

RIBS of a ship, are the timbers of the buttocks, when the planks are off, so called because they are bent like the *ribs* of a carcass or skeleton.

RICE, *orizæ*, a grain or seed of a plant of the same name; frequent in the East-Indies, in Greece, and Italy, and other places.

The grains of *rice* grow in clusters each terminated with a spica or beard, and are inclosed severally in yellow rough capsule, or cafes. When stript of their skin they appear almost oval; of a shining white colour, and as it were transparent. *Rice* grows best in moist marshy places.

Throughout the East, and a great part of the Levant, *rice* is the principal food, and serves for bread.—In the Indies the women thrash and dress all the *rice*, which is a very painful office, that the men leave to them either out of idleness, or disrespect.

Rice is a great food in the Roman Catholic countries in time of Lent.—The ordinary preparation is by first steeping it in water, then boiling it in milk.—Some make it into a sort of farina, or flower, by pounding it in a mortar, after having first put it in hot water, and again washed it out in cold.

Rice

Rice is of some use in medicine, being esteemed proper to loosen and thin the humours, to moderate fluxes of the belly, &c.—The northern nations eat their fowls and other meats with *rice* and saffron—The Chinese make a wine of *rice*, which is of an amber colour, and tastes like Spanish wine, and serves them for their common drink—In some parts of Europe they also draw a very strong brandy or spirit from *rice*.

RICKETS, RHACHITIS, in physic, a disorder affecting the bones of children, and causing a considerable protuberance, incurvature, or distortion thereof.

It sometimes arises from a fault in swathing the child, rolling it too tight in some places, and too loose in others; placing it in an inconvenient, or too often in the same posture; or suffering it to be long wet—It is likewise attributed to the want of proper motion, and to the using of the child to be borne in one arm only; whence the legs and knees remain too long in the same incurvated situation.

Or it may be occasioned by some fault in the digestion, occasioning the aliment to be unequally applied to the body; by which some parts of the bones increase in bulk more than the rest.

The *rickets* usually appear between the first eight months, and the sixth year of the child's age: the part thus diseased affects, grows lax, flaccid, and weak; and, if it be the legs, they become unable to support the body—All the parts subservient to voluntary motion are likewise debilitated and enfeebled; and the child grows pale, sickly, slothful, and cannot sit erect.

His head generally becomes too large for the trunk, and cannot be supported or managed by the muscles of the neck, which gradually wear away. Swellings, and knotty excrescences, appear in the wrists, ancles, and tips of the ribs; and the bones of the legs and thighs grow bowed or crooked—The like disorder sometimes also seizes the bones of the arms.

If the symptoms continue long, the thorax becomes strait; a difficulty of respiration ensues, as also a cough, and a hectic fever; the abdomen swells; the pulse grows weak and languid; and the symptoms increasing, at length prove mortal.

When the child is able to talk before he can make use of his legs, he is commonly presumed to have the *rickets*.

When the disorder is taken early, it may be remedied by proper bolsters and bandages, suited to the parts affected; but, when the bones are grown rigid and inflexible, other mechanical contrivances, as padding, strait boots, and several sorts of machines or engines made of paste-board, whale-bone, tin, &c. are made use of, to restore the distorted bones to their natural straightness.

Cold bathing is also found of service in the *rickets*, before the distemper comes to be too much confirmed. This is best done during May and June, continuing the child in the water two or three seconds at each plunge.

Others choose a liniment of rum and palm-oil; and others a plaster of the de minio and oxycroceum applied along the back, to cover the whole spine—Dry frictions over the whole body, with a warm linen cloth before the fire, especially on the parts affected, are found of service. What is called the oil of snails is very famous for the same intention: this is what drops from them, after bruising and suspending them in a flannel bag. With this the limbs and spinal bone are to be anointed.

RIDDLE. See the article *ÆNIGMA*.

RIDE of hazle, or other wood, is a group or cluster of sprigs shooting out of the same root or foot.

RIDE, in the manage—To *ride* signifies to learn to *ride*—Thus, he *rides* under a good master. See *HORSE*.

RIDE, in the sea-language, is a term variously applied—Thus, a ship is said to *ride*, when her anchors hold her fast, so that she drives not away by the force of the wind or tide.

A ship is said to *ride well*, when she is built so as not to overbeat herself in a head sea, so as that the waves over-rake her (that is, over-wash her) from item to stern.

A ship *rides across*, when the *rides* with her main-yards and fore-yards hoisted up to the hounds, and both yards and arms topped alike.

She is said to *ride a peak*, when one end of the yard is pecked up, and the other hangs down: this is also said of a ship, when, in weighing, she is brought directly over her anchor.

She is said to *ride athwart*, when her side is to the tide—and to *ride betwixt wind and tide*, when the wind hath equal force over her one way, and the tide another—If the wind have more power over her than the tide, she is said to *ride windward*.

She is said to *ride howfowl*, when, in stress of weather, she falls so deep, that the water runs in at her hawkes.

She is said to *ride portwise*, when her yards are struck down upon the deck, or when they are down a-port-aft.

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RIDEAU*, in fortification, a small elevation of earth, extending itself lengthways on a plain; serving to cover a camp, or give an advantage to a post.

* The word, in its original French, signifies a curtain or cover, formed from the Latin, *ridellum*—Borel derives it from *ridere*.

A *rideau* is also convenient for those who would besiege a place at a near distance, and to secure the workmen in their approaches to the foot of a fortress.

RIDEAU is sometimes also used for a trench, the earth whereof is thrown up on its side, to serve as a parapet for covering the men.

RIDERS, in a ship, are great timbers both in the hold and aloft, which are bolted on to other timbers, to strengthen them, when the ship is discovered to be too slightly built—See *Tab. Ship*, fig. 2. n. 47-49. 50.

RIDER is also used for after-clauses added to bills, whilst they are depending in parliament.

Out-Riders. See the article *OUT-riders*.

RIDER-roll. See the article *ROLL*.

RIDGE, in building, the highest part of the roof or covering of a house.

Ridge is particularly used for the piece of wood wherein the rafters meet.

RIDGE-TYLE. See the article *TYLE*.

RIDGES of a horse's mouth are wrinkles or risings of the flesh in the roof of the mouth, running across from one side of the jaw to the other, with interjacent furrows. See *HORSE*.

It is commonly in the third or fourth *ridge* that the farriers strike with the horn, in order to bleed a horse, whose mouth is overheated.

RIDGLING, or **RIDGEL**, among farriers, &c. the male of any beast that has been but half geld.

RIDICULE. See *LAUGHTER*, *RISIBILITY*, &c.

RIDING, a division of Yorkshire, whereof there are three; viz. the East-riding, West-riding, and North-riding.

In indictments in that county, it is necessary the town and riding be expressed.

RIDING-CLERK, one of the six clerks in chancery, who in his turn, for one year, keeps the controlment-books of all grants that pass the great seal that year.

RIENS arrears, in law, a kind of plea used to an action of debt upon arrears of accounts; whereby the defendant alleges, that there is *nothing in arrears*.

RIENS passe par le fait, nothing passes by the deed, is the form of an exception taken in some cases to an action.

RIENS par descent, nothing by descent, is the plea of an heir when sued for his ancestor's debt, though he had no lands from him by descent, nor has assets in hand.

RIER, or **REER-COUNTY**, **RETRO COMITATUS**, is used in our law books in opposition to *open county*.

This appears to be some public place, which the sheriff appoints for the receipt of the king's money after the end of the county court—Fleta says, it is *dict crastinus post comitatum*.

RIGADOON*, a kind of dance, borrowed originally from Provence, performed in figure by a man and a woman—The *rigadon* is gay, merry, &c.

* The word is formed from the French, *rigodon*, which signifies the same.

RIGEL. See the article *REGEL*.

RIGGING, of a ship, includes her whole cordage; or all the ropes belonging to her masts, yards, &c.—See *Tab. Ship*, fig. 1.

A ship is said to be *well-rigged*, when all her ropes are of their fit size, in proportion to her burden—She is said to be *over-rigged*, when her ropes are too big for her; which wrongs her much in her sailing, and is apt to make her heel.

RIGHT, in geometry, something that lies evenly, and without inclining or bending one way or another.

Thus, a *right line* is that whose several points all tend the same way.

In this sense, *right* signifies as much as *straight*, and stands opposed to *curved* or *crooked*.

RIGHT angle is that formed by two lines falling perpendicularly on one another.

The quantity or measure of a *right angle* is a quadrant of a circle, or 90°—All *right angles* therefore are equal.

In this sense, the word *right* stands opposed to *oblique*.

RIGHT-angled is understood of a figure, when its sides are at right angles, or stand perpendicularly one upon another.

This sometimes holds in all the angles of the figure, as in squares and rectangles; sometimes only in part, as in *right-angled triangles*.

RIGHT-cone. See the article *CONE*.

RIGHT-*Line* *angle*. See the article **ANGLE**.

RIGHT *line*. See the article **SINE**.

The word here stands contradistinguished to *versed*. See **VERSED**.

RIGHT *sphere* is that where the equator cuts the horizon at right angles—Or, that wherein the poles are in the horizon, and the equator is in the zenith.

Such is the position of the sphere with regard to those who live directly under the equator.—The consequences hereof are, that they have no latitude, nor elevation of the pole.—They can see nearly both poles of the world; all the stars rise, culminate, and set with them; and the sun always rises and descends at right angles to their horizon, and makes their days and nights equal.

In a *right sphere* the horizon is a meridian; and, if the sphere be supposed to revolve, all the meridians successively become horizons, one after another.

RIGHT *ascension* of the sun, or a star, is that degree of the equinoctial, accounted from the beginning of aries, which rises with the sun or star in a *right sphere*. See **ASCENSION**.

Angle of RIGHT *ascension*. See **ANGLE**.

Parallax of RIGHT *ascension*. See **PARALLAX**.

RIGHT *descension*. See the article **DESCENSION**.

Parallax of RIGHT *descension*. See **PARALLAX**.

RIGHT *sailing* is when a voyage is performed on some one of the four cardinal points.

If a ship sail under the meridian, that is, on the north or south points, she varies not in longitude at all, but only changes the latitude, and that just so much as the number of degrees she hath run.

If a ship sail under the equinoctial, upon the very east or west points, she alters not her latitude at all, but only changes the longitude, and that just so much as the number of degrees she has run.

If she sail directly east or west, under any parallel, she there also alters not her latitude, but only the longitude; yet that not according to the number of degrees of the great circle she hath sailed in, as under the equinoctial, but more according as the parallel is remoter from the equinoctial towards the pole. For the less any parallel is, the greater is the difference of longitude.

RIGHT *circle*, in the stereographical projection of the sphere, is a circle at right angles to the plane of projection, or that which passes through the eye. See **CIRCLE** and **PROJECTION**.

RIGHT, RECTUM, in logics and ethics.

In this sense, the word stands opposed to *wrong*, *erroneous*, *false*, &c.

RIGHT, *ius*, in law, signifies not only a property, for which a writ of right lies, but also any title or claim, either by virtue of a condition, mortgage, or the like, for which no action is given by law, but only an entry.

Such are, *ius proprietatis*, a right of property; *ius possessionis*, a right of possession; and *ius proprietatis & possessionis*, a right both of property and possession.

This last was formerly called *ius duplicatum*—As, if a man be disseised of an acre of land, the disseisee hath *ius proprietatis*; the disseisor hath *ius possessionis*; and, if the disseisee relate to the disseisor, he hath *ius proprietatis & possessionis*.

HEREDITARY RIGHT. See the article **HEREDITARY**.

PRETENDED RIGHT. See **PRETENSED**.

RIGHT of reformation. See **REFORMATION**.

Writ of RIGHT. See the article **WRIT**.

RIGHT in court. See **RECTUS in curia**.

RIGHT distillation. See **DISTILLATION**.

RIGHT the helm, a sea phrase, ordering to keep the helm even with the middle of the ship.

RIGID marble. See the article **MARBLE**.

RIGIDITY, among philosophers, a brittle-hardness; or that kind of hardness supposed to arise from the mutual indention of the component particles within one another. See **HARDNESS**.

Rigidity is opposed to ductility, malleability, &c.

RIGLET. See the article **REGLET**.

RIGOL, a kind of musical instrument, consisting of several sticks bound together, only separated by heads.—It makes a tolerable harmony, being well struck with a ball at the end of a stick.

RIGOR, in medicine, a convulsive shuddering from severe cold, an ague-fit, or other disorder.

RILL, or **RIVULET**. See the article **RIVER**.

RIM, in a watch or clock, the circumference, or circular part of a wheel.

RIMA, literally denotes a fissure, or chink. See **FISSURE** and **RHAGADES**.

Hence, it is applied to several parts of the body that bear a resemblance thereto: as *rima pudendi*, fissura magna, the same with *vulva*; and *rima laryngis*, the aperture of the larynx, called the *glottis*.

RIMA, is also used for a narrow aperture of a small cavity under the fornx, opening into the infundibulum; called also the third ventricle of the brain.

RIME in poetry. See the article **RHYME**.

RIND, the skin of any fruit that may be cut off, or pared.

The outer coat of the chestnut, set with prickles, is particularly called the *urchin-like rind*.

RIND, is also used for the inner bark of trees; or that soft, whitish, juicy substance, adhering immediately to the wood.

Through this it is that the sap, in the modern theory of vegetation, is supposed to return from the extremities of the branches to the root; the vessels hereof are by some also supposed to do the office of arteries; whence Mr Bradley calls them *arterial vessels*.

Grafting in the RIND. See **ENGRAFTING**.

RING, annulus, a little moveable, put on the finger, either by way of ceremony, or of ornament.

The bishop's ring, makes a part of the pontifical apparatus; and is esteemed a pledge of the spiritual marriage between the bishop and his church.

The episcopal ring is of a very antient standing.—The fourth council of Toledo, held in 633, appoints, that a bishop condemned by one council, and found afterwards innocent by a second, shall be restored, by giving him the ring, staff, &c.

From bishops, the custom of the ring has passed to cardinals, who are to pay a very great sum, *pro jure annuli cardinalitii*.

Origin of RINGS—Pliny, lib. xxxvii. cap. i. observes, that we are in the dark as to the person who first invented, or wore the ring; for that what is said of Prometheus, as also of Midas's rings, are fables. The first people among whom we find the ring in use, are the Hebrews, Gen. xxxviii. where Judah, Jacob's son, gives Tamar his ring or signet, as a pledge of his promise: but the ring appears to have been in use at the same time among the Egyptians, from Gen. xli. where Pharaoh puts his ring upon Joseph's hand as a mark of the power he gave him. And in the first book of Kings, chap. xxi. Jezebel seals the warrant she sent for the killing of Naboth with the king's ring.

The ancient Chaldeans, Babylonians, Persians and Greeks, had likewise the use of the ring; as appears from several passages in Scripture, and from Quintus Curtius, who tells us that Alexander sealed the letters he wrote into Europe, with his own seal; and those into Asia with Darius's ring.

The Persians will have Guiamschild the fourth king of the first race, to have first introduced the ring, to seal his letters and other acts withal.—The Greeks, Pliny thinks, knew nothing of the ring in the time of the Trojan war: the reason he gives is, that we find no mention thereof in Homer, but that when letters, &c. were to be sent away, they were tied up, and the strings knotted.

The Sabins had rings in Romulus's time; and it is to them probably, the practice first came from the Greeks; and from them that it passed to the Romans, though it was some time before it got footing there—Pliny cannot learn which of the kings of Rome first adopted it; but there are no signs of it in any of their statues, before those of Numa, and Servius Tullus. He adds, that it was also in use among the antient Gauls and Britons.

Matter of antient RINGS—There were some of one single metal, and others of a mixture, or of two. For the iron and silver were frequently gilt; or at least the gold part was fixed within the iron, as appears from Artemidorus, lib. ii. cap. 5.

—The Romans were contented with iron rings a long time; and Pliny assures us, that Marius first wore a gold one in his third consulate, which was in the year of Rome 650. Sometimes the ring was iron, and the seal gold; sometimes it was hollow and sometimes solid; sometimes the stone was engraven, and sometimes plain; and the graving sometimes was in relief, and sometimes in creux: the last were called *gemmae clypeæ*; the former *gemmae sculpturae* prominent.

The manner of wearing the RING has been various: from Jeremy, chap. xxii. it appears that the Hebrews wore it on their right hand. Among the Romans, before they came to be adorned with stones, and while the graving was yet on the metal itself, every one wore them at pleasure, on what hand and finger he listed.—When stones came to be added, they wore them altogether on the left hand; and it would have been held an excessive folly to have put them on the right.

Pliny says, they were at first wore on the fourth finger, then on the second or index; then on the little finger; and at last on all the fingers, excepting the middle one.—The Greeks wore them altogether on the fourth finger of the left hand, as we are informed by Aul. Gellius, lib. x. and the reason he gives

gives for it is, that having found from anatomy, that this finger had a little nerve that went straight to the heart, they esteemed it the most honorable, by reason of this communication with that noble part—Pliny says, the Gauls and ancient Britons wore the *ring* on the middle finger.

At first they only wore a single *ring*, then one on each finger, and at length several on each finger. Martial, lib. xi. l. 60. At last one on each joint of each finger. Aristoph. in *Nub.* &c.—Their foppery at length went to that pitch that they had their weekly *rings*. Juvenal. Sat. VII. speaks of *annuli semestres*; as also of winter and summer *rings*. But of all others Lampridius, cap. 32. observes, that Helioababalus carried the point tartheth, who never wore the same *ring*, or the same shoe twice.

Rings have been also wore in the nose, as pendants in the ears—Bartholin has an express treatise, *de annulis narum*, of *rings of the nostrils*. St Augustin affirms us, it was in his time the fashion of the Moors; and Pietro della Valle observes the same of the modern Orientals.

In effect, there is no part of the body where *rings* have not been worn—Several East-India travellers affirm, that the natives now commonly wear them on their nose, lips, cheeks and chin. Ramulo tells us, that the ladies of Narsingua in the Levant, and Diiodorus Siculus, lib. 3. that those of Ethiopia used to adorn their lips with iron *rings*.

As to the ears, the custom still obtains of wearing *rings* therein, both by men and women, almost all over the world.

The Indians, particularly the Guzerattes, have wore *rings* on their feet—And when Peter Alvarez had his first audience of the king of Calicut, he found him all covered with stones set in *rings*, having bracelets and *rings* both on the hands and fingers, and even on the feet and toes. Louis Bartome represents a king of Pegu as still more extravagant, having *rings* set with precious stones on every toe.

Use of RINGS—The antients had three different kinds; the first served to distinguish conditions or quality. Pliny assures us, that the senators at first were not allowed to wear the gold *ring*, unless they had been ambassadors at some foreign court. Nor was it even allowed them to wear the gold *ring* which was given them in public, except on public occasions. At other times they wore an iron one. And those who had a triumph observed the same rules.

At length the senators and knights were allowed the common use of the gold *ring*; but Acron on Horace, lib. ii. sat. vii. observes, they could not do it unless it were given them by the prætor.

In after days the gold *ring* became the badge of the knights, the people wearing silver *rings*, and the slaves iron ones. Though the gold *ring* was sometimes also allowed the people, and Severus granted it to his common soldiers. Augustus allowed it the liberti or freedmen; and though Nero made a regulation to the contrary, yet it was soon set aside.

A second kind of *rings* were the *annuli sponsalities*, wedding-rings. Some carry the origin of this custom as far back as the Hebrews, on the authority of a text in Exodus xxxv. 22—Leo of Modena, however maintains, that the antient Hebrews did not use any nuptial *ring*. Selden, in his *Uxor Ebraica*, lib. ii. chap. xiv. owns, that they gave a *ring* in the marriages, but that it was only in lieu of a piece of money of the same value which had used to have been given before—The Greeks and Romans did the same, and from them the christians took it up very early, as appears from Tertullian, and in some antient liturgies, where we find the form of blessing the nuptial *ring*.

The third kind of *rings* were those used as seals, called *circographi* or *circographi*; an account whereof see under the article SEAL.

Richard bishop of Salisbury, in his constitutions anno 1217, forbids the putting of *rust-rings*, or any the like matter on womens fingers, in order to the debauching them more readily; and he insinuates the reason of his prohibition, that there were some people weak enough to believe that what was thus done in jest was a real marriage.

De Brevel in his antiquities of Paris, says, it was an antient custom to use a *rust-ring* in the marriage of such as had had an affair together before their marriage.

RING, in astronomy—The *ring* of Saturn is a thin, luminous circle encompassing the body of that planet, but without touching it.

The discovery hereof is owing to M. Huygens, who after frequent observation of Saturn, perceived two lucid points or *ansæ*, arising out from the body in a right line. See ANSÆ.

Hence, as in subsequent observations, he always found the same appearance, he concluded that Saturn was encompassed with a permanent *ring*; and accordingly produced his new system of Saturn in 1659.

The plane of the *ring* is inclined to the plane of the ecliptic in an angle of $23^{\circ} 30'$ —It sometimes appears oval, and ac-

cording to Campani, its greatest diameter is double its least.

See SATURN.

RING, is also the name of an instrument used in navigation for taking the altitudes of the sun, &c.

It is usually of brass, about 9 inches diameter, suspended by a little swivel, 45° from the point whereof is a perforation, which is the centre of a quadrant of 90° divided in the inner concave surface.

To use it, they hold it up by the swivel, and turn it to the sun, till the sun-beams falling through the hole, make a spot among the degrees, which marks the altitude required.

This instrument is preferred to the astrolabe by reason the divisions are here larger than on the astrolabe.

RING is also used for the sound or tone of a bell. See BELL.

Base RING. See the article BASE.

RING-Bone, among farriers, &c. a hard callous substance, growing in the hollow circle of the little pattern of a horse, above the coronet.

It sometimes goes quite round, like a *ring*, whence its name; sometimes it is hereditary, derived from the stallion or mare, but it oftener comes by accident, as from a strain, a blow of a horse, &c.

Corniche RING. See the article CORNICHE.

RING-dial, is a kind of dial, usually small and portable, consisting of a brass ring or rim, seldom exceeding two inches in diameter, and one third of an inch in breadth.

In a point of this rim there is a hole, through which the sun-beams being received, make a lucid speck on the concavity of the opposite semicircle, which gives the hour of the day in the divisions marked therein.

But it only holds good about the times of the equinox—To have the dial perform throughout the whole year, the hole is made moveable, and the signs of the zodiac, or the days of the month are marked on the convex side of the *ring*, by means whereof the dial is rectified for the time.

To use it put the moveable hole to the day of the month, or the degree of the zodiac the sun is in; then suspending it by the little ring, turn it towards the sun, till his rays, as before, point out the hour among the divisions on the inside.

Universal or astronomical RING-dial, is a ring-dial which serves to find the hour of the day in any part of the earth; whereas the former is confined to a certain latitude—Its figure see represented in *Table Dialling*, fig. 7.

It consists of two rings or flat circles, from two to five inches in diameter, and their breadth, &c. proportionable—The outward ring A represents the meridian of any place you are at, and contains two divisions of 90° each, diametrically opposite to one another, serving the one from the equator to the north, the other to the south pole—The inner ring represents the equator, and turns exactly within the outer, by means of two pivots in each ring at the hour of 12.

A cross the two circles goes a thin reglet or bridge, with a cursor C, that slides along the middle of the bridge. In the cursor is a little hole for the sun to shine through.

The middle of this bridge is conceived as the axis of the world, and the extremities as the poles; and on the one side are drawn the signs of the zodiac, and on the other the days of the month. On the edge of the meridian slides a piece, to which is fitted a ring to suspend the instrument by.

Use of the universal RING-dial—Place the line a (on the middle of the sliding piece) over the degree of latitude of the place (e. gr. 51° for London) put the line which crosses the hole of the cursor to the degree of the sign, or day of the month. Open the instrument so as that the two rings be at right angles to each other, and suspend it by the ring H, that the axis of the dial, represented by the middle of the bridge, may be parallel to the axis of the world. Then turn the flat side of the bridge towards the sun, so as his rays striking through the little hole in the middle of the cursor, fall exactly on a line drawn round the middle of the concave surface of the inner ring; in which case the bright spot shews the hour of the day in the said concave surface of the ring.

Note, The hour of 12 is not shewn by this dial, by reason the outer circle being then in the plane of the meridian, hinders the sun's rays from falling on the inner; nor will this dial shew the hour when the sun is in the equinoctial, by reason his rays then fall parallel to the plane of the inner circle.

Fairy RING.

Natal RING.

Reinforced RING.

Truncheon RING.

RING-walk, among hunters, a round walk. See HUNT-ING.

RING-worm, in medicine. See the article SERPICO.

RIOT, in law, the forcible doing of an unlawful thing, of a private nature, by three or more persons assembled together for that purpose.

The

FAIRY.

NATAL.

REINFORCED.

TRUNCHION.

The word is formed from the Latin, *rista*, of *arietare*, to run at each other as rams do. Though, from an ancient Gaulish version of the bible, quoted by Skinner, *rist* should rather seem originally to signify luxury and excess: whence our law *rist* might proceed; in regard these are frequently attended with quarrels.

For the difference between a *riot*, rout, and unlawful assembly. See **ROUT** and **UNLAWFUL ASSEMBLY**.

Kitchen gives us the following cases of *riots*, viz.—The breach of inclosures, banks, conduits, parks, pounds, barns, the burning of stacks of corn, &c. Lambard adds, the beating a man, and entering on a possession forcibly.

By a late act of parliament, made on occasion of the frequent pulling down of meeting-houses, &c. by mobs, or riotous assemblies, about the time of the rebellion in 1715, a *riot* was made felony, if the *rioters* did not disperse after reading a proclamation made for that purpose.

RIPENERS, in medicine, a sort of topical remedies, called also *drawers*, *digestives*, *maturantia*, *suppuratives*, &c.

RIPENING. See **MATURATION**.

RISIBILITY, the faculty of laughter. See **LAUGHING**.

Risibility is commonly supposed an attribute peculiar to man; as being the only creature capable of judging what is ridiculous—Some philosophers go so far as to assert, that the degree of judgment is always seen in that of laughter, fools always either have too little or too much of it.

Authors do not agree as to the peculiar mechanism in man, whereby laughter is raised—It is usually attributed to the communication between the plexus nervosus, and the diaphragmatic nerves.

RISING, in astronomy, the appearance of the sun, a star, or other luminary above the horizon, which before was hid beneath it.

By reason of the refraction of the atmosphere, the heavenly bodies always *rise* before their time, i. e. they are seen as above the horizon, while they really are below it.

There are three poetical kinds of *rising* of the stars—The *cosmical rising*, when a star rises at the same time with the sun.

Astronomical rising is when the star rises at the same time that the sun sets.

Heliacal, solar, or *apparent rising*, is when the star emerges out of the sun's rays near the horizon, and is no longer hid in his brightness; which happens about 20 days after the conjunction of such star with the sun; more or less, according to the magnitude of the star, its distance, &c.

Heiod long ago observed, that Sirius was hid 40 days: viz. 20 days before his *cosmical rising*, and 20 after—Some nations of America, and among others the savages of Cayenna, regulate their civil year by the course of Sirius; beginning it with the *helical rising* of that star.

To find the rising, &c. of the sun and stars by the Globe. See **GLOBE**.

RISK, or **RISQUE**, the hazard or chance of a loss, damage, &c.

There is a great *risk* run in letting goods go upon credit to great lords, wives not authorized by their husbands, and young people not yet arrived at the age of majority.

Skinner derives the word from the Spanish, *risco*, steep: Covarruvias, from *rigeo*. In the barbarous Greek, they say, *periclitari*, for *periclitari*, I hazard; and *periclitari*, for lot or chance; which words as well as *risque*, Skinner thinks, may be deduced from *periclitari*, for *periclitari* *est* *ut* *risco*, I cast the dice.

To prevent any *risk* in invoices of merchandizes by sea, it is usual to insure them.

The *risk* of merchandizes commences from the time they are carried aboard—In matters of insurance, it is a maxim, that all is never to be *risqué* on one bottom, or in the same vessel; to denote, that assurers must act with discretion in the signing of policies, and not hazard too much on each vessel; there being more to be expected from several than from one.

RISUS, *laughter*. See the article **LAUGHTER**.

Risus caninus is a kind of laughter wherein the lips are contracted, so as to shew all the teeth.

Risus sardonius, sardonian laughter, is a forced, spiteful laughter; or a laughter that does not go beyond the teeth.

The phrase is by some said to be founded on this, that in Sardinia there is a venomous plant, which occasions such a contraction of the muscles of the face in persons it kills, that they seem to die laughing in this manner.

RITE, **RITUS**, in school divinity, denotes the particular manner or form of celebrating or performing the religious ceremonies, which obtains in this or that place.

The Eastern people, Armenians, &c. celebrate divine service according to the Greek *rite*—The Western world follow the Latin *rite*; or that of the Roman church.

The English observe the *rite* of the church of England, prescribed in the book of Common-prayer, &c.

RITORNELLO, or **REFRET**, in music, the burthen of a song, or a repetition of the first or other verses of the song, at the end of each stanza or couplet.

The word is Italian, and signifies properly a *little return*, or a short repetition, such as that of an echo, or of the last words of a song; especially when the repetition is made after a voice, by one or more instruments.

But custom has extended the use of the word to all symphonies, played before the voices begin, and which serve by way of prelude or introduction to what follows.

In the partitions or score of the Italian music, we frequently find the *ritornello*'s signified by the words *si suona* to shew that the organ, spinnet, or the like, are to repeat what the voice has been singing.

RITUAL, **RITUALE**, a church-book, directing the order and manner of the ceremonies to be observed in celebrating divine service, in a particular church, diocese, religious order, or the like.

The ancient heathens had, likewise, their *rituals*, or *rituales libri*; whereof those of the Hetrurians were much famed—These books contained the rites and ceremonies to be observed in the building a city, in the consecrating a temple or an altar, in sacrificing, and deifying, in dividing the curiae, tribes, centuries, and in general in all their religious ceremonies.

There are several passages in Cato's books, *de re rustica*, which may give us some idea of the *rituals* of the ancients.

RIVAGE, **RIVAGIUM**, a toll antiently paid to the king on some rivers, for the passage of boats or vessels therein.

RIVAL, **RIVALIS**, a term of relation, applied to two persons who have the same pretension.

It is properly used for a competitor in love; and figuratively for an antagonist in any other pursuit—The intrigues of comedies and romances usually turn on the jealousies of *rivals*, who dispute for the same mistress.

The lawyers derive the word from the Latin, *rivus*, stream, *quod ab eodem rivus aquam hauriant*. Donatus supposes it to have been formed hence, that beasts coming to drink at the same brook, or fountain, frequently quarrel.

Cælius says, that *rivales* were originally such whose fields were parted by a brook or rivulet; the course whereof being liable to be varied several ways, occasioned frequent disputes and law-suits.

RIVER, *fluvius*, or *flumen*, in geography, a stream or current of fresh water, flowing in a bed or channel, from a source or spring, into the sea.

If the stream be not large enough to bear boats, or small vessels, loaden; it is properly called in English, by the diminutive, *rivulet* or *brook*; by the Latins, *rivus*; and by the French, *ruisseau*—If it will only bear such vessels, the Latins call it *amnis*—If it be considerable enough to carry larger vessels, it is called by the general name *river*; by the Latins, *fluvius*, and *flumen*; and by the French, *fleuve*—between all which the difference is only as to greater and less.

Some will have none to be properly *rivers*, except those which bear the same name from their source to their mouth.

Others, none but those which empty themselves immediately into the sea; and not into any other river.

Rivulets have their rise, sometimes, from great rains, or great quantities of thawed snow; especially in mountainous places; as in the long ridges in Africa, India, Sumatra, &c. But the generality of *rivulets* arise from springs.

Rivers themselves all arise either from the confluence of several *rivulets*, or from lakes: nor is there any great *river*, such as the Rhine, Elbe, &c. known to flow from a single spring—The Volga, e. gr. consists of above two hundred *rivulets*, all flowing into it, before it reach the Caspian: and the Danube receives as many. Pliny, indeed, and Cardan, say, that the Nile receives none; but the later travellers into the Abyssinia assure us of the contrary.

The Rhine, Rhone, Danube, Borysthenes, &c. arise originally from springs in the mountains; and the Nile, the Volga, the great river of St Laurence, &c. from lakes.

Phænomena and variations of RIVERS—*Rivers* are found subject to great alterations, as different seasons of the year, day, &c. from frequent rains, and melted snow—Thus in Peru and Chili many of the *rivers* are almost insensible in the night-time, and only flow by day, as being then augmented by the dissolution of the snow on the mountains *Andes*—Thus the Volga abounds in water in May and June, so as to cover the sand-banks, &c. which all the rest of the year lie bare, so as scarce to allow a passage to the loaden ships.—Thus also the Nile, Ganges, Indus, &c. are frequently so increased as to overflow; and that either in the winter, from rain, or in the summer, from the melting of the snow.

Some

Some *river*s bury themselves under ground in the middle of their course, and break out again in other places like new *river*s.—Thus the Niger, which some cosmographers derive by a subterraneous channel from the Nile, because it swells at the same time with the Nile, without any other apparent cause of its swelling: the Niger itself, meeting the mountains of Nubia, is hid under them, and rises again on the western side of those mountains. Thus also the Tygris is lost in the mountain Taurus, &c.

Aristotle and the poets mention several such *river*s about Arcadia: Alpheus, a *river* of Arcadia, is particularly famed.—This, being swallowed up in the ground, is supposed, by the Greek authors, to continue its progress under earth, and under the bottom of the sea, into Sicily; where breaking up near Syracuse, it forms the *river* Arethusa. The great reason of this opinion was, that, every fifth summer, the *river* Arethusa in Sicily cast up the dung of cattle about the time of the celebration of the olympic games in Achaia, when the dung of victims was used to be cast into the Alpheus.

Some *river*s empty themselves into the sea by one mouth, some by several.—Thus, the Danube opens into the Euxine sea by seven mouths, the Nile by seven, and the Volga by at least seventy. The cause of this variety of mouths Varenus attributes principally to banks of sand, &c. formed therein, which gradually increasing, form islands, whereby the channel is divided into several branches.—Indeed, the ancients tell us, that the Nile formerly only emptied itself at one mouth, called the *ostium canalicum*; and add, that the other fix are adventitious or artificial.

The channels of *river*s, except such as were formed at the creation, Varenus endeavours to prove to be all artificial, and dug by men.—His reasons are, that, when a new spring breaks forth, the water does not make itself a channel, but spreads over the adjacent land; so that the people have been necessitated to cut it a channel, to secure their grounds; and that a great number of channels of *river*s are certainly known, from history, to have been dug by men, &c.

As to the question, whether those *river*s, which run into others, have made themselves that way by their own motion, or have been turned thither in canals cut by men? he takes the latter to be the more probable; and concludes the same of the arms or branches of *river*s, and of the turns whereby islands are formed in the Tanais, Volga, &c.

To the question, why we have no salt *river*s, when there are so many salt springs? he answers, that it is because men having no occasion for salt water, have not dug channels to conduct the water of salt springs; salt being procureable at less expence.

The water of most *river*s carries with it particles of metals, minerals, sands, or oily and fat bodies, &c.—Thus, some *river*s bring sands intermixed with grains of gold; of which kind is, 1^o. A *river* in Japan. 2^o. Another in the island Lequeu, near Japon. 3^o. A *river*let in Africa called Arroe, breaking out of the roots of the mountains of the Moon, wherein there are gold mines. 4^o. A *river* in Guinea, where the negroes separate the gold-dust from the sand, and sell it to the Europeans, who traffic thither for that very purpose. 5^o. In some *river*lets near the city of Mexico there are grains of gold taken up, especially after rain; which is also to be understood of all the other *river*s, none of which yield any thing considerable, except in rainy seasons. 6^o. In Peru, Sumatra, Cuba, Hispaniola, and Guiana. Lastly, there are several brooks in the countries about the Alps, especially Tirol, out of the sediment of whose waters gold is drawn, though there be no grains conspicuous therein. Add to this, that the Rhine also in many places affords a golden mud.

As to *river*s that bring grains or particles of silver, iron, copper, lead, &c. we find no mention of them in authors, though doubtless there are great numbers of each; and many of the medicinal effects of mineral waters are doubtless owing to particles of these kinds.

We must not here omit a water in Germany, which is ordinarily supposed to change iron into copper.—The truth is, there is no real conversion of the metal; all that is done is, that the cuprine, and vitriolic particles in the water, corrode the iron, and detaching parts thereof by means of the motion of the water, coppery particles succeed in their room.

From this variety in the mixture of *river* water, result various qualities, different specific gravities, different colours, &c.

Some *river*s, at certain seasons of the year, swell so as to overflow their banks, and drown the neighbouring lands.—Of these the most eminent is the Nile, which rises so as to cover all Egypt, except the hills. The inundation begins about the 17th day of June, and increases for the space of forty days, and decreases for as many; during which period, the cities of Egypt, which are all built on hills, appear as so many islands.

To these inundations Egypt owes all its fertility; the heavens there affording no rain, or at least none in any respect considerable.—Hence, as the inundation is great or small, Egypt for that year is fruitful or barren.

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The ancient Greeks, &c. were mistaken as to the cause of this inundation, no body in those days having travelled up to the source of the river: but the modern English and Portuguese traders into Congo, Angola, Monomotapa, &c. have let us into the secret.—From them we learn, that the spring or source of the Nile is in a large lake called Zaire, round which are a great number of huge mountains, called the mountains of the Moon. Now, as these lie in the southern hemisphere, their winter will be at the time of our summer: but, by reason of their nearness to the equator, (being only 10^o distant from it) they never feel any notable cold: hence it is, that, instead of snow in the winter, they have rain every day, at least two hours before, and two hours after noon. In effect, the tops of these mountains are always covered with clouds, and the rains are at the proper season almost continual. Hence torrents are constantly gushing down from the mountains, all ending in the lake of Zaire; whence they flow into the channel of the Nile, and other *river*s arising from the same lake, as the Cuamar, the Zaire, &c. and hence the inundation of the Nile.

The other *river*s, which have any notable stated inundations, are, the Niger, or Gambia, which overflows at the same time with the Nile. Leo Africanus says, it begins on the 15th day of June, increases for forty days, and decreases as long.—The Zaire, a *river* of Congo, proceeding from the same lake with the Nile, and therefore affected in the same manner: the Rio de la Plata in Brasil, which, Maffeus observes, overflow at the same time with the Nile: the Ganges: and the Indus; both which last overflow in June, July, and August, at which times the natives save great quantities of the water in ponds, to serve them the rest of the year: several *river*s flowing out of the lake Chiamay into the bay of Bengal, which overflow in September, October, and November. These all bring a very great fertility with them to the ground: the *river* Macoa in Camboia; the *river* Parana, or Paranguaia, which some will have to be the same with the silver *river*; several *river*s in Coromandelia, a part of India, which overflows in the rainy months, from the great quantity of water issuing from the mountain Gatis; the Euphrates, which overflows Mesopotamia certain days in the year; and, lastly, the *river* Sus in Numidia.

The *river*s most celebrated for their length, breadth, swiftness of current, &c. are,—the Nile, which runs almost in a straight course 2520 geographical miles; the Niger, which runs 2400 miles; the Ganges, 1200 miles; the Ob, 1600 miles; the Jenisea in Asia, about the same length with the Ob; the *river* Orellana in America, 60 miles broad at its mouth, and 5000 miles long; the Rio de la Plata, 80 miles broad at the mouth; the Omarannan, another *river* of Brasil; and the great *river* of St. Laurence, near 2500 miles long.

RIVER, in physics, denotes a stream of water running by its own gravity, in a channel open above.—Such as A E Tab. Hydrostatics, fig. 34.—See also WAVE.

LAWS OF THE MOTION OF RIVERS.—The modern philosophers endeavour to bring the motion and flux of *river*s to precise laws; and, with this view, they have applied geometry and mechanics thereto; so that the doctrine of *river*s is become a part of the new philosophy.

The Italian authors have distinguished themselves herein, and it is chiefly to them we are indebted for the improvement; particularly S. Guglielmini, who, in his treatise *della Natura de Fiumi*, has abundance of new observations and discoveries relating thereto.

*River*s, he observes, usually have their sources in mountains, or elevations of ground; and it is in their descent from these that they acquire the velocity or acceleration, which maintains their future current.—In proportion as they advance farther, this velocity diminishes, by reason of the continual friction of the water against the bottom and sides of the channel, of the various obstacles they meet withal in their progress, and of their arriving at length in plains, where the descent is less, and their inclination to the horizon, of consequence, greater.—Thus the Reno, a *river* of Italy, which gave occasion, in some measure, to these speculations, is found, near its mouth, to have scarce a descent of 52 seconds.

If the acquired velocity be quite spent through the many obstacles, so that the current becomes horizontal, there will then nothing remain to propagate the motion, and continue the stream, but the depth, or the perpendicular pressure of the water, which is always proportional to the depth.—And, happily for us, this resource increases as the occasion for it increases; for, in proportion as the water loses of the velocity acquired by the descent, it rises and augments in depth.

The upper parts of the water of a *river*, and those at a distance from the banks, may continue to flow from the single cause or principle of declivity, how small soever it be; for, not being detained by any obstacles, the minutest difference of level will have its effect: but the lower parts, which roll along the bottom, will scarce be sensible of so small a declivity, and will only have what motion they receive from the pressure of the superincumbent waters.

The natural viscosity and cohesion of the particles of water, and that implication, as it were, which they seem to have with one another, makes the lower, which are moved by means of the depth, carry along with them the upper, which, in a horizontal channel, would have no motion at all, or in a channel very little inclined, next to none; so that the lower, in this case, communicate to the upper a part of the motion they have received from the pressure of it. Hence, from the pressure, it frequently happens, that the greatest velocity of a river is about the middle of its depth; such middle parts having the advantage of being pressed with half the depth of the river, and of being free, at the same time, from the friction of the bottom.

To find whether the water of a river, almost horizontal, flows by means of the velocity acquired in its descent, or by the pressure of its depth; set up an obstacle perpendicular thereto; if the water rise and swell immediately against such obstacle, it runs in virtue of its fall; or, if it stop a little while first, in virtue of its pressure.

Rivers, according to this author, almost always make their own beds.—If the bottom have originally been a large declivity, the water, in consequence hereof, falling with a great deal of force, will have swept away the most elevated parts of the soil, and carrying them lower down, will gradually render the bottom horizontal; where the stream is swiftest, there will the earth be most dug up, and consequently there the greatest cavity will be made.

The water having made its bed horizontal, becomes so itself, and consequently rakes with the less force against the bottom, till at length that force becomes only equal to the resistance of the bottom. The bottom is now arrived at a state of permanency, at least for a considerable time; and the longer, according to the quality of the soil, clay and chalk resisting longer than sand or mud.

On the other hand, the water is continually gnawing and eating off the brims of its channel, and this with the more force, as, by the direction of its stream, it impinges more perpendicularly against them. By this means, it has a continual tendency to render them parallel to its own course; and when it has arrived as near that as possible, it ceases to have any effect that way. At the same time that it has thus rectified its edges, it has enlarged its own bed; that is, it has lost of its depth, and consequently of its force and pressure: this it continues to do till there is an equilibrium between the force of the water and the resistance of its banks, upon which they will remain without farther mutation. And it is evident from experience, that these equilibriums are all real; inasmuch as we find, that rivers only dig and widen to a certain pitch.

The very reverse of all these things does also, on some occasions, happen.—Rivers, whose waters are thick and muddy, raise their bed, by letting part of the heterogeneous matters contained in them fall to the bottom: they also contract their banks by a continual apposition of the same matter in brushing over them. This matter being thrown aside far from the stream of water, might even serve, by reason of the obscurity of the motion, to form new banks.

Now, these opposite effects seem almost always to concur, and are differently combined, according to the circumstances; whence it is very difficult judging of the result. Yet must this combination be known very accurately, before any measures can be taken about rivers, especially as to the diverting their courses.—The Lamona, which emptied itself into the Po, being turned another way, to make it discharge itself into the Adriatic, was so altered, and its force so far diminished, now that its waters were left to themselves, that it raised its bed a great height, by continual depositions of mud, till it became much higher than the Po in its utmost accretions, and needed very high banks or dykes to keep it from overflowing.

A little river may be received into a large one, without either augmenting its width or depth.—This seeming paradox arises hence, that the addition of the little river may only go towards moving the waters before at rest near the banks of the large one, and thus augmenting the velocity of the stream, in the same proportion as it does that of the quantity of water.—Thus, the Venetian branch of the Po swallowed up the Ferrarese branch, and that of Panaro, without any enlargement of its own dimensions. And the same may be concluded proportionally of all other accessions to rivers, and, in the general, of all new augmentations of water.

A river offering to enter into another, either perpendicularly, or in an opposite direction, will be diverted by degrees from that direction, and obliged to make itself a new and more favourable bed towards the mouth.

The union of two rivers into one makes the whole flow the swifter: by reason, in lieu of the friction of four shores, they have only two to surmount; and that the stream, being farther distant from the banks, goes on with the less interruption; besides, that a greater quantity of water moving with a greater velocity, digs deeper in the bed, and, of course, retrenches of its former width.—Hence also it is that rivers, by being united, take up less space on the surface of the earth, and are

more advantageous to low grounds which discharge their superfluous moisture into them, and have likewise less occasion for dykes to prevent their overflowing.

These advantages are so considerable, that S. Guglielmini thinks them worthy of nature's having had a view to them in her contriving to make the confluences of rivers so frequent as we find them.

To determine more precisely the general laws of the motion of rivers, it may be observed that a river is said to remain in the same state, or to be in a permanent state, when it flows uniformly, so as to be always at the same height in the same place. 2°. That a plane, which cutting a river is perpendicular to the bottom, as *p o n q*, is called the section of a river.—See *Tab. Hydrostat. fig. 34*.

Hence, when a river is terminated by flat fides, parallel to each other, and perpendicular to the horizon, and the bottom also is a plane, either horizontal or inclined, the section of the river with these three planes makes right angles, and is a parallelogram.

Now in every river that is in a permanent state, the same quantity of water flows in the same time through every section; for unless there be in every place as great a supply of water, as what runs from it, the river will not remain in the same state. This will hold good, whatever be the irregularity of the bed, or channel, from which in other respects several changes in the motion of the river may arise: for example, a greater friction, in proportion to the inequality of the channel.

The irregularities in the motion of a river may be infinitely varied, nor can any rules be given to settle them.—To ascertain their general course, all irregularities must be set aside; only the general tenor or flux be considered.

Suppose then, the water to run in a regular channel, without any sensible friction, and that the channel is terminated with plane fides, parallel to one another, and vertical; and also that the bottom is a plane, and inclined to the horizon.—Let *A E* be the channel, into which the water runs from a greater receptacle or head; and let the water always remain of the same depth at the head, so that the river may be in a permanent state: the water here descends along an inclined plane, and is accelerated; whereby, because the same quantity of water flows through every section, the depth of the water, as you recede from the head of the river, is continually diminished, and its surface will acquire the figure *i g s*.

To determine the velocity of the water in different places; suppose the aperture of the channel *A D C B* to be shut up with a plane; if there be an hole made in the plane, the water will spout the faster through the hole, as the hole is more distant from the surface of the water *h i*; and the water will have the same celerity that a body falling from the surface of the water to the depth of the hole below it would acquire; all which regularly arises from the pressure of the superincumbent water.—There is the same pressure, that is, the same moving force, when the obstacle at *A C* is taken away, upon which every particle of water enters into the channel with the celerity a body would acquire in falling from the surface of the water to the depth of the particle. This particle is moved along in an inclined plane in the channel, with an accelerated motion; and that in the same manner, as if falling vertically, it had continued its motion to the same depth below the surface of the water in the head of the river.

So, if you draw the horizontal line *i t*, the particle at *r* will have the same celerity as a body falling the length *i C*, and running down *C r*, can acquire; which is the celerity acquired by the body in falling down *t r*. Therefore the celerity of a particle may be every where measured, by drawing from it a perpendicular to the horizontal plane, which is conceived to run along the surface of the water in the head of the river; and the velocity which a body acquires in falling down that perpendicular, will be the celerity of the particle; which is greater, the longer the perpendicular is. From any point, as *r*, draw *r s* perpendicular to the bottom of the river; this will measure the height or depth of the river.—Since *r s* is inclined to the horizon, if from the several points of that line, you draw perpendiculars to *i t*, they will be shorter, the more distant they are from *r*, and the shortest of them will also be *s v*: therefore the celerities of the particles in the line *r s*, are so much the less, the nearer they are to the surface of the river, and the lower water is moved faster than the upper water.

Yet the celerities of those waters, as the river runs on, continually approach nearer and nearer to an equality: for the squares of those celerities are as *r t* to *s v*, the difference of which lines as you recede from the head of the river is continually lessened, because of the depth *r s*, which is also continually diminished as the lines themselves are lengthened. Now as this obtains in the squares, it will much more obtain in the celerities themselves, whose difference therefore is diminished as they increase.

If the inclination of the bottom be changed up to the head of the river, so as to become *y Z*, and a greater quantity of water flow into the channel, it will be deeper every where in the

the river, but the celerity of the water will not be changed.—For this celerity does not depend on the depth of the water in the river, but, on the distance of the moved particle from the horizontal plane of the surface at the head continued over the said particle, which distance is measured by the perpendicular *r z*, or *s v*: but these lines are not changed by the afflux of water, provided the water remain at the same height in the basin or head.

Suppose the upper part of the channel stopped by an obstacle, as *X*, which defends a little way below the surface of the water; here the whole water which comes cannot run through, therefore it must rise; but the celerity of the water below this cataract is not increased, and the water that comes on is continually heaped up, so that at last it must rise so as to flow over the obstacle, or the banks of the river. If the banks be raised, and the obstacle be continued, the height of the water would rise above the line *i t*: but before that, the celerity of the water cannot be increased; in which case the height of all the water in the head will be increased; for as we suppose the river in a permanent state, there must continually be as great a supply of water to the head as there runs from it down the channel; but if less water runs down, the height must necessarily be increased in the head till the celerity of the water flowing under the obstacle be increased to such degree, that the same quantity of water shall run under the obstacle, as used to run in the open channel before.

RIVULET, a diminutive of river. See RIVER.

RIXDOLLAR or **RIXDALLER**, a silver coin, struck in several states and free cities of Germany, as also in Flanders, Poland, Denmark, Sweden, &c.

There is but little difference between the *rixdollar* and the *dollar*, another silver coin struck in Germany, each being nearly equal to the French crown of three livres, or the Spanish piece of eight, or 4 *s*. 6 *d*. sterling.

The *rixdollar* is one of the most current and universal coins in the world—it is used equally in the commerce of the Levant, the North, Muscovy, and the East-Indies.

ROACH-fishing. See the article FISHING.

ROAD, *VIA*, an open way or passage, forming a commodious communication between one place and another.

The Romans, of all people, took the most pains in their roads; the labour and expences they were at to render them spacious, straight, smooth and agreeable to the very extremities of their empire are incredible. See Bergier's *History of the great roads of the Roman empire*.

Usually they strengthened the ground by ramming it, laying it with flints, pebbles or sand, sometimes by a lining of masonry, rubbish, bricks, puddles, &c. bound together with mortars.

F. Menestrier observes, that in some places in the Lyonnais he has found huge clusters of flints cemented with lime, reaching 10 or 12 feet deep, and making a mass as hard and compact as marble itself; and which, after resisting the injuries of time for 1600 years, is still scarce penetrable by all the force of hammers, mattocks, &c. and yet the flints it consists of are not bigger than eggs.

Sometimes they even paved their roads regularly with large square free-stones, such as the Appian and Flaminian ways, &c.

The roads paved of very hard stones they usually called *vias ferreas*, either because they resembled iron, or because they resisted the iron of the horses feet, chariots, &c.

Roads are either natural or artificial, terrestrial or aquatic, public or private.

Natural Road is that which has been frequented for a long succession of time, and subsists with little expence by reason of its disposition, &c.

Artificial Road is that made by labour of the hand, either of earth or masonry, and in the making whereof several difficulties were to be surmounted, such as most of those along the banks of rivers, and through marshes, lakes, &c.

Terrestrial or land Roads, are not only those made upon the ground but also those formed of earth heaped up in manner of a bank, and sustained by spurs, buttresses and counter-forts.

Aquatic Road, is a road made in the waters, whether current, as those of rivers, &c. or stagnant, as banks and causeways, or over morasses, &c.

Under this denomination are also comprehended navigable rivers and artificial canals, as those in Italy, Holland, &c.

Public Road or *grand road*, in any common road, whether straight or a-crook, military or royal, &c.—**Private road** is that made for the convenience of some particular house, &c.

Military Roads, so called among the Romans, were grand roads appointed for the marching of their armies into the provinces of the empire, for the assistance of their allies, &c.

The principal of these roads in England, are Watling-street, Ikenild-street, Foss-way and Erminage-street; which see under the article **WAY**.

Double-Roads, among the Romans, were roads for carriages, having two pavements or causeways, the one for those going one way, the other for those returning the other, to prevent clashing, stopping and confusion.

These two ways were separated from each other by a bank raised in the middle, paved with bricks, for the convenience of foot-people, with borders and mounting stones from space to space; and military columns to mark the distance.—Such was the road from Rome to Ostia, called *Via Portuensis*.

Subterraneous Road, is that dug in a rock with the chissel, and left vaulted.—Such is that of Puzzuoli near Naples, which is near half a league long, and is fifteen foot broad and as many high.

Strabo says it was made by one Cocceius, a relation probably of Nerva, but it has since been widened by Alphonsus king of Arragon and Naples, and made straight by the viceroys.—There is another of the same kind in the same kingdom, between Balae and Cumae, called the *Gratto of Virgil*, because mentioned by that poet in the sixth book of his *Aeneid*.

ROAD, in navigation, denotes a place of anchorage at some distance from shore, and sheltered from the winds, where vessels usually moor to wait for a wind or tide proper to carry them into harbour, or to set sail.

When the bottom is clear of rocks, and the hold firm, and the place well covered from the wind, the road is said to be good.—An open road is one which has but little land on any side.

The roads within his majesty's dominions are free to all merchant vessels, either of his subjects or allies.—Captains and masters of ships who are forced by storms, &c. to cut their cables, and leave their anchors in the roads, are obliged to fix up marks or buoys, on pain of forfeiture of their anchors, &c.

The masters of ships coming to moor in a road, must cast anchor at such distance as that the cables, &c. may not mix, on pain of answering the damages; when there are several vessels in the same road, the outermost to the seaward is obliged to keep a light in his lantern in the night-time; to apprise vessels coming in from sea.

Cock Road. See the article **COCK-ROAD**.

ROADER, among sailors, a ship that rides at anchor in a road.

ROB, in pharmacy, *sapa*, a preparation anciently much used, consisting of the juices of fruits, purified and boiled to a consumption of two thirds of their moisture, or to the consistence of a jelly.

There are *robs* made of quinces, sloes, cherries, mulberries, elderberries, barberries, gooseberries, and other fruits; for various diseases.—The juice of grapes thus prepared is more particularly called *rob* or *sapa simplex*; this is almost of the consistence of honey.

When only one third of the humidity is boiled away, it is called *defrutum*; and when only boiled to the consistence of a soft electuary, *arefm*.

The word *rob* is pure Arabic; and signifies originally a juice dried in the sun, or over the fire, that it may keep the longer without damage.

Sometimes it also denotes a composition of some juice made up with honey or sugar, in which sense it is confounded with loche or lohoc.

The *rob* is a form now much out of use, though there are several directed in the college dispensatory; as *robs* of black cherries, of sloes, of quinces, &c. the *rob* of elder is now most used.

ROBBERY, **ROBBERIA** or **ROBERIA**, in law, a felonious taking away another man's goods, from his person, presence or estate, against his will, with putting him in fear, &c.—This is sometimes also called *violent theft*, and its punishment, be the value of the thing taken ever so small, is death.

The word is said to have taken its rise hence, that anciently robbers only took away the *robes* or clothes from travellers. Though my lord Coke, in the third of his Institutes, takes the name to have had its rise from Robin Hood, who lived under Richard I. in the borders of England and Scotland, by robbery, burning houses, rape and spoil.—Hence also *Robbers-men* or *Robberds-men*; mentioned in several statutes for mighty thieves.

ROBBING. See the article **HOUSE-ROBBING**.

ROBE, **ROBA**. See the article **GOWN**.

Master of the ROBES, is an officer of the household, who has the ordering of all his majesty's robes; as those of the coronation, those of St. George's feast, of parliament, &c. as also of his wearing apparel, collar of SS, &c.

He has several officers under him, as a clerk of the robes, a yeoman, three grooms, a page, a brusher, sempstress, laundress, starcher, keeper of the wardrobe at Whitehall, &c. See **WARDROBE**.

ROBERVALLIAN lines, a name given to certain lines,

used for the transformation of figures; thus called from their inventor M. de Roberval.

The abbot Gallois, in the memoirs of the royal academy, an. 1693, observes, that the method of transforming figures, explained at the latter end of M. de Roberval's *traicté de indivisibles*, is the same with that since published by Mr James Gregory, in his *universal geometry*; and that, by a letter of Torricelli's, it appears that Roberval was the inventor of this manner of transforming figures, by means of certain lines which Torricelli therefore called *Robervallian lines*.

He adds, that it is highly probable that J. Gregory first learned the method in the journey he made to Padua in 1668, the method itself having been known in Italy from the year 1646; though the book was not published till the year 1692.

This account Dr David Gregory has endeavoured to refute, in vindication of his brother—His answer is inserted in the *Phil. Transact.* an. 1694, and the abbot has rejoined in the French memoirs of the academy, an. 1703.

ROBIGALIA, or RUBIGALIA, in antiquity. See RUBIGALLA.

ROBORANTIA, in medicine, *strengtheners*; or such medicines as strengthen the parts, and give new vigour to the constitution.

ROCAMBOLES, a mild sort of garlic, by some called Spanish garlic; being much of the nature of shallot; and well known in cookery, in quality of a sauce.

ROCHE, or ROCH alum. See the article ALLUM.

ROCHET, or ROCKET, a lawn garment, worn by bishops and abbots, resembling a surplice, except in this, that the sleeves are gathered at the wrist; whereas the surplice is quite open.

* Menage derives the word from the Latin, *rochetus*, a diminutive of *robus*, used in writers of the lower Latin for *tunica*, and formed originally from the German *rok*.

The regular canons of St Augustin do also wear *rochets* under their copes.

ROCHETS also denote the mantles wore on days of ceremony, by the peers sitting in the English parliament. See PEER and PARLIAMENT.

Those of viscounts have two bands or borders and a half; those of earls, three; those of marquises, three and a half; and those of dukes four. *Larrey*.

ROCHET fishing. See the article FISHING.

ROCK*, RUPES, a large mass or block of hard stone, rooted in the ground.

* The word is formed of the Greek *raz*, *rima*, cleft, chink; and *raz* from *razu*, *raz*, I break; whence *rime*, a stony shore.

There are various ways of breaking rocks with wood, gunpowder, &c.

We have roads, grotto's, labyrinth, &c. dug through rocks.

ROCK-allum. See the article ALLUM.

ROCK-crystal, or crystal of the rock, is that supposed to be formed by a congelation of the lapidific juice which trickles down in rocks and caverns. See Supplement article CRYSTAL.

ROCK-Salt. See the article SALT.

ROCKET, in pyrotechny, an artificial fire-work, consisting of a cylindrical case of paper, filled with a composition of certain combustible ingredients; which being tied to a stick, mounts into the air to a considerable height, and there bursts.

The rocket has a great part in all fire-works of entertainment, being not only used singly, but sometimes also as an ingredient in others.

Besides the rocket here defined, which is properly called the *sky-rocket*, there is another, which from the sphere it moves in, the water, is denominated *water-rocket*—The mechanism, preparation, &c. of each whereof, we shall here describe.

Method of making Sky-ROCKETS—1°. A concave cylindrical mould, or frame, AB, (*Tab. Miscellany*, fig. 7.) is turned, of hard wood, with a base BD, and a capital HC, usually adorned with architectural moulding—The cylinder is to be open at both ends, and its dimensions, for rockets of various sizes, as in the following article—When large, it is sometimes also made of brass or tin; and when small, of bone.

2°. Of the same matter with the cylinder, is prepared a quadra, or foot E; in the middle whereof is turned a hemisphere G, considerably less than that of the cavity of the frame; making the cap or head of another cylinder IK, and reaching up within the case; where it is kept steady by a pin LM.

Authors do not agree about the proportions—Simionowitz prescribes those that follow. If the diameter of the aperture HN be equal to that of a leaden-ball of a pound, or at most two pound weight; the height of the cylinder, with the base and capital HC, to be seven diameters, and the height of the quadra FE $1\frac{1}{2}$. The altitude of the cylinder KI, 1. The diameter IN $\frac{1}{3}$. The diameter of the hemisphere G, $\frac{1}{3}$. The height of the capital AC, 1—The same

author adds, that he finds by abundant experience, that if the diameter of the aperture be divided into 100 parts, according to the different weight of the leaden-balls to whose diameter it is equal, the following numbers being multiplied by 7 give the height HE.

Weight of Leaden-Ball.	Subseptuple of Altitude H E.	Weight of Leaden-Ball.	Subseptuple of Altitude H E.
1	100	20	86
2	98	30	82
4	96	40	78
6	94	50	75
10	91	70	67
15	88	100	57

The mould being ready, a wooden cylinder or mould AB (*Fig. 8.*) is provided, whose diameter is $\frac{1}{2}$ of the aperture of the frame, and its length equal to the height of the same; to which is fixed a haft or hilt AD. About this mould is a thick strong paper rolled, till such time as it fill the cavity of the frame. This done, where the haft is joined to the cylinder, as at A, it is choaked, i. e. firmly bound round with fine pack-thread, so as to constrict or straighten the cavity thereof—The part thus choaked or bound up FG, (*fig. 9.*) to be equal to the hemisphere G. (*fig. 7.*)

The case is now taken off the mould, and put into the cavity of the frame, *fig. 7.* the choak GF upon the hemisphere; and in this disposition is filled with a composition described in the following article, rammed strongly in by means of a wooden cylinder or rammer fitting the cavity, and a mallet.

When filled, a paper cap of a conical form is glued over the end of the case filled last; and the space left a-top is filled with whole gun-powder, to the height of about one diameter; then the rocket is bound, or choaked in E, as before in G. Lastly, the rocket is bored, as is represented in AL *fig. 9.* care being taken to do this in the middle—Some, indeed, bore the rocket as they fill it, by thrusting a long, sharp spike through the lower basis, and drawing it out again when the rocket is full: But it is best not to bore till the rocket be used.

The boring is to go two thirds of the height of the rocket, abating one diameter of the cavity. The diameter of the bore in G is to be $\frac{1}{2}$ of the diameter of the cylinder; and in L $\frac{1}{2}$ of the lower diameter.

To make the rocket mount straight up, it is tied fast to the end of a long slender stick, MD, eight times as long as the rocket; in such manner as that when poised on the finger near the touch-hole F, the stick (which is usually made bigest at this end, and sloping gently to the other) may preponderate, though very little—The rocket thus equipped, is hung at freedom, and lighted with port-fire.

Note, Some instead of a stick to make the rocket mount, furnish it with two wings, as MN, (*fig. 10.*) which have the same effect: and instead of paper some make the cases of wood covered with leather; others of a thin iron plate. And some, instead of a wooden stick use an iron wire, with a plummet at the end of it.

The composition wherewith rockets are filled, consists of the three following ingredients, viz. Salt-petre, charcoal and sulphur; all well ground: but the proportions of these are various for rockets of various sizes: as in the following table. Noting, that in small rockets gun-powder dust is added.

Compositions for ROCKETS of various sizes.

Weight of Rocket.	Salt- pet.	Sul- phur.	Char- coal.	Gun-powder Dust.
1lb	1lb	1lb	1lb	
100 or 60	30	10	20	
50	30	7	18	
20	18	42	12	26
15	12	23	8	16
10	9	62	9	20
9	6	35	5	10
5	4	64	8	16
3	2	60	2	15
1		2	6	32
Ounces.	Oun.	Oun.	Oun.	Ounces.
9	4	1	2	9
6	12	1	4	15
3	2	1	1	12
1		1	2	15

Note, Several rockets being disposed round the circumference of a wheel, whether circular or polygonous, the head of the one applied to the tail of another, and the wheel put in motion; as one rocket is spent another will take fire, and the wheel be continued in its rotation.

ROE

As an additional ornament to *rockets*, it is usual to furnish them either with flars, or with serpents, or sparks, which take fire when the *rocket* bursts; and sometimes little *rockets* are inclosed in great ones: these are to take fire when the great one is at its greatest height.

To make flars for ROCKETS—Mix 3 pound of salt-petre with 11 ounces of sulphur, 3 ounces of beaten gun-powder, and 10 of antimony. Moisten the mass with gum-water, and form them into little balls of the size of filberds, drying them well, either in the sun or an oven. When dry, inclose a number of them in the conical cap of the *rocket*.

Method of making a water-ROCKET—Make a *rocket* AB after the usual manner, excepting in the number of choaks, expressed in fig. 11—Let its diameter be equal to that of a leaden-ball of two or three inches diameter, and let it be bored to a third part of its height. Inclose the *rocket* in a hollow paper cylinder, which linear over with melted pitch, or wax, that it may resist the moisture.

Note, The weight of the *rocket* is to be so proportioned to that of the water, that the whole cylinder may be immersed.—Some, instead of a cylinder, use a truncated cone, or even a spheroid; and some hang a weight to the end at which it is lighted.

Theory of the flight of sky-ROCKETS—Mariotte takes the rise of *rockets* to be owing to the impulse or resistance of the air against the flame. Dr. Delauniers accounts for it otherwise.

Conceive the *rocket* to have no vent at the choak, and to be set on fire in the conical bore; the consequence would be, either that the *rocket* would burst in the weakest place, or that, if all its parts were equally strong, and able to sustain the impulse of the flame, the *rocket* would burn out immovable.—Now, as the force of the flame is equable, suppose its action downwards, or that upwards sufficient to lift 40 pounds; as these forces are equal, but their directions contrary, they will destroy each other's action.

Imagine, then, the *rocket* opened at the choak; by this means the action of the flame downwards is taken away, and there remains a force equal to 40 pounds acting upwards, to carry up the *rocket*, and the stick it is tied to—Accordingly, we find, that, if the composition of the *rocket* be very weak, so as not to give an impulse greater than the weight of the *rocket* and stick, it does not rise at all; or, if the composition be slow, so that a small part of it only kindles at first, the *rocket* will not rise.

The stick serves to keep it perpendicular; for if the *rocket* should begin to tumble, moving round a point in the choak, as being the common centre of gravity of *rocket* and stick, there would be so much friction against the air, by the stick between the centre and the point, and the point would beat against the air with so much velocity, that the re-action of the medium would restore it to its perpendicularity.

When the composition is burnt out, and the impulse upwards is ceased, the common centre of gravity is brought lower towards the middle of the stick; by which means, the velocity of the point of the stick is decreased, and that of the point of the *rocket* is increased; so that the whole will tumble down, with the *rocket* end foremost.

All the while the *rocket* burns, the common centre of gravity is shifting and getting downwards, and still the faster and the lower as the stick is the lighter; so that it sometimes begins to tumble before it be burnt out: but when the stick being a little too heavy, the weight of the *rocket* bears a less proportion to that of the stick, the common centre of gravity will not get so low, but that the *rocket* will rise straight, though not so fast.

ROCKET used for a habit. See **ROCHET**.

ROD, VIRGA, VERGE, a wand, or long slender stick or staff. See **VERGE**.

ROD is also used for a land-measure of 16 feet $\frac{1}{2}$: the same with *perch* and *pole*.

ROD, in gauging. See **GAUGING-rod**.

ROD-knights, in ancient customs. See **REDMANS**.

Black-ROD. See **BLACK-rod** and **USHER**.

Ezechiel's ROD. See the article **EZECHIEL**.

Fishing-ROD. See the article **FISHING**.

Rhineland-ROD. See the article **RHINELAND**.

ROE of a fish is that part which contains the spawn or seed thereof.

That of male-fishes is usually distinguished by the name of *soft roe*, or *milt*; that of the female by *hard roe*, or *spawn*.

The *soft roe*, when squeezed, yields a liquor resembling milk; whence its name *milt*: the French call it expressly *milk*, *lait*.

M. Petit found 342144 ovula or little eggs in the *hard roe* of a carp 18 inches long. Lcwenhoek, Tom. 1. p. 216. only found 217629 eggs in a carp; but four times the number in a cod; and p. 188. he says, that a common cod contains 9344000 eggs; and that the eggs of a fish of one year

ROL

old are as big as those of a fish of 25 years old. *Mém. Acad. R. Scien. an. 1733.* p. 290.

ROE is also one of the beasts of chase. See **BEAST** and **GAME**.

ROE-BUCK, a beast of chase or forest. See **BEAST**; **GAME**; &c.

The *Roe-buck* is called an *hind* the first year; *gyre* the second; *henys* the third; *roe-buck* of the first head the fourth; and a *fair roe-buck* the fifth.

The *roe-buck* is a deer well known in Germany; and seems to have also been formerly found in England, though now the race be extinct.

ROFFENSIS testus. See the article **TEXTUS**.

ROGA *, *roga*, in antiquity, a donative or present, which the augusti or emperors made to the senators, magistrates, and even to the people; and the popes or patriarchs to their clergy.

* The word is derived by some from the Latin, *erogare*, to give, or distribute; according to others, from *rogo*, I ask: hence, say they, it is that St Gregory the Great calls such distributions *precaria*, as being to be demanded, in order to be had—Others, again, derive it from the Greek *ῥογή*, sometimes used for corn; because it antiently consisted in corn distributed among the populace, the soldiery, &c.

The emperors used to distribute these *rogæ* on the first day of the year, or on their birth-day, or on the natalis dies of the cities—The popes and patriarchs in passion-week.

This custom of *rogæ*, or largesses, was first introduced by the tribunes of the people, to gain the populace more effectually over to their interest. The emperors at length took it up, and made such distributions to the people, and even to the soldiery, who are hence called by the Greek writers of the middle age *ροταροποι*.

ROGA is also used for the ordinary pay of the soldiery.

ROGATIO, **ROGATION**, in the Roman jurisprudence, a demand made by the consuls, or the tribunes, of the Roman people, when a law was proposed to be passed. See **LAW**.

The demand was made in these terms: *do you will and appoint that (for instance) war be declared against Philip?* this was the *rogatio*; and what the people returned in answer, as *the Roman people do appoint war to be made against Philip*, was the *decretum*, decree, or resolve.

The word **ROGATIO** is frequently also used for the decree itself, to distinguish it from a *senatus consultum*, or decree of the senate.

Frequently, also, **ROGATIO** is used in the same sense with *law*; because there never were any laws established among the Romans, but what was done by this kind of *rogation*—Otherwise they were null.

ROGATION-week, the week immediately preceeding Whit-sunday; thus called from three fasts therein; viz. on the Monday, Tuesday, and Wednesday, called also *rogations*, or *rogation days*, because of the extraordinary prayers, and processions then made, for the fruits of the earth.

The first who appointed these *rogations* was St Mamertus bishop of Vienne, who, in 474, assembled several bishops, to implore the mercy of God by a fast of three days, on occasion of an incursion then made into the country by a great number of wild beasts—Others say, it was first set on foot by the same Mamertus in 468, on occasion of some great public calamities.

ROGUE, in law, an idle and sturdy beggar; who, by ancient statutes, for the first offence, is called a *rogue of the first degree*, and punished by whipping, and boring through the gristle of the right ear with an hot iron an inch in compass; and, for the second offence, is called a *rogue of the second degree*, and ordered to be put to death as a felon, if he be above eighteen years of age.

ROLL, in the manufactories, something wound and folded up in a cylindrical form.

Few stuffs are made up in *rolls*, except fattins, gawfes, and crapes, which are apt to break, and take plaits not easy to be got out, if folded otherwise—Ribbons, however, and laces, galloons, and paduas of all kinds, are thus *rolled*.

To roll hot—By an arret of council in 1698, fullers, shearmen, &c. in Poictou, are prohibited to *roll* any stuff *hot*, either by having fire over or under it, or by heating the rollers, or otherwise, on forfeiture of 100 livres for the first offence; or of being degraded from the privileges of mastership, in case of a second fault.

The antients made all their books up in form of *rolls*, or little columns; and, in Cicero's time, the libraries consisted wholly of such *rolls*—The dearth of parchment, and the cheapness of papyrus, whereof the *rolls* were made, was the reason that scarce any but paper *rolls* were used.

Vossius says, they pasted several sheets end to end, when filled on one side, and *rolled* them up together, beginning with the last, which they called *unaliatus*, and to which they fastened an ivory or boxen stick, to sustain

the *roll*.—To the other extremity they pasted a piece of parchment to cover and preserve it.

These *rolls* were placed in the libraries perpendicularly to the horizon.—The Jews still preserve the ancient usage of *rolls* for the books they read in their synagogues.

ROLL of tobacco, is tobacco in the leaf, twisted on the mill, and wound twist over twist, about a stick or roller.

The generality of tobacco in America is there sold in *rolls* of various weights, and it is not till after its arrival in England, Spain, France and Holland, that it is cut.—*Roll* tobacco is what is chiefly used both for chewing and rasping. See TOBACCO.

ROLL, ROTULUS, in law, denotes a schedule of paper or parchment, which may be wound up by the hand into the fashion of a pipe.

Of these there are in the Exchequer several kinds, viz. the great *wardrobe-roll*, the *exchequer's-roll*, the *subsidy-roll*, &c.

The word is formed from the french *rolle*, of the latin *rotulus*, because most instruments and expeditions in law were antiently wrote on papers, or parchments sewed or glued together, and thus rolled up; whence the word *enroll*, and the like.

ROLLS of parliament are the manuscript registers of the proceedings of our ancient parliaments.

Before the use of printing, and till the reign of Henry VII. our statutes were all engrossed in parchment, (and by virtue of the king's writ for that purpose) proclaimed openly in every county.

In these *rolls* we have also a great many decisions of difficult points of law, which were frequently in former times referred to the decision of that high court.

Rider-ROLL, a schedule or small piece of parchment, frequently sewed or added to some part of a *roll*, or record.

Now observes that the court ex officio, may award a *certiorari*, *ad informandum conscientiam*; and that which is certified shall be annexed to the record, and called a *rider-roll*.

ROLL, is also used for a list of the names of several persons of the same condition, or entered in the same engagement.

Court-ROLL, of a manor, is that wherein the names, rents and services of each tenant are copied and enrolled.

Myfter-ROLL, that wherein are entered the soldiers of every troop, company, regiment, &c.

As soon as a soldier's name is wrote down on the *roll*, it is death for him to desert.

Calves-head ROLL, is a *roll* in the two Temples, wherein every benchman is taxed yearly at 2s. every barrister at 1s. 6d. and every gentleman under the bar, at 1s. to the cook, and other officers of the house, in consideration of a dinner of calves-heads, provided in Easter term.

Ragman's-ROLL, or **Ragimund's-ROLL**, is a roll denominated from Ragimund, a papal legate in Scotland, who calling before him all the people who held benefices in that kingdom, caused them upon oath to give in the value of their estates, according to which they were taxed in the court of Rome.

ROLLS, or office of ROLLS, in Chancery-lane, London, is an office appointed for the custody of the *rolls* and records in chancery.

The master of this office is the second person in that court; and in the absence of the lord chancellor he sits as judge.

This house or office was antiently called *domus conversorum*, as being appointed by king Henry III. for the use of converted Jews; but their irregularities occasioned king Edward III. to expel them thence; upon which the place was deputed for the custody of the *rolls*.

ROLL or ROUL among military men. See **ROUL**.

Head-ROLL. See the article **HEAD-roll**.

Check-ROLL. See the article **CHECK-roll**.

Counter-ROLL. See the article **COUNTER-roll**.

ROLL of parchment, properly denotes the quantity of sixty skins.

ROLL, in antiquity.—From the time of Anastasius, we find in the hands of the emperors, on medals, a kind of narrow long *roll* or fachel, the meaning whereof has greatly puzzled the antiquaries.

Some imagine it to be a *roll* or bundle of papers, memoirs, petitions, &c. presented occasionally to princes, consuls and the like.—Others take it to be a plaited handkerchief, which the persons who presided at the games cast forth as a signal for their beginning.—Others will have it a bag of dust and ashes, presented the emperor at the ceremony of his coronation, and called **AKAKIA**, *q. d.* a means of preserving innocence, by the remembrance of dust, &c.

ROLL or ROLLER, is also a piece of wood of a cylindrical

form, used in the construction of several machines, and in several works and manufactures; though sometimes under other names.

It is on such *rolls*, properly called *beams*, that the woollen, filken, and other threads are wound, whereof the weaver's works consist.—For which end each loom has usually two, and that of the gawle-weavers three.

In the glass manufacture they have a *running roll*, being a thick cylinder of cast brass, serving to conduct the melted glass to the end of the table whereon large looking-glasses, &c. are to be cast.

The founders also use a *roller* to work the sand which they use in making their moulds.

The presses called *calenders*, as serving to calender stuffs withal, consist, among other essential parts, of two *rollers*.

It is also between two *rollers* that the waves are given to silks, mohairs, and other stuffs proper to be tabbed.

Prints, or impressions from copper-plates, are also taken by passing the plate and the paper between two *rollers*. See **PRINT** and **ROLLING-press-printing**.

ROLLS, in coining, are two iron instruments of a cylindrical figure, which serve to draw or stretch out the plates of gold, silver and other metals, whereof the planks or pieces are to be formed for the species.

ROLLS, in printing, are two large cylinders or barrels of wood fastened in the middle of what they call the cradle or galleys of the press; and which, by means of a cord or girt passing over each, and a handle which gives motion to one of them, draw the carriage of the press backwards and forwards. See **PRINTING**.

ROLLS, in the sugar-works, are two large iron barrels which serve to bruise the canes, and express the juice.—They are cast hollow, and their cavities are filled up with wood, the cylinders of which are properly the *rollers*.

ROLLS or ROLLERS, among carpenters, malons, &c. are plain cylinders of wood, seven or eight inches in diameter, and three or four foot long, used for the removing of beams, huge stones, and other like burdens, which are cumbersome but not exceeding heavy.

These *rollers* are placed successively under the fore-part of the mallees to be removed; which, at the same time, are pushed forwards by levers, &c. applied behind.

Endless ROLLS.—When blocks of marble, or other excessive heavy loads are to be removed; they use what they call *endless-rolls*.

These to give them the greater force, and prevent their bursting, are made of wood joined together by cross-quarters; they are about double the length and thickness of the common *roller*; and besides are girt with several large iron hoops at each end.—At a foot's distance from the ends are four mortises, or rather only two, but pierced through and through, into which are put the ends of long levers, which the workmen draw by ropes fastened to the ends, still changing the mortise as the *roll* has made a quarter of a turn.

ROLL-rich-stones, in antiquity, a series of huge stones, ranged in a circle near Morton in Marly, in Oxfordshire.—There are a world of fabulous traditions about them.—Among the antiquaries some take them to be a monument of a victory, others a burying-place, and others a place for the coronation of the Danish kings.

Near Penros in Cornwall is a like monument.

ROLLER. See the article **ROLL**.

ROLLER, in surgery, a long and broad ligature, usually of linen cloth, used for binding, surrounding and containing the parts of the human body, and keeping them in, or disposing them to a state of health.

A *Roller* consists of two parts, the *body*, and the two extremities, which some call *heads* or *chiefs*, and others *tails*.—There are single headed *rollers*, that is, such as are rolled at one head only, double headed *rollers*, &c.

Again, some are equally rolled and gathered together, as those applied to fractures and dislocated joints.—Others are cut into several chiefs or heads; as those for the head, chin, &c.—Others are composed of several swaths gathered and stitched together, as those for the testicles, &c.—Some again are *broad*, as those for the breast, belly, &c.—Others narrow, as those for the lips, fingers, &c. Guidon directs the roller for the shoulder to be six fingers broad, that for the thigh five, for the leg four, for the arm three, and the finger one.

ROLLING, ROTATION, in mechanics, a kind of circular motion, wherein the moveable turns round its own axis or centre, and continually applies new parts of its surface to the body it moves upon.

Such is that of a wheel, a sphere, or the like.—Such, particularly

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particularly are the motions of the earth, the planets, &c.

The motion of *rolling* is opposed to that of *sliding*, wherein the same surface is continually applied to the plane it moves along.

It must be noted, that in a wheel it is only the circumference that properly *rolls*, the rest proceeds in a compound, angular kind of motion, and partly *rolls*, partly *slides*—

The not distinguishing between which two, occasioned the difficulty of that celebrated problem the *rota Aristotelica*, Aristotle's wheel. See *ROTA Aristotelica*.

The friction of a body in *rolling*, or the resistance made to it by the roughness of the plane it moves on, is found to be much less than the friction in *sliding*.

Hence the great use of wheels, rolls, &c. in machines, as much of the action as possible being laid thereon, to make the resistance the lesser.

For the laws of bodies *ROLLING* on inclined planes, see *Inclined Plane* and *DESCENT*.

ROLLING-press-printing. See *PRINTING*.

ROMAN, something belonging to the city of Rome—The Roman commonwealth lasted from the expulsion of the Tarquins to the battle of Pharsalia, 460 years. The Roman empire, from the battle of Pharsalia to the building of Constantinople by Constantine in the year 330, lasted 378 years; from the building of Constantinople to the taking of it by the Turks in 1453, was a farther period of 1123 years.

A Roman citizen, at first, was only a citizen of Rome; at length the right of citizenship was given to other cities and people, both in Italy and the provinces—it was thus St Paul was a Roman citizen, Acts xvi. 21, 37, 38. xxii. 25, 26, 27. xxiii. 27, the city of Tarsus in Cilicia, a native of which he was, having the right of Roman citizenship.

For the Roman senate, their magistracy, consuls, soldiery, tribes, courts, names, weights, measures, coins, and other matters relating to the antiquities of that people, their policy, religion, law, customs, &c. see the respective articles in this work.

ROMAN purple, now denotes the dignity of a cardinal.

ROMAN or ROMISH church, is that whereof the pope is head; so called in opposition to the reformed churches.

The Roman law is the civil law or the written law, as compiled by the emperor Justinian.

A **ROMAN charity** among painters, is a picture of a woman sucking an old man—*Roman knight*, &c. See *KNIGHT*, &c.

King of the ROMANS, in our age is a prince elected and designated successor to the German empire.

ROMAN games, *ludi ROMANI*, were solemn games held in ancient Rome, thus called by way of eminence, and on account of their antiquity, as having been instituted by Romulus.

They were sometimes also called *magni ludi*, from the great pomp and expence thereof, and sometimes *consualia*, because performed in honour of the god Neptune, who was also called *consus*, in his quality of god of secret councils.

They also bore the denomination of *ludi circenses*, because held in the Circus.

This solemnity, Halicarnassensis observes, was originally instituted by Evander, in honour of Neptune, under the name of *innuptia*, whence the festival itself was called *innuptia*; and was afterwards renewed by Romulus in honour of the same deity, only under another name.

For Romulus, needing the advice of a god to council him in the design he had to furnish his new citizens with wives, applied to the god of secret council himself, *Consus*; proclaimed the *consualia*, and invited his neighbours all around to the first celebration thereof—The consequence was, the rape of the Sabine women, who came to be spectators thereof.

The great ceremony in these games consisted in a cavalcade of horses and asses, adorned with garlands, Neptune being reputed the first author of riding on horseback.

Their horses here were of two kinds, *viz.* *peripneusti*, or such as were merely led up and down for state; and *exeritani*, which were for race and exercise.

The other diversions were fencing, and that till one of the combatants was killed on the spot, fighting with beasts and with castus or whirlbats; wrestling, running, leaping, sea-fights, horse-races, chariot-races, &c.

These games, Livy tells us, were improved and rendered much more magnificent by Tarquinius Priscus—Manutius says, they were held on the eve of the nones of September, *i. e.* on the 14th day of the month.

ROMAN order, in architecture, is that more usually called the *composite*. See *COMPOSITE*.

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ROMAN balance, *statera ROMANA*, the steel-yard. See *STEELYARD*.

ROMAN indiction.

ROMAN year, &c.

ROMAN language, &c.

ROMANCE, antiently *ROMAUNT* and *ROMANT*, a fabulous relation of certain intrigues and adventures in the way of love and gallantry, invented to entertain and instruct the readers.

M. Fontenelle calls *romances* poems in prose; and Bossu is not averse to their being admitted as poetical pieces, though not written in verse.

Setting aside the verification, it is certain an epic poem and a *romance* are almost the same thing—The just notion therefore of a *romance* is, that it is a discourse invented with art to please and improve the mind, and to form or mend the manners, by instructions disguised under the allegory of an action or series of actions, related in prose in a delightful and probable, yet surprizing manner.

A just *romance* consists of two parts, *viz.* a moral, as its foundation and end, and a fable or action, as the superstructure and means.

It must also have the manners, that is, the characters must be distinguished, and the manners must be necessary, and it must have all the other qualities of poetical manners.

The incidents must be delightful, and to that end rightly disposed and surprizing—The sentiments fall under the same rules as in the drama.

But the diction is allowed to be more lofty and figurative, as being a narration, and not having terror or pity but admiration for its end.

As compositions of this kind have a long time been little else but histories of amorous adventures and feats of knight-errantry, the origin of *romances* is referred to that of love histories, and accordingly Dearchus, a disciple of Aristotle, who first wrote of those matters, is usually esteemed the original author of *romances*—Though Photius is of opinion that Antonius Diogenes's book on the errors and amours of Dinias and Dercyllis, gave birth to most of the works of this kind. Be this as it will, it is certain the antients have had their *romances* as well as we—Such are the amours of Rhodanis and Sinionides, described in Iambics; such is the *romance* of Leucippe and Clitophon, composed by Achilles Tatius, a Greek writer, afterwards a bishop; such are the four books of incredible things, wrote by Damascius; such are the Ethiopics of Heliodorus, wherein he relates the amours of Theagenes and Chariclea—Lastly, under the same class may be ranked the fables of Parthenius Nicanus of Athenagoras, Theodorus Prodromus, Eustathius and Longus.

Indeed antiquity could scarce be reconciled to such pieces, and always looked on them as abuses—Photius, in his *Bibliotheca*, Cod. LXXXVII. gives a frightful account of that of Tatius; and the Ethiopics of Heliodorus, though one of the modestest and most reserved pieces of the kind, met with very severe treatment—That author was bishop of Tricca in Thessalia in the fourth century. Nicephorus tells us, that a synod, considering the danger which might accrue to youth from reading his *romances*, authorized as it was by the dignity of its author, proposed it to him either to suppress his book, or renounce his bishopric; and that he chose the latter—But this history is a little doubtful.

Be this as it will, Heliodorus has served as a model to all the *romances* wrote since; and the marriage of Theagenes and Chariclea, has produced a very numerous issue, even all the *romances* now extant in the world.

In imitation of the archbishop Turpinus, who passed for author of the *romance* of the feats of Charlemaign and Orlando, a great number of histories of the like kind were wrote in France, during the time of Philip the fair; the authors whereof seemed to improve on each other, contending who should go farthest in the merveilleux—These books being intended for the polite people, were wrote in the court language of that age, which was called the *romans*, *romant* or *romanic*; whence the books themselves were called by those names; and thus by degrees *romans*, &c. became the general name of all books of this kind; whence at length our *romance*.

Others derive the word from the Spanish *romansero*, I invent, as intimating *romances* to be meer fictions—And hence it is that the antient poets of Provence, who were the first great dealers in *romances*, are called *troubadours*. q. d. finders or inventors.

The French, above all other nations, have applied themselves to this kind of writing; whether it be owing to the natural taste and genius of the people, or to the freedom, &c. wherewith they converse with the women—They began chiefly with *romances* of chivalry; hence their Amadis, in 24 volumes; Palmerin d'Oliva, and of England king Arthur, &c. whereof we have an agreeable critique in Don Quixot.

The later *romances* are much more polite; the best of which are the *Astrea* of D'Urfé; the *Cyrus* and *Clelie* of mademoiselle de Scudéri; the *Cassandre* and *Cleopatre* of la Calprenède; *Ariane*, *Francion*; and the *Adventures of Telemachus* by the late archbishop of Cambray, worth all the rest.

The Germans, too, have their *romances*; especially *Hercules* and *Herculifcus*, the *Aramena*, *Octavia*, *Arminius* *Otbert*, &c.

The Italians have their *Eromena*, by Biondi; the works of Loredano, Marino, &c.—The Spaniards, their *Diana*, and Don Quixot—The English their *Arcadia*, &c. The *Argenis* of Barclay is rather a *satyr* than a *romance*.

ROMANS, ROMANT, or ROMANIC, the polite language formerly spoke at the court of France; in contradistinction to the *Waloon*, or ancient Gaulish, spoke by the common people. See **LANGUAGE** and **WALOON**.

The *Romans* having subdued the Gauls, introduced part of their language among them; and a mixture of half Latin, half Gaulish, or Celtic, constituted the *Romans*; whereof the modern French is only an improvement.

Hence to *enromance*, was to write in *romans*, &c. See **ROMANCE**.

ROME-*foot*. } See the article **PETER-pence**.

ROME-*peny*. }

ROMPEE, or **ROMPU**, in heraldry, is applied to ordinaries, that are represented as broken; and to chevrons whose upper points are cut off—As in *Tab. Herald. fig. 83*—He beareth a chevron rompee, between three mullets, argent, by the name of Sault.

RONDEL, in fortification, a round tower, sometimes erected at the foot of a bastion. See **TOWER**.

ROOD, a quantity of land, equal to the fourth part of an acre; and containing 40 square perches or poles.

ROOF, in architecture, the uppermost part of a building; being that which forms the covering of the whole.

The *roof* contains the timber-work and its furniture of slate or tile, wherewith a house is covered, or that which serves it as a cover.—Though carpenters usually restrain *roof* to the timber-work only.

The form of the *roof* is various: sometimes it is pointed, in which case the most beautiful proportion is to have its profile an equilateral triangle.

Sometimes it is square, that is, the pitch or angle of the ridge, is a right angle; which, therefore, is a mean proportion between the pointed and the flat form.

A *flat-roof*, is that in the form and proportions of a triangular pediment. This is chiefly practised in Italy, and the hot countries, where little snow falls.

Sometimes the *roof* is in the pinnacle form. Sometimes it has a double ridge—Sometimes it is cut, or mutilated, that is, consists of a true and a false *roof* which is laid over the former: this last is particularly called a *mansard*, from its inventor M. Mansard, a famous French architect.

Sometimes, again, it is in form of a platform; as in most of the eastern buildings.

Sometimes it is truncated; that is, instead of terminating in a ridge or angle, it is cut square off at a certain height, and covered with a terrace, and sometimes this also incompassed with a balustrade.

Sometimes it is in manner of a dome, that is, its plan is square, and the contour circular.

Sometimes it is round, that is, the plan is round or oval, and the profile spherical—Sometimes the base being very large, it is cut off to diminish its height, and covered with a terrace of lead, raised a little in the middle, with sky-lights from space to space, to give light to some corridors, or other intermediate piece, which without such an expedient would be too dark.

ROOF-trees, or **RUFF-trees**, are the timbers in a ship which go from the half-deck to the fore-castle.

The term is also used for the upper timbers of any building; whence in the northern countries, it is common to signify a whole family, by saying, all under such a one's *roof-tree*.

False ROOF. } See { **FALSE**.
Hip ROOF. } { **HIP-roof**.
Attic of a ROOF. } { **ATTIC**.
ROOF-tiles. } { **TILE**.

ROOM, in building—See **BUILDING**.
Cook-ROOM. See the article **COOK-room**.
Flight of ROOMS. See the article **FUGUE**.

ROOMER, in the sea language: A ship is said to be a *roomer*, when she is larger than ordinary.

ROOT, RADIX, in botany, that part of a plant which immediately imbibes the juices of the earth, and transmits them to the other parts, for their nutrition.

The *root* consists of woody fibres, covered with bark, more or less thick—It arises from a little point in the seed, called the *radicle*.

It is no small difficulty to conceive, how the *root* should always get downwards, and turn up the stem perpendicularly; considering that in the sowing of plants the *radicle* must frequently happen to be upwards, and the plumule downwards! See **PERPENDICULARITY**.

The *root* is always found in the ground, in terrestrial plants, except in a very few cases: the ivy and cuscuta being perhaps the only plants where part of the *root* lies bare.

The *root* in plants has been observed to do the office of the stomach in animals; that is, to make the first and principal digestion of the alimentary matter—M. Reneaume shews that the *root* does the office of all the parts in the belly of animals destined for nutrition; it being the *root* that receives the nourishment, that prepares it, digests it, and alters and changes it into sap, to be afterwards distributed to all the parts of the plant.

The smell, colour, and even taste, shew how considerable an alteration the juices undergo in the *root*; so that the *root* may be laid down as the great principle of vegetation.

Plants growing at the bottom of the sea have this peculiar to them, that they have no *roots*; at least the parts which do the office of *roots* have nothing of the usual figure of other *roots*—These plants are usually fastened to some solid body; adhering to it by a very smooth polished lamina, which does not send forth any fibre. Add to this, that the body to which they adhere, being frequently a rock or flint, appears very unfit to feed them, in case they had *roots*. M. Tournefort, therefore, conjectures that they are fed by a juice afforded them by the thick oily mud at the bottom of the sea, which they receive by the pores or the exterior surface of this lamina, but it is more probable that they are all over *root* and take in nourishment from the water at all parts.

Boerhaave observes, that the *root* may have any situation at pleasure, with respect to the body of the plant; nor needs to be either lowest, or highest—Accordingly in the aloë, coral, mosses, funguses, &c. the *root* is frequently uppermost, and its growth downwards.

Roots are generally divided by botanists into

1°. *Fibrous*, which send out only small strings from the bottom of the plant, distinct from each other—Such are those of most species of grass.

2°. *More thick and gross*, which have a body thick and large either branched out into subdivisions or else sending out fibres from it all along.

These last are either *carnous*, which again are either,

1. *Broad and swelling*, or
2. *Long and slender*, which are commonly harder and more woody.

Broad and swelling roots are either

1. *Bulbeous*, which consist but of one globe or head, and send out fibres from the bottom, and are either.

{ *Squammose*, and scaly, as those of lillies, martagon, &c.
{ *Coated*, which are involved in skins or coats, as in the cepa, hyacinthus, allium, &c.

2. *Tuberous*, which are of a carnos, solid, and continued consistence, and these either

1°. *Simple*, with but one globe or head, as rapa, crocus, &c.
2°. *Manifold*, as asphodelus, pæonia, &c.

Long roots are either,

(1) *Sarmentous*, i. e. twiggy, or branching, which shoot or creep out transversely or in breadth, of these some are geniculated, knotty or jointy; as those of couch-grass, mints, &c.

(2) *Cauliformer*, i. e. stemmy or stalky, which shoot down deep directly, though often sending out fibres and strings from the great stem; which also itself is sometimes divided or branched.

ROOTS, in medicine—The principal *roots* used in the practice of physic, are rhubarb, rhaponticum, farfaparilla, ipecacuanha, jalap, zedoary, galangal, casimunar, gentian, turmeric, liquorice, madder, &c. See each described under its proper article **RHUBARB**, **RHAPONTIC**, **SARSAPARILLA**, **IPECACUANNA**, &c.

ROOT-grafting. See the article **ENGRAFTING**.

ROOT, in mathematics, denotes a quantity which is multiplied by itself; or a quantity considered as the basis or foundation of a higher power.

Thus if any number, as 2 be multiplied by itself, the product 4 is called the *square*, or second power of 2; and 2 itself, with regard to that power, it called the *root*; or particularly the *square root* of 4. See **SQUARE-root**.

Since;

Since, as unity is to the square *root*, so is the *root* to the square; the *root* is a mean proportional between unity and the square.—Thus 1 : 2 :: 2 : 4.

If a square number, as 4, be multiplied by its *root* 2, the product 8 is called the *cube*, or third power of 2; and with respect to this cubic number 8, the number 2 is called *root*; or particularly the *cube-root*.

Since as unity is to the *root*, so is the *root* to the square; and as unity is to the *root*, so is the square to the *cube*, *i. e.* unity, the *root*, the square, and the *cube*, are in continual proportion: thus 1 : 2 :: 2 : 4 :: 4 : 8. And the *cube-root* is the *root* of the two mean proportionals between unity and the *cube*.

To extract the *Root* out of a given number, or power, as 8, is the same thing as to find a number, as 2, which being multiplied by itself a certain number of times, *v. gr.* twice, produces the given number, 8.

A *root*, whether square or cubic, or of any higher power; if it consist of two parts, is called a *binomial root*, or simply a *binomial*; as 24, or 20+4.

If it consist of three, a *trinomial*; as 245, or 240+5. Or 100+140+5.—If of more than three, it is called *multinomial*; as 2456, or 2450+6, or 2400+56, or 2000+456, or 2000+400+50+6.

Root of an equation, in algebra, denotes the value of the unknown quantity in an equation.

Thus, if the equation be $a^2 + b^2 = x^2$, the *root* of the equation is the square *root* of a , and that of b , expressed thus, $\sqrt{a^2 + b^2}$.

Real Root—If the value of x be positive, *i. e.* if x be a positive quantity; *e. gr.* $x = 5$, the *root* is called a *real* or *true root*.

False Root—If the value of x be negative, *e. gr.* $x = -5$, the *root* is said to be *false*.

Imaginary Root—If the value of x be the *root* of a negative quantity, *e. gr.* $\sqrt{-5}$; it is said to be *imaginary*.

The great use of algebra is to bring problems to equations; then to reduce those equations, or to exhibit them in the most simple terms.

What remains after this to the solution of the problems, is to extract the *roots* of the equations thus reduced, be they lines or numbers.

Residual Root. See the article RESIDUAL.

Extraction of the *Roots* of equations. See EXTRACTION.

ROOTS, RADICES, in grammar, are the primitive words of a language, whence others are compounded or derived.

Thus the Latin *fluo* is the *root* of *fluus*, *fluxus*, *flumen*, *fluvius*, *influxus*, *refluus*, *fluxifer*, *fluxifolius*, *fluxivagus*, &c.—Thus also the Greek, $\alpha\iota\omega$, is the *root* of $\alpha\iota\omega\varsigma$, $\alpha\iota\omega\tau\epsilon\rho$, $\alpha\iota\omega\tau\epsilon\rho\alpha$, &c.

And thus also, though in a less proper sense, the Danish *raad* is the *root* of the English word *root*; the Latin *radix* the *root* of the French *racine*, as *rad* is the *root* of *radix*; and perhaps $\alpha\iota\omega$ the *root* of *radix*.

The Greek and Hebrew tongues are learnt by *roots*—Of dictionaries, some are in alphabetical order, others are disposed by *roots*, as Scapula, Faber's Thesaurus, and the first edition of the dictionary of the French academy: in the edition of 1718, this last is thrown into the usual alphabetical order.

ROPE, an assemblage of several twists or strings of hemp, twisted together by means of a wheel; of various uses, as in binding, staving, drawing, sailing, &c.

When the *rope* is made very thick, it is called a *cable*, and when very small, a *cord*.

The greatest consumption of *ropes* is in navigation, for the tackling of ships; where, though *ropes* include the whole cordage,

Yet there are several *ropes* particularly so denominated: as, the *entering rope*, hung at the ladder to help people up—

The *top-rope*—A *bolt-rope*, when the sail is fowed—*Buoy-rope*, to which the buoy of the anchor hangs—*Guest-rope*, to tow the long-boat—The *keel-rope*—The *bucket-rope*—*Rudder-rope*, to save the rudder if it should chance to be beat off—

Preventer-rope, to save the yard in case any part of the ties should be broke—*Breeft-ropes*, to lash the panels to the masts—*Guy-rope*, to keep the foremast forwards, directly over the hatch-way—And *boat-ropes*, by which the boat hangs, or is fastened a-float on the ship—*Port-ropes*. See PORT-ROPE.

ROPE, cord, or strap, in the manage, is any of these tied round a pillar to which the horse is fastened when they begin to quicken and supple and teach him to fly from the shambrier, and not gallop fatly or incompetably.

In those manages where there is no pillar, a man stands in the centre of the ground, and holds the end of the *rope*.

ROPES of two pillars, are the ropes or reins of a cavezon, VOL. II.

used to a horse that works between two pillars. See PILLAR.

ROPE dancer. See the article DANCER.

ROPE deck. See the article DECK.

ROPE yarn, is the yarn of any *rope* untwisted—It commonly consists of cable-ends, which are worn out; and are called *junks of the cables*—It serves for many purposes among the sailors.

RORIFEROUS-dust, *q. d. deu dropping pipe*; a name given by some to the thoracic duct; from its slow manner of conveying, and as it were, infilling, the chyle into the common stream of blood.

ROS, dew. See the article DEW.

Ros vitrioli, among chymists, is sometimes used for the first phlegm distilled from vitriol in balneo marie.

ROSADE, a kind of liquor, prepared of pounded almonds and milk, mixed with clarified sugar.

ROSARUM acetum. See ACETUM.

ROSARY, in the Romish church, a chaplet consisting of five or fifteen decads of beads, to direct the recitation of so many *ave maria's*, in honour of the virgin.

ROSARY, also denotes a particular mass or form of devotion addressed to the virgin, to which the chaplet of that name is accommodated.

Some attribute the institution of the *rosary* to St Dominic; but F. d'Achery shews it was in use in the year 1100; so that St Dominic could only make it more celebrated—Others attribute it to Paulus Libycus, and others to St Benedict; others to the Chartreux; others to venerable Bede; and, finally, others to Peter the hermit.

Those who ascribe it to St Dominic, differ as to the particular time of its institution; some referring it to the year 1208, when he preached against the Albigenses; others will have him to have set it on foot in the court of his missions in Spain, before he passed into France.

Order of the ROSARY, or of *our lady of the ROSARY*, is an order of knights, supposed by Schoonebeck, and the jesuit Bonanni, to have been instituted by St Dominic; but by mistake: for that saint never instituted any order under this name, and these authors apparently make a military order of an army of croixes, who under the command of the count de Montfort, fought against the Albigenses.

The abbot Justiniani, and M. Hermant, will have this order to have been established by an archbishop of Toledo, named Frederick, after St Dominic's death; and to have bore for a badge, a black and white cross, in the middle whereof was represented our lady, holding her little son in one hand, and in the other a *rosary*—F. Mendo adds, that they were obliged to rehearse the *rosary* on certain days—After all, F. Helyot doubts whether or no such an order in reality ever existed.

ROSATA alar.	} See {	ALOE.
ROSATUM acetum.		ACETUM.
ROSATUM aromaticum.		AROMATICUM.
ROSATUM vinum.		VINUM.

ROSE, ROSA, rosas, a medicinal flower, produced by a shrub of the same name; which gives the denomination to several preparations in pharmacy.

The kind of *roses* are various: those chiefly used in medicine are the *red* and *damausk roses*—The *damausk* are a good and safe gentle purgative, administered in infusion, or by way of syrup—The *red* are astringent; and the conserve thereof is used with success against distempers of the breasts and lungs, and in disorders of the eyes.

It is a tradition among the antients, that the god of love made a present to Harpocrates the god of silence, of a beautiful *rose*, the first that had been known: to engage him not to discover any of the private practices of his mother Venus—And hence it became a custom to have a *rose* placed in their rooms of mirth and entertainment, that under the assurance thereof they might be induced to lay aside all constraint, and speak what they pleased—Thus did the *rose* become a symbol of silence; so that to be *sub rose*, under the *roses*, denotes as much as to be out of danger of having any conversation divulged.

Sugar of ROSES, is made of red *rose* leaves, dried in an oven, pulverized, and put into a proper quantity of sugar dissolved with a little water in a chafing-dish over the fire.

ROSE-WATER, a water drawn by distillation from *damausk roses*.

It is a good cordial, and was formerly highly esteemed; but is since fallen from its reputation, and is now little used but in diseases of the eyes, and in perfumes and wafers.

It is however, in great esteem throughout the East, particularly in China and Persia, where the trade thereof is very considerable. The *rose-leaves* remaining at the bottom of the still, are kept under the name of *rose cakes* for a perfume.

ROS

Golden ROSE, is a rose which the pope blesses at mass on the first Sunday in Lent, while they sing letare Jerusalem; and which, after mass, he carries in procession; and then sends as a present to some sovereign prince.

The *fashions of the red and white ROSE*, are famous in our English histories—They had their rise in 1454, under Henry VI. between the houses of York and Lancaster, and ended in Henry VII. who united the two branches—The house of Lancaster had for its badge a *red rose*; that of York a *white* one.

ROSE-WOOD, *lignum rhodium*, or *aspalathum*. See ASPALATH.

ROSE, in architecture and sculpture, an ornament cut in resemblance of a *rose*—See *Tab. Archit. fig. 54. fig. 26. lit. b.*

It is chiefly used in frizes, corniches, and vaults of churches, and particularly in the middle of each face of the corinthian abacus. See ABACUS—And in the spaces between the modillions; under the plafonds of corniches.

ROSE nail. See the article NAIL.

ROSE diamond. See the article DIAMOND.

ROSE-NOBLE, an ancient English gold coin, first struck in the reign of Edward III. and then called the *penny of gold*; since called *rose-noble*, because stamped with a *rose*: It was current at 6s. 8d.

ROSEMARY, ROSMARINUS, a medicinal plant, whose flower, called *anthos*, is of considerable use in the present practice.

Rosemary flowers are esteemed the principal aromatic of our growth—Quincy speaks of them as good in most nervous complaints, especially in such as arise from too great moisture and cold, as they are hot and drying—In epilepsies, apoplexies, palsies, &c. they are rarely omitted in prescription, under one form or other.

They abound with a subtle detergent oil, which makes them deobstruent and opening, whence their use in uterine obstructions, the jaundice, &c.

They are the basis of the celebrated Hungarian water; with a small quantity of which, diluted in common water, the confectioners make water of *rosemary* flowers, essence of *rosemary*-water, &c.

ROSECRUCIANS. See the article ROSYCRUCIANS.

ROSIN, RESINA, in pharmacy. See RESINA.

ROSEIN, is particularly used for a resinous matter prepared from the juice of the pine-tree; in ordinary use for the making of ointment, plasters, and for other purposes.

Mr Bent in the *Phil. Transf.* N^o. 243, gives us the manner of preparing this coarse drug, in the southern parts of France; thus—The bark being pared off from the pine, to make the sap run down into a hole made at bottom to receive it; as the juice runs, it leaves a cream or crust a-top; which being tempered with water, is sometimes sold, by a cheat, for white bees-wax.

When they have got a quantity of the juice they strain it through a basknet, and what runs through is the common turpentine.

What stays behind, they mix with water, and distilling it in an alembic, the matter that rises is the oil of turpentine; and the calx that remains is the common *rosin*.

ROSOLIS, or ROS-SOLIS, popularly, ROSA-SOLIS, *sun-dew*, an agreeable spiritous liquor formerly much in repute, chiefly taken after meals, by way of dram, to aid digestion: being composed of burnt brandy, sugar, cinnamon, and milk-water, and sometimes perfumed with a little musk.

It had its name, because antiently prepared wholly of the distilled water of the plant *ros solis*; but that plant was at length no ingredient therein.

The best was that of Turin—The French have now a particular kind not called *ros solis*, but *du roy*: because used with good effect by the late King Lewis XIV.—It is composed of Spanish wine, wherein are infused anise, fennel, aneth, coriander, &c. for three weeks.

ROSTING. See the article DRESSING, FOOD, &c.

ROSTRA, in antiquity, a part of the Roman forum, wherein orations, pleadings, funeral harangues, &c. were delivered.

The *rostrum* was a kind of chapel, taken out of the forum, and furnished with a suggestion, or eminence called more particularly the *rostra*, where the orators stood to speak.

It was adorned, or as Livy says, built with the beaks of ships taken from the people of Antium, in a naval engagement; whence the name.

ROSTRALIS corona, ROSTRAL crown, in antiquity. See CROWN.

ROSTRALIS columna, ROSTRAL column. See COLUMN.

ROSTRIFORMIS processus, in anatomy, the same as coracoides. See CORACOIDES.

ROSTRUM literally denotes the beak or bill of a bird.

ROT

Hence the word is also figuratively applied to the beak, or fore-part of the head of a ship.

ROSTRUM, in chymistry, signifies the nose, or beak of the common alembic, which conveys the liquor distilled into its receiver.

ROSTRUM, is also a sort of crooked scissars, which the surgeons in some cases make use of for the dilation of wounds.

ROSYCRUCIANS, ROSICRUCIANS, or *brothers of the ROSE-CROSS*, a name assumed by a sect or cabal of hermetical philosophers; who arose, or at least became first taken notice of in Germany, in the beginning of the fourteenth century.

They bound themselves together by a solemn secret, which they all swore inviolably to preserve; and obliged themselves at their admission into the order, to a strict observance of certain established rules.

They pretended to know all sciences, and chiefly medicine: whereof they published themselves the restorers—They pretended to be matters of abundance of important secrets; and among others, that of the philosopher's stone; all which they affirmed to have received by tradition from the antient Egyptians, Chaldeans, the Magi, and Gymnosophists.

Their chief was a German gentleman, educated in a monastery, where he learnt the languages—In 1378 he went to the Holy Land, where falling sick at Damascus, he consulted the Arabs, and other Eastern philosophers, by whom he was supposed to be initiated into this wonderful art—At his return into Germany he formed a society, to whom he communicated the secrets he had brought with him out of the East, and finally died in 1484.

They have been distinguished by several names, accommodated to the several branches of their doctrine—Because they pretended to protract the period of human life, by means of certain nostrums, and even to restore youth; they were called *immortales*.

As they pretended to know all things, they have been called *illuminati*; and because they have made no appearance for several years, but have kept altogether incognito, they have been called the *invisible brothers*.

Their society is frequently signified by the letters F. R. C. which some among them interpret *fratres rosis colli*, it being pretended that the matter of the philosopher's stone is dew concocted, exalted, &c.

Some, who are no friends to free masonry, make the present flourishing society of free masons a branch of *Rosicrucians*; or rather the *Rosicrucians* themselves under a new name, or relation; viz. as retainers to building—And it is certain, there are some free masons who have all the characters of *Rosicrucians*; but how the era and original of masonry, as traced by Mr Anderson, and that of *Rosicrucianism*, here fixed from Naudæus, who has wrote expressly on the subject, conflict, we leave others to judge.

ROT, a disease, which in moist years is incident to sheep, in the same ground where in drier years they are free from it; which, yet, arises, not only from the moisture, but from a certain principle of putrefaction, both in the air and the grass.

ROTA, in mechanics. See the article WHEEL.

ROTA Aristotelica, *Aristotle's wheel*, is the name of a celebrated problem in mechanics, founded on the motion of a wheel about its axis; thus called, because first, that we know of, taken notice of by Aristotle.

The difficulty is this—While a circle makes a revolution on its centre, advancing at the same time in a right line along a plane; it describes, on that plane, a right line equal to its circumference. Now if this circle which we may call the *deferent*, carry with it another smaller circle concentric with it, and which has no motion but what it receives from the *deferent*; which is the case of the nave of a coach-wheel carried along by the wheel; this little circle, or nave, will describe a line in the time of the revolution, equal, not to its own circumference, but to that of the wheel: for that its centre advances in a right line, as fast as that of the wheel does; as being in reality the same therewith.

The matter of fact is certain—But how it should be, seems a mystery—It is obvious, that the wheel advancing during the revolution, must describe a right line equal to its circumference; but how would the nave, which revolves like the wheel, describe a right line so much greater than its circumference?

The solution Aristotle gives is no more than a good explication of the difficulty—Galileo, who next attempted it, has recourse to an infinity of infinitely little vacuities in the right line described by the two circles; and imagines that the little circle never applies its circumference to those vacuities;

ROT

vacuities; but in reality only applies it to a line equal to its own circumference; though it appears to have applied it to a much larger.

But it is evident that this is all gratis dictum—The vacuities are imaginary; and why does not the great circle apply its circumference to them? lastly, the magnitude of these vacuities must be augmented or diminished according to the different proportion of the two circles.

F. Tacquet will have it, that the little circle making its rotation more slowly than the great one, does on that account describe a line longer than its circumference; yet without applying any point of its circumference to more than one point of its base—But this is no more allowable than the former.

The attempts of so many great men proving vain, M. Dortous de Méryan, a French gentleman, had the good fortune to hit on a solution, which he sent to the royal academy of sciences, where being examined by Mess. de Louville and Saulmon, appointed for that purpose, they made their report that it was satisfactory—The solution is to this effect.

The wheel of a coach is only acted on, or drawn in a right line; its circular motion or rotation arises purely from the resistance of the ground whereon it is applied. Now this resistance is equal to the force wherewith the wheel is drawn in the right line, inasmuch as it defeats that direction; of consequence the causes of the two motions, the one right, the other circular, are equal, and therefore their effects, i. e. the motions are equal. And hence the wheel describes a right line on the ground equal to its circumference.

For the nave of the wheel, the case is otherwise—It is drawn in a right line by the same force as the wheel, but it only turns round because the wheel turns, and can only turn with it, and at the same time therewith. Hence it follows, that its circular velocity is less than that of the wheel in the ratio of the two circumferences; and therefore its circular motion is less than its rectilinear one.

Since then it necessarily describes a right line equal to that of the wheel, it can only do so by sliding, or what they call the motion of *ration*—That is, a part of the circular nave cannot be applied to a part of a right line greater than itself but by sliding along that part, and that more or less, as the part of the nave is less than that of the circle.

ROTA, is also used for a particular court or jurisdiction in Rome, established for taking cognizance of beneficiary matters, &c.

The *rota* consists of twelve doctors, chosen out of the four nations of Italy, France, Spain and Germany; three of them being Romans, one a Florentine, one a Milanese, one of Bologna, one of Ferrara, one a Venetian, one a Frenchman, two Spaniards, and one a German, each having four clerks or notaries under him.

Their office is to judge of all beneficiary causes, both within Rome, and throughout the state of the church, in case of appeal, and of all civil processes which are for above 500 crowns.

They are also called *chaplains* of the pope, as succeeding the ancient judges of the sacred palace, who held their court in his chapel.

The denomination *rota*, *wheel*, some will have derived hence, that they officiate by rotation; others, because the most important affairs of the Christian world turn upon them—Du Cange derives it from *rota porphyretica*, because the pavement of the chamber where they formerly sat was of porphyry; and fashioned like a wheel.

ROTATION, **ROLLING**, in mechanics. See **ROLLING**.

ROTATION, in geometry, the circumvolution of a surface round an immoveable line, called the *axis of rotation*.

By such *rotation* of planes, solids are formed or generated. See **GENESIS**, **SOLID**, &c.

The method of cubing solids, generated by such *rotation*, is laid down by M. de Moivre, in his specimen of the use of the doctrine of fluxions—For the fluxions of such solids take the product of the fluxion of the abscissa, multiplied by the circular base; and suppose the ratio of a square to the

circle inscribed, be as $\frac{n}{1}$: the equation expressing the nature or property of any circle, whose diameter is d , is $yy = dx - xx$. Therefore $\frac{4dxx - x^2x}{n}$ is the fluxion of a portion

of the sphere, and consequently the portion itself $\frac{4}{3}x^{\frac{3}{2}} - \frac{1}{2}dx^{\frac{3}{2}}$

$-x^{\frac{3}{2}}x^{\frac{1}{2}}$, and the circumscribed cylinder is $\frac{4}{3}dx - \frac{x^2}{n}$ therefore

the portion of the sphere is to the circumscribed cylinder as $\frac{4}{3}d - \frac{1}{2}x$ to $d - x$. *Philos. Transact.* N^o. 216.

ROU

ROTATION, **REVOLUTION**, in astronomy. See **REVOLUTION**.

DIURNAL ROTATION. See **DIURNAL** *Rotation* and **EARTH**.

ROTATION, in anatomy, the action of the *musculi rotatores*; or the motion which they give to the parts they are fixed to.

There are two muscles, the great and the little obliquus, used to perform the *rotation* of the eye—The obturator internus and externus effect the *rotation* of the thighs.

ROTATOR, in anatomy, a name given the oblique muscles of the eye, called also from the direction of the fibres *circulares*, and from the effect of their action *amatorii*.

ROTHER-BEASTS, a word used in old statutes, and still in the northern parts of England, for any horned beasts; as oxen, cows, steers, heifers, &c.

Whence *rotther-fail*, in Herefordshire, is taken for the dung or soil of such cattle.

ROTHER-NAILS, are such as have a very large head, and are used to fasten the rudder-irons in ships.

ROTONDO, **ROTUNDO**, in architecture, a popular term for any building that is round both within and without side, whether it be a church, a saloon, a vestibule, or the like.

The most celebrated *rotundo* of antiquity is the pantheon at Rome, dedicated to Cybele and all the gods, by Agrippa, son-in-law of Augustus, but since consecrated by pope Boniface IV. to the virgin and all the faints, under the title of *Sta. Maria della rotunda*.

The chapel of the Escorial, which is the burying place of the kings of Spain, is also a *rotundo*; and in imitation of that of Rome is also called *pantheon*.

ROTTENNESS, *putredo*. See **PUTREFACTION**.

ROTULA, in anatomy. See the article **PATELLA**.

ROTULI magni ingrossator. See **INGROSSATOR**.

ROTULORUM custos. See the article **CUSTOS**.

ROTULUS, a roll. See the article **ROLL**.

ROTULUS contrarientium—The earl of Lancaster taking part with the barons against king Edward II. it was not thought fit, in respect of their power, to call them rebels or traitors, but only *contrarientis*; accordingly, we have a record of those times called *rotulus contrarientium*.

ROTULUS quintoniæ, an exact survey of all England, by counties, hundreds and tithings, made under king Alfred, not unlike that of *domes-day*.

It was thus called, because antiently kept at Winchester among other records of the kingdom.

ROTUNDO. See the article **ROTUNDO**.

ROTUNDUS, in anatomy, a name given to several muscles, from the roundness of their body.

Such are the *rotundus major*, called also *teres major*, and the *rotundus minor*, called also *teres minor*, and *transversalis*—See *Tab. Anat. (Myol.) fig. 2. n. 13. fig. 6. n. 12, 13. fig. 7. n. 14, 34 and 35*.

Pronator radii ROTUNDUS. See **PRONATOR**.

ROUAGE. *Battery en ROUAGE*. See **BATTERY**.

ROUGE-croix, q. d. *red-cross*. See **POURSUIVANTS**.

ROUGE-dragon, q. d. *red-dragon*. See **POURSUIVANTS**.

ROUGH, **ROUGHNESS**, in mechanics. See **FRICTION** and **RESISTANCE**.

ROUGH casting. See **PLASTERING** and **MORTAR**.

ROUGH diamond. See the article **DIAMOND**.

ROUGH emerald. See the article **EMERALD**.

ROUGH leaved plants. See the article **PLANT**.

ROUGH taste. See **TASTE**.

ROUL, **ROLL** or **ROWL**, in the military art—Officers of the same rank, who mount the same guards, and take their turns in relieving one another, are said to *roul* or *roll*.

ROULADE, in music, a trilling or quavering.

ROUND, **ROTUNDUS**, in geometry. See **CIRCLE**, **GLOBE** and **SPHERE**.

ROUND, in anatomy. See the article **ROTUNDUS**.

ROUND, in music—The Italians call *b round*, what we call a *flat*, and the French *b mol*, and *b square*, what we call a *sharp*. See **FLAT** and **SHARP**.

ROUND, is also a military term, signifying a walk or turn which an officer, attended with some soldiers, takes in a garriſon or fortified place, *around* the ramparts in the night-time, to listen if any thing be stirring without the works, and to see that the centries are watchful, and do their duty, and all things are in good order.

In strict garriſon the *rounds* go every quarter of an hour, that the rampart may be always furnished—The centries are to challenge at a distance, and to rest their arms as the *rounds* pass, and let no one come near them.

When the *round* is near the corps de garde, the centry calls aloud, *who comes there?* and when the answer is, *the rounds*, he says, *stand*; then calls for the corporal of the guard, who draws his sword, and calls also, *who comes there?* and when

it is answered, *the rounds*, he that has the word advances and delivers it to the corporal, who receives it with his sword pointed at the giver's breast. See **WORD**.

Way of the Rounds. See the article **WAY**.

Counter-Rounds. See **COUNTER-ROUND**.

Quarter-Round. See the article **QUARTER-ROUND**.

ROUNDS, among maçons, denotes the broken pieces of statues.

ROUND-heads. See **WHIG** and **TORY**.

ROUND-head nails. See the article **NAIL**.

ROUND-HOUSE, in a ship, is the uppermost room or cabin on the stern of a ship, where the master lies.

ROUND-house also denotes a kind of prison, for the nightly-watch to secure persons in, till they can be carried before a magistrate. See **WATCH**.

ROUND niche } See the articles { **NICHE**.

ROUND roof } { **ROOF**.

ROUND table } { **TABLE**.

ROUND, in the academics, denotes a circular piste or tread. See **PISTE**.

To ROUND a horse, is a general term for all sorts of maneges upon a volt, or circular tread.—Hence to *round* a horse upon a trot, gallop, &c. is to make him carry his shoulders and haunches roundly or compactly, upon a large or smaller circle, without travelling or bearing to a side.

ROUNDLAY*, or **ROUND**, a kind of ancient poem, thus called, according to Menage; from its form; and because it still turns back again to the first verse, and thus goes round.

* The word is formed from *round* and *lay*.—The French call it *rondeau*. The Spaniards *gloja*.

The common *roundlay*, consists of thirteen verses, eight whereof are in one rhyme, and five in another.—It is divided into couplets; at the end of the second and third whereof, the beginning of the *roundlay* is repeated; and that if possible, in an equivocal or punning sense.

The *roundlay* is a popular poem among the French, but little known among us.—Marot and Voiture have succeeded the best in it.

Rapin observes, that if the *roundlay* be not very exquisite, it is flack nought.—In all the ancient *roundkeys*, Menage observes, that the verse preceeding has a compleat sense; and yet joins agreeably with that of the close; without depending necessarily thereon. This rule well observed makes the *roundlay* more ingenious; and is one of the finesses of the poem.

ROUNDELET. See the article **RUNDELET**.

ROUNDNESS, **ROTUNDITY**, in physics. See **SPHERICITY**.

ROUND, or **ROUNDELAY**, in music, a kind of burden or ritornello; where the beginning of each couplet is repeated at the end thereof.

ROUPIA, or **RUPEE.** See the article **RUPEE**.

ROUSE up a hart, among hunters. See **HUNTING**.

To ROUSE, among falconers, is when a hawk lifts up and shakes himself.

To ROUSE a bawser, or *cable*, in the sea phrase, signifies to hale in part of the hawser or cable, which lies slack in the water.

ROUT*, **ROUTE**, a public road, highway, or course; especially that which military forces take.

* The word is French, *route*, formed from the Latin, *rupta*, or *ruta*; or the French, *rouer*, an old word for horse; or rather from the old Celtic, *rent*, road.

Sanfon and Ogilby have made maps of the *routes* and post-roads of France and England; soldiers are prohibited going out of their *routes*.—*Routes* are frequently cut in parks, forests, &c. both for ornament and for the conveniences of hunting.

Some use *route* for a path cut a-crofs a wood; in opposition to *way*, which is a great road.

ROUT, in navigation. See the article **COURSE**.

ROUT is also used for the defeat and flight of an army.—The sergeants endeavour to rally the soldiers in a *route*.

ROUT, in law, is an assembly or combination of three, or more persons, going forcibly to commit an unlawful act; though they do not actually perform it.

If they go, ride, or move forwards, after their meeting, it is a *route*, though they do not put their purpose in execution; if they do, it is a *riot*.

A *route*, therefore, seems to be an unlawful assembly; and a riot the disorderly fact committed thereby. See **RIOT**.

Two things, however, there are in common to *route*, *riot*, and *unlawful assembly*: the one, that there be at least three persons together; the other, that, being together, they dis-

turb the peace, either by words, shew of arms, turbulent gesture, or actual violence.

ROUT of wolves, among hunters, denotes a herd of those wild beasts.

ROUTIER, in navigation. See **WAGGONER**.

ROWEL, among farriers, a kind of issue, made by drawing a skain of silk, thread, hair, or the like, through the nape of the neck, or other part of an horse; answering to what in chirurgery is called a *seton*.

The ROWELLING of horses is a method of cure frequently had recourse to in cases of inward strains, especially about the shoulders or hips; as also for hard swellings not easy to be resolved.

The operation is thus—A little slit being made through the skin, about a handful below the part aggrieved, big enough to put a swan's quill in; the skin is raised from the flesh, the end of the quill put in, and the skin blown from the flesh upwards, and all over the shoulder.—Then the hole being stopped with the finger, the place blown is beaten with a hazel-stick, and the wind spread with the hand all over; and then let go.

This done, a skain of horse-hair, or red farfenet, half the thickness of the little finger, is put in a *rowelling* needle seven or eight inches long; the needle is put into the hole, and drawn through again six or seven inches higher; then the needle is drawn out, and the two ends of the *rowel* tied together: anointing it every day, as well as before the putting it in, with sweet butter and hog's grease, and drawing it backwards and forwards in the skin, to make the putrid matter discharge itself more plentifully.

Others, disliking these *rowels*, as making too great a fore and scar, use the French *rowel*, which is a round piece of stiff leather, with a hole in the midst; laying it flat between the flesh and skin, the hole of the *rowel* just against that in the skin; fowing it with a needle and thread drawn through the hole and the skin; cleaning it once in two or three days, and then anointing it afresh.

ROWING. See **OAR**, **BOAT**, &c.

ROWS of trees. See the article **PARALLELISM**.

ROYAL*, **REGAL**, something relating to a king.

* The word is French, formed from the Latin, *regalis*, of *rex*, king.

In this sense we say, the *royal family*, the *royal blood*, *royal line*, &c.

In England the prince and princefs of Wales, the king's brother, &c. are addressed under the title of *royal highness*.—The duchefs of Savoy is called *madame royale*.

ROYAL abbey, denotes an abbey founded by a king, or by a prince who is succeeded by a king.

ROYAL academy of sciences, &c. See **ACADEMY**, &c.

ROYAL antler among hunters, expresses the third branch of the horn of a hart or buck, that shoots out from the rear or main horn above the back antler.

ROYAL army, is an army marching with heavy cannon; capable of besieging a strong, well fortified city.—It is usual to hang up a governor who has the assurance to hold out a petty place against a *royal army*.

ROYAL assent, is that assent or approbation which the king gives to a thing done by others; as the election of a bishop by dean and chapter; or a bill passed in both houses of parliament.

The *royal assent* in parliament being given, the bill is endorsed with these words, *Le roy le veult*; that is, it pleases the king.—If he refuses it, thus, *Le roy s'avisera*, q. d. the king will advise upon it.

ROYAL boroughs. See the article **BOROUGH**.

ROYAL crown, is that worn by kings.

This they also call an *imperial crown*, being closed a-top.

The English crown is closed by semicircles of gold meeting at the monde or globe, on which the cross stands; and those semicircles adorned with crosses and fleur-de-lises: the whole embellished with precious stones.

ROYAL charter. See the article **CHARTER**.

ROYAL African company. See the article **COMPANY**.

ROYAL Exchange, the burse or meeting place of the merchants in London.

It was first built in 1566, at the charge of Sir Thomas Gresham; and in a solemn manner, by herald with sound of trumpet, in presence of queen Elizabeth, proclaimed the *royal exchange*.—Till that time the merchants met in Lombard-street.

It was built of brick; yet then esteemed the most splendid burie in Europe.—An hundred years after its building, at the great fire, it was burnt down; but it was soon raised again, in a still more magnificent manner; the expence thereof amounting to 50000*l*.

One half of this sum was disbursed by the chamber of London, the other by the company of Mercers; who, to reimburse themselves, let to hire 190 shops above stairs, at

at 20 pound each; which with other stops, &c. on the ground, yielded a yearly rent of above 4000 pounds, yet the ground it stands on does not exceed $\frac{1}{4}$ of an acre: whence it is observed to be much the richest spot of ground in the world.

It is built quadrangular, with walks a-round, wherein the merchants of the respective countries associate themselves. In the middle of the area or court, is a fine marble statue of king Charles II. in the habit of a Roman Caesar; erected by the society of merchant adventurers; the workmanship of Grinlin Gibbons. Around are ranged the statues of the several kings since the Norman conquest.

ROYAL fishes, are whales and furgeons, and, some add, porpoises too, which the king, by his prerogative, is to have whenever cast on shore, or wrecked, in all places of the realm, unless granted to subjects by express words.

ROYAL Foot. See the article FOOT.

ROYAL Fort. See the article FORT.

ROYAL franchise. See the article FRANCHISE.

ROYAL hospital. See the article HOSPITAL.

The **ROYAL oak** was a fair spreading tree at Boscombe in the parish of Donnington in Staffordshire, the boughs whereof were all covered with ivy; in the thick of which king Charles II. sat in the day time with colonel Careless, and in the night lodged in Boscombe-house: so that they are mistaken who speak of it as an old hollow oak; it being then a gay flourishing tree, surrounded with many more.—The poor remains hereof are now fenced in with a handsome wall, with this inscription over the gate, in gold letters—*Reliquissimam arborem quam in asylum potentissimi regis Caroli II. Deus op. max. per quem reges regnant, hic creverat voluit, &c.* Philosoph. Transact. No. 310.

ROYAL officers. See the article OFFICER.

ROYAL Parapet, or *parapet of the rampart*, in fortification, is a bank about three fathoms broad, and six foot high, placed upon the brink of the rampart, towards the country; to cover those who defend the rampart.

Port ROYAL. See the article PORT royal.

ROYAL Society of England, is an academy, or body of persons of eminent learning; instituted by king Charles II. for the promoting of natural knowledge.

This illustrious body had its original in an assembly of ingenious men, who before the restauration met weekly in Wadham-college, in Oxford, at the lodgings of Dr Wilkins.

Afterwards, from about the year 1658, many of them living in London, held meetings at Gresham-college; till they were at length taken notice of by the king, who was pleased to grant them an ample charter dated the 22d of April, 1663; whereby they were erected into a corporation, consisting of a president, council, and fellows, for promoting the knowledge of natural things, and useful experiments.

Their manner of electing fellows is by balloting. Their council are in number 21, eleven of which are continued for the next year, and ten more added to them, all chosen on St Andrew's day.

Each member at his admission subscribes an engagement, that he will endeavour to promote the good of the society; from which he may be freed at any time, by signifying to the president, that he desires to withdraw.

The charges are 40s. paid to the treasurer at admission; and 13s. per quarter, so long as the person continues a member.

Their design is to "make faithful records of all the works of nature or art, which come within their reach; so that the present as well as after ages may be enabled to put a mark on errors which have been strengthened by long prescription, to restore truths that have been neglected; to push those already known to more various uses; to make the way more passable to what remains un-revealed, &c.

To this purpose they have made a great number of experiments and observations on most of the works of nature; eclipses, comets, meteors, mines, plants, earthquakes, inundations, springs, damps, subterraneous fires, tides, currents, the magnet, &c.—Also, numbers of short histories of nature, arts, manufactures, useful engines, contrivances, &c. The services they have been of to the public are very great.—They have improved naval, civil, and military architecture; advanced the security and perfection of navigation; improved agriculture; and put not only this kingdom, but also Ireland, the Plantations, &c. upon planting.

They have registered experiments, histories, relations, observations, &c. reduced them into one common stock; and have from time to time published some of the most immediate use, under the title of *Philosophical Transactions*, &c. and laid the rest up in public registers, to be nakedly transmitted to posterity, as a solid ground-work for future systems. See TRANSACTIONS.

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They have a library adapted to their institution; towards which the late earl-marshall contributed the Norfolcian library, and a museum, or repository of natural and artificial rarities, given them by Daniel Colwal, Esq; and since enriched by many others.—Their motto is, *Nulius in Verba*.

ROYAL Spanish academy. See the article ACADEMY.

ROYAL sugar. See the article SUGAR.

ROYALTIES, **REGALTIES**, the rights of the king; otherwise called the *king's prerogative*, and the *regalia*. See PREROGATIVE and REGALIA.

Of these, some the king may grant to common persons; others are inseparable from the crown. See KING, GRANT, &c.

RUBARB, **RHABARBARUM**, in medicine. See RHUBARB.

RUBBING. See ATTRITION and FRICTION.

RUBIA *Tindorum*, a root or drug popularly called *madder*. See Madder.

RUBIFYING*, in chymistry, &c. the act of turning a thing red by force of fire, &c.

* The word is formed of the Latin *rubeus*, ruddy, and *io*, I become.

Red arsenic is common white arsenic rubified by a mixture of sulphur and copper.

RUBIGALIA, or **ROBIGALIA**, in antiquity, a feast celebrated by the Romans in honour of the god Rubigus, or the goddess Rubigo; to engage those deities to preserve the corn from blasting, and mildews.

The *rubigalia* were instituted by Numa in the eleventh year of his reign; and were held on the 7th of the calends of May, which is our 25th of April; being about the time when the blight or mildew, called by the Latins *rubigo*, uses to attack the corn.

Varro fixes it to the time when the sun enters the 16th degree of Taurus.—Indeed the true time seems rather to have been on the eighteenth day before the equinox; and the true reason, because then canicula, or the little dog, sets; which is esteemed a malific constellation.

Hence they sacrificed a dog to rubigo: Ovid says, the entrails of a dog, and those of a sheep: Columella, only a sucking puppy. Festus insinuates, that the victim must also be red.

RUBIGO, or **ROBIGO**, a disease incident to corn, popularly called *mildew*.

The *rubigo* is a species of blight. See BLIGHT.

RUBRICK, **RUBRICA**, in the canon law, denotes a title or article in certain ancient law-books; thus called, because wrote, as the titles of the chapters in our ancient bibles are, in red letters.—You'll find such a law under such a *rubrick*.

RUBRICKS, also denotes the rules and directions given at the beginning, and in the course of the liturgy; for the order, and manner wherein the several parts of the office are to be performed.

There are *general rubricks*, and *special rubricks*, a *rubrick for the communion*, &c.—In the Romish missal and breviary are *rubricks* for matins, for lauds, for translations, beatifications, commemorations, &c.

They are called *rubricks*, from the Latin, *ruber*, red; because formerly printed in red-ink, to distinguish them from the rest of the office, which was in black; as they still are in the Romish missals, &c.

The great *rubrick* for the celebration of Easter, prescribed by the Nicene council, is to this purpose.—Easter-day to be the Sunday which falls upon, or next after the first full moon which immediately succeeds the vernal equinox.

—Dr Wallis has a particular discourse on the ancient *rubricks* for the feast of Easter; in the *Philosoph. Transactions*.

RUBY, **RUBINUS**, a red coloured, sparkling gem, of the first rank among precious stones.

There are but two places in the East where the *ruby* is found: The kingdom of Pegu, and the isle of Ceylon.—The mine in Pegu, where it is found in greatest plenty, is in the mountain Capelan, 12 days journey from Siren, the residence of the king of that country.—The finest *rubies* brought hence do not exceed three or four carats; the king reserving all the larger to himself.

In Ceylon, the *rubies* are found in a river which descends from the mountains towards the middle of the island: Some few are also found in the ground.—The *rubies* of Ceylon are usually brighter and more beautiful than those of Pegu; but they are rare; the king of Ceylon prohibiting his people to gather them, or traffick with them.

There are *rubies* also found in Europe, particularly in Bohemia and Hungary; especially the former, wherein is a mine of flints of divers sizes, which upon breaking, are sometimes found to contain *rubies* pretended to be as fine and hard as any of the Eastern ones.

The Greeks call the *ruby* *ασπρηδος*, *q. d.* resisting the fire.—The antients out of their credulity and superstition attributed many virtues to the *ruby*; as, that it expels poisons, cures

tures the plague, abates luxury and incontinence, banishes sorrows, &c.

Lapidaries usually distinguish three kinds of rubies; the *rack ruby*, *balais*, and *spinell*: Some add a fourth kind, viz. the *rubacelle*. It is the different degree of colour which makes their different value and beauty.—The *balais ruby* is of a crimson colour with a cast of purple: The *spinell ruby* is of a bright rosy red.

It is said the inhabitants of Pegu have the art of heightening the redness and brilliancy of rubies, by laying them in the fire, and giving them a proper degree of heat, but this seems a very erroneous account.

The *ruby* is formed in a stony substance or bed of a rose colour, called *mother of ruby*; it has not all its colour and lustre at once; but comes to it by degrees—At first it is whitish, and as it approaches to maturity, becomes red. Hence we have white rubies, others half white, half red; and others blue and red, called *sapphire rubies*.

When a *ruby* exceeds twenty carats, it may be called a *carbuncle*, the name of an imaginary stone, whereof the ancients and moderns have given us so many descriptions. See CARBUNCLE.

They have several manners of counterfeiting rubies, and some have carried the imitation to that length, that the most able lapidaries till they come to try the hardness are sometimes over-seen.

Furetiere assures us, very positively that there have been rubies in France of 240 carats.—Tavernier tells us, he saw one in the Indies of 15 carats, which he had a mind to have bought. He adds, that the king of France has finer and larger rubies than any in the possession of the Great Mogul.

The value of rubies from one carat, or four grains, to ten carats, is thus given us in the *dictionnaire de commerce*, from a good hand:

	l.	s.	d.
A ruby of one carat, is worth	1	15	0
Of two C.	9	00	0
Of three C.	22	10	0
Of four C.	33	15	0
Of five C.	45	00	0
Of six C.	67	10	0
Of seven C.	84	10	0
Of eight C.	106	00	0
Of nine C.	150	00	0
Of ten C.	216	00	0

Sapphire Ruby. See the article SAPPHIRE.

RUBY, in chymistry, is a name given to several preparations of natural bodies, because of their red colour; as, *ruby of arsenic*, &c.

RUBY, in heraldry, denotes the red colour wherewith the arms of noblemen are blazoned; being the same which in the arms of others not noble, is called *gules*.

RUCTATION, *belching*, a ventosity arising from indigestion, and discharging itself at the mouth, with a disagreeable noise.

There are belches owing to repletion, and others to inanition, or emptiness.

Quincy says, hypochondriac and hysterical people are particularly liable to this disorder.—They are rather to be cured with proper stomachics, than carminatives and hot liquors—Burnet recommends the iliac pills of Rhafis against *ructation*.

RUDDER, in navigation, a piece of timber turning on hinges in the stern of a ship, and which opposing sometimes one side to the water, and sometimes another, turns or directs the vessel this way or that—See *Tab. Ship*, fig. 2. n. 106.

The *rudder* of a ship is a piece of timber hung on the stern-posts, by four or five iron hooks called *piniles*; serving, as it were, for the bridle of a ship; to turn her about at the pleasure of the steer's-man.

The *rudder* being perpendicular, and without side the ship, another piece of timber is fitted into it at right angles, which comes into the ship; by which the *rudder* is managed and directed—This latter properly is called the *helm*, or *tiller*; and sometimes, tho' improperly, the *rudder* itself.

The power of the *rudder* is reducible to that of the lever.

As to the angle the *rudder* should make with the keel; the author of a late book on the working of ships, shews, that, in order to stay or bear up the soonest possible, the tiller of the *rudder* ought to make an angle of near 55° with the keel.

A narrow *rudder* is best for a ship's sailing, provided she can feel it, that is, be guided and turned by it; for a broad *rudder* will hold much water when the helm is put over to any side: but if a ship have a fat quarter, so that the water cannot come quick and strong to her *rudder*, she will require a broad *rudder*.

The aft-most part of the *rudder* is called, the *rake* of the *rudder*.

RUDDELE, **RUBRICA**, a sort of dusky red chalk or earth found in divers parts of England; chiefly in iron mines, of which mineral it has a copious mixture, it is used to mark cattle, and in painting. See *Supplement* article **RUBRICA**.

RUDENTED COLUMN. See the article **COLUMN**.

RUDENTURE, in architecture, the figure of a rope or staff, sometimes plain, sometimes carved, wherewith a third part of the flutings of columns are frequently filled up.

It is thus called from the Latin, *rudens*, *cable*; whence some call it a *cabling*, and the columns whose flutings are thus filled, they call *rudented*, or *cabled columns*.

There are also *rudentures* in relievo, laid on the naked of pilasters not fluted; an instance of which we have in the church of St Sapienza at Rome.

RUDERATION, **RUDERATIO**, in building, a term used by Vitruvius for the laying a pavement with pebbles or little stones.

To perform the *ruderation*, it is necessary the ground be first well beaten, to make it firm, and to prevent its cracking—Then a stratum of little stones is laid, to be afterwards bound together with mortar made of lime and sand, called by Vitruvius, *statumen*.

If the sand be new, its proportion to the lime may be as 3 to 1; but if dug out of old pavements or walls, as 5 to 2.

RUDERATION, Daviler observes, is also used by Vitruvius, lib. 7. cap. 1. for the coarsest and most artless kind of masonry; where a wall is, as it were, cobbled up.

RUDIARIUS, in antiquity, a veteran gladiator, who had got a discharge from the service. See **GLADIATOR**.

He was thus called, because as a mark of dismissal a rod was put into his hand called *rudis*.

The *rudarii* were also called *speciataiores*.

RUDIMENTS, **RUDIMENTA**, the first principles or grounds of any art or science; called also the *elements* thereof. See **ELEMENTS**.

RUDIS, a knotty rugged stick, which the prætor among the Romans gave the gladiators, as a mark of their freedom and dismissal.

Hence the Latin phrase, *rude donare*, to make a gladiator free, to discharge him from fighting any more—They were hence called *rudarii*.

RUE, *RUTA hortenif*, a medicinal plant, much used in the present practice—Schroder commends it as an alexipharmic, and cephalic; says it resists poisons and malignities, and is therefore to be used in fevers; and that it is good in all convulsive cases.

It is replete with a fat viscous juice, and by that means yields little to any purpose in distillation, unless where first digested in a spiritous menstruum—Hence its simple water in the shops, according to Dr Quincy, is nothing worth, though others are of a very different opinion. It ought to be raised with a spiritous liquor, or used in conserve; or which is best of all, the plant may be eat alone fresh gathered, with bread and butter. It is of service in nervous cases, particularly such as arise from the womb, as it deterges the glands, and by its viscosity, bridle those inordinate motions, which frequently begin there, and affect the whole constitution, the general characters and several species of *rue*, see in the *Supplement* article **RUTA**.

RUELLE, a French term, lately introduced into our language: it is a diminutive of *rue*, street; and signifies, literally, a *little-street*.

Its use among us, is for an alcove, or other genteel apartment, where the ladies receive visits either in bed or up—The poets go reading their works from *ruelle* to *ruelle*, to bespeak the approbation and interest of the ladies.

RUFF-TREES. See the article **ROOF-TREES**.

RUFFER-HOOD, among falconers, a plain leather-hood, large and open behind, to be worn by an hawk, when she is first drawn.

RUINS, a term particularly used for magnificent buildings fallen to decay by length of time; and whereof there only remains a confused heap of materials.

Such are the *ruins* of the tower of Babel, of the tower of Belus, two days journey from Bagdat, in Syria, on the banks of the Euphrates; which are now no more than a heap of bricks, cemented with bitumen; and whereof we only perceive the plan to have been square.

Such, also, are the *ruins* of a famous temple or palace near Schiras in Persia; which the antiquaries will have to have been built by Ahasuerus; and which the Persians now call Tchelminar, or Chelminar, q. d. the forty columns; because there are so many columns remaining pretty entire, with the traces of others; a great quantity of basso relievo's, and unknown characters, sufficient to shew the magnificence of the antique architecture.

RULE,

RULE, or RULER REGULA, a very simple instrument, ordinarily of hard wood, thin, narrow and straight, serving to direct the drawing of right lines.

The *rule* is of principal use in all the mechanical arts—To prove whether or no it be *ut*, draw a line by it on paper; then turn the *rule* about, the right end to the left, and apply the same edge this way to the line, if the edge now agree exactly with the line, the *rule* is true.

Desmarêts has a fine poem on the amours of the *rule* and compass—The stone-cutters *rule* is usually four foot long; and divided into feet and inches.

The Mason's *rule* is 12 or 15 foot long, and is applied under the level to regulate the courses, to make the piers equal, &c.

Parallel RULE of RULER. See PARALLEL.

RULE is also applied to certain instruments which have other considerable uses besides that of drawing lines—Such are the carpenters *joint-rule*, Everard's and Coggehal's *sliding-rules*, &c.

Carpenters joint-RULE, is an instrument usually of box, 24 inches long, and one and a half broad, each inch being subdivided into eight parts—On the same side with these divisions is usually added Gunter's line of numbers.

On the other side are the lines of timber and board-measure, the first beginning at 82, and continued to 36, near the other end; the latter is numbered from 7 to 36, four inches from the other end.

Use of the Carpenters joint-RULE—The application of the inches in measuring lengths, breadths, &c. is obvious—That of the Gunter's line, see under GUNTER's line—The use of the other side is all we need here meddle with.

1. *The breadth of any surface, as board, glass, &c. being given, to find how much in length makes a square foot*—Find the number of inches the surface is broad, in the line of board measure, and right against it is the number of inches required.

Thus if the surface were 8 inches broad, 18 inches will be found to make a superficial foot.

Or, more readily thus—Apply the *rule* to the breadth of the board or glass, that end marked 36 being even with the edge; the other edge of the surface will shew the inches and quarters of inches which go to a square foot.

2. *Use of the table at the end of the board measure*—If a surface be one inch broad, how many inches long will make a superficial foot? Look in the upper row of figures for one inch, and under it in the second row is 12 inches, the answer to the question.

3. *Use of the line of timber measure*—This resembles the former, for having learnt how much the piece is square, look for that number on the line of timber-measure: The space thence to the end of the *rule* is the length, which at that breadth makes a foot of timber—Thus, if the piece be 9 inches square, the length necessary to make a solid foot of timber is 21 $\frac{1}{2}$ inches—If the timber be small, and under 9 inches square, seek the square in the upper rank of the table, and immediately under it is the feet and inches that make a solid foot—Thus, if it be 7 inches square, 2 foot 11 inches will be found to make a solid foot.

If the piece be not exactly square, but broader at one end than another, the method is to add the two together, and take half the sum for the side of the square—For round timber, the method is to girt it round with a string, and to allow the fourth part for the side of the square—But this method is erroneous, for hereby you lose above $\frac{1}{3}$ of the true solidity. See TIMBER.

Caliber-RULE. See CALIBER measure.

Everard's sliding-RULE. } See the article } **SLIDING-rule.**
Coggehal's sliding-RULE. }

RULE, REGULA, also denotes a certain maxim, canon or precept, to be observed in any art or science. Thus we say, the *rules* of grammar, of logic, of philosophizing, &c.

School philosophers distinguish two kinds of *rules*, viz. *theoretical*, or *rules of knowing*, which relate to the understandings, being of use in the discovery of truth; and *practical* or *rules of acting*, which relate to the will, and serve to direct it to what is good and right.

For the management and application of these two sorts of *rules* there are two distinct arts, viz. *logic* and *ethics*.

RULES of knowing, regulæ sciendi, are such as direct and assist the mind, in perceiving, judging and reasoning.

RULES of acting, regulæ agendi, are those whereby the mind is guided in her desires, pursuits, &c.

Authors are extremely divided about the regard to be had to the *RULES* of *poetry* fixed by the ancients, Aristotle,

Horace, Longinus, &c. and admitted by the modern critics, as Boffu, &c. some contended that they must be invariably observed; others pleading for liberty to let them slide on occasion—*Rules*, it is complained, are fetters; rank enemies to genius; and never religiously observed by any, but those who have nothing in themselves to depend on. Voiture frequently neglected all the *rules* of poetry, as a master who scorned to be confined by them.

The theatre has its particular *rules*, as the *rule* of 24 hours; the unities of action, time and place, &c.

If it be true, says Moliere, that plays conducted according to the *rules*, do not please; but those which are not, do: The *rules* must be naught—For myself, when a thing hits and diverts me, I do not enquire whether I have done amiss, nor whether Aristotle's *rules* forbid me to laugh.

RULES of philosophizing. See PHILOSOPHIZING.

RULE, in arithmetic, denotes a certain operation with figures to find sums or numbers unknown, and to facilitate computations, mercantile, astronomical, &c.

Each *rule* in arithmetic has its particular name, according to the use for which it is intended—The four first, which serve as the foundation of the whole art, are called *addition*, *subtraction*, *multiplication* and *division*; each whereof see under its proper article ADDITION, &c.

From these arise several other *rules*; as the *rule of three*, or of *proportion*; called also the *golden rule*, and distinguished into *direct* and *inverse*, *simple* and *compound*—Also, the *rule of five numbers*—*rule of fellowship*, *simple* and *with time*—*rule of allegation*, *medial* and *alternate*—*rule of exchange*—*rule of false position*, *single* and *double*—To which add *approximation*, *barter*, *combination*, *equation*, *exchange*, *extractions*, *involution*, *progression*, *rebates*, *reduction*, &c. See FELLOWSHIP, &c.

RULE of three or of proportion, commonly called the *golden rule*, is a rule which teaches how to find a fourth proportional number to three others given.

As, if three degrees of the equator contain 70 leagues, how many do 360 degrees, the circumference of the earth, contain?

The *rule* is this—Multiply the second term 70 by the third 360; divide the product 25200, by the first term 3, and the quotient 8400 is the fourth term required.

The use of this *rule* is of vast extent, both in common life, and the sciences, but has no place except where the proportion of the given numbers is known—Suppose *e. gr.* a large vessel full of water to empty itself by a little aperture; and suppose 3 gallons to flow out in 2 minutes, and it were required to know in what time 100 gallons would be thus evacuated?—Here indeed are three terms given, and a fourth required: But, as it is evident from experience, that this water flows faster at first than afterwards, the quantity of flowing water is not proportional to the time; and therefore the question does not come under the *rule of three*.

The things which come under commerce are proportionable to their prices, twice as much of any commodity always costing twice as much money, &c. The price therefore of any quantity of a commodity being given, the price of any other quantity of the same, or the quantity of the commodity answering to any other given sum, is found by the *rule of three*—*e. gr.* If 3 pounds cost 17 s. what will 30 pounds cost? Since as 3 pounds are to 30 pounds, so is the value of the former 17 s. to the value of the latter. The question stands thus:

$$\begin{array}{r} 3 \text{ lb} \text{ --- } 30 \text{ lb} \text{ --- } 17 \text{ s.} \\ 17 \\ 3 \end{array}$$

Again; if 3 pounds be bought for 17 s. how many will 170 s. buy? Since as 17 s. is to 170 s. so are 3 pounds to the pounds required: The number will be found thus:

$$\begin{array}{r} 17 \text{ s. --- } 170 \text{ s. --- } 3 \text{ lb.} \\ 3 \\ 17 \end{array}$$

If the given terms be heterogeneous, i. e. have broken numbers among them, they do not bear the same proportion to each other which the things they express bear—They must therefore be reduced to homogeneous ones, or to the same denomination, as pounds into shillings, shillings into pence, &c. hours into minutes, &c.

R U L

R U M

E. gr. If 3 pounds and 4 ounces cost 2 s. 4 d. what will 2 pounds cost? The operation will be thus:

3 lb. 4 oz.	2 lb.	2 s. 4 d.
16	16	12
52	32	28
	256	
	64	
	52896	(17 d. $\frac{1}{2}$ of a penny.
	52	
	376	
	364	
	12	

In many cases of commerce and accounts, we have more compendious ways of working questions that come under the rule of three than by the rule itself; which, by reason of their expediting practice, are called *practice*; and constitute a particular rule of themselves. See PRACTICE.

RULE of three inverse, is, where the natural order of the terms is inverted—As, if 100 workmen build a house in two years, in how long time will 200 workmen build the same?

This is usually considered by the writers of arithmetic, and taught in the schools as a particular rule; being wrought by multiplying the first term 100 by the second 2, and dividing the product 200 by the third term 200, the quotient 1 is the number required.

But there is no necessity for making a particular rule for the matter; this coming naturally enough under the former, by only ranging the terms as the nature of the question requires.

Thus it is evident, that as the number of men 200 is to 100, so is the space 2 years, wherein 100 build the house, to the space wherein 200 will build the same—For the less time the more hands are required. The question then will stand thus:

200 M.	100 M.	2 Y.
	2	
	200	1 years.

RULE of five numbers, or *compound rule of three*, is where two rules of three are required to be wrought, before the number sought be found—As if 300 l. in 2 years yield 30 l. interest, how much will 1000 l. yield in 12 years?

Here the first thing to be done is to find by the rule of three, what interest 1000 l. will give in 2 years, and then by the same rule what it will give in 12 years.

This also is considered by the writers, &c. of arithmetic, as a particular rule, but without any necessity, a double operation solving it better, as in this example:

300 l.	1000 l.	30 int.
	130	
	3000	100 int.
2 Y.	12	100 l.
		12
		2)12000(600 int.

But in questions of this kind a single rule of three may do the business; for 300 l. give the same interest in two years which twice 300 give in one year; and twelve times 1030 l. give the same interest in one year that 1000 give in 12; omitting therefore the circumstances of time, say, if twice 300 (that is, 600) give 36 l. interest (in one year) what will 12 times 1000 (that is, 12000) give (in one year)?

600	12000	36
	36	
	72000	
	36000	
	600	43200(720 l. int.

Central Rule. See the article CENTRAL.
RULE, in a monastic sense, is a system of laws or constitutions, whereby religious houses are established and regulated; and which the religious make a vow to observe, at their entrance.

The monastic rules are all to be approved of by the pope, in order to make them valid—The rule of St Benedict, is by some authors called the *holy rule*.

Those of St Bruno and St Francis, are of all others the most austere. See CARTHUSIANS.—When a religious cannot support the austerities of his rule, he flies for a dispensation.

RULE, in the canon law—The *RULE*, *de verisimili noticia*, of probable notice, in the romish church, renders all provisions to a benefice vacant by death, null; if it appear that from the day of the decease, to the day of the date of the provisions, or to the day when the courier arrives from Rome, there has not been time sufficient for regular notice of the person's decease to be conveyed to the pope.

Provisions are even null if it be proved the courier set out before the person was deceased—This rule is strictly observed in France, in other countries the pope finds frequent occasions to dispense with it.

RULE of twenty days, *regula viginti dierum*. By this rule, if an ecclesiastic resign his benefice, to make the resignation valid, the resigner must survive its admission in the court of Rome twenty days—If he die before the expiration of the twenty days, the resignation is void, and the benefice becomes vacant by death.

This rule does not hold of the provisions of ordinary collators, nor of simple and pure resignations into the hands of the ordinary, but only in case of provisions of the pope, dispatched on resignations *in favorem*.

This rule antiently extended to such as resigned in time of health as well as of sickness—Pope Boniface refrained it to the latter, whence it is commonly called *regula de infirmis resignantibus*.

RULE de publicandis—By this rule the resignee of a benefice, if he have a provision from the court of Rome, is obliged to publish the resignation and take possession within six months, or if he have it from the ordinary collator, within one month. Otherwise, if the resigner die, the resignation becomes null.

RUM*, a species of brandy, or vinous spirit, drawn by distillation from fugar canes.

* The word *rum* is the name it bears among the native Americans.

Rum is very hot and inflammable, and is in the same use among the natives of the fugar countries, as brandy among the French. See Supplement article RUM.

RUMB, RUM or RHUMB, in navigation. See RHUMB.

RUMB-Line, or *loxodromia*. See RHUMB-Line.

RUMEN, the first stomach of animals which chew the cud, and which are hence called *ruminants*.

The food is transmitted into the rumen without any other alteration in the mouth, than being a little rowled and wrapped up together.

The rumen or paunch is much the largest of all the stomachs, as being to contain both the drink, and the whole crude mass of aliment, which there lie and macerate together, to be thence remitted to the mouth, to be re-chewed and comminuted, in order to their farther digestion in the other ventricles.

In the rumen, or first ventricle of camels, are found divers facculi, which contain a considerable quantity of water; an admirable contrivance for the necessities of that animal, which living in dry countries, and feeding on dry hard food, would be in danger of perishing, but for these reservoirs of liquor.

RUMINANT, **RUMINANS**, in natural history, an animal which chews over again what it has eat before; this is popularly called *chewing the cud*.

Joah. Con. Peyer has an express treatise *de ruminantibus & ruminations*, where he shews, that there are some animals which do really *ruminare*; such are oxen, sheep, deer, goats, camels, hares and squirrels; whereas others only appear to *ruminare*, which he calls *ruminantia spuria*; of which number are moles, crickets, bees, beetles, crabs, mullets and several other fishes.

This latter class, he adds, have their stomachs composed of muscular fibres, by means whereof the food is ground up and down, much as in real ruminants.

Ruminants, Mr. Ray observes, are all quadrupedal, hairy and viviparous, some with hollow and perpetual horns, others with deciduous ones.

The horned ruminants have all four stomachs, appropriated to the office; viz. 1°. The *rumen* of Aristotle, the rumen, *venter magnus*, or what we call the paunch or inward, which receives the meat slightly chewed, retains it a-while, and then delivers it back again into the mouth, which is what we call the *cud*, to be re-chewed—2°. The *reticulum*, or *reticulum*, which we call the *honey-comb*, from its internal coat being divided into cells, like honey-combs—3°. The *omasus*, which Mr. Ray thinks hath been wrong translated *omasus*, and which he chuses to call the *echinus*: This being difficult to clear, our people throw it away, and call it the *manifold*—4°. The *caecum*, of Aristotle, by Gaza called the *abomasus*, and among us the *mau*.

Again, all the horned ruminant animals want the *dentes primarii*, or broad teeth in the upper jaw; and they afford that hard kind of fat, called *suet*, *sebum*, *zsep*, which is firmer, and less liquifiable in them, than the adeps of other animals.

RUMINATION, **RUMINATIO**, an action peculiar to a class of animals called *ruminants*, whereby they return the food

food they have formerly swallowed; to be chewed over-again, and rendered more fit for chyle; by this second grinding in the mouth.

Peyer defines *rumination*, a natural motion of the stomach, stomach, and other parts; by means of which the food eaten, at first, hastily, is returned back again to the mouth; where it is re-chewed and swallowed a second time; and that much to the benefit of the animal.

Burnet, in his *Theſaur. med.* gives several instances of men that *ruminated*, from Salmuth, Rhodius, &c.—Dr Slare in the *Philos. Transact.* gives us a fresher instance in one of our own countrymen, living at Bristol. His account, as it is curious, and may let us see a little how it fares with *ruminating* animals, we shall here add.

“He begins to chew his meat over again within a quarter of an hour after meals, if he drink with it; if not, somewhat later. His chewing after a full meal lasts about an hour and a half: and if he go to bed presently after meals, he cannot sleep till the usual time of chewing be over. The victuals, upon the return, taste somewhat more pleasantly than at first. Bread, meat, cheese, and drink, return much of such colours as they would be of were they mixed together in a mortar. Liquids, as spoon-meat, return to his mouth in the same manner as dry and solid food. The victuals seem to him to lie heavy till they have passed the second chewing; after that they pass clean away. If he eat variety of things, that which passes down first, comes up again first. If the *ruminating* faculty chance to leave him, it signifies sickness; and it is never well with him, till it returns. He is about twenty years of age, and was always thus since he can remember. His father does the like, sometimes; but only in small quantities.

RUMMAGE*, in the sea language, signifies to clear a ship's hold, or remove goods or luggage from one place to another.

* The Word is probably derived from the Saxon, *raum*, room, or space.

RUN of a ship, so much of her hull as is always under water; growing thinner and lankier by degrees, from the floor timber to the stern-posts.

This is also called the *ship's way astward*.

A ship is said to have a *good run*, when it is long, and the water passes easily to her rudder, her tack not lying too low, which is of great importance to her sailing.—If the water do not come strongly to her rudder, by reason of her being built too broad below, she cannot steer well; and a ship that cannot steer well, cannot keep a good wind, nor will have any fresh way through the sea, but will always be falling to leeward.

And yet a ship with a large and good *run*, loses much stowage, because made narrow below.

RUNDLES, or **ROUNDLES**, in heraldry, the same as balls or pellets. See **PELLETS**.

RUNDLET, **RONLET**, or **ROUNDLET**, a small vessel, containing an uncertain quantity of any liquor, from three to twenty gallons.

RUNIC, a term applied to the language and letters of the antient Goths, Danes, and other northern nations.

Some have been of opinion that Gulphilus, or Ulphilas, a Gothic bishop about the year 370 was the first inventor of the *runic character*: but Olaus Wormius shews at large that Ulphilas could only be the first who taught it to foreigners; for that the *runic* or characters themselves were older than he. See Wormius de *liter. run.* c. 4. citante Becman, *Hist. orb. terr.* c. 9. sect. 3. §. 15.

In reality, Ulphilas, according to other authors, was so far even from teaching the character, that he invented an Alphabet of his own, on purpose to put the *runic* characters which had been made subservient to the superstitions of heathenism, out of use. *V. Sherringh. de Anglor. Gent. Orig.* p. 174.

It is supposed they were called *runic*, as being mysterious and scientific like the Egyptian hieroglyphics. See Wormius de *literatura runica*; and Hicks's *Theſaurus* of the antient northern languages.

There are some *runic* medals in the closets of the curious; and some modern Danish and English medals, the inscriptions whereof are Latin, and the character *runic*.

RUNNER, in the sea language, a rope belonging to the garnet, and to the two bolt tackles.—It is reeved in a single block fasted to the end of a pennant, and has at one end a noose to hitch into any thing, and at the other end a double block, into which is reeved the fall of the tackle or the garnet, by which means it purchases more than the tackle or garnet could allow.—See *Tab. Ship. fig. 1. n. 39. 73. 82. 110.*

To *overhaul the runner*, is to pull down the hooked end, and hitch it into the fling.

RUNET, or **RENNET**, an acid juice, found in the stomachs of calves that have fed on nothing but milk, and are killed before the digestion be perfected.

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It is this *runnet* that is chiefly used to curdle or turn milk for cheese.

Its proper place is the abomasus.—The like matter is also said to be found in goats and hares.

The longer the *runnet* is kept the better it is.—Though it readily coagulates milk; yet if put into it when already coagulated, it dissolves it.

If salt be put in the milk before the *runnet* be applied it prevents its coagulation—; but if the salt be put in afterwards it hardens the coagulum.

Aristotle will have the *runnet* to be the proper substance of the milk, but he is mistaken when he says it is found in all animals which give milk, especially in all ruminants.

RUNNING of goods, a clandestine landing of goods without paying the legal customs or duties for the same. See **SMUGGLING**.

RUNNING-saddle. See the article **SADDLE**.

RUPEE, **ROUPIA** or **ROUPIAS**, a coin very current in the territories of the Great Mogul, and in several other parts of the East-Indies.

Rupees are struck both of gold and silver; and both the one and the other have their diminutions, as *half-rupees*, *quarter-rupees*, &c.

The gold *rupee* is worth 1 s. 6 d. sterl. The value of the silver *rupee* is various, according to its quality and the place where it is coined. A general observation is, that the *rupees* are always current for more at the place where they are struck than elsewhere; and the new *rupees* for more than the old ones.—The reason of this last difference is; that the Indians being very fond of silver, to save it, use, as soon as they have got a few *rupees* together, to hide them under ground. To prevent which inconvenience, tending to drain the state of current monies, the princes and rajas strike new *rupees* every year, still augmenting the value thereof, without any augmentation of the weight.

Besides this difference of new and old *rupees*, the Indians make three other classes.—The first called *rupees siccas*, which at Bengal are worth 2 s. 11 d. sterl. The second, *rupees of Surat*, worth 2 s. 6 d. sterl.—The third *rupees of Maderas*, worth 2 s. 5 d. sterl. All which is to be understood of the new *rupees*.

As to the old ones, those of Maderas are only current at 1 s. 11 d. sterl. Those of Surat at 2 s. and the Siccas at 2 s. 4 d. Yet in other places the order and prices vary; at Surat, those struck there have the first place; the Siccas the second; and those of Maderas the third. Along the coast of Coromandel the Maderas have the first place, and the Siccas the second, &c.

RUPTURE, in medicine, called also *hernia*, and popularly *burtheness*, is when the rim, thin film, or caul which holds up the intestines, is broken or over-strained or stretched, so as that the guts fall down either into the groin; cod or elsewhere. See **HERNIA**.

According as the *rupture* happens in the abdomen, or inguens, or scrotum, it is called *exomphalus*, *hernia inguinalis*, or *hernia scroti*.

RURAL*, or **RUSTIC**, something that relates to the country.

* The word is form'd of the Latin *rus*, *ruris*, country.

RURAL dean, in the antient church was a temporary dean appointed by the bishop or archbishop, for some particular ministry, without canonical institution.

The *rural dean* is the same with what in the laws of Edward the confessor, is called *decanus episcopi*, the bishop's dean.—In some places these deans seem to have been called *choropiscopi*.

Heylin observes, that each diocese has in it one or more archdeacons for dispatch of ecclesiastical business; and each archdeaconry is subdivided into *rural deaneries*, fewer or more, according to the extent thereof, the deans whereof were also called *archipresbyteri* and *decani christianitatis*.

RUSSIA-company. See the article **COMPANY**.

RUST of a metal, the flowers or calx thereof, procured by corroding and dissolving its superficial parts by some menstruous fluid.

Water is the great instrument or agent in producing *ruff*; the air apparently rusts bodies, but it is only in virtue of the water it contains.

Hence, in a dry air, metals remain a long time without contracting *ruff*; and hence oils and other fatty bodies secure metals from *ruff*; water being no menstruum to oils, &c. and therefore not able to make its way through it.

All metals are liable to *ruff*; even gold itself, though generally held incapable thereof, grows *ruffy* if exposed to the fumes of sea-salt.

The reason why gold is so rarely found to *ruff*; is that sea-salt, which is the only salt that will prey upon it, is of a very fixed nature, and therefore little of its effluvia or exhalations are found floating in the air.

Ruff is usually supposed a corruption of the metal, but without much foundation: it is the very metal itself, only under another

another form; and accordingly we find that *rust* of copper may be again turned into copper.

The *rust* of copper, called *arugo*, makes what we call *verdigrise*. Cerufs is made of lead converted into *rust* by vinegar. Iron, in time, turns wholly into *rust*, unless preserved from the air by paint or varnish.

RUSTIC gods, in antiquity, *dii Rustici*, were the gods of the country, or those who presided over agriculture, &c. Varro invokes the twelve *dii consentes*, as the principal among the *rustic* Gods; *viz.* Jupiter, Tellus, the Sun, Moon, Ceres, Bacchus, Rubigus, Flora, Minerva, Venus, Lympha and Good Luck—Besides these twelve arch-*rustic*-gods, there were an infinity of lesser ones; as, Pales, Vertumnus, Tutelina, Fulgor, Sterculius, Mellona, Jugatinus, Collinus, Vallonia, Terminus, Sylvanus and Priapus—Struvius adds, the Satyrs, Fauns, Sileni, Nymphs, and even Tritons, and gives the empire over all the *rustic* gods to the god Pan.

RUSTIC, in architecture, expresses a manner of building in imitation of simple or coarse nature, rather than according to the rules of art.

RUSTIC fash. See the article **FASTI**.

RUSTIC fountain. See the article **FOUNTAIN**.

RUSTIC freeze. See the article **FREEZE**.

RUSTIC quints, by Vitruvius called *lapides minantes*. See

Rustic QUOIN.

RUSTIC work, is where the stones in the face, &c. of a building, instead of being smooth, are hatched or picked with the point of an instrument.

RUSTIC order, is an order decorated with *rustic* quoins, *rustic* work, &c.

Felicien says, it is properly where the several parts of the five

orders are not exactly observed; but this confounds *rustic* with *Gothic*.

RUT, in hunting, &c. a term used for the venery or copulation of deer—For the terms which obtain in respect of this and other beasts of game, with the noise they make during the acts, see **HUNTING**.

The *rutting*-time with the hart begins about the middle of September, and holds two months: the older they are, the better, and the more beloved they are by the hinds, and the earlier do they go to *rut*—At this time they will turn head, and furiously make at any living creature. It is easy killing them at this time; their whole business being to scent and pursue the track of the females; scarce feeding at all. The young herd are forced to fly with great precipitancy when the hart comes in sight of his mate. If there be any other of bulk, they will dispute it very hotly with their horns—As the season expires, they withdraw and dig themselves holes wherein to lie to assuage the strong fervour of their lust: when become a little sweet, they return to their pasture, and live in herds.

The *rutting* or tounning-time of the roe-buck begins in October, and only lasts 12 or 15 days. This over, he casts his horns.—After the hind is filled, she keeps no more company with the male till she be delivered—But the doe always accompanies her paramour, till her time approaches; when she retires, for the safety of her young, which he would otherwise kill.

RUYSCHIANA. See **TUNICA**.

RYAL. See the article **RIAL**.

RYME. See the article **RHyme**.

RYPTICKS, in medicine. See **RHYPTICKS**.



S, A consonant, and the eighteenth letter of the alphabet.

S is accounted one of the three hissing consonants; the other two being Z and J.—It is also held a semi-vowel, as forming a kind of imperfect sound, without the assistance of any of the vowels.

Some of the Ancients avoided all use of the S very studiously; particularly Pindar, who has whole poems without once mentioning it. And hence also in Plautus, and some others of the Latin poets, we find it cut abruptly off, as in *dignu', omnibu'*, &c.—Others, on the contrary, affected the use of it every where, inserting it where 'twas not wanted; as *Calpurnia* for *Gamenia*, *dulmosa* for *dumosa*, *cavia* for *cana*, &c. Of all other Letters, the S is nearest a-kin to the R; whence it was frequently changed, by reason of its disagreeable sound, into R.—Thus the *Valerii*, *Furii*, &c. were at first call'd *Valefii*, *Fufii*, &c. and what we now call *ara*, *arena*, *carmen*, *seria*, *lares*, &c. were antiently wrote *ala*, *alena*, *calmen*, *fisia*, *laser*, &c. Add to this, that the Latin nouns now terminated in *or*; as *arbor*, *labor*, &c. all antiently ended in *s*, as *arboſ*, *laboſ*, &c.

In the inflections of nouns, S is variously changed; sometimes into *r*, as *fies*, *floris*; sometimes into *n*, as *sanguis sanguinis*; sometimes into *d*, as *pes pedis*; sometimes into *t*, as *nepos nepotis*.—On the contrary, in verbs, it is frequently put for other letters; for *b*, as in *jubeo jussu*; for *c*, as in *parco parsi*; for *d*, as in *ludo lusi*; for *g*, as in *spargo sparsi*, &c.

The Latins also frequently changed the Greek *s* into *l*, as *Anteus Annibal*; into *d*, as *pes pedis*, &c.—The double *s* was frequently changed into *x*, as *πύσσα πύξ*; and sometimes even the single one, as *Αἴας Ajax*.

The old and the new orthography of the French, differ chiefly in the use of the *s*; the latter omitting it in writing, where it is not heard in the pronunciation, and the former retaining it: thus the followers of the one, particularly the academy in their dictionary, write *tempeſte*, *huisse*, *juſſe*; those of the other, *tempête*, *huitre*, *flûte*, &c.

S was a numerical letter among the Ancients, signifying seven: according to the verse,

S vera septenos numeratos significabit.

S, in books of navigation, &c. signifies South.—S. E. South-East.—S. W. South-West.—S. S. E. South South-East, &c.

S sometimes also stands for *socius*, fellow, or member; and sometimes for *societas*: as R. S. S. *regiæ societatis socius*, fellow of the royal society.

S. A. in medicinal prescriptions is an abbreviation of *secundum artem*, according to the rules of art; it is chiefly used where some uncommon care or dexterity is required.

SABÆANS*, SABÆI, the adherents to Sabaiſm; a sect of idolaters, much antienter than Moses and the Jewish law.

* The word is sometimes also written *Sabiani*, *Sabaiter*, *Zabæani*, *Zabiani*, *Zabaiter*, *Tjabæani*, *Tjabiani* and *Tjabaiter*.

The Sabæans were very numerous throughout the east: in later times they have mixt something of christianity with their superstition. They set a great value on the baptism of St. John; whence they have been also denominated *christians of St. John*.

Some, indeed, doubt whether the Sabæans be the same with the christians of St. John; but Father Angelo de St. Joseph, a Carmelite missionary, and Maracci, in his notes on the Alcoran, assert it expressly. Be this as it will, Mahomet, in his Alcoran, and the Arabian authors since him, make frequent mention of them. Beidavius, in his comment on the Alcoran, represents them as a kind of mean between the Christians and the Magusians, who are the followers of the Magi, among the Persians: he adds, that they pretend to be of the religion of Noah.—Kestæus notes, that they pretend to be in possession of the Books of Seth and Enoch; though they own none of the books of scripture.

Some charge them with worshipping the stars; and others, the angels, or dæmons. Maimonides attributes both to them; as is observed under the Article SABATISM.

Abu Joseph Aſchæus, and Kestæus place the Sabæans about Charan, or Charres, and Ghezira in Mesopotamia; which opinion is confirmed by this, that all their books are in the Chaldee tongue, though in a character very different from the Chaldee.

Hottinger sets aside the common derivation of *Sabæan* from *שבת* militia, *heſt*; and will not have it the name of a sect of religion, but of a people in Arabia Felix, the descendants of *Saba*, Grandson of Cham.—But the critics, to a man, conspire against this opinion.

SABAISM, an ancient kind of idolatry; the first that ever entered into the world.

Sabaiſm consisted in the worship and adoration of the stars; or as the scriptures call them *שוכני שמים* *ſeba ſchamain*, or *ſela ſchamain*, i. e. hosts, or militia of heaven; whence

some Moderns have formed the word *Sabaiſm*, to denote the worship of the heavenly bodies, and that of *Sabæans* for the worshippers. But as the Hebrew word, whence these are formed, is wrote with a *Y tzade*, which some express in the modern tongues by an *s*, some by an *z*, others by *tz*, and others by *tz*; hence arise a great many different manners of writing the word among different authors. Some *e. gr* writing *Sabæans*, others *Zabiani*, or *Zabæani*, or *Zabaiſts*, as Buxtorf; others *Tjabiani*, others *Tjabæani*, &c.

Maimonides makes frequent mention of this idolatry in his *Moré Nevochim*: it was very general, he observes, in the time of Moses. Some of the retainers hereto taught, that God was the spirit of the sphere, that is the soul of the world. Abraham, he adds, was brought up in the doctrine of the *Sabæans*, who admitted no other gods but the stars, and who in their books, many of which have been translated into Arabic, maintain expressly, that the fix'd stars and planets, are inferior gods, and the sun and moon the superior ones. Abraham at length, he tells us, opposing these errors, first asserted the existence of a creator distinct from the sun.

The king of the Cuthæans clapt him up in prison; but he still persisting, that prince, from an apprehension of his disturbing the state by teaching a new religion, confiscated his goods, and banished him to the extremities of the east.

—This relation, he tells us, is found in a book intitled, *הקדמה והפירוש* *The religion of the Nabathæans*.

He adds, That the *Sabæans*, to the adoration of the stars, joined a great respect for agriculture; they set a high value on cattle and sheep; and taught, that it was unlawful to kill them. He even adds, that they worshipped dæmons, under the form of goats, and that they eat the blood of animals, (though they judged it unclean,) merely because they imagined it was the food of dæmons.

This is a summary of what that Rabbin gives us concerning *Sabaiſm*; from whence, it is easy judging of what some people tell us, that *Sabaiſm* is a mixture of Judaïsm, Christianity, Mahometanism, and Paganism. The truth is, the worship of the stars was established long before not only Christianity, but even before the law of Moses. Not but some of the later *Sabæans* have, in later ages, given into divers articles of almost all religions.

SABBATARIANS, a sect of Anabaptists, in the XVIIth century; thus called, because they observed the Jewish or saturday-sabbath, from a persuasion that it was never abrogated in the New Testament by the institution of any other.

SABBATH*, SABBATUM, the seventh day of the week, held as a feast among the Jews, in memory of God's resting on the seventh day of the creation.

* The word is pure Hebrew, *שבת*, and signifies *cessation* or *rest*. Philo calls it, *Τετάρτη γενέσεως*, The world's birth-Day.

The Sabbath was appointed from the beginning, by God himself, Gen. ii. 2, 3. and by him 'twas set apart for the commemoration of the great work of the creation; and when it had fallen into neglect after the flood, it was re-established by him, upon his settling the Jewish polity after the return out of Egypt.

The Christians also apply the word *Sabbath* by extension, to the first day of the week, popularly called *Sunday*, or the *Lord's Day*; as instituted by the apostles to take place of the Jewish Sabbath, and by us observed in remembrance, not of the creation, but of the work of redemption's being completed by our Saviour's resurrection on that day.

Those who dispute the divine appointment of a Christian Sabbath, yet allow the moral necessity thereof, as a wise designation of time for the recruiting of our bodies, and at the same time, keeping up a sense of the great benefits we have received from God, and a spiritual temper of mind. By allowing six days to labour, the poor has time to earn his bread, and the man of business has time to dispatch his affairs. Had more time been allotted to labour and business, and none to rest; our bodies would have been too much fatigued and wasted, and our minds too long engaged about worldly matters, so as to have forgotten divine things. Greedy people, without such an injunction, would scarce have spared their own bodies, much less their servants, slaves, cattle, &c.—The creation, therefore, would have suffered, had it not been provided for by the institution of a Sabbath.

The Jews had also their SABBATICK YEAR, which was every seventh year; wherein they were obliged to set their slaves at liberty, and to let their lands lie idle. See JUBILEE.

SABDATH, is also used for a nocturnal assembly which Witches are supposed to hold on saturdays, where the devil appears in form of a goat, around whom they make fevral dances, and magic ceremonies, amply described in the books of Daemonomania.

To prepare themselves for this meeting, it is pretended, they take certain superstitious drugs; after which they are said to fly

up the chimney, and to be spirited through the air to the Sabbath on a switch.

SABBATH-day's-journey, is a Jewish itinerary measure, fixed by crickets to the space of 750 paces; or 2000 Jewish cubits.

SABBATIANS, SABBATIANI, a sect of hereticks thus called from *Sabbatini*, their leader, who lived under Dioclesian; he was first a Jew, then converted, and made a priest by Marcion; but he afterwards left the sect of Marcionites, on account of the celebration of Easter, which he would have to be on the fourteenth day of the moon; whence he, and his adherents, were called also *Quartodecimani*.

The *Sabbatians* are recorded by ecclesiastical historians, as having a great abhorrence of the left-hand; so as to make it a point of religion, not to receive any thing with it.---This custom, which is now become a piece of manners among us, was then esteemed so singular, that the *Sabbatians* were thence denominated *κρηνη, q. d. sinistri*, or left-hand-men.

SABELLIANS, a sect of ancient hereticks in the east, who reduced the three persons in the Trinity, to three states or relations; or rather reduced the whole Trinity to the one person of the Father; making the Word and the Holy Spirit to be only virtues, emanations, or functions thereof.

Sabellius, their chief, first broached this doctrine, in the third century, in a city of Lybia, called Ptolemais: he taught, that he, who in heaven is the Father of all things, descended into the virgin, became a child, and was born of her as a Son; and that, having accomplished the mystery of our salvation, he diffused himself on the apostles, in tongues of fire; and was then denominated the Holy Ghost.

Epiphanius tells us, that the God of the *Sabellians*, whom they called the Father, resembled the sun, and was a mere substratum; whereof the Son was the illuminative virtue or quality, and the Holy Spirit the warming virtue.

The Word, they taught, was shot or darted forth like a divine ray, to accomplish the work of redemption; and that being re-ascended to heaven, as the ray returns to its source, the warmth of the Father was communicated, after a like manner, to the apostles.

The council of Antioch, held by the Eusebians in 345, tells us, that, at Rome, those were called *Patropassians*, who in the east, were called *Sabellians*.

SABLE*, in heraldry, the black colour, in the arms of gentlemen.

* The name is borrowed from the little animal called *Sable*, which is of a black colour.

In those of nobility, it is called *Diamond*; and in the coats of sovereign princes, *Saturn*.

It is expressed in engraving by perpendicular and horizontal hatches drawn a-crois each other---as represented in *Tab. Herald. fig. 27*.

SABRE*, a kind of cutting sword, or scimitar, having a very broad, heavy blade; thick at the back, and a little crooked towards the point.

* The word is formed from the German *Sabel*, which signifies the same, or the Slavonic *Sabla*, a sword or hanger.

The *Turks* are very expert in the use of the *Sabre*, which is the weapon they ordinarily wear by their side, &c.---With this, it is said, they can cleave a man quite down, at a single stroke.

SAC*, or **SAK, SACA, or SACRA**, in law, a royal privilege which a lord of a manor claims in his court, of holding plea in causes of debate arising among his tenants and vassals, and of imposing and levying fines and amercements touching the same.

* The word is Saxon, *sac*, and literally signifies *cause, contest, &c.* Rastal defines *Sac* by the forfeiture or amercement itself.

SACÆA, ΣΑΚΑΙΑ, in antiquity, a feast which the ancient Babylonians, and other Orientals, held annually in honour of the god Anaitis.

The *Sacæa* were in the east what the *Saturnalia* were at Rome, viz. a feast for the slaves. One of the ceremonies hereof, was to chuse a prisoner condemned to death, and allow him all the pleasures and gratifications he would wish, before he were carried to execution.

SACCADE, in the manege, a jerk or violent check which the rider gives his horse, by drawing both the reins very suddenly; it is used when the horse bears too heavy on the hand, or obstinately arms himself.

The *Saccade* is a kind of correction rarely to be used; for fear of spoiling the horse's mouth.

SACCHARUM, or SACCHAR. See **SUGAR**.

SACC • BENITO, or **SACO BENITO**. See **SAN-BENI**.

SACCOPHORI*, a sect of ancient hereticks, thus called, because they always went clothed in sackcloth, and affected a great deal of austerity and penance.

* The word is Greek, *Σακκοφοροι*; formed of *σακος*, a sack, and *φορος*, I bear.

We know but little of their tenets: in all probability they were the same with the *Massilians*. See **MASSALIAN**.---

The emperor Theodosius made a law against the *Saccophori*, and Manichees.

SACCULUS, a diminutive of *Saccus*; used in anatomy, to

express several parts of the body, bearing some resemblance to bags; as,

SACCULUS Chyliferus, or Roriferus, a passage which makes the beginning of the thoracic duct: called also *receptaculum chyli*.

SACCULUS Cordis, the pericardium. See **PERICARDIUM**.
SACCULUS Lacrymalis, a little membranous bag, into which the puncta lacrymalia of the eye open; and which is, itself, the entrance of a canal, by which the liquor separated in the glandula lacrymalis, is discharged into the cavity of the nose. It is the ulceration of this *Saccus*, that makes the fistula lacrymalis. See **FISTULA**.

SACCULI Adiposi, little cells or vesicles, in the membrana adiposa, wherein the fat of the body is contained.

SACCULUS Medicinalis, denotes a topical medicine, applied to the side, stomach, or other pained part; consisting of herbs, or drugs inclosed in a linen bag.

SACCULUS Medicinalis, is also a name given to a bag of ingredients suspended in a liquor, in making diet-drinks; called also *Nidule*.

SACER, or SACER DORSI, in anatomy, a muscle arising from the hind-part of the os sacrum, and running along under the longissimus dorsi.---With its several tendons, it lays hold on the spine, and every transverse process of the loins, and the lowest of the back.---It assists in erecting the trunk.

SACER Imitis, } See the articles } **ERYSIPELAS**.

SACER Aethus, } **EPILEPSY**.

SACERDOTAL*, **SACERDOTALIS**, something belonging to the priesthood.

* The word is formed from the Latin, *Sacerdos* priest, of *Sacer* holy.

SACERDOTAL Benefices, are such as cannot be legally held by any but persons in holy orders: such are all cures of souls, bishopricks, &c.

The **SACERDOTAL Ornaments**, are those wherewith the priests are clothed when they officiate, &c.

SACK of Wool, is a determinate quantity, containing just 26 stone; and every stone 14 pounds. 14 E. 3. Stat. 1. c. 2.

In Scotland, a *Sack* is 24 stone; each stone containing 16 pounds.

A **SACK of Cotton Wool**, is a quantity from an hundred and half to 400 weight.

SACKS of Earth, SACS a Terre, in fortification, are canvas bags full of earth, the largest about a cubic-foot wide, and the lesser somewhat more than half a foot.

They are also called *Earth-bags* and *Canvas-bags*, and are used on several occasions; particularly for making retrenchments in huils, to place on parapets, or the heads of the breaches, &c. or to repair them when beaten down.

They are of good use also, where the ground is rocky, and affords not earth to carry on the approaches, because they can easily be brought on, and carried off.

The same bags, on occasion, are used to carry powder in, of which they hold about fifty pounds a-piece.

SACKBUT, a musical instrument of the wind kind; being a kind of a trumpet, though different from the common trumpet both in form, and use.

The *Sackbut* is very fit for playing bass; and is contrived so as to be drawn out or shortened, according to the gravity or acuteness of the tones.---The Italians call it *Trombone*, the Latins, *Tubo Dutilis*.

It takes asunder into four pieces, or branches; and hath frequently a wreath in the middle; which is the same tube, only twisted twice, or making two circles in the middle of the instrument; by which means, it is brought down one fourth lower than its natural tone. It has also two pieces or branches on the inside, which do not appear, except when drawn out by means of an iron bar, and which lengthen it to the degree requisite to hit the tone required.

The *Sackbut* is usually eight foot long, without being drawn out, or without reckoning the circles. When extended to its full length, it is usually fifteen foot. The wreath is two foot nine inches in circumference. It serves as bass in all concerts of wind music.

There are *Sackbuts* of different sizes, serving to execute different parts; particularly a small one, called by the Italians, *Trombone piccolo*, and by the Germans, *Cleine alt-posaune*, proper for a counter tenor. The part assigned it, is usually called *Trombone primo*, or 1^o.

There is another large kind, called *Trombone maggiore*, which may serve as a tenor: its part is usually called *Trombone secondo*, or 2^o. There is a third still bigger, called *Trombone basso*; its part is call'd *Trombone terzo*, or 3^o. 1stly, there is another, which exceeds all the rest, and which is much heard in the music, especially in the bass; its part is called *Trombone quarto*, or 4^o, or simply *Trombone*. It has usually the key of F, ut, fa on the fourth line; though frequently also on the fifth line from the top, by reason of the gravity or depth of the sounds.

SACRA Arteria, a branch of the aorta descendens, which descend through the middle of the os sacrum to the pelvis.

See **AORTA** and **ARTERY**.

SACRA Vena, a vein arising from the os sacrum, and terminating usually in the iliac vein; sometimes in the place where the two ilia meet the ascending aorta.

SACRAMENT, *SACRAMENTUM*, in the general denotes a sign of a holy, or sacred thing. See SIGN and SYMBOL.

* The word is formed from the Latin, *Sacramentum*, which signified an oath, particularly that which the soldiers took to be true to their commanders; the words whereof according to Polybius, were *Omnipotens sum & facturus quicquid mandabitur ab imperatoribus puxa caris*.

In this sense, the word includes both the *Sacraments* of the law of nature, as sound morality, the manner of offering the bread and wine practised by Melchisedech, &c. and those of the law of Moses, as the circumcision, the paschal lamb, purifications, order of priesthood, &c.

SACRAMENT, with regard to the Christian church is defined, a visible sign of a spiritual grace annexed to the use thereof.

There are two objects in a *Sacrament*; the one a material sign, the object of the senses; the other the thing signified, which is the object of faith.—Thus it has pleased God to give as it were a body or substance to spiritual mysteries, that our faith might have the assistance of sensible signs.

Roman Catholics own seven *Sacraments*, viz. baptism, confirmation, the eucharist, penance, extreme unction, ordination and marriage. See each under its proper article.—The Protestants admit of only two, viz. baptism and the eucharist, or Lord's supper.

The Romanists, however, call the eucharist, by way of eminence, the *Holy Sacrament*.—Thus to expose the *H. Sacrament*, is to lay a consecrated host on the altar to be adored.

The procession of the *H. Sacrament*, is that wherein this host is carried about the church, or about the town.

In a like sense they say, the feast of the *H. Sacrament*, the congregation of the *H. Sacrament*, &c.

SACRAMENT, was also used in the Roman law, for a pledge or gage of money, which both the plaintiff and defendant, in a real action, laid down in court to be forfeited by him who should lose the cause.—This was particularly called, *Sacraments provocare, regere, stipulari*, &c.

SACRAMENTARIANS, a general name give to all such as have published, or held erroneous doctrines of the sacrament of the Lord's supper.

The term is chiefly applied among Roman Catholics, by way of reproach, to the Lutherans, Calvinists, and other Protestants.

SACRAMENTARY, *SACRAMENTARIUM*, an ancient church-book, comprehending all the prayers and ceremonies practised at the celebration of the sacraments.

Pope Gelasius was the first author of the *Sacramentarium*: it was afterwards revised, corrected and abridged by St. Gregory.—It was the same with what the Greeks now call *Euchologium*.

SACRED, *SACER*, something holy, or, that is solemnly offered, and consecrated to God with ceremonies, benedictions, unctions, &c.

Kings, prelates, and priests, are held *sacred* persons; abbots are only blessed.—The deaconhood, sub-deaconhood, and priesthood, are all *sacred* orders, and impress a *sacred*, indelible character.

The custom of consecrating kings with holy oil, is derived, according to Gutlingius, from the Hebrews; among whom, he agrees with Grotius, it was never used but to kings who had not an evident right by succession. He adds, that the Christian emperors never used it before Justin the younger; from whom he takes it to have passed to the Goths, &c.

SACRED, is also applied to things belonging to God, and the church.

Church lands, ornaments, &c. are held *sacred*.—The *sacred* college is that of the cardinals.

SACRED Majesty, is applied to the emperor, and to the king of England; yet Loyseau says it is blasphemy. See MAJESTY.

The Ancients held a place struck with thunder as *sacred*.

In the civil law, *sacred* place chiefly denotes that, where a person deceased, has been interred.

SACRIFICE, *SACRIFICIUM*, an offering made to God on an altar, by means of a regular minister, as an acknowledgment of his power, and a payment of homage.

Sacrifices differ from mere oblations, in this, that in a *Sacrifice* there is a real destruction or change of the thing offered; whereas an oblation is only a simple offering or gift, without any such change at all.

Divines divide *Sacrifices* into *bloody*, such as those of the old law; and *bloodless*, such as those of the new law.

They also divide them again into *impetratory*, which are those offered, to obtain some favour of God, or to thank him for some already received; and *propitiatory*, which are those offered to atone for the guilt of sins.

The Phœnicians are usually held to have been the first authors of *Sacrifices*. Porphyry, indeed, attributes the invention to the Egyptians; who, he says, first offered the

first-fruits of their grounds, to the gods; burning them upon an altar of turf. At length they came to burn perfumes, and at last, he says, they sacrificed animals; observing that they first eat some herbs, or fruits regularly offered on the altars.—He adds, that libations were very frequent before the *Sacrifices* of beasts got footing.

Ovid observes, that the very names *Victimæ* and *Lyfina* import, that they were not slain, till such time, as *Victims* were obtained over enemies: indeed, while men lived on herbs and pulse, it is no wonder they abstained from *Sacrifices* of beasts: since the law of *Sacrifices* required, that they should eat some part thereof. In effect, it is supposed to be this that first introduced *flesh* as a food, and made man a carnivorous animal.

The truth is, in all antiquity, both sacred and profane, *Sacrifices* were ordinarily nothing else but holy banquets.

The scriptures furnish us a somewhat different account; Noah certainly sacrificed animals at his coming out of the ark; and it is even suggested, that Abel himself sacrificed the best and fattest of his flocks: though Grotius thinks it more probable, he contented himself with making a mere oblation of his lambs, &c. to God without *sanctifying* them. Macrobius tells us, that the Egyptians, long accustomed to bloodless *Sacrifices*, being at length obliged to admit the worship of Serapis and Saturn, to whom *Victims* were to be sacrificed; would not allow their temples to be built in the cities.

These *Victims*, however, or bloody *Sacrifices*, at length obtained, in exclusion of almost all the rest: the most usual of these among the Ancients, were bulls, oxen, cows, sheep and lambs, in regard these were the most ordinary food of man.

The manner of sacrificing among the ancient Hebrews, is amply described in the books of Moses. That in use among the Romans, is as follows.—In the choice of the *Victim*, care was taken it were without blemish or imperfection, its tail not too small at the end; the tongue not black, nor the ears cleft; and the bull such as had never been yoked. The *Victim* being pitched upon, they gilt his forehead and horns, especially if a bull, heifer, or cow. The head they also adorned with a woollen insula, whence hung two rows of chaplets with twisted ribbons; and on the middle of the body a kind of stole, pretty large, hung down on both sides: the lesser *Victims* were only adorned with bundles of flowers and garland, together with white tufts or wreaths.

The *Victims* thus made ready, were brought before the altar; the lesser were not led in a string, but driven to the place: the greater were conducted in an halter; if they made any struggle, or refused to go, the resistance was taken for an ill augury, and the *Sacrifice* was often set aside.—The *Victim* thus brought before the altar, was examined very circumspically, to see if there were no defect in it: then the priest, being clad in his sacerdotal habit, and accompanied with the *Sacrificers* and other attendants, and being washed and purified according to the ceremonies prescribed, began the *Sacrifice*, with making a loud confession of his unworthiness, acknowledging himself guilty of divers sins; for which he begged pardon of the gods, hoping they would be pleased to grant his requests.—The confessions were like those of the Hebrews; with this difference, that the Pagans confessed the frailty of mankind, and owned their faults; the Jews confessed chiefly the greatness of God, accompanying it with hymns and musical instruments.

The confession over, the priest cried aloud, *hæc age*, i. e. compose yourselves, and mind your business; and presently an usher, holding a rod in his hand, called *Commentaculum*, went through the temple, and made all those withdraw, who were not initiated in the mysteries of religion, or such as were excommunicated.

The custom of the Greeks, from whom the Romans borrowed theirs, was, that the priest coming to the altar, should ask aloud, *τίς ἐστί;* Who is here? The people answered, *ἡμεῖς οἱ ἅγιοι*. Many good persons: then the other went through the temple, crying, *εὐαὶ ἰαὶ, καὶ βέλτερον*, that is, Out with the wicked. The Romans commonly used the words, *Nocentes, profani, abscidite*.—All those who were driven out of the temples among the Greeks, were comprehended under these general words, *βλάδιον, ἀπειρατον, ἀσεβητον*. The profane being withdrawn, they cried, *Forsate linguas, or animas, and Pœsate linguam*, to require silence, and attention during the *Sacrifice*.

These ceremonies ended, the chief *Sacrificer* being sat down, and the rest of them standing, the magistrates or private persons, who offered *Sacrifice*, came before him, and presented him with the first-fruits and victim, and sometimes made a short discourse, by way of compliment; as we find Homer makes Ulysses do, when he presented the high priest with Iphigenia to be sacrificed.—As any person came to present his offering, he washed his hands in a place appointed in the temple for that purpose.

Lastly, when the ceremony was made, the priest that officiated, perfumed the victim with incense, and sprinkled it with the libral water; and having washed his hands, and got up again to the altar, he prayed to the god to whom he presented the

Sacrifice.

Sacrifice, with a loud voice, that he would accept of those offerings, and be pleased with the victim he sacrificed to him for the publick good, and for such and such things in particular.—In the close of the offertory and prayer, made by the priest to the gods, he came down the steps of the altar, and from the hand of one of his assistants, received the sacred paste, called *insula falsa*, made of barley or wheat flour, mixed with salt and water, which he threw upon the head of the victim, sprinkling a little wine upon it, which was called *immolatio*.—Servius says, the priest scattered little bits of this paste upon the head of the victim, and also on the altar where the sacred fire burned, and on the knives, by way of consecration.

He then took wine in a vessel called *simpulum*, and having tasted it himself first, and made his assistants do the same, to shew that they partook of the *Sacrifice*, he poured it between the horns of the victim, pronouncing these words of the consecration, *Mactus hoc vino inferis esto*. This done, he pulled off the hairs from between the horns, and threw them into the fire; and commanded the victimarius (who asked him, *Agon*, Shall I strike?) to knock down the victim with a blow on the head with an hammer or ax; upon which, another assistant, named *Pepas*, presently thrust a knife into its throat; whilst a third received the blood, wherewith the priest sprinkled the altar.

When the victim was slain, they flead him, if it was not a burnt-offering; (for then they burned skin and all,) they then took the flesh off the head, and adorning it with garlands and flowers, fastened it to the pillars of the temples, as well as the skins, as tokens of religion; carrying them about in procession in publick calamities.—Not but that the priests oft wore the skins, and others went to sleep upon them in the temples of *Æsculapius* and *Faunus*, that they might receive favourable responses in their dreams, or be cured of their maladies. They then opened the victim's entrails, and after circumspectly viewing them, to draw presages therefrom, according to the art of the aruspices, they flowered them with meal, and sprinkled them with wine, and made a present of them to the gods, *reddebant exta diis*, by throwing them into the fire in small bits, boiled or parboiled; and hence the entrails were called *parviæ*.

The entrails being burned, and the other ceremonies finished, they believed the gods to be satisfied; and that they could not fail to find the vows accomplished, which they expressed by the word *litare*, *q. d.* all is finished, and well done; whereas *non litare*, on the contrary, intimated there was something wanting to the perfection of the *Sacrifice*, and that the gods were not appeased.—The priest afterwards dismissed the people with these words, *Allet*.

Hence it may be observed, that the *Sacrifices* consisted of four principal parts; the first called *libatio*, or the pouring a little wine upon the victim; the second *innolatio*, when, after they had scattered the crumbs of salted paste thereon, they killed it; the third *redditi*, when they offered the entrails to the gods; and the fourth *litatio*, when the *Sacrifice* was perfected, and accomplished without any fault.

SACRILEGE, SACRILEGIUM, the crime of profaning sacred things, or things devoted to God; or of alienating to laymen, or common purposes, what was given to religious persons, and pious uses.

Our fore-fathers were so tender in this case, that, when the order of knights templars was dissolved, their lands, &c. were all given to the knights hospitallers of Jerusalem, for this reason, *Ne in pios usus erogata, contra donatorum voluntatem, in alios usus distraberentur*.

SACRISTA, or SACRISTAN, a church officer, otherwise called *Sexton*. See *SEXTON*.

SACRISTY, SACRISTIA, a place or apartment in a church, where the vessels and other utensils, and ornaments of the church, are preserved; and where the ministers dress and undress themselves before and after the service.

The *Sacristy* is also called in ancient authors, *Secretarium*.—Among us the *Feetry*.

SACROLUMBARIS, or SACROLUMBUS, in anatomy, a muscle, that arises fleshy from the superior part of the os sacrum, the posterior part of the ilium, and from all the spines and transverse processes of the vertebrae of the loins.—It gives a small tendon to the posterior part of each rib near its root, where a small bundle of fleshy fibres arises and unites with each ascending tendon, to the third, fourth, fifth, and sixth vertebrae of the neck.—See *Tab. Anat. (Mus.) fig. 6. n. 30. 30. fig. 7. n. 16. 16.*

This with the *ferratus potticus inferior*, and *triangularis*, help to contract the ribs in expiration. But they are but of small force; and seem only to accelerate the motion of the ribs, which fall down chiefly by their own gravity, and the elasticity of the ligaments, by which they are tied to the vertebrae.

SACRUMOS, in anatomy, the lower extremity of the spina dorsa; being that part whereon we sit.—See *Tab. Anat. (Osteol.) fig. 3. n. 15. fig. 7. n. 20.*

It is doubted whence this name should arise; some think it is because the Ancients offered it in sacrifice to the gods;

others, because it is very large; and others, because it incloses the natural parts.

Its figure is triangular: it is hollow within-side, and by that means contributes to the forming of the cavity at the bottom of the hypogastrum, called the *pelvis*. Its fore-part is smooth, by which means, the parts it contains, are secured from being wounded; and its hind-part is rough, that the muscles may fasten the better to it.

It has three different articulations: the first is with the last of the vertebrae of the loins, and is like that of the other vertebrae: the second with the os coccygis, by *synchondrosis*: the third, is with the bones of the hips.

The os sacrum is usually divided into five parts, which are ranked among the number of vertebrae: the highest is the greatest; the rest growing less as they go lower. These vertebrae are easily separated in children, by reason the cartilages which join them, are not yet ossified. But in adults, they are so firm, that they only make one bone.

It is in the os sacrum, that the cavity which contains the spinal marrow, terminates.

SADDLE, in the manage, a kind of stuffed seat, laid on the back of a horse, for the convenience of the rider.

The origin of the *Saddle* is not well known: *Gorop. Becanus* attributes its invention to the *Sali*, a people among the ancient Franks; and hence, says he, came the Latin *Sella* saddle.

It is certain, the ancient Romans were unacquainted with the use either of *Saddles* or stirrups; whence *Cæsen* observes in several places, that the Roman cavalry, in his time, were subject to several diseases of the hips and legs, for want of having their feet sustained on horse-back. And long before him, *Hippocrates* had noted, that the Scythians, who were much on horse-back, were frequently troubled with dislocations in their legs, because of their hanging down.

The first time we hear of *Saddles* among the Romans, was *Anno* 340; when *Constantius*, endeavouring to deprive his brother *Constantine* of the empire, made head against his army, and entering the squadron where he himself was, threw him off his *Saddle*, as we are informed by the historian *Zonaras*.—Before this time, they made use of square pannels; such as we see in the statue of *Antoninus* in the capitol.

The use of *Saddles* was first established in England, by a law of *Henry VII.* whereby the nobility were obliged to ride on *Saddles*.—It is but very lately that the Irish have taken to it.

There are various kinds of *Saddles*; as the *Running SADDLE*, a very small one, with round skirts.

Burford SADDLE, which has the seat and skirts plain.

Pad SADDLE, of which there are two kinds; the one made with burs before the seat, the other with bolsters under the thighs.

French Pad SADDLE, the burs whereof came all round the seat.

Pottartua SADDLE furnished with a cantle behind the seat, to keep a carriage off the rider's back.

War SADDLE, furnished with a cantle, and a bolster both behind and before.

SADDLE-CALLED, is when a horse's back is hurt, or fretted with the *Saddle*.

It is to be cured by bathing the part with urine, or warm wine: when the sore is large, they bathe it with aqua secunda, strewing over it the powder of old ropes or flax, and consuming the proud flesh with vitriol or colcothar.

SADDUCES, or SADDUCEES, SADUCÆI, a sect among the ancient Jews, esteemed as deists, or free-thinkers, rather than real Jews; though they assisted at all the ceremonies of the worship in the temple.

St. Epiphanius will have the *Sadduces* to have taken their rise from *Dositheus*, a Samaritan sectary; and *Tertullian* is of the same opinion. St. Jerom, and other writers add, that the *Sadduces* came near the Samaritans in many things; particularly in this, that they allowed no books of scripture, but the five books of Moses. The Jesuit *Serrarius* has also embraced this opinion, as seeming to be supported by the authority of *Josephus*. But *Josephus* says only this, that they admitted all that was written, *i. e.* all the books of scripture; intimating hereby, that they disowned the unwritten traditions of the Pharisees.—In effect, St. Epiphanius forced to own, that the *Sadduces* were Jews, and not Samaritans; inasmuch, as they assisted at the worship and sacrifices of the temple at Jerusalem: whereas the Samaritans sacrificed on Mount Gerizim.

Some authors ascribe the origin of this sect to one *Sadoc*, a disciple of *Antigonus Sochus*, who frequently inculcated it on his scholars, that God is to be served for his own sake, and not out of view to any reward from him in the next world, as slaves serve their masters merely for recompence.—*Sadoc*, add they, putting a false interpretation on these words of his master, published, that there was no reward allotted to good actions done in this world. And hence arose the sect of *Sadduces*; thus denominated from their leader *Sadoc*.—Though St. Epiphanius, and some modern writers after

after him, take the *Sadduces* to have been thus called from the Hebrews, *Sams*, just, or *Sale*, just, in regard of the great justice and equity which they shewed in all their actions.

It is observed, Acts xxiii. 8. that the *Sadduces* say, there is no resurrection, neither any angel or spirit; but that the Pharisees believe both the one and the other. These words, *The one and the other*, seem to insinuate, that angel and spirit are one and the same thing. But (as Oecumenius observes on that passage) as the apostles do not always use the exactest terms, one may understand by spirit, all spiritual substances; as if the *Sadduces* had believed that God himself was corporeal.—This, however, is not Oecumenius's opinion: he asks, why the scripture says, *The one and the other*, though it spoke of three things, resurrection, angel, and spirit? and he answers, that it is either because angel and spirit are the same thing; or that one and the other, which is only properly understood of two things, is, perhaps, here spoke of three: exact propriety of words not being to be required in books wrote by illiterate fishermen. It is true, in explaining what goes before, he observes, that the *Sadduces*, being very ignorant, might possibly disbelieve the existence of a God; and on that account, might be represented as denying a resurrection, &c. But he does not say, that by spirit, they might mean all spiritual substance. It is probable, all meant by it, is the immortality of the soul; it being the opinion of the *Sadduces*, that there was nothing immortal in man.

It is certain, they denied all resurrection; and allowed of no happiness but what is enjoyed in this life; believing, that every thing told of the other world, had been artfully invented by the Pharisees.—Hence, also, they derived a divine providence, and attributed all things to free-will; in which, they opposed the opinion of the Pharisees, who admitted a kind of destiny, or fatality, in all our actions. See PHARISEES.

SAFE-CONDUCT, *SALVUS CONDUCTUS*, a security given by the prince under his great seal, to a stranger, for his quiet coming in and passing out of the realm. The *Safe Conduits* is granted to enemies, the passport to friends.

Judges sometimes give *Safe-Conduits* to delinquents, or prisoners, to enable them to act in their affairs.

SAFE-GUARD, *SALVA GUARDIA*, in a law sense, a protection given by the king to a person fearing the violence of some other, for seeking his right by course of law.

SAFE-GUARD, at sea, denotes a rope which saves, and secures any thing; for instance, that whereby persons walk securely over the bolt-spirit.

SAFE-GUARD of the Helm, is a rope which goes through the helm, and is fastened to the futtocks of the ship. See HELM.

SAFE-PLEDGE, *SALVUS PLEGUS*, in law, a security given for a man's appearance on a day assigned. See PLEDGE.

SAFFRON*, *CROCUS*, a plant which produces a flower of the same name; whence, also, a drug called *Saffron*, or *Crocus* is collected.

* The word is formed from the Arabic, *Zopheran*, which signifies the same. Botanists call the plant *Crocus autumnalis sativus*. The root which produces the *Saffron* plant, is a kind of bulb, covered with several hollow skins: its grassy leaves are long, narrow, thick and soft to the touch: its flower, which appears sometimes before the leaves, and sometimes after them, is of a pale purple, streaked with whitish lines: but towards the bottom of the petals the purple is deeper. From the middle of the flower there arise three long flame-coloured stamina or chives, crowned with their spics. Under these is the ovary or vulvum feminale, by some called the Pistil of the plant: it is divided into three capsules, wherein the seeds are formed. From the upper part of the ovarium arises the stylus, a long slender tube inclosed within the stilar part of the flower, where it is of a whitish colour, but changes into a yellow before its division, which is into three parts, opposite to the tops of the stamina: 'tis these three parts only that make the true *Saffron* of the shops, for the sake of which alone the plant is cultivated. They are of a yellow colour just at the beginning from the stylus, but afterwards are all of a deep red colour, only their jagged extremities are tipped with white inclining to yellow. See a figure and description of the plant by Dr. Douglas in Phil. Trans. N^o 380. p. 441.

As soon as the flower is gathered, they separate the stylets and lay them on hurdles, or in large sieves, or on a little kiln for that purpose, with a little coal-fire underneath to dry them. When dry, the *Saffron* is in its perfection, and fit for use. It is observed, that five pounds of fresh styles, which some mistakenly call the *chives*, only make one pound of dry *Saffron*.

The good qualities of *Saffron* are, that its styles be long and broad, that they be velvety over, of a fine red, of an agreeable smell, free of yellow threads, and very dry. The best *Saffron* in Europe is that of England: It is cultivated chiefly about Walden in Essex; that brought from Spain is good for nothing; because it the old Spaniards mix with it to make it keep.

Saffron is used both in food and medicine, to cheer, fortify, Vol. II. N. CXXXVI.

and resolve. It is the greatest cordial in medicine, and a sure promoter of a diaphoresis.—It is also used by illuminers, to make a golden yellow colour.

SAFFRON is also a name given to several chymical preparations, from the resemblance of their colour to that of the vegetable *Saffron*, but more usually called *Croci*. Such are **SAFFRON of Venus**. See COPPER and VENUS.

SAFFRON of Mars. See CROCUS MARTIS.

SAFFRON of Gold. See AURUM Fulminans.

SAGAPENUM, *Sagapenum*, a medicinal gum, whose smell comes very near that of the pine; whence its name.

It flows by incision, from the trunk of a ferulaceous plant growing in Persia: the best is in bright transparent tears, of a strong, pungent, porraceous smell; and the whiter and freer of dirt, the better. Sometimes it is found as white, both within and without side, as milk; though this is very rare. It is esteemed aperitive and purgative, and is good in the epilepsy, asthma and palsy; and is also used externally to assuage pains, and resolve tumours.

SAGATHEE*, in commerce, a slight woollen stuff; being a kind of serge, or ratteen; sometimes mixed with a little silk.—It is manufactured chiefly at Amiens; though we have our share of it in England.

* The word is formed from the French, *Sayette*, a diminutive of *Say*, *Sey*. See SAY.—The French name *Sayette* again is derived from that of the thread used herein, which is chiefly prepared and spun in Flanders, about Turcoing, &c. and called *Fil de Sayette*.

SAGE, *SALVIA*, a medicinal herb of an agreeable, aromatic taste; esteemed an excellent cephalic of the detergent kind; and on that score likewise used as a vulnerary and diaphoretick. There are several kinds of *Sage*; those used and cultivated by us are the *Tea Sage*, or *Sage of Virtue*, the *Red Sage*, and the *Wormwood Sage*.

The first, *salvia verticillata*, or *salvia hortensis minor*, has the most agreeable flavour; and on that score is cut when young and full of juice, to be dried, and kept for tea.—The Dutch dry and prepare this *Sage* like other teas, and carry it to the Indies as a very precious thing. They there find a good market for it; the Chinese preferring it to the best of their Indian teas; and for every pound of *Sage* giving in exchange four pounds of their tea, which they sell again very dear in Europe.

The common *Sage*, *salvia hortensis major*, is esteemed of the most efficacy in medicine, and is that alone used in the shops.—It makes an excellent gargarism, especially if sharpened with a little acid. Its decoction is very grateful and cooling, with the addition of a little lemon-juice. It is both detergent and absorbent, and as such, finds place in diet drinks, and medicated ales, intended for sweeteners and cleansers of the blood.

The school of Salernum recommend *Sage* as a remedy in all diseases: hence the verse,

Cur moriatur homo, cui salvia crescit in horto?

“Why should a man die, while he has *Sage* in his garden?” *Sage*, when viewed with a microscope, often appears covered all over with little spiders, which are seen to walk, &c. about.—It yields, by distillation, a very agreeable, aromatic oil, of some use in the Shops.

SAGITTA, in astronomy, the arrow or dart, a constellation of the northern hemisphere near the eagle. See CONSTELLATION. The stars in the constellation *Sagitta*, in Tycho's catalogue are five, and as many in Ptolemy's. In Mr. Flamsteed's catalogue they are twenty three; the longitudes, latitudes, &c. whereof are as follow.

Names and situation of the stars.	Sign.	Longitude	Lat. North.	Magn.
		° ' "	° ' "	
	♊	20 00 08	43 07 45	6
		20 20 24	43 15 10	6
		21 45 45	33 31 25	6
Informes over <i>Sagitta</i> , and preceding it.		21 53 27	38 31 18	6
5		22 47 43	41 16 27	6
		23 07 32	41 32 45	6
		24 07 59	41 34 28	6 5
		25 35 50	40 49 26	6
Preced. glyphis or nib tow. S.		25 39 42	37 27 09	5
Preced. of three in the shaft		26 45 16	38 49 52	4
10				
In the extremity of the nib		26 53 23	38 15 17	4
In the middle of the shaft		29 04 40	38 56 52	4 5
Last of three in the shaft		29 43 47	39 27 05	6
	♊	0 35 41	38 48 23	6
		1 02 13	36 36 54	6
15				
In the point of the arrow		1 34 53	36 39 43	6
In the triangle under north		2 42 58	39 13 39	4
In the point		2 28 06	37 14 03	6
Middle and posterior		3 00 24	35 35 06	6
20		3 33 10	36 35 02	6
Preced. of 3 following the point				
Middle		4 46 28	39 18 22	6
		6 29 53	39 52 58	6
Last		8 37 48	40 07 17	6

SAGITTA, in botany, signifies the top of any small twig, cyon, or graft of a tree.

SAGITTA, in geometry, is a term which some writers use for the abscissa of a curve.

SAGITTA, in trigonometry, &c. is the same as the versed sine of any arch; and is so called by some writers, because it is like a dart, or arrow, standing on the chord of the arch.

SAGITTAL, **SAGITTALIS**, **SUTURA**, in anatomy, the second of the genuine *Sutures* of the Cranium.—See *Tab. Ant. (Myol.) fig. 1. lit. f. fig. 2. lit. i.*

It reaches the whole length of the head; and has its name from the Latin, *Sagitta*, as being straight, like an arrow.—Whence it is also called *Retia*, and sometimes also *Rhabdoides*.

SAGITTARIUS, in astronomy, the *archer*, one of the signs of the zodiac; the ninth in order.

The stars in the constellation *Sagittarius*, in Ptolemy's catalogue are thirty one; in Tycho's sixteen; in the Britannic catalogue fifty. The longitudes, latitudes, magnitudes, &c. whereof are as follow:

Names and situations of the stars.	Long. ° ' "	Latitude. ° ' "	Magn.
Inform. preced. the bow	22 55 01	4 22 42 S	6
Nebulous stars	25 38 16	0 19 45 S	6
	25 43 17	0 47 41 S	7
	26 19 47	0 47 50 S	6
That in point of the arrow	26 55 47	6 55 51 S	3
More north in top of the bow	28 54 10	2 22 54 N	4
Subseq.	29 15 05	2 42 28 N	6
In handle of bow against hand	0 14 10	6 25 21 S	3
In the fourth part of the bow	0 45 33	10 59 54 S	2 3
	1 04 54	7 24 47 S	7
10			
South. in north part of bow	1 37 40	2 48 39 N	6
Preced. the clara humeri	1 59 55	2 04 01 S	4
	5 50 42	3 54 35 S	4
	7 19 56	2 39 12 N	6
	7 26 23	0 48 34 N	7
15			
1st of contig. stars in the eye	7 45 55	1 01 30 N	7
	8 09 07	0 09 12 N	5
	8 15 09	1 32 03 N	6
Bright st. in preced. should.	8 03 12	3 23 32 S	3
Subseq. of contig. in the eye	8 22 14	0 12 33 N	5
20			
Preced. of three in the head	9 05 09	2 09 25 N	6
That under the arm pit	9 08 52	1 42 12 N	4
Middle one in the head	9 17 22	7 07 55 S	3
That under preced. should. bone	10 40 42	0 54 38 N	4
	10 30 10	5 01 12 S	4
25			
Last of three in the head	11 56 44	1 28 59 N	3 4
Between the shoulders	12 43 06	2 52 57 S	5
In north part of the south	14 02 22	3 17 59 N	6
Ephaptis of three middle	15 08 20	4 15 43 N	5
Contiguous to that	15 06 17	3 48 43 N	6
30			
North of 3 in the Ephaptis	15 21 49	6 08 42 N	6
In the hind shoulder	15 00 19	2 26 17 S	5
Contiguous to that	15 02 43	2 21 05 S	5
A third more north	15 07 46	1 54 36 S	6
	15 39 04	0 12 20 N	6
35			
In the cubitus of sc. arm	17 24 12	3 01 53 S	6
	17 31 15	3 13 01 S	5
	18 28 04	1 54 04 S	6
Those following the n. part of Ephapt. of 2	19 53 56	5 05 54 N	6
Subseq.	20 20 29	5 11 26 N	6 5
40			
Preced in south Ephaptis	20 37 36	1 27 02 N	6
	22 06 02	1 54 03 N	6
Preced. in the root of tail	21 29 46	5 22 55 S	5
Of four middle ones in south	21 35 15	6 16 34 S	5
the root of the tail north	22 13 16	5 24 44 S	5
45			
2d. and north in south Ephaptis	24 07 49	5 08 03 N	6
2d. in the root of the tail	22 43 30	7 03 48 S	5
	25 27 19	6 54 32 N	6
	26 38 01	8 44 40 N	6
50			
	26 29 27	7 31 45 N	6

SAGO, a medicinal substance brought from the East-Indies; of considerable use in diet, as a nourisher, and restorative.

Sago is a sort of bread procured from a tree called *Landan*, growing in the Molucco's.

When the tree is felled they cleave it into two in the middle, and take out the pith, which is even eatable when it comes fresh out of the tree. They pound this very small in a mortar, till it is reduced into a kind of powder somewhat like meal. This done, they put it in a scarce made of the bark of the same tree, and place the scarce over a cistern, pouring water upon it, and by this means separating the pure part of the powder from the veins of wood wherewith the pith abounds.

The flour thus filtrated, they call *Sagu*: they make it into ruffs, and bake it in earthen furnaces; and thus they do

with so much expedition, that in three or four hours a man makes as much bread as will feed an hundred persons a day. From the same tree they also draw a liquor, as agreeable to drink as the European wines.

The leaves also, when they are young, are covered with a kind of cotton, whereof they make their cloth; and as they grow older they serve them to tile their houses. The larger veins of these leaves serve them for stakes in building; and of the smaller they make a kind of hemp, wherewith they make very good ropes.

SAGUM, in antiquity, a military garment wore by the Greeks, Romans and Gauls, in manner of a cloak or cafsack; covering the shoulders and back, as low as the hips; where it was fastened to the cuiras.

It was usually made of coarse wool, and square.—They had one for the winter, and another lighter for summer.

SAICK, or **SAIQUE**, a Turkish vessel, very proper for the carriage of merchandizes.

It has square sails on the middle-mast; without either mizzen, top-gallant, or throuds: only a main-mast, with a main top-mast, both very high; with a bolt-sprit, and a little mizzen-mast.

The height of the main-mast makes the *Saicks* visible at a great distance: their make renders it impossible for them to go with a side-wind; but when they have the wind behind them, nothing can out-go them.—The generality of them carry no guns.

SAIGNER, in fortification, a French term, signifying to empty or drain.

Hence *saigner la fosse*, is to empty or drain the water out of the moat, by conveyances under ground; that it may be passed over the more easily; by laying hurdles or rushes on the mud remaining.

SAIL, in navigation, an assemblage of several breadths of canvas, or strong hempen cloth, sewed together by the lifts, and edged round with a cord; fastened to the yards and stays of a vessel, to make it drive before the wind which bears thereupon.

There are two kinds of *Sails*; the one square, generally used in high-bottomed vessels.—This sort has various names, according to the various masts it is fastened to; as the *Main-sail*, *Fore-sail*, the *Mizzen-sail*, the *Sprit-sail*, &c.

The others are triangular, and are called *Snack-sails*, and by some *Latin-sails*, because chiefly used in Italy, and in flat-bottomed vessels; though they are also used on the mizzen-masts and stays of other vessels.—They need but few ropes, and little wind; but they are dangerous, and not to be used in foul weather.

There are ordinarily ten *Sails* in large vessels; which number is increased at bottom by the addition of bonnets, and at sides by *Cape-sails*.—See *Tab. Ship. fig. 1. n. 2. 17. 20.*

44. 65. 67. 86. 107. 109. 126. 138.
A vessel is said to *set sail*, to go with full *sail*, to make all her *sail*, that is, to open all her *Sails*. To be under *sail*, is to be ready to *set sail*, &c.

SAILS, also denote the vanes of windmills; or the arms or flights, whereby the wind has its effect on them.

These are either horizontal or perpendicular. See **WIND-MILL**.

SAILS, in falconry, denote the wings of an hawk.

SAILING, in a general sense, is used for the art, or act of navigating; or of determining all the cases of a ship's motion, by means of sea-charts.

Of this there are three kinds, *plain*, *Mercator's*, and *circular*.

Plain SAILING, is that performed by means of rhumbs drawn on a plain chart. See **Plain Chart**, and **RHUMB**.

Mercator's SAILING, is that performed by rhumbs drawn on a *Mercator's* chart. See **MERCATOR'S Chart**.

Circular SAILING, is that performed by the arch of a great circle; which, of all others, where practicable, is the shortest. See **CIRCULAR Chart**.

Doctrine of plain and Mercator's SAILING.—I. The longitude and latitude of two places given; to find the departure, or miles of longitude.

In *plain Sailing*. 1°. If both places be more easterly than the first meridian, subtract the less longitude from the greater, the remainder is the difference of meridians. If one of the places be more easterly, and the other more westerly than the first meridian, add the longitude of the more easterly to the complement of the longitude of the more westerly to a whole circle; the sum is the difference of meridians. 2°. Divide the difference of meridians into so many parts as there are degrees in the difference of latitude: or, if the difference of latitude be greater than that of the meridians, into so many fewer. 3°. Reduce the minutes of longitude answering to one part, into miles of the several parallels, in the former case; or into miles of the parallel, which is an arithmetically mean proportional between the two, in the latter case. 4°. The aggregates of these parts collected into one sum, exhibit the departure, or miles of longitude.

E. gr. Suppose the longitude of the one place 35°, and that of the other 47°. the difference of meridians is 12°. Suppose

pose the latitude of the first 4° , and that of the latter 8° , the difference will be 4° , consequently we have failed from the 4th to the 8th parallel. Therefore divide 12 by 4, and reduce the quotient 3° into miles in the several parallels 4, 5, 6, and 7. (see DEGREE) the several quotients will be 43° . 71° . 43° . 68° . 43° . 65° . 43° . 59° . the sum of which is 174, the departure or miles of longitude required.

In Mercator's Sailing. The reduction is much more commodiously performed in Mercator's charts; wherein the arch intercepted between the two meridians, is applied to an arch of the meridian intercepted between the two parallels; and the distance it there measures, gives the departure, or miles of longitude required.

II. The longitude and latitude of two places, to and from which, a ship is to sail, being given; to find the rhumb to be sailed on, and the distance to be run.

In plain Sailing. 1. Find the departure by the last case. 2. From the departure, and difference of latitudes, find the loxodromic angle or rhumb-line; which is done by this proportion: as the difference of latitude is to the departure, so is the whole sine to the tangent of the angle of the rhumb-line. The distance then, to be run on this rhumb, is to the departure, as the whole sine to the sine of the angle of the rhumb.

In Mercator's Sailing. 1. Apply the center of the mariners compass on the place sailed from, on the Mercator's chart, as *a*, (Tab. Navigation, fig. 7.) and so as that the north and south line thereof be parallel to some of the meridians. 2. Mark the rhumb of the compass, wherein the place sailed to, as *b*, is placed. For this is the rhumb to be sailed on. 3. The same rhumb is likewise found by drawing a right line from *a* to *b*, and with a protractor, finding the angle the rhumb makes with any meridian which it cuts. 4. The quantity or distance *a b* is found by applying the part *a* to 1 K, 1 2 to *k l*, 2 *b* to 1 m.

Note, the rhumb and distance may also be found after the same manner on a plain chart.

The same may likewise be found by loxodromic tables; thus, 1. Choose a rhumb at pleasure, and under the same, in the tables, find the longitudes corresponding to the given latitudes. The difference whereof, if it coincide with the difference of the given longitudes, the rhumb is well chosen; otherwise another must be pitched on, either more or less oblique, till the tabular difference agree with the given difference. 2. The rhumb thus found, the distances answering to the given latitudes, must be taken from the tables, and the less being subtracted from the greater; the remainder is the distance sought.

III. The rhumb and distance sailed being given; to find the longitude and latitude of the place arrived at.

In plain Sailing. 1. From the data, find the difference of latitude of the two places: (by the proportion delivered under the article RHUMB-line.) This difference added to the latitude of the place sailed from, or subtracted from the same, the sum, or the remainder, leaves the latitude of the place sailed to. 2. From the same, find the departure; and thence the latitudes of the place sailed to (as directed under RHUMB-line.)

In Mercator's Sailing. 1. Place the mariner's compass on the chart, with the center over the place *a*; and the meridian, and north or south line, parallel to the meridian thereof. 2. From the point *a*, draw a right line, as *a b*, for the ship's course. Take the distance by parts, in parts of the meridian I K, K l, &c. and set it off upon the right line *a b*; *e. gr.* from *a* to *c*; then will *c* be the place the ship is arrived at; the longitude and latitude whereof are given by the chart. See CHART.

By the loxodromic tables. 1. Under the given rhumb, seek the distance answering to the latitude of the place sailed from; and either add it to, or subtract it from the given distance; as the latitude of the place sailed to is greater, or less, than that sailed from. 2. Under the same rhumb, ascend or descend further, till you meet with the distance corrected. 3. The latitude answering thereto in the first column, is the latitude of the place sailed to. 4. From the second column of the table take the longitudes corresponding to the latitudes of the places sailed to and from. Their difference is the difference of longitude of the places sailed to and from.

IV. The latitudes of the places sailed to and from, together with the rhumb sailed in, being given; to find the distance and difference of latitudes.

In plain Sailing. From the difference of latitude and the rhumb given, find the distance; and from the same data, the departure. This converted into degrees of a great circle, exhibits the difference of longitudes sought.

In Mercator's Sailing. 1. Place the compass on the chart, as in the preceding case. From the place sailed from, *a*, draw the rhumb-line *a b*, failed in; till it cut the parallel of the given latitude. 2. The point of intersection will be the

place arrived in. 3. Hence its longitude is easily found; and the distances.

By the tables. Take both the longitudes and the distances answering to the latitudes of the given places, out of the tables; then subtract both the longitudes and the distances from each other. The first remainder is the difference of longitude, the latter is the difference of the places.

V. The latitudes of the places sailed from, and to, with the distance given; to find the rhumb and the difference of longitude.

In plain Sailing. From the difference of latitude, and the distance, find the rhumb, and from the same data find the departure; which may be also determined from the rhumb now found, and the difference of latitude, or from the rhumb and the distance run. Lastly, from the departure find the difference of longitude.

In Mercator's Sailing. On the map draw the parallel the ship arrives at, C D. Reduce the distance run into parts proportional to the degrees of the map. The distance reduced, being *a* 2; from *a* describe an arch touching the parallel C D in 2: then will 2 be the place in the map; whose longitude accordingly is easily found.

By the tables. Subtract the given latitudes from each other; and in the tables seek the rhumb; under which, the distance run answers to the given difference of latitude. Subtract the longitude under the rhumb, answering to the latitude of the place sailed to; and that under the same rhumb against the latitude of the term sailed to, from each other; the remainder is the difference of longitude sought.

VI. The difference of longitudes of the places sailed to, and from, with the latitude of one of the places, and the distance run, being given; to find the rhumb, and the latitude of the other.

In plain Sailing. Convert the difference of longitudes into miles of longitude for the departure; from the given departure and distance run, seek the rhumb; and from the same, and the rhumb, seek the difference of latitude; which, and the latitude of one place being had, the latitude of the other readily follows.

In Mercator's Sailing. Through the given place *a* in the map, draw a right line E F parallel to the meridian I H; and make F L equal to the difference of longitudes. From F draw L M parallel to E F, which will be the meridian the ship is arrived at. Then from *a*, with the interval of the distance run, *a c*, describe an arch intersecting the meridian M L; the place sought will be in *c*. If then a compass be placed on the map, as before directed, the rhumb-line will fall in with *a c*; and consequently the rhumb will be known. Lastly, if through *c* be drawn N O, parallel to A B; N A will be the latitude of the place required.

By the tables. Take a rhumb at pleasure, and under the same in the tables, find the longitude, and the distance answering to the given latitude. Add the given distance to the distance found in the tables, if the vessel failed from the equator; or subtract it therefrom, if it failed towards the same. With the same sum, or the difference, enter the tables; and the longitude found against it, subtract or add from that just found. If the remainder be found the given difference of longitudes, the rhumb is then well taken. Otherwise, it must be changed for a more or less oblique one, till the same operation being repeated, the remainder be found the difference of longitudes; then the latitude in the first column, corresponding to the distance, will be the latitude of the other place.

VII. The difference of longitude, and the latitude of one of the places, being given, together with the rhumb; to find the distance run, and the latitude of the other place.

In plain Sailing. Reduce the difference of longitude into miles of longitude, or departure, as under the first case. From the departure and the rhumb, find the distance run. And from these, or from the rhumb, and the distance run, find the difference of latitude. This done, as the latitude of the one is already had, that of the other is so too.

In Mercator's Sailing. Place the compass on the chart as before; and by the given rhumb, draw the rhumb-line, *a b*. Draw a meridian E F through the given place *a*; and with the interval of the difference of longitude F L, draw another, L M, for that the vessel is arrived at. Where this intersects the rhumb-line, is the place *c* that the vessel is arrived at. Wherefore, if through *c* be drawn N O parallel to A B; N A will be the latitude of the place. The distance run *a c* is easily reduced into miles by the scale.

By the tables. Under the given rhumb, seek the distance run, and the difference of longitude answering to the given latitude. If the vessel have failed towards the pole, the difference of longitude is to be added to the given difference of longitude; if towards the equator, it is to be subtracted from the same. In the former case, descend in the table, and in the latter, ascend; till in the first, the aggregate, in the latter, the difference be seen in the column of longitude. The latitude answering hereto in the first col-

lunary, is that sought. And from the distance answering to this latitude in the first case, the tabular distance is to be subtracted; or in the latter case, that distance is to be subtracted from the tabular distance. What remains, is the distance run.

From the solution of these cases in *Sailing*, it is evident, some are more easily performed by the charts than the tables; and that the Mercator's charts are greatly preferable to the plain ones; since in the latter, the distance is not reduced by the map, but by a particular scale for that purpose.

Doctrine of circular SAILING.—I. *The latitude and longitude of the place sailed to, and from, being given; to find the angle M (fig. 8.) which a ship's way M O proceeding in a circular course, includes with the meridian P M of the place sailed from.*

Since in the triangle P M N, we have P M and P N, the complements of the given latitudes H M, and I N, together with the angle M P N, measured by the arch H T, the difference of the given longitudes H and T; the angle P M N is found by spherical trigonometry. See TRIANGLE.

II. *The latitude H M, and the longitude H S, of the place sailed from, M, with the distance run, and the latitude of the place L S the ship in a circular voyage arrives at, being given; to find the longitude of the place L, and the angle P L M comprehended between the ship's way M L, and the meridian P S.*

In the triangle P M L, we have given P M the complement of the latitude H M, and P L the complement of the latitude L S. Wherefore, if the ship's way M L be turned into degrees of the equator; we shall find the angle M P L, which is equivalent to the difference of longitudes H S; and likewise the angle P L M by spherical trigonometry.

After the like manner may other problems be solved; but as it is easier and better *Sailing* by rhumbs, than by circles, and as this latter way is but very little in use; we chuse to pass them over.

SAILING, in a more confined sense, is the art of conducting a vessel from place to place, by the working or handling of her sails and rudder: though what is done by means of this latter, is more properly called *Steering*.

To bring *Sailing* to certain rules, M. Renau computes the force of the water, against the ship's rudders, stern, and side; and that of the wind against her sails.—In order to this, he 1^o considers all fluid bodies, as the air, water, &c. as composed of little particles, which, when they act upon, or move against any surface, do all move parallel to one another, or strike against the surface after the same manner.

2^o That the motion of any body, with regard to a surface on which it is to strike, must be either perpendicular, parallel, or oblique. In the first case, the body strikes with all its force, which will be greater or less, according as the body moves swifter or slower. In the second case, the line of motion *a b*, (*Tab. Navigation*, fig. 3.) will not affect the surface at all, because it is no way opposed to it; nor can the moving body strike upon it, or touch it. In the third, if the line of motion, A D, be oblique to the surface D C, so that the angle of incidence be A D C, then the motion of the body in the line A D may be resolved into two directions, *viz.* into A E, or B D, and into A B. But the direction or line of motion A E being parallel to the surface D C, cannot affect it at all; so that the whole motion of the body A in that oblique manner of striking on the surface, will be expounded by the perpendicular line, A B. And if D A be made the radius of a circle, whose center is at D, B A will be the sine of the angle of incidence, A D C.

Hence it is deduced, that the force of a particle of air or water, as A, striking against the surface D C, which may represent, either a sail or the rudder of a ship, in the oblique direction A D, will be to the perpendicular force thereof, as B A is to D A: that is, as the sine of the angle of incidence is to the radius.

And since what is thus true of one particle, singly considered, will be true of all the particles of any fluid body collectively; it will follow, that the force of the air or water striking perpendicularly upon a sail or rudder, to the force of the same, in any oblique impingency, will be, as the square of the radius, to the square of the sine of the angle of incidence: and consequently, that all oblique forces of the wind against the sails, or of the water against the rudder, will be to one another, as the squares of the sines of the angles of incidence.

If the different degrees of velocities be considered, it will be manifest, that the forces will then be as the squares of the velocities of the moving air or water; that is, a wind that blows thrice as strong, or moves thrice as swift as another, will have nine times the force upon the sail.—And it being also indifferent, whether you consider the motion of a solid in a fluid whose particles are at rest; or of those particles moving all parallel against a solid that is at rest, the reciprocal impressions being always the same: if a solid be moved with different velocities in the same fluid matter (as suppose

water, the different resistances which it will receive from that water, will be in the same proportion, as the squares of the velocities of that body.

Let H M (fig. 4.) represent a ship, C D the position of the sail, and A B the course of the wind blowing towards B. Draw B G perpendicular to the sail, and G K perpendicular to the line of the keel produced H M K. By what is said above, the sail C D, will be driven by the wind A B, according to the direction of the line B G. So that if she could divide the water every way with the same facility, as she doth with her head, the ship would go directly to the point G, along the line B G. And if H K represent her direct course, she would have got forward the length B K, and sideways she would have gone the quantity G K. But as her length is much greater than her breadth, so she will divide the water, or make her way in it with more difficulty with her side, than with her head or stern; on which account, she will not run sideways so far as K G, but will fall short of it in proportion to the said difficulty of dividing the water with her side, that is, if the resistance she finds in her passing through the water sideways, be to that of passing lengthways, suppose, as ten to one, then will not the ship get sideways above a tenth part of the line G K.

Wherefore, if K G be found to G L, in the ratio of the resistance of the side to that of the stern, and the line B L be drawn; the ship will go to the point L, along the line, B L, in the same time as it would have gone to G, if it could have divided the water every way equally.—This part, K L, is called the *drift*, or *lee-way* of a ship, and the angle K B L is her degrees of lee-way; as the angle A B K, expresses how near the wind lies.

After this, the Author proceeds to demonstrate, that the best position or situation of a ship; so as she may make the best lee-way, but go wind-ward as much as possible, is this: that, let the sail have what situation it will, the ship be always in a line bisecting the complement of the wind's angle of incidence upon the sail; that is, supposing the sail in the position B C (fig. 5.) the wind blowing from A to B, and consequently, the angle of the wind's incidence on the sail A B C, and its complement C B E; then must the ship be put into the position E K, or move in the line B K, bisecting the angle C B E.

He shews farther, that the angle which the sail ought to make with the wind, *i. e.* the angle A B C, ought to be but 24 degrees; that being the most advantageous situation to go to wind-ward, the most that is possible. And in order to bring this to bear in practice, he directs to put marks to the sheets, braces, and bow-lines of the lower sails, to know when they are in their best situation; and then, even in the night, when the marks of a brace or of a sheet shall come to the cleat, one may be pretty well assured, that the sail trims well.

To this might be added, many curious things from Borelli *de Vi Percussis* concerning the different direction given to a vessel from the rudder, when sailing with a wind, or floating without sails in a current; in the former case, the head of the ship always coming to the rudder, and in the latter always flying off from it.

SAILORS, the elder seamen, who are employed in working or managing the sails, the tackle, steering, &c.

SAIN'TS, *SANCTI*, in the Romish church, holy persons deceased, and since their decease, canonized by the pope; after several informations and ceremonies.

One of the points wherein the Roman catholics and Protestants differ, is, that the former address, invoke, and supplicate saints, &c. to intercede for them; whereas the latter hold it sufficient to propose their good examples for our imitation.

The number of *Saints*, allowed as such, in the Romish church, is prodigious: Father Papebroche reckons seventeen or eighteen hundred to have died on the first of June, only. Indeed, the crowd of *Saints* wherewith their martyrologies are stocked, is scandalous, even to the more sober of their own communion. Father Mabillon, in an express dissertation on the worship of unknown *Saints*, observes, that honours are given to *Saints*, who perhaps, were not Christians; and whose very names were never known. Hence, being under a necessity of giving them names, they are thenceforth called *Baptized Saints*. He adds, that they every day beseech *Saints* to intercede for them with God; when, it is much doubted, whether they themselves be in heaven.

Father Papebroche and his associates have been a long time employed in writing the lives and acts of the *Saints*: they range them each on the day of the year wherein they died: for the first six months they have published twenty-four volumes in folio; and since Papebroche's death, in 1714, his successors have published more.

SAKER, a small sort of cannon; whereof there are three species: *extraordinary*, *ordinary*, and *least fixed*.

SAKER Extraordinary, is about four inches diameter at the bore, 1800 pound weight, 10 foot long; its load 5 pounds, shot 3 inches and half diameter, and something more than 7 pound

pound and a quarter weight; its level range is 163 paces.

SAKER Ordinary, is a fize less, 3 inches 3 quarters bore, 9 foot long, 1500 weight; its charge, 4 pounds of powder; bullets diameter 3 inches and a half, weight 6 pounds, its level range is 160 paces.

SAKER of the least Size, is 3 inches and a half diameter at the bore, 1400 pound weight, 8 foot long, its load near 3 pounds and a half; shot 4 pounds 3 quarters weight, and 3 inches and a quarter diameter.

SAL, in chymistry, &c.

SAL Armoniac , or <i>Ammoniac</i> ,	See	SALT .
SAL Petre , or <i>Nitri</i> ,		ARMONIAC.
SAL Prunelle ,		SALT-PETRE, & NITRE.
SAL Tartari ,		PRUNELLE.
SAL Polychrestum ,		TARTAR.
SAL Gemma ,		POLYCHREST.
		GEMMA.

SAL Volatile Oleosum, is the name of an aromatic volatile liquor, first prepared by Sylvius de la Boe, and found a very notable medicine, chiefly as a cephalic, and cordial. It is made thus: to an ounce of volatile salt of sal ammoniac, distilled with salt of tartar, and dulcified with spirit of wine, put a dram and half of some aromatic oil, or essence, drawn from some generous aromatic vegetable, as cinnamon, cloves, rosemary, balm, &c. And when the spirit and oil are well stirred and incorporated together, draw off the volatile salt and spirit in a cucurbit. Some, instead of this, mix all the ingredients together at first, viz. the sal ammoniac, sal tartari, spirit of wine and powder of cinnamon or cloves, with other aromatics, and distill off the volatile spirit and salt at once; but the former way is preferred.

SALADINE, a tax, imposed in England and France, in the year 1188, to raise a fund for the crusade undertook by Richard I. of England, and Philip Augustus of France, against Saladin sultan of Egypt, then going to besiege Jerusalem.

The *Saladine*-tax was thus laid: that every person who did not enter himself a croife, was obliged to pay a tenth of his yearly revenue, and of the value of all his moveables, except his wearing apparel, books and arms.

The Carthusians, Bernardines, and some other religious, were exempted from the *Saladine*.

SALAMANDER'S BLOOD, a term which chymists give to the red vapours, which in distilling spirit of nitre, rise towards the latter end, and fill the receiver with red clouds.

They are the most fixed, and the strongest part of the spirit; nothing but nitre yields a red vapour in distillation.

SALARY, SALARIUM, a stipend, or wages allowed any person in consideration of his pains, industry, or service in another man's business.

SALET*, **SALLET**, or **SALADE**, in war, a light covering, or armour for the head, anciently wore by the light horse; only differing from the *casque*, in that it had no crests, and was little more than a bare cap.

* Nicod derives the word from *Sila*, which had the same signification among the Latins: others from *Saladini*, alleging, that it was borrowed from the orientals; others from the Italian *Calesta*, as if the head were hid hereby. Others from the Spanish *Calada*, a little calk, &c.

SALIANI*, in fortification, denotes *projecting*.

* The word is formed from the French *Saliant*, which signifies the same thing; of *salter*, to project, advance onwards, and that, of the Latin *salire*, to leap.

There are two kinds of angles; the one *Salient*, which are those that present their point outwards.—The other *Re-entrant*, which have their points inwards. Instances of both kinds, we have in tenailles, and star-works.

SALIENT, SALIANT, or SALLANT, in heraldry, is applied to a lion, or other beast, when its fore-legs are raised in a leaping posture.

A lion *Salient* is that which is erected bend-ways: standing so as that his right fore-foot is in the dexter chief point, and his hinder left-foot, in the sinister base point of the escutcheon.—By which it is distinguished from rampant. See **RAMPANT**.

SALIC*, or **SALIQUE LAW**, *Lex SALICA*, an ancient and fundamental law of the kingdom of France, usually supposed to have been made by Pharamond, or at least by Clovis; in virtue whereof males only are to inherit.

* Some, as Pothellus, will have it to have been called *Salic*, *q. d. Gallic*, because peculiar to the Gauls. Cœnal takes the reason to be, that the law was only ordained for the royal family, or palaces: Claud. Sessil says, it was thus called, because of the *furt* and the providence it abounds withal: Fer. Montanus insists, it was because Pharamond was at first called *Salica*. Others, with the abbot Uspers, derive its name from *Saliggi*, Pharamond's principal minister; and others from the frequent repetition of the words *Si aliquis*, at the beginning of the articles. Genebr. rd says, it was called *Salic* for *Seimonic*, by reason Solomon set the first example of it. Davison derives it from the German word, *Salis* and *Lack*, *q. d. hinc to salt*.—The most probable opi-

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nion is, that which derives the word from the ancient Franks, who were called *Sal*, *Salici*, and *Salvici*, on account of the Sala, a river of ancient Germany: this is the sentiment of Rhenanus and Ziminius, who are followed by several others; among the rest, Menage, Pasquier, Borel, and Jukenet. Bouteroue gives another plausible origin of the word: he says, it comes from the word *Salicis*, which, in the old Teutonic language, signified *salutary*; and that the French in this law imitated the policy of the ancient Romans, who made salutary laws, which the magistrates were to have before them when they administered Justice. This he confirms from a curious figure taken out of the *Notitia Imperii*, where the book is represented covered with gold, with this inscription, *Leges Salutaris*.

Du Haillan, after a critical examination of the *Salic Law*, declares it to have been an expedient of Philip the Long, in 1316, for the exclusion of the daughter of Louis Hutin, from inheriting the crown. Father Daniel, on the other hand, maintains, that it is quoted by authors much more ancient than Philip the Long; and that Clovis is the real author of it. The style, which is scarce intelligible, and which is in a latinized dialect, is a mark of its antiquity.

This law has not any particular regard to the crown of France: it only imports in the general, that in *Salic* land, no part of the inheritance shall fall to any female; but the whole to the male sex. *De terra Salica nulla portio hereditatis mulieri veniat; sed ad virilem sexum tota terra hereditas perveniat*.—So that it is a popular error to suppose, that the *Salic Law* was established purely on account of the succession to the crown: since it extends to private persons as much as to those of the royal family.

Part of it seems to have been borrowed by our Henry I. in compiling his laws, cap. 89. *Quod si fuerit femina, unde legem Salicam moriatur*.

By *Salic* lands or inheritances were anciently denoted all lands, by whatever tenure held, whether noble or base, from the succession whereof, women were excluded by the *Salic Law*; for they were by it admitted to inherit nothing but moveables, and purchases; whenever there were any males.—Indeed M. Fenelon observes, that there were originally *Salic* lands, distinguished from all others, and destined for the military people of the nation; and to these, it is supposed, the law was originally intended to be confined.

M. Eccard, a Hanoverian, is said to have recovered an ancient MS. of this famous law, containing a third part thereof, much more amply than any yet discovered, with a very curious chronology of the same law, hitherto unknown.

SALII, in antiquity, priests of Mars, whereof there were twelve, instituted by Numa; wearing painted, parti-coloured garments, and high bonnets, with a steel cuirass on the breast.

They had their name *Salii* from *saltare*, to dance; because, after assisting at sacrifices, they went dancing about the streets with ancylia, or bucklers in the left hand, and a rod in the right, striking musically on one another's bucklers with their rods, and singing hymns in honour of the gods.

There were two companies or colleges of the *Salii*: The ancient established by Numa, called *Palatini*; the latter by Tullus Hostilius, called *Collini*, and *Arundines*. Though Servius tells us, there were two kinds instituted by Numa, the *Collini* and *Quirinales*; and two others by Tullus, the *Pavarii* and *Palatini*.

In singing, they used a peculiar ancient song, called *Salicæ Carmen*; and after the ceremony, they were entertained with a feast: whence *Salicæ Epulæ*, and *Salicæ Dapes*, passed into a proverb for good eating.

Their chief, called *Præsul*, and *Magister Saliorum*, was one of their number: it was he that led the band, and began the dance; the rest imitating all his steps and motions.—The whole company was called *Collegium Saliorum*.

Sext. Pompeius makes mention of *Salicæ Mædæ*, *Virgines Salicæ*, hired for the purpose, and joined with the *Salii*, wearing a kind of military garb, called *Paludamentum*, with high round bonnets like the *Salii*, and, like them, performing sacrifice with the pontifices in the palaces of kings.

M. Patin takes it, that there is a figure of one of the *Salii* a medal of the Saguinian family; who, besides the buckler in one hand, holds the caduceus in the other.—But his look appears too grave, and sedate: and besides, the buckler he holds, does not seem to be an ancle, as being quite round, and not indented any where. And again, why should a priest of Mars, the god of war, be represented with a caduceus the emblem of peace? It is probable therefore, this is no figure of any *Salic*.

SALIVA, *spittle*, a thin, pellucid humour, separated from the arterial blood by the lungs, about the mouth and fauces; and conveyed by proper fiducial ducts into the mouth, for several uses.

It consists of a great deal of water or phlegm, and a volatile salt; and some add, a volubrious spirit.

The *Saliva*, Boerhaave observes, is void both of taste and smell, it does not heat, it is more capacious, fluid, sharp, penetrating, and detergent, as a person has lasted longer; and it is separated from the pure arterial blood.

The glands wherein the *Saliva* is separated from the blood, are the parotides; the maxillary glands; the sublinguals; or those under the tongue; the amygdalæ, or almonds of the ears, and the palatine, or glands of the palate. See each under its proper article.

The great use of the *Saliva*, is in masticating and diluting the food, and making the first digestion thereof. The other uses are to moisten the tongue, to render its motion more quick and easy; to lubricate the throat and oesophagus, in order to facilitate deglutition; to prevent thirst; and to assist in the sensation of tastes, by dissolving the salts.

Some imagine it to do the office of a menstruum, by mixing the oily and aqueous parts of the food more intimately, dissolving the saline parts, and procuring a fermentation in the stomach. But Dr. Drake will not allow it fit for that purpose. Were the *Saliva*, says he, acrimonious enough for this, it would be impossible but it must offend the stomach; especially, considering the quantities of it that many swallow, even upon an empty stomach.

M. Gassaldi, in a thesis on the *Saliva*, observes, that it takes its name from the salt it contains; which salt he will have to be partly a volatile acid, and partly alcalious. He adds, that it contains some oleaginous parts, and a little earth. By being compounded of so many different kinds of parts, it becomes a dissolvent proper for all the different kinds of foods whereof we live.—Its natural and laudable state, is to be a little more viscid than common water, and much less so than milk. And it is preserved in this state by the application of the spirits, and of the particles of air which insinuate into it.

According to all appearance, the *Saliva* is derived from the blood of the arteries: part of the arterial blood brought to the salivary glands, serves to feed them; another part is returned into the veins, and continues the circulation; and a third part, which is the serum, receiving a sub-acid quality from them, is there converted into *Saliva*.

Some authors have imagined, that the nervous juice contributed to the composition of the *Saliva*; and the rather because larger and more numerous twigs of nerves are communicated to these glands, than to most other parts, which yet have a more exquisite feeling than these. But Dr. Nuck has refuted this opinion by several experiments.

Too great an excretion of *Saliva*, Boerhaave observes, disorders the first digestion; and hence causes thirst, driness, a black bile, and finally consumption, and atrophy.—On the contrary, if no *Saliva* be discharged into the mouth, or if only less than ordinary, it spoils both the mastication of the food, and its taste, swallowing, and digestion; and withal, occasions thirst.

SALIVAL, or SALIVARY DUCT, in anatomy, certain little lymphatic canals lately discovered; whereby the saliva falls into the mouth.

The *Lower Salival Duct* comes from the maxillary glands, situated under the lower jaw, and terminated behind the dentes incisores.—It was first described by our Dr. Wharton, in his treatise of the glands, in 1656.

The *Upper Salival Duct* was discovered by Nicolas Steno, in 1660.—It comes from the parotid glands; whence perforating the buccinator, it terminates near the third upper grinder.

Casp. Bartholine, in 1682, discover'd another *Salival Duct* coming from the glands situate on the side of the tongue; and Rivinus, a physician of Leipzig, had mentioned it before, in a dissertation printed in 1679.

Ant. Nuck, professor at Leyden, discovered a fourth *Salival Duct*, arising from a gland situate in the orbit of the eye, between the musculus abductor, and the upper part of the os jugale.

These ducts are all double, there being one of each kind on either side.—But it is pretended, the two last are only found in some brutes, and not in man.

As the demand of saliva is greatest in mastication, deglutition, talking, &c. the disposition of the *Salival Ducts*, to favour the discharge on those occasions, is very remarkable: thus the ducts of the parotides pass close over the muscular masseters, and through the buccinators: the *Salival Ducts* of the maxillary glands pass close under the mylohyoideus, where the sublingual glands are placed; by means whereof, the intumescence of the masseters, in chewing, accelerates the spittle in the parotid *Salival Ducts*: as the mylohyoideus does in the action of deglutition, by drawing the hyoides upwards.—The agitation of the cheeks and lips, is fully sufficient to promote the discharge from the glands of the lips, &c.

SALIVATION, SALIVATION, in medicine, a promoting of the flux of saliva, by means of medicines; chiefly by mercury.

The chief use of *Salivation* is in diseases belonging to the gland, and the membrum adiposum; and principally in the cure of the venereal disease. Though it is sometimes also used in epidemic cases.

The body is prepared for *Salivation* by a copious and continued use of attenuating, diluting, softening decoctions; as

officubious, pellitory, china, farfaparilla, fassiafras, and faunders. *Salivation* is either partial or universal. By the first, only the humours of some part of the body are to be discharged; as in catarrhs, tooth-ach, &c.—By the second, the whole mass of blood is to be purged.

The first is raised either by a flow continued chewing of some tenacious matter, as mastich, wax, or myrrh; especially if other sharp things be mixed with them, as pyrethrum, ginger, or pepper: or by drawing in sharp irritating vapours, as those of tobacco, rosemary, thyme, marjoram, &c.

The latter is effected by the action of such medicines as create some slight but constant nausea; as stibium not quite fixed, nor yet quite emetic; a little common vitriol, &c.—But chiefly by such as dissolve all the parts of the mass of blood, turn them into lymph, and thus cause a pyalism: such are crude quicksilver, cinnabar, a solution of quicksilver in aqua-fortis, white and red precipitate, turbit mineral, sweet sublimate of mercury, &c.

MERCURIAL SALIVATION, is now a very usual method of cure; especially in venereal, scrophulous, and hypochondriac cases. In effect, it proves the surest remedy yet discovered for the Gallic lues; though the discovery hereof, as that of most other remedies, was owing to chance. Jac. Carpi, a physician of Bologna, having read in Avicenna, and Meise, two Arab authors, that mercury applied externally, was proper for the lepra, and some kinds of pustules, particularly the scabies or itch; had a mind to try it in a pocky itch: a *Salivation* was hereupon unexpectedly raised, and the patient was unexpectedly cured not only of his itch, but of his pox.—The same method he afterwards used for the pox itself; and meeting with great success therein, others were induced to follow him; and thus did it arrive at its present height.

There are two manners of applying mercury to raise a *Salivation*: the one external, or in the way of unction; by mixing it up with some unguent, and then rubbing it on the joints, &c.—The other internal, where it is taken at the mouth.

In each case, the mercury insinuates itself into the mass of blood, and mixing with the venereal poison, the two bodies thus locked together, are drawn, with the serosity, into the salivary glands, where they are separated and discharged, as finding the pores of those glands proportioned to their figures, and proper to receive them.—For the manner wherein the mercury acts to raise the *Salivation*, see further under **MERCURIALS**.

Dr. Quincy will have the internal to be much the safer and better method: the mineral globules, he thinks, being intimately combined with salts, in the preparations given inwardly, will, by the irritation thereof, be easily and fully thrown off by the secretory organs, till the blood is quite discharged of its load.—Whereas, in mercurial frictions, it is possible, some of the heavy particles may be left lodged in the interstices of the fibres, or cells of the bones. Add to this, that by computing the proportion of mercury in all the doses necessary to promote a spitting, internally; and the weight of the same mineral used when it is done by unction; the quantity used in the latter case, far exceeds that in the former; consequently, the ill effects apprehended from that dangerous medicine, must needs be more sensible in the one case than the other.

The external application, therefore, is only to be allowed of, where either the case requires the violence of such a management; or outward ulcers and tumours require a particular cure by liniments. Thus Quincy.

But a learned French Physician, M. Chicoineau, chancellor of the university of Montpellier, has lately done some discredit to the practice of salivating in any manner; and that, in a little treatise, where he endeavours to prove, that the *Salivation* itself contributes nothing to the cure, but is rather prejudicial thereto: that the salutary effects of the mercury are independent of any evacuation at all; and that it acts purely as a specific. It is without reason, therefore, he urges, that venereal patients are put to the torture of a *Salivation*, since the full effect of the medicine may be had without carrying matters to that extremity. The *Salivation* is only an accident to the cure; which is effectually obtained by a mercurial unguent rubbed on the joints in such quantities, and at such intervals, as not to raise any *Salivation*. He supports the whole by the experience of forty or fifty cures wrought in one year, by this new method. The same method, it seems, has been lately too, tried in England, and with success; as appears from a translation of Chicoineau's piece since published with notes, by an English physician.

SALLET*, or SALLAD, a dish of eatable herbs ordinarily accompanying roast-meat, composed chiefly of crude, fresh herbage, seasoned with salt, oil, and vinegar.

* Menage derive the word from the Latin, *Salata*, of *Sal* salt; others from *Salado*: Du Cange from *Saligama*; which is used in Ausonius, and Columella in the same sense.

Some add mustard, hard eggs, and sugar; others, pepper, and other spices, with orange-peel, saffron, &c.

Some define *Sallet* more generally, a composition of plants and roots, of several kinds, to be eaten either raw or green; blanched or candied, by themselves, or mixed with others; and even, occasionally boiled, pickled, or otherwise prepared and modify'd, to render them more grateful to the palate.—But this definition includes pot-herbs, &c. which the generality of authors deny to be proper *Salleting*.

The principal *SALLET-herbs*, and those which ordinarily make the basis of our English *Sallets*, are lettuce, fennel, endive, cress, radish, and rape. Along with which, by way of furniture, or additional, are used purslane, spinage, sorrel, tarragon, burnet, corn-fallet, and chervil.

The different tastes of mankind will not allow any certain mixture of these to be prescribed as most agreeable; but, still, in mixing them, the relish of the several herbs is to be considered: those, for instance, which are most hot and biting; as cress, mustard, fennel, tarragon, chervil, &c. with those that are more cool and insipid to the taste; as turnips, rape, spinage, lettuce, corn-fallet, purslane, &c. by this means the herbs may be so judiciously mixed, that the too strong taste of one kind may not over-power all the rest; and the insipid kinds be discretely used to moderate and qualify the heat and pungency of the others, as the season of the year is more hot or cold; so as every *Sallet* may not only be agreeable to the taste, but also physic to the body.

The gardeners call some plants *small herbs*, in *Sallets*, these should always be cut while in the feed leaf; as cress, mustard, radish, turnip, spinage, and lettuce; all which are raised from seeds sown in drills or lines, from the middle of February to the end of March, upon glassies or frames, and thence to the middle of May, upon natural beds, warmly exposed; and during the summer-heats, in more shady places; and afterwards, in September, as in March, &c. and lastly, in the rigour of the winter, in hot beds. If they chance to be frozen in very frosty weather, putting them in spring-water two hours, before they be used, recovers them.

In gathering small-herbs, the best way is to pull them up by the roots from the hot beds. If the roots be left, and a second crop of *Salleting* sown on the same bed, it will not prosper.—In sowing second crops, it is also to be observed, that seeds of the same kind be not sown in the same place; but the ground is to be eased by varying its burden, putting hot seeds where cold ones grew before, &c. A very essential rule is, that no plant be placed in the same spot where the same kinds have grown before.

Winter-*Sallets* are greatly improved by blanched fennel, which is a hot herb, of a very rich flavour; raised from seed sown in March, and April, in a well-exposed place, and transplanted, six weeks after its first appearance, into beds, where it remains till the middle of June, and then planted in trenches eight or ten inches wide, and as many deep, first pruning off the tops and roots. As they grow large, they are earthed up within four or five inches of the top, which is repeated several times, till they be fit for use.—Endive blanched is also much used in winter *Sallets*, though it have neither taste nor flavour; it is cultivated much after the same manner as fennel.—Of lettuce there are various kinds, the best are the Roman, Dutch brown, Imperial, and Silesia-kinds, all which cabbage well. They are all commonly sown with other crops in March, for summer *Sallets*; and in August, they are to be transplanted; or in September, to stand the winter; either to be cut for winter *Sallets*, or to cabbage early the next spring, or for seeds.

For the additional, or secondary *SALLET-herbs*: burnet is a cool perennial herb, whose tender leaves, mixed with other herbs in winter, give the agreeable flavour of a cucumber: It is propagated by seed sown in March. Corn-fallet, raised at the same time, and in the same manner, makes a good winter-*Sallet* furniture; purslane, an insipid, yet cooling herb, is admired by some in summer-*Sallets*: it is raised by seeds sown in March in a warm place.—Sorrel is chiefly used in the spring, when the young leaves are very agreeable. It is raised from seeds sown in March, usually in rows or drills. Spinage is sometimes an ingredient in raw *Sallets*, to be cut in the ear-leaf; but it is better for boiling in the winter and spring. It is sown in March, April, and May; and again in August, in a place well exposed to the sun, that the leaves may be large enough for boiling in the winter.—Tarragon, of all others, should never be wanting; it is a cordial herb alone, though not the most agreeably tasted; and yet a few leaves, or three or four of the tender tops, give a *Sallet* a good relish. It is propagated from slips, and planted in March.—Note, in the spring dandelion blanched, which is gathered in almost every ploughed field, makes an excellent *Sallet* mixed with other herbs. Some likewise gather violet flowers, cowslips, and blossoms of burrage, as part of the *Sallet* furniture; and others, fennel, and parsley.

Dressing of SALLETS.—The fennel and endive are to have their hollow, green stem, or stalk, stripped of all its outside leaves, and sliced in the blanched part, cutting the root into four parts. The other ingredient herbs being exquisitely culled and cleansed, of all faulty leaves, &c. are washed rather by sprinkling, then soaking them in spring-water;

and to drain of all superfluous moisture, then shook and squeezed together gently, in a coarse cloth, to dispose them to receive the seasonings, viz. the salt, vinegar, oil, &c. The oil is not to be yellow, or high-coloured, but of a pale olive green, without either taste or smell. The vinegar perfectly clear, neither musty nor palled. The salt is to be the best ordinary or bay-salt, clean, bright, and dry.

Some indeed recommend the essential salts and spirits of vegetables, with a little of the alcalizate and fixed kind, extracted from the calcination of balm, rotemary, wormwood, &c. and affirm, that, without eating the gross *sallet-herbs* themselves, we might thus have healing, cooling, generous *sallets*, wholly out of the salt-feller.

Note, in the proportion of the salt, pepper, and vinegar, regard is to be had to the season, constitution, &c. the two first being best for cold, the second for hot stomachs and seasons.—For a moderate oxaline, or *sallet-vehicle*, to three parts of oil, put one of vinegar, or lemon, or orange juice, and in the mixture, steep slices of horse radish with a little salt; occasionally, add a little Guinea pepper, and mustard, with the yolks of two eggs boiled, squeezed, and bruised into a mash therein. Pour the whole on the herbs, stirring and mingling them till they be thoroughly imbibed.

SALLY, in architecture, from the French *Sailly*, is what we more usually call *Projecture*.

SALLY, in the military art, the issuing out of the besieged from their town or fort, and falling upon the besiegers to cut them off, nail their cannon, hinder the progress of their approaches, destroy their works, &c.

We say, to make a *Sally*, to repulse a *Sally*, &c.

To cut off a *Sally*, is to get between those who made it and the town.

SALON, or *SALOON*, in architecture, a grand, lofty, spacious sort of hall, vaulted at top, and usually comprehending two stories, with two ranges of windows.

The *salon* is a grand room in the middle of a building, or at the head of a gallery, &c. Its faces, or sides, are all to have a symmetry with each other; and as it usually takes up the height of two stories, its ceiling, Daviler observes, should be made with a moderate sweep.

The *salon* is a state-room: it is much used in the palaces in Italy; and from thence the mode came to us. Embassadors, and other great visitors, are usually received in the *salon*.

It is sometimes built square, sometimes round or oval, sometimes octagonal, as at Marly, and sometimes in other forms.

SALT, *SAL*, in chymistry, a simple substance, which enters the composition of all bodies, and is held one of the five principles, or elements thereof; and may always be extracted by fire.

Salt, M. Hoinberg observes, is an ingredient in all animal, vegetable, and mineral bodies, excepting perhaps some metals, and stones. In vegetables and animal bodies, that have undergone a fermentation, the *salt* rises first in the alembic, then the phlegm: if the mixt have not undergone a fermentation, the *salt* rises after the phlegm.

Salts are distinguished, with regard to the manner of extracting them, &c. into *volatile*, *fixed*, and *essential*.

Volatile SALTS, are those light, subtle ones, which rise easily upon distillation, or are even exhaled by a slight heat, and rendered sensible to the smell.

Fixed SALTS, are such as, being more gross and material, resist and sustain the fire; and are not raised by it, but remain, after calcination, or distillation, in the earthy part, at the bottom.—For the manner of extracting them, &c. see *Fixed SALT*.

Essential SALTS, are those drawn from vegetables, without the use of fire; as by crystallization, and other easy, natural means.

Volatile salts become distinguishable to the nose, tongue, and brain, by their tenuity and briskness: *fixed salts* by their bitterness, and heat in the mouth. To these may be added an intermediate kind of *salt*, under the title of

Mixed SALTS, which are those resulting from a mixture of a *volatile* with a *fixed salt*.

SALTS again are of different kinds, according to the different matters wherewith they are found mixed; some are mixed bodies themselves, and their mixture separable by fire, and lixiviation.—Such are all essential *salts* or plants, and all fossil *salts*, &c. but these are no proper chymical principles. There are others which we are sensible are mixed, and whose mixture we know pretty nearly, though we are not yet able to decompound them: it is these which make the chymical principle *salt*; for our analyses will not render them more simple, which is the character of a principle.—And in this sense, *salt* is defined, a matter dissoluble by water, and unchangeable by fire; to which some add, of a pungent taste. There are three kinds, or classes, of *salts*, which come under this definition; two whereof are *volatile*, and the third *fixed*.—The *volatile* ones, are acid *salts*, and urinous *salts*. the *fixed*, are those drawn by a lixivium, after calcination, and called *lixivious salts*. Nature produces none of these *salts* simple and unmixed; but we easily extract them by art, from the mixts wherein she has placed them.

The principal natural *salts* may be reduced to *Salt petre*, &c.

Sea-Salt, and *Vitriol*. Each whereof has its different kinds; of the various combination whereof, with different oily matters, all the natural *Salts*, we know of, are compounded.

These *Salts* are found, by chymical analyses, to consist of aqueous, earthy, oily, sulphurous, and acid particles.—The acid matter is the pure *Salt*, or *Saline* principle, and is the basis of all the rest. This M. Homberg observes, is pretty uniform, and nearly the same in all *Salts*, before the particular admixture to form this or that *Salt*, by the particular admixture of the sulphur, &c.

Salt-petre, *Sea-Salt*, and the rest, therefore are not principles; but the acid *Salts* distilled from them are: and the water wherein these *Salts* swim, and the earth, or fixed *Salt* remaining in the retort after distillation, are other chymical principles.

The principle *Salt* is held a mean between the active and passive principles. The pure acid, though accompanied with its sulphurous determinating matter, never becomes sensible but when lodged either in some earthy matter, or artificially in some simple aqueous fluid. In the first case, it appears, under the form of a crystallized *Salt*, as *Salt-petre*, &c. In the second case, it appears in the form of an acid spirit, which, according to the determination of the sulphur that accompanies it, is either spirit of nitre, or spirit of common *Salt*, or spirit of vitriol.—And what we have here observed of the three simple, or fossil *Salts*, may be applied to all other more compound *Salts* of plants, animals, &c. with this difference, that when in form of a concrete *Salt*, these last always have a greater quantity of earthy matter, and when in form of an acid spirit, a greater quantity of aqueous matter, than the simple ones. Whence it follows, that the acid spirits of compound *Salts* are always weaker, lighter and less penetrating than those of fossil *Salts*; and after distillation leave a greater quantity of earthy matter behind them.

We do not know precisely what figures the three *Salt*-principles, acid, urinous, and lixivial, really have: But to judge by their effects, one would conclude, the acids to be pointed, only the points sheathed in some sulphurous matter; the urinous *Salts* to be sponges, containing some of the acid, and some of the fixed oil of the animal or plant, and the lixivious *Salts* to be sponges only containing the remainder of the acid, which the calcining fire could not expel. Acid spirits may be conceived as pure, and without any mixture; in which case all acids will be found of the same nature: but if we consider them as distillation gives them, we shall always find them accompanied with some sulphurous matter, which we cannot separate from them, and which gives the degree of activity to the acid spirits. It is this sulphurous matter which characterizes them, and makes all the difference we find between them. M. Homberg ranges all the kinds of acid spirits under three different classes, according to the different sulphurous matters which accompany them.—The first class is of those which contain animal or vegetable sulphur; under which come all acids, distilled from plants, fruits, woods, &c. as also spirit of nitre.

It is easy to conceive, that the acids of plants may have retained a part of the oil of the plant, which is their sulphur; since in reducing these acids into *Salts*, we always find a little oil therein; which can be nothing else but that of the plants themselves. And for *Salt-petre*, as this is always drawn from earths moistened with the excrements of animals, or from old walls, plaster, &c. full of the sulphurous matters of the animals that have lived within them, the foot, &c. it is thence, doubtless, *Salt-petre* borrows its sulphur. The second class is of those which contain a bituminous sulphur: under which come the acids of vitriol, common sulphur, and alum. For these are all usually drawn from the same mineral stone, wherein the bituminous matter, which makes one of the principal parts of common sulphur, predominates.

The third class is of those which contain a more fixed mineral, sulphurous matter; approaching nearer the properties of a metalline sulphur under which class come the acids drawn from several kinds of *Sea-Salts*, *Rock-Salts*, &c. For the *Rock-Salt*, or *Sal-Gemma*, is always found in places near metallic mines; and *Sea-Salt*, in all appearance, is nothing but *Rock-Salt*, the quarries whereof have been penetrated by the sea-water, which has extracted all the saltness therefrom.

The sulphurous matters of the first class of acids being very light, and taking up a deal of space, must augment the bulk of the points of the acids to which they are joined. And hence these acids become disabled from penetrating very compact bodies; but their surface being increased from the same cause, the flame will have the greater hold to impel them: And hence the acids of this class act more swiftly than any of the rest.

The bituminous sulphur is the least active of all the sulphurs we know, as being loaden with a great quantity of earthy matter, which serves it as a matrix. Hence it unites more difficultly with saline matters than any of the other sulphurs;

so that a less quantity of it may be conceived to adhere to the acids of this, than of either of the other classes.—Accordingly we find, that the acids of this class, used alone, scarce dissolve any metals; but mixed with the others, they partake of their sulphur, and thereby become enabled to dissolve all metals.

The metallic-sulphur is of all others the most fixed; that is, its parts are the smallest, and most compact.

Hence the points of this class of acids will not be much swelled by it, and of consequence will be able to insinuate themselves into the most compact bodies, or those whose pores are the smallest. And for the same reason they will not give much hold to the flame that agitates them, and will therefore act with less violence than those of the first class of *Salts*.

Acids joined to fixed *Salts*, compose mixed *Salts*: thus spirit of nitre, with *Salt* of tartar, make *Salt-petre*; and spirit of *Salt*, with *Salt* of tartar, make a true common *Salt*; and spirit of vitriol, with *Salt* of tartar, a true vitriol.

However, the two ingredient *Salts* still remain, the one fixed, the other volatile: acids joined with urinous *Salt*, compose another kind of *Salts*, called *Salcs Ammoniaci*, which are always volatile.

Lixivial and urinous *Salts* are called *Alcalies*; the first a fixed alkali, the second a volatile alkali.

These *alcalies* are usually esteemed antagonists to the acid *Salts*, because their mixtures always occasion a sudden ebullition. But it is more probable this ebullition is not the effect of a combat, but rather a proper junction and union of two matters which had been naturally united together, and only separated by the fire, and which now re-place themselves in the same parts whence the flame had tore them off. Hence, the one are compared to sheaths, and the other to points, fit to be sheathed therein. Now, the precipitation wherewith the points of the acids enter the pores of the *alcalies*, tears asunder their contexture, and reduces them into minute parts invisible to the eye; and thus is the business of dissolution accounted for.

Thus far will the mere doctrine of alkali and acid go towards accounting for some of the great phenomena of nature. But the theory is made vastly more complete and adequate, by Sir Isaac Newton's principle of attraction, for which we refer the reader to the articles *ACID*, and *MENSTRUUM*, where the operations of *Salts*, or acid spirits, are perhaps more satisfactorily accounted for.

The principal chymical *Salts* of use in medicine are; *Salt* of urine, of viper, of human blood, of wormwood, of guaiac, of quinquina, of tobacco, of rhubarb, of rosemary, of sage, of juniper, of vitriol, of amber, of saturn, &c. most of which, with many others, are explained under the articles of the respective drugs, &c. whence they are drawn: to which the reader may have recourse.

SALT, in its popular sense, denotes a kind of saline crystallization; or a sharp, pungent, detergent and astringent substance, used to season fish, fish, butter, hides, and other things that are to be kept; as also to give a relish to meats, &c.

This we usually call *Common Salt*, in contra-distinction to the chymical *Salt*.

M. Guglielmini, in an express dissertation *de Salibus*, lays it down as a fundamental, that the first principles of common *Salt*, *Salt-petre*, vitriol, &c. had their figures unalterably fixed at their first creation, and are indivisible as to any created force. That of common *Salt* he maintains to be a little cube; that of *Salt* of vitriol, a parallelepiped; that of *Salt-petre* a prism whose base is an equilateral triangle, &c.

Common *Salt* is of three kinds, viz. *Sea-Salt*, *Fossil* or *Rock-Salt*, and *Salt* drawn from briny springs, and wells.

For *Sea-Salt*, the greatest and best part is made in France; tho' not a little in England.—*Fossile*, or *Rock-Salts*, are chiefly found in Poland, Hungary, and Catalonia.—For *Salt* springs, there are considerable ones in Cheshire, Worcestershire, Hampshire, Northumberland, Franche Comte, Lorraine, Tirol, and some other places.

The great property of *SALT* is, that it is incapable of corruption, and that it even preserves meats, &c. seasoned therewith, or steeped in solutions thereof. It endures the fire, and even comes purer out of it, as being thereby freed of its humidity. In very hot fires it fuses, and is converted into corrosive waters.

It gives fertility to lands, and promotes the fusion of all metals; yet, we read of princes, who, as a mark of their indignation, sowed grounds with *Salt* to render them barren. Plutarch observes, that the Egyptians believed *Salt* to be the spittle, or foam of the giant Typhon, the great enemy of their gods: and hence, adds he, they held it in the greatest abhorrence.

Salt is found to have two opposite qualities: by its subtilty, penetrating acidity, it breaks and dissolves the hardest and most compact minerals and metals; and by a contrary property, it coagulates liquid bodies, as milk, blood, &c. Some of its spirits, mixed in a certain proportion with water, produce

produce an excessive heat; yet when mixed in a less quantity they augment its coldness: as *Salt-petre* in snow, &c. Though all *Salts* dissolve by moisture, yet water only dissolves a certain quantity. However, when impregnated with any *Salt*, as much as it can bear, it will still dissolve a quantity of another *Salt*, whose particles are of different figures, proper to insinuate into the remaining vacuities of the water: thus, after *Common Salt* will no longer dissolve in it, alum will, and after alum, *Salt-petre*, then *Sal Armoniac*, &c.

The use of *Salt* is so universal, and the traffic thereof so very important in the places where nature has produced the different *Salts*, and so necessary for those which have not that advantage; that a detail of the preparation, commerce, &c. of the several kinds, cannot fail of being acceptable.

Sea-SALT is made of sea-water, thickened by frequent evaporations, and at length crystallized.—Of *Sea-Salt* there are two kinds: that which requires only the sun's rays to give it its consistence, called, from its brown colour, *Bay-Salt*; and that which receives its consistence from the heat of a fire, called *White-Salt*.

In France they use either this or that manner of preparation, according to the disposition of the coasts, where it is made: if the coasts rise in downs or hills of sand, the *Salt* is made by fire, in copper or leaden vessels.—If the coasts be flat, and low; especially, if the bottom be a little clayey, the *Salt* is crystallized wholly by the action of the sun.

We have many of the former sort of works in England: some indeed we have of the latter, at *Shells* in Northumberland; but France is the principal place for *Bay-Salt*; more being made there than in all Europe, perhaps in all the world beside; and it is hence that we are chiefly furnished therewith. We shall therefore deliver the method of making it, as it is practised there.

The chief coasts for *Bay-Salt* are those of Bretagne, Saintonge, and the Pays d'Aunis. The chief *Salt-works*, in the two latter places, are Brouage, Maran, and the Isle of Rhe. Those in Bretagne are in the bay of Borneuf, Guerand, and Croisil: their *White-Salt*, is chiefly made on the coasts of Normandy. In the bay of Borneuf alone, are computed above twenty thousand considerable *Salt-works*.

Manner of making Bay-SALT.—Low marshy-grounds, disposed by nature for the reception of the sea-waters when the tide swells, and provided with banks and sluices to retain the same, make what is called a *Salt marsh*.

These *Salt-marshes*, the bottoms whereof they line and ram with a great deal of care, are divided into several square pits or basins, some greater, others less, separated by little banks 13 or 14 inches broad: and into these basins, when the season is at hand, they let in the sea-water.

The *Salt* season is from the middle of May to the end of August; in which time the days being long, and the sun's rays strongest, the *Salt* is formed and crystallized better than in any other season. Before they let in the water, they take care the basins be well cleared of what had been left in them during the winter to keep them in order. The water is admitted to the height of about six inches, after having first let it rest, and warm two or three days in huge reservoirs, without the works, that it may come in luke-warm. The water admitted, the sluices are shut, and the rest of the work is left to the wind and the sun.

The surface of the water being struck, and agitated by the direct rays of the luminary, thickens, at first, imperceptibly, and becomes, at length, covered over with a slight crust, which hardening by the continuance of the heat, is wholly converted into *Salt*. The water, in this condition, is so hot, that the hand cannot be put into it without scalding it. When the *Salt* has received its full cohesion, they break it with a pole, upon which it sinks to the bottom, whence being dragged out, they leave it sometime in little heaps, about the edge of the pit, to complete the drying; and at length lay in greater heaps, containing several thousand muids, which they cover over with straw, or rushes, to secure them from the rain.

Eight, ten, or at most fifteen days, having thus perfected the crystallization of the *Salt*, they open the sluices, when the tide is rising, for a fresh stock of water; and thus they continue alternately, taking in water, and gathering the *Salt*, till the season be over. Rainy weather is very pernicious to the work; for rain-water, mixing in any quantity with the sea-water, renders it useless, so that new water must be taken in.

The *Salt* is brown when taken out of the pits, and is usually thus sold, without farther preparation: indeed in some places they make it into *White Salt* by refining. They refine it by boiling it in large flat caldrons, which not only takes away its acrimony, but is found to increase the quantity.

Method of making White Sea-SALT.—The *White Salt* of Normandy is not made by refining the *Bay-Salt*, but has this colour naturally when taken out of the pits.—To make it they gather a muddy sand on the flats of the shoar, which the rising tide has covered and impregnated with its waters for seven or eight days. This sand being removed into pits

for the purpose, discharges itself by degrees of all its water, which filtrates through some straw wherewith the opening of the pit is filled, and trickles into vessels set on purpose to receive it. Of this water it is that they make their *Salt*.

Their furnaces are of earth, and their boilers of lead: each furnace boils four leads. When the water wherewith they have filled the leads begins to boil, they take off the skins, which arises in abundance, and in proportion as it diminishes, throw in fresh water, which they continue to skim, as before. When it thickens, they keep it continually stirring, with a crooked stick, or ladle; and when the grain is formed, they take it off the fire to purify it.

The purifying is performed by letting it stand in large osier baskets; where it drains itself of certain humidities that remained. When dry, it is laid in heaps, and thence is carried into the magazines.

The commerce of *Salt* brings an immense profit to France, though more to the king than to the makers and sellers: the duty is one fourth part of the price the *Salt* is sold at. The English and Dutch, and (when they are at war with France) the Swedes and Danes, take off most of the *Salts* of the Comte Nantois; paying for it, *communibus annis*, from 20 to 35 livres the load. That of Guerande is preferred, by the English and Irish, to all the rest, as the best. Yet that of Borneuf, though browner and heavier, is most used in France, as also throughout the Baltic; particularly in Poland, where, besides the ordinary uses, it serves in tilling the ground; being found to warm it, and to prevent little vermin from gnawing the grain.

The English and Dutch have oft strove hard, in times of war, to do without the French *Salts*; and to that end, have endeavoured to take *Salts* from the Spaniards and Portuguese; but there is a disagreeable sharpness and ferocity natural to them, which renders them very unfit for the salting of flesh, fish, &c.—To remove this, they boil them with sea-water, and a little French *Salt*, which they procure by means of neutral nations; which not only softens them, but increases their quantity by one third. But it should seem their refining does not succeed to their wish, by the eagerness wherewith they return to the *Salts* of Bretagne, &c. as soon as any treaty has opened the commerce.

Felsile, or Rock-SALT, is called also *SAL-Gemma*, from a certain brightness it has, which gives it some resemblance to gems. Indeed, it should have something like the gems in its nature; if there be nothing exaggerated in the account Dr. Ed. Brown, (who went down into the *Salt-mines* in Hungary) gives us thereof in his travels.

This *Salt* was intirely unknown to the ancients: Pliny, however, gives some curious things about *Salts* in Nat. Hist. lib. 30. c. 7. which we should have transcribed hither, could we believe them as true as they are pretty. We shall here content ourselves with what well-warranted relations we could get of the *Salt-mines* of Willica in Poland; those in the Upper Hungary, and those in the mountains of Catalonia, which make a very considerable article of commerce in those three states; *Salt* being transported thence to the several neighbouring nations, who cannot be conveniently supplied with *Sea-Salt*.

SALT-MINES of Poland, &c.—The Polish-mines, in the village Willica, five leagues from Cracow, were first discovered in 1251. Their depth and capacity are surprizing. Within them is found a kind of subterraneous republick, which has its polity, laws, families, &c. and even publick roads, and carriages; horses, &c. being kept here to draw the *Salt* to the mouth of the quarry, where it is taken up by engines. These horses, when once they are down, never see the light again; but the men take frequent occasions of breathing the village air. When a traveller is arrived at the bottom of this strange abyss, where so many people are interred alive, and where so many are even born, and have never stirred out, he is surprized with a long series of lofty vaults, sustained by huge pilasters cut with the chissel, and which, being themselves all of *Rock Salt*, appear, by the light of flambeaux, which are incessantly burning, as so many crystals, or precious stones of various colours, casting a lustre, which the eye has much ado to bear.

The rocks of *Salt* are hewn in form of huge cylinders; the workmen using hammers, pick-axes, and chissels, much as in our stone quarries, to separate the several banks. As soon as the massive pieces are got out of the quarry, they break them into fragments fit to be thrown into the mill, where they are ground, and reduced into a coarse farina or flour, which serves all the uses of *Sea-Salt*.

In the *Salt-mines* of Willica, there are two kinds of *SAL-Gemma*; the one harder and more transparent, and the crystallization whereof appears more perfect than that of the other: This is the real *SAL-Gemma* of the Druggists and Dyers. It cuts like crystal, and is frequently used for toys, chaplets, little vases, &c. the other is less compact, and only fit for kitchen uses. One of the chief wonders of the place is, that through these mountains of *Salt*, and along the middle of the mine, there runs a rivulet of fresh water sufficient to supply the inhabitants.

The *SALT-MINES* in the Upper Hungary are every whit as

extraordinary. They are found in the mountains, two miles from Epéries, a city in the county of Sarax, on the river Tarh. The depth is 180 fathoms. The mineral runs in huge veins, so that pieces are sometimes dug not less than an hundred thousand weight; which however, are afterwards reduced into square pieces two foot long, and a foot thick, for the conveniency of drawing them out of the mine. When out, they are broke farther, and put to the mill to be ground. The colour of the salt while in the mass is a little brownish, and yet, when ground, it becomes as white as if it had been refined. Some of the masses are found as hard and transparent as crystal; some white, yellow, blue, &c. fit for various works, whereon they engrave as on precious stones. The mine is cold and moist, whence there arises some difficulty in reducing the *Salt* into powder. Of the water drawn out of it and boiled, is made a blackish *Salt*, which fattens cattle.

The *Salt-Mines of Catalonia* are found in the mountains of the dutchy of Cardonna, and belong to the grandes of that name. It is the opinion of the country people there, that the *Salt* grows again, and is re-produced, after several years, in the same places whence it had been dug. But the naturalists will scarce allow of such a re-production. Many think however, that it vegetates, or grows sometimes: M. Tournefort, by the specimens he had of it in his cabinet, thought this plain.

The *Salt* is of four kinds, white, bay, red, and brilliant: The first, is almost like *Common Salt*, only that it is not granulated. The second, of an iron and slate colour, has most of the qualities of the first. The third, of a conserve rose colour, only differing from the rest by the mixture of some bole, or earth, which gives it this colour. The fourth is a brilliant *Salt*, transparent as crystal, which is the proper *Salt Gemma* of the druggists.—Of this kind there is some blue, and some green, orange, red, &c. but they all become white by grinding.

These four kinds of *Salts* are found over each other in distinct strata or beds: the commerce hereof is very considerable: The English, &c. when trade is prohibited with France, furnish themselves hence.

Salt Gemma is to be chosen in large, bright, transparent pieces, easy to break, and dividing into little square grains. It grows red-hot in the fire, like iron, but dissolves easily in water: the druggists wash it, to give it the greater lustre, but they take care to wipe it dry again speedily.

SALT *Ardena* from *briny Springs*.—Our method in England is thus: near the spring, or place of the brine, is built a salt-tern, or boiling-house, with a convenience for the conveyance of the brine within it. The salt-tern is usually large enough to contain several huge flat pans, or boilers, each furnished with its grate and furnace.

At Shields, &c. on the eastern coast, where brine springs are wanting, they use sea-water in its place; which at spring-tides is let into their ponds called *jumps*, and from thence is pumped into the pans.

The brine being in the pan, the fire is kindled; and after two hours time, the liquor begins to be ready to granulate: which is known by a thin skin rising at the top; this they skim off into brine tubs, that the brine that goes with it may not be lost: and whereas all brines contain, or yield a sand, which is supposed to petrify in boiling; for that if the liquor have been strained before-hand through brown paper, yet upon boiling it, sand will be separated; and as the pan boiling violently in the middle, the sand is cast towards the corners, where it falls to the bottom of the pan, before the *Salt* precipitates; they rake it to one corner of the pan, with a broad rake, and then take it out with ladles, and put it into wooden vessels, open at one end placed on stands.

The sand being thus removed, that the *Salt* floating in liquor may precipitate, they shut up the vent-holes, and door, and let the fire go out; and in twelve hours time the *Salt* falls to the bottom, and grows hard; a liquor called the *bittern*, remaining at top, which being again boiled away, yields more *Salt*.—To make the *Salt* precipitate more readily, after the liquor is skimmed, &c. they frequently use some beef-suet, and wine lees, of each a like weight, melting and mixing them together; and putting an ounce of this mixture on the end of a lice, they turn it round in the liquor till it is spent: then after two hours, at most, they open the vent-holes and door, quicken the fire, and lade away the liquor in a good measure, and so is the *Salt* found lying at the bottom, fit to be removed.

It is now raked up to one side, taken out and put into cribs, or vessels, like hay-racks, with loose tubs on each side, so close to one another, that an half-crown will scarce go between: here, after eight hours draining, it is found an hard granulated *Salt*, and may be taken away; but it yet continues dripping three weeks, and afterwards, if not often moved, will become rocky: the liquor in the pan, called *bittern*, is to be all taken out, except a little to keep the pan from burning; this is drained from the *Salt*, and cast away, or reserved for *Salt* *petre* make s; and the pan immediately filled with fresh brine, for another boiling.

A pan of brine, of moderate strength, in eight hours time will be completely made into *Salt*, with the expense of about a bushel and half of coals, which will make a pan of *Salt* from two bushels and half to four bushels, or more, according as the liquor is in strength.

This *Salt* they sometimes mould into the form of sugar-loaves, in which state it will dry without fire, and keep so for a long time. At Nantwich, they bake the loaves twice or thrice, in an oven, and keep them in a stove, or the chimney corner.

SALT from brine raised by the sun.—In some parts of England, as at Limington, Port sea, &c. they use water raised by the sun, and then boiled, which they find preferable to the natural brines of springs; these being always found either too weak, or too strong.

To this end, they have several ponds, or cisterns, called *sun-ponds*, built with clay, and well-exposed to the sun, with little channels, to convey the brine from them all to a large shallow reservoir, called the *common sun-pan*, not exceeding seven or eight inches in depth. Here the liquor is left to mellow, from twelve to twenty-four hours, or till the liquor is so far raised or evaporated, that it will bear a hen's egg new laid; and when it has attained a sufficient strength, it is from thence derived by channels into the cisterns, where it more perfectly ripens in standing, and is rendered fitter for boiling, which is performed after the same manner as is already described.

SALTIER, *SALTER*, or *SALTIRE*, in heraldry, an ordinary in form of a St. Andrew's cross; anciently called the *Cross of Burgundy*.

The *Saltier* may be said to be composed of a bend dexter and sinister, crossing each other in the centre of the escutcheon. See *Tel. Herald.* p. 35.

Its ordinary breadth, when alone, is one third of the escutcheon. It is sometimes bore alois, and sometimes in number, placed in different parts of the field: Sometimes charged, countercharged with the field, accompanied, raguled, engrailed, indented, quarterly-quartered, &c.

The *Saltier* was anciently a piece of the knight's harness: being fastened to the saddle, and serving him for a stirrup to mount upon; and it was hence it has its name *Saltier*, by the French *Sautiers*, from *Sauter*, to leap.—It was made of silk cord, or some other kind of cord, covered with some rich stuff.

Others will have it, that the original *Saltier* was a kind of palisade, serving to fence parks, woods, &c. where wild beasts were inclosed. Though Spelman says, it was an instrument for the taking them, thus called *Qued fit in usque in Saltu*. Lastly, others assure us, that *Saltier* was anciently the figure of an engine, which being full of pins, was used in the scaling of the walls of a besieged place: whence its origin from *Sauter*, as it helped the soldiers to leap over the wall.

SALTNESS, *SALSED*, the quality of something that is impregnated with salt; or that yields a salne taste.

The *Saltiness* of the sea, lakes, &c. is a thing that has long perplexed the philosophers to account for. Some have even taken it to be the effect of the dry, adult, and even saline exhalations, which the sun raises from the earth, and the winds, and which runs discharge into the sea: and hence, say they, it is that the sea is found more brackish near the surface, than towards the bottom.—Others contend, that the sun being continually extracting the purest and subtlest parts from the water; the crasser parts remaining, being exalted and concocted by this heat, acquire by little and little, their degree of *Saltiness*.—Others, as Father Bouhours, will have it, that the Creator gave the waters of the ocean their *Saltiness* at the beginning, not only to prevent their corruption, but also to enable them to bear greater burdens.—Dewar seems to be nearer the matter, when he ascribes the *Saltiness* of the ocean to the saline or mineral salts brought into it by subterranean currents and dissolved in the water.

The Count de Marfigli observes, that in Provence, the bottom of the sea is wholly stony, and is nothing but a continuation of the mountains of the Cevennes; being even found to consist of several strata; among which, are salt, and pit-coal: and hence he derives the *Saltiness* and bitterness of the sea-water.

Dr. Halley, in an express discourse of the *Saltiness* of the ocean, in the Philosophical Transactions, observes, that all the lakes in the world are *saline*, some more, some less so, than the ocean; which, in this case, may be esteemed a great lake itself: and that all the vapours exhaled by the sun from lakes, are perfectly fresh; so that all the saline particles brought in by the waters which have pass'd over salt-mines remain behind, while the fresh evaporate. Hence it is evident, their *Saltiness* must be continually augmented.

Now if this be the true reason of the *Saltiness* of lakes, it is probable the *Saltiness* of the ocean itself arises from the same cause: and hence we are furnished with a method of estimating the age of the world, by observing the increase of *Saltiness* in the waters of lakes; and computing in how long time the ocean might, at that rate, arrive at its present *Saltiness*.

SALT.

SALT-PETRE, *SALPETRA*, *nitre*; a bitter kind of salt; of great use in chymical preparations, in the composition of gun-powder, dying, the glass-manufacture, making aqua-fortis, &c.

All the *Salt-petre* we now have, M. Homberg observes, is drawn either from earths moistened, and manured with the excrements of animals; or from old walls, and the plaister of ruined buildings, which have been filled with sulphurous matters as well from the animals which inhabited them, as the foot penetrating them, and the air incomparting them.

We usually make a division of *Salt-petre* into *natural* and *fastitious*.

Of *natural SALT-PETRE* there are two kinds: the first formed by a natural crystallization of saline sulphurous juices diffusing in caverns, or along old walls.—This is what they call *Salt-petre of the rocks*.

The second is furnished by the water of a dead lake in the territory of Terrana in Egypt, called the *Nitrian Waters*, exalted and concocted by the heat of the sun, much after the manner of our bay-salt.—This is the *natrum* or *antrum* of the ancients, which the druggists call *natron*; now used in France in the bleaching of linens. See *NATRON*.

Artificial, or fastitious SALT-PETRE, is also of two kinds: the first, called, by some, *Mineral Salt-petre*, is procured in several places in the kingdom of Pegu, and about Agra, in villages anciently populous, but now desart: also, in some places along the banks of the Wolga, a famous river, which after watering a good part of Muscovy, empties itself into the Caspian sea.

The *Salt-petre* is here drawn from three different kinds of mineral earths, black, yellow, and white. The best is that procured from the black; as being freest from common-salt, and needing no purifying after it comes to us, to fit it for making of gun-powder; as the rest do.

The method of working it is thus: two flat pits are dug; one of which they fill up with the mineral earth, turning water upon it for some time; they then tread it with their feet into the consistence of pap, letting it stand two days for the water to imbibe, and extract all the salt therein. They then pak the water into the other pit, where standing some time, it shoots and crystallizes into *Salt-petre*. This they dissolve and crystallize again once, or twice, as they would have it more or less white and pure, scumming it continually, and filling it out into pots, holding 25 or 30 pounds each, and exposing these to the air in clear nights; by which means, if there be any impurity, it sinks to the bottom: they then break the pots, and dry the salt in the sun.

The second kind of artificial or fastitious *Salt-petre*, is that prepared from nitrous matters collected in old buildings, dove-houses, the middle of ancient ruins, &c. by means of lixiviums, or lyes made of wood-ashes, and sometimes of those of herbs.

Of this there are great quantities made in France, particularly in the arsenal at Paris, where there is a corporation of *Salt-petre makers* appointed for the purpose.—The *Salt-petre* gained thus, they refine, by boiling it three or four times, and passing it successively through several lyes.

Some naturalists pretend, that the earths, which have already served for *Salt-petre*, may be re-animated, and made fit to serve again, by keeping them covered for twelve or fourteen years, and watering them with the scum, &c. of the *Salt-petre*, and even with brine.

Good common *Salt-petre* should be well cleansed, white, dry, and as free from common salt as possible: the best refined *Salt-petre*, is that whose crystals are the longest, largest, and clearest.

Philosophers generally allow the air to be impregnated with a volatile nitre, or *Salt-petre*, which is thence communicated to plaister, mortar, &c. It is probable it may derive it from foot and smok, which are actually found to abound with volatile salt of a nitrous nature. Dew and rain are supposed to fertilize the ground principally by their bringing down this nitre.

Salt-petre has a property of rarifying, or expanding itself to a prodigious degree. It is hence that gun powder derives its force, whereof *Salt-petre* is the principal ingredient. It is computed, that when inflamed, it takes up above ten thousand times the space it possessed before.

There are abundance of chymical preparations made with *Salt-petre*, as spirit of nitre, aqua-fortis, crystal-mineral, sal polychrest, butter of nitre, &c. each of which see under its proper article, *AQUA-FORTIS*, &c.

SALTS, or **SAULTS**, in the manage, denote the leaps, or high airs and vaults of a horse: from the French *Saut*, of the Latin *Saltus*, a leap, dance, &c.

A *step* and a *Salt* is a high air, wherein the horse rising, makes a curvet between two *Salts*, or caprioles; so as to mount before, and fling back with his hind-feet.

Two *steps* and a *Salt* is a motion composed of two curvets, ending with a capriole.

SALTUARIUS, in antiquity, an officer, or servant among the Romans, who had the care and custody of a country-

house, with land, and woods, and who was to look to the fruit, the fences, &c.

In Nehemiah, chap. ii. 8. mention is made of an officer of this kind; *capitaneus saltus regis*, which the English translators interpret, keeper of the king's forest; but he was more; having not only the keeping of a forest, but of a house with a forest; *Saltus* being here used as *horti* for a house of pleasure; because gardens are the principal part.

In the Laws of the Lombards, *Saltuarius* is an officer who has the guard of the frontiers.

SALTUM. *Ordination per SALTUM*. See *ORDINATION*. **SALTUS**, in law books, a high, thick wood.

SALVAGE Money, is a recompence allowed both by the statute and civil law, to such persons as have assisted in saving merchandizes, ships, &c. from perishing in wrecks, or by pirates, or enemies.

This usually was a tenth part of the value of the things saved. See *WRECK*.

SALVATELLA, in anatomy, a famous branch of the axillary vein, passing over the back of the hand, between the ring finger and the little finger.

Several physicians, in imitation of the Arabs, recommend bleeding in the *Salvatella*, as proper in tertian and quartan agues, and in most hypochondriac diseases.

SALVE Regina, among the Romanists, the name of a Latin prayer, addressed to the virgin, and sung after complines; as also upon the point of executing a criminal.

Durandus says, it was composed by Peter bishop of Compostella.—The custom of singing the *Salve Regina*, at the close of the office, was begun by order of St. Dominic; and first, in the congregation of Dominicans at Bologna, about 1237. Gregory IX. first appointed it to be general. St. Bernard added the conclusion, *O dulcis! O pia*, &c.

SALVER, a flat dish, commonly of silver or other precious metal, used to set glasses on to serve wines, and other liquors.

The French call it *Sous-coupe*, under-cup.—The Italians use to present a *Salver*, with several kinds of wines, with this compliment, *Si non è buono, futte lo*: If it be not good, make it so.

SALUTATION, the act or ceremony of saluting, greeting, or paying respect, or reverence to any one.

There is a great variety in the forms of *Salutation*: we salute God by adorations, prayers, &c. kings by genuflection, &c. In England, we salute one another by uncovering the head, inclining the body, &c. The Orientals salute by uncovering their feet, laying their hands on their breast, &c.

The pope makes no reverence to any mortal but the emperor of Germany, to whom the popes a very little, when he admits him to kiss his mouth.

In the army, the officers salute by certain orderly, studied motions of the half-pike, &c.

It was believed by the ancients, that the statue of Memnon, in a temple of Egypt, saluted the sun every morning at his rising: the cheat consisted in this, that the statue being hollow, when the warmth of the morning began to rarify the included air, it was driven out through a narrow duct in the mouth: this made a gentle murmur, which the priests interpreted a *Salutation*.

At sea, they salute by a discharge of cannon, which is greater or less, according to the degree of respect they would shew.

Ships always salute with an odd number of guns; galleys with an even one.—A vessel under the wind of another, is always obliged to salute first.

To salute with musquets, is to fire one, two or three volleys; which is a method of *Salutation* that sometimes precedes that of the cannon; and is chiefly used on occasion of feasts.

After the cannon, they sometimes also salute or hale with the voice, that is, a joint shout of all the ship's company three times; which *Salutation* also occasionally obtains where they carry no guns, or do not care to discharge any.

Saluting with the flag, is performed two ways; either by holding it close to the staff, so as it cannot flutter; or by striking it so as it cannot be seen at all, which is the most respectful *Salutation*.

Saluting with the Sails, is performed by hovering the top-sails half way of the masts.—Only those vessels which carry no guns, salute with the sails.

When there are several ships of war together, the commander alone salutes.

Father Fournier has an express treatise of sea-salutes and signals. See *SIGNAL*.

Angelical SALUTATION, is an address which the Romanists make to the virgin; containing the formula wherein the angel saluted her, when he acquainted her with the mystery of the incarnation.

SALZ, **SULZ**, **SALTZ**, or **SULTZ**, a sort of brine or pickle made of salt, dissolved by the coldness, or moisture of a cellar.

SAMARITANS, an ancient sect among the Jews; still subsisting in some parts of the Levant, under the same name.

Its origin was in the time of Rehabeam; under whose

reign, a division was made of the people of Israel into two distinct kingdoms. One of these kingdoms, called Judah, consisted of such as adhered to Rehoboam, and the house of David; the other retained the ancient name of Israelites, under the command of Jeroboam.—The capital of the state of these latter was Samaria; and hence it was that they were denominated *Samaritans*.

Some affirm that Salmanazar, king of Assyria, having conquered Samaria, led the whole people captive into the remotest parts of his empire; and filled their place with colonies of Babylonians, Cutheans, and other idolaters. These finding themselves daily destroyed by wild beasts, it is said, desired an Israelitish priest to instruct them in the ancient laws and customs of the land they inhabited. This was granted them; and they thenceforth ceased to be incommoded with any beasts.—However, with the law of Moses, they still retained somewhat of their ancient idolatry. The Rabbins say, they adored the figure of a dove on mount Gerizim.

Be this as it will, it is certain, the modern *Samaritans* are far from idolatry: some of the most learned among the Jewish doctors own, that they observe the law of Moses more rigidly than the Jews themselves.—They have a Hebrew copy of the Pentateuch, differing in some respects from that of the Jews; and written in different characters, commonly called *Samaritan* characters; which Origen, Jerome, and other fathers and critics, ancient and modern, take to be the primitive character of the ancient Hebrews; though others maintain the contrary. The point of preference, as to purity, antiquity, &c. of the two Pentateuchs, is also much disputed by the modern critics.

The *Samaritans* are now few in number; though it is not very long, since they pretended to have priests descended directly from Abraham. They were chiefly found at Gaza, Neapolis, (the ancient Sichem) Damascus, Cairo, &c. They had a temple, or chapel on mount Gerizim, where they performed their sacrifices.

Joseph Scaliger, being curious to know their usages, wrote to the *Samaritans* of Egypt, and to the high priest of the whole sect, who resided at Neapolis. They returned two answers, dated in the year 998 of the Hegira of Mahomet. These answers never came to the hands of Scaliger. They are now in the French king's library, and have been translated into Latin by father Morin, priest of the oratory; and printed in the collection of letters of that father in England, 1682, under the title of *Antiquitates Ecclesie Orientalis*. M. Simon has inserted a French translation in the first edition, of *Ceremonies & Coutumes des Juifs*, by way of supplement to Leo de Modena.

In the first of these answers, wrote in the name of the assembly of Israel in Egypt, they declare, that they celebrate the passover every year, on the fourteenth day of the first month, on mount Gerizim; and that he who then did the office of high priest, was called Eleazar, a descendant of Phineas, son of Aaron.—At present they have no high priest. In the second answer, which is in the name of the high priest Eleazar and the synagogue of Sichem, they declare, that they keep the Sabbath in all the rigor wherewith it is enjoined in the book of Exodus; none among them stirring out of doors, but to the synagogue. They add that on that night they do not lie with their wives; that they begin the feast of the passover with the sacrifice appointed for that purpose in Exodus; that they sacrifice no where else but on mount Gerizim; that they observe the feasts of harvest, the expiation, the tabernacles, &c. They add further, that they never defer circumcision beyond the eighth day; never marry their nieces, as the Jews do; have but one wife; and, in fine, do nothing but what is commanded in the law: whereas the Jews frequently abandon the law to follow the inventions of their rabbins.

At the time when they wrote to Scaliger, they reckoned 122 high priests; affirmed that the Jews had no high priests of the race of Phineas; and, that the Jews belied them, in calling them Cutheans, for that they are descended from the tribe of Joseph, by Ephraim.

The truth is, the Jews impose abundance of things on the *Samaritans*: they frequently confound them with the Sadducees, as if they were infected with their errors.—Rabbi Benjamin, who lived in the XIIIth century, confirms the best part of what we have said of the *Samaritans*: he observes, they had priests of the tribe of Aaron, and who never married with any but those of the same tribe: that they sacrificed on mount Gerizim, where they had an altar of stone raised by the Israelites after passing over Jordan. He adds, that they are of the tribe of Ephraim; that they change their habit to go to the synagogue, and wash before they put it on.

SAMARITAN Characters, or Letters. See LETTER and HEBREW.

SAMARITAN Medals.—In the cabinets of antiquaries we find some medals, usually called *Samaritan Medals*; the inscription and legends wherof are Hebrew; but the character different from the Hebrew of our bibles, which is the square Hebrew, or Chaldean: and it is hence, viz. from the cha-

acter, not from their being struck by the *Samaritans*, that they are denominated *Samaritan*.

These medals have been infinitely canvassed by the critics, both Jewish and Christian; particularly rashi Alcher, rabbi Bartenora, rabbi Azarias, rabbi Moses, father Kircher, Villalpandus Wafers, Conringius, Hottinger, father Morin, Walton, Hardouin, Spanheim, &c.

The learned jesuit Souciet, in an express dissertation on the *Samaritan* medals, rejects all Hebrew medals, whose inscriptions are in Chaldean characters, as spurious; and allows of none to be genuine but the *Samaritan*.—Of these there are four kinds.

The first bear expressly the name of *Simon*, and the subject for which they were struck, viz. the deliverance of Jerusalem. The second kind have not the name *Simon*, but only the deliverance of Sion, or Jerusalem. The third kind have neither *Simon*, nor the deliverance of Sion; but only the epocha's, first year, second year, &c. The fourth class have neither any inscriptions, nor any thing whence one may judge of the time when they were struck.

The three first kinds were certainly struck after the return from the Babylonish captivity, and in the time of Simon Maccabeus, after Jerusalem had been freed from the yoke of the Greeks. But though struck after the captivity, father Souciet observes, their character shews itself to be that of the ancient Hebrew, which was used before the captivity, and the use wherof was lost by the people, during their sojourn in Babylon and Chaldea; but was again restored after their return, on the same footing as before. He adds, that the inscriptions are pure Hebrew, such as it was spoke before the captivity; that the character, therefore, is the true ancient Hebrew character: that it was the custom to write each language in its proper character: that if they had departed from this rule, they had doubtless used the new character they brought with them from Babylon: that there could be no other reason, but that of settling all things on the same foundation they were on before the destruction of Jerusalem, that could have induced them to use this character on their coins. And, lastly, that these medals were not struck by the *Samaritans*, but by the Jews, and in Jerusalem.

F. Souciet is very full on all these points, and, to the proofs drawn from medals, he adds two others foreign thereto: the first drawn from the resemblance of the Greek letters, introduced by Cadmus the Phœnician, with this Hebrew character; which was the same with that of the Phœnicians, as the language of those people was the same with that of the Hebrews. The second drawn from several various readings in the scriptures, which cannot be well accounted for otherwise, than by supposing, that the books wrote before the captivity, where in the same character with these medals, and which shew, that it is the conformity which certain letters have in that character, that has deceived the copists. From the whole, he concludes, that this character of the medals is the true ancient Hebrew character; and, that to judge of the various readings of the Hebrew text, and the differences of the ancient Greek and Latin translations, either from themselves, or from the Hebrew text, recourse must be had to this character.

SAMARITAN Pentateuch. See PENTATEUCH.

SAMBUCUS, an ancient musical instrument of the wind kind, resembling a kind of flute; probably thus called because made of the stalks of the elder, which the Latins call *Sambucus*.

SAMBUCUS was also the name of an ancient engine of war, used by Marcellus in besieging the city of Syracuse.

It was so big, that Plutarch, in the life of that general, observes, two ships were required to carry it.

SAMIAN Earth, Terra SAMIA, a kind of astringent earth brought from the island of Samos, in the Ægean sea. The best is called by Dioscorides, *Collyrium*, because used in the medicines of that name: it is white, very light, soft, friable, well-tasted, and a little glutinous on the tongue.

There is another kind, harder, fouler, and more glutinous, called *After-Samius*, in regard little shining flakes were frequently found in it, glittering like little stars.

Each kind was esteemed very astringent, proper to dry, and heal wounds; having much the same qualities with the Armenian bole.

There is also a **SAMIAN Stone**, *lapis Samius*, taken out of the mines in the same island.—It is white, and sticks to the tongue when applied to it: it is held astringent, and cooling; and is also used by the goldsmiths to burnish their gold, and give it a greater lustre. See *Supplement article SAMIA*.

TERRA.

SAMOSATENIANS, SAMOSATENI, a sect of ancient Antitrinitarians, thus called from their leader, Paulus * Samosatenus, bishop of Antioch, under the emperors Aurelian and Probus.

* They are also called by St. Augustin *Paviani*, and by the fathers of the council of Nice, *Pavianicenses*.

This heresiarch renewed the heresy of Arius, and had several sentiments in common with Sabellius, &c. tho' he differed from them in the manner of explaining them.—He owned, that

that the Father, Son, and Holy Ghost were but one God; but he denied that the Son, and Holy Spirit had any real subsistence. According to him, they only subsisted in the Father, as the word of man subsists in his understanding.

St. Epiphanius will have the *Samoſatenians* to be real Jews, without any thing more than the name of Christians; adding, that they use the same arguments against the mystery of the trinity that the Jews do; pleading against it, with them, on pretence of maintaining the unity of the godhead: though they do not observe the ceremonies of the law.

Their chieftain was condemned by a council held at Antioch, in 272, whereto assisted above seventy bishops; and was depofed from his bishoprick.

SAMPSEANS, SAMPSÆI, ancient ſectaries; the same, according to St. Epiphanius, with the Elceſaites. See **ELCESAITES**.

The *Sampsæans* were not properly either Jews, Christians, or Gentiles; though they took their name from the Hebrew, *Semes*, fun; as if they adored the fun.

They acknowledged one only God; washed themselves often, and were attached, in almost every thing, to the religion of the Jews.—Many among them abſtained wholly from eating of fleſh.

Scaliger, after Epiphanius, will have the *Sampsæans* to be the same with the *Effenii*. In effect, the *Elceſaites*, *Sampsæans*, *Maſſahani*, and *Effenii*, appear to be no more than fo many different names for the same ſect; unleſs, perhaps, the firſt added ſomething to the opinions of the laſt.

SAN BENITO, or **SACO BENITO**, a kind of linen garment; born as a badge, by perſons condemned by the inquisition.

The *San Benito* is in form of a ſcapular; being a broad piece of cloth hanging down before, and behind; with two St. Andrew's croſſes on it; it is of a yellow colour, and is painted over with devils, and flames.

It is ſuppoſed to be an imitation of the ancient ſackcloth, uſed by publick penitents in the primitive church.

SANCTIFICATION, the act of *ſanctifying*, or making a thing holy, and ſeparate to God.

The reformed divines define *Sanctification* an act of God's grace, whereby a man is renewed inwardly, his deſires and affections are alienated from the world, and the man put in a courſe of dying to ſin, and living to righteouſneſs.

The *ſanctifying of the Sabbath*, among the Jews, is of divine right, or institution.—By *ſanctifying* the ſabbath, is meant, the ſpending it in prayer, praife, &c. not in worldly concerns.

The firſt petition in the Lord's Prayer is, *Hallowed, i. e. ſanctified be thy name*: by which is meant, let thy name be ever accompanied with bleſſing, and praife.

SANCTION, **SANCTIO**, the authority given to a judicial act; or that, whereby it becomes legal and authentic.

The word is formed from the Latin *ſancire*, to eſtabliſh.

The royal aſſent gives the *ſanction* of ſtatutes, to all bills in parliament that have paſſed each houſe thrice.

Pragmatical SANCTION. See **PRAGMATICAL**.

SANCTU-VITI Chorea. See **CHOREA Sancti-Viti**.

SANCTUARY, among the Jews, was the holieſt and moſt retired part of the temple of Jeruſalem; wherein was preſerved the ark of the covenant; and into which no-body was allowed to enter but the high prieſt, and that only once a year to intercede for the people.

The *ſanctuary* called alſo *ſanctum ſanctorum*, or *holy of holies*, is ſuppoſed to be a type, or figure of heaven, and of Jeſus Chriſt the true high prieſt, who is aſcended thither to make interceſſion for us.

Some will have it, that the whole temple was called the *ſanctuary*; and that the *ſanctum ſanctorum*, where the ark was kept, was only a little chapel or oratory therein.

To try or examine a thing by the *weight of the SANCTUARY*, is to examine it by a juſt, and equal ſcale; in regard among the Jews, it was the cuſtom for the prieſts to keep ſtone weights, to ſerve as ſtandards for regulating all weights by; though theſe did not differ from the royal, or profane weights.

SANCTUARY, in our ancient cuſtoms, denotes an aſylum, or place privileged by the prince, for the ſafeguard of mens lives, who were guilty of capital crimes.

In Scotland they call the *Sanctuary*, *Girtboll*, or *Gyrthol*.

The Saxons alſo called it *Fredmotel* and *Fridſtoll*.

Till Henry the VIIIth, all our churches and church-yards were *ſanctuaries*; and protected traitors, murderers, &c. if within forty days they acknowledged their fault, and ſubmitted themſelves to ſatisfaction; and during that time, if any lay-man expelled them, he was excommunicated; if a clerk, he was made irregular: but after forty days no man might relieve them.

St. John's of Beverly had an eminent *ſanctuary*, called by V. L. II. N.º. CXXXVII.

the Saxons, called *ſanctuary* to had St. Martin's le Grand, in London. Roper ſaid the like granted by William, King of the Mercians, to had St. Burdens in Cornwall, granted by king Athelstan, Anno 936; and Weſtmiſter had the like, granted by Edward the Confeſſor.

SANCTUARY, is ſo called in the Rabbiniſh church for the chancel, or that part of the church whereon the altar is placed, incompaſſed with a rail or baluſtrade.

SANCTUM SANCTORUM. See **SANCTUARY**.

SAND, a fine, hard, gravelly ſort of earth, or rather ſtones, divided into ſmall grains; of great uſe in building, and many other arts, and manufactures; as glaſs-making, plumbery foundery, &c.

There are three kinds of *sands*, diſtinguiſhed by the places whence they are drawn, viz. *pit-sand*, *river-sand*, and *ſea-sand*.

The uſe of *sand* in building, is as an ingredient in mortar: See **MORTAR**.—For this purpoſe, *pit-sand* is of all others the beſt; and of *pit-sand*, the wetteſt is always the worſt. Of *river-sand*, that found in the falls of waters is beſt, becauſe moſt purged: and *ſea-sand* is the worſt.

Pit-sand, as being fat and tough, is moſt uſed in walls and vaults.—*River-sand* ſerves beſt for rough-caſting.

All *sand* is good in its kind, if when ſqueezed and handled it crackles; and if being put on a white cloth, it neither ſtains nor makes it foul.—That *sand* is naught, which, mixed with water, makes it dirty and muddy, and which has been long in the air; for ſuch will retain much earth, and rotten humour.—Hence ſome maſons waſh their *sand* before they uſe it.

The *sand* of Puſzuolo, de Lorme obſerves, is the beſt in the world; eſpecially for maritime buildings. See **POZZOLANE**.

Some diſtinguiſh a *male ſand*, which is of a deeper colour than another ſort in the ſame banks or beds, called *female ſand*.

The *sand* whereof glaſs is made, is white, and gritty, and full of little ſparkling grains.

The *sand* uſed by founders, is ſoſſile: it is properly a yellow fat earth, whereof they make their moulds, for the caſting of ſmall work; whence it is they ſay, *Craie ſand*.

The plumbers alſo uſe *sand* to mould ſeveral of their works, particularly large ſheets.—To prepare the *sand* for theſe ſheets, they wet it lightly, then ſtir and work it with a ſtick, and then beat and plan it. See **PLUMBERY**.

Sands may be divided into *ſharp* and *ſoft*.

Sharp, or *rag-ſand*, is that compoſed of ſmall transparent pebbles naturally found in the mountains.

Of this, again, there is ſome *fine* and white, or grey, reddiſh or brown; and others *coarſe*, either of a greeniſh, or brown colour.

Soft or *ſmooth ſand*, is that mixed with flat particles from lime-ſtone, or with mixce of glittering particles, either ſilver-like, as the *ſea-sand* about the Scilly iſlands; or gold-like, as in Cleveland.

SAND in agriculture, denotes one of the three uſual kinds of ſoil; which are *sandy*, *clay*, and *earth*, or *loam*.

M. de la Quintinie attributes all the difference we find in ſoils, to the different quality of the *sands* mixed in them.—

Soft ſands, according to him, make a ſoft, gentle earth: *uneven ſands*, a ſtiff earth: *coarſe ſands*, a rough untractable earth, &c.

SAND is alſo applied to thoſe dry, crumbling earths, which, wanting ſtanchs to bind them together, the wind eaſily breaks into duſt, and carries them away.

In this ſenſe it is that travellers tell us, the caravans in Africa, are frequently loſt, and buried under clouds of *sand*, torn up by whirlwinds; and ſometimes heaped into mountains.—The deſerts of Lybia are mere *sands*; and hence their ſterility. See **Supplement**, article **SANDS**.

SANDAL, **SANDALIUM**, *Sandalius*, in antiquity, a rich kind of ſlipper, or wear for the feet, made of gold, ſilk, or other precious ſtuff; uſed by the Roman and Greek ladies; conſiſting of a ſole, with a leſſow at one extreme to embrace the ankle; but leaving the upper-part of the foot bare.

Terence ſpeaks of this *sandal*, *Uti ſancti committigari videam ſandalio caput*: I wiſh he would break your head with her *sandal*.

Apollo was ſometimes called *sandalarius*, *sandal-maker*; the reaſon of which appellation has given great perplexity to the critics: ſome derive it from a freeſt called *sandalarius*, chiefly inhabited by *sandal-makers*, wherein that god had a temple: but others, with more probability, derive the name of the freeſt from that of the god, and take Apollo to have been thus called from his effeminate dreſs, as if he wore women's *ſandals*.

SANDAL is alſo uſed for the ſhoe or ſlipper wore by the pope, and other Roman prelate, &c. when they officiate; being ſuch as is ſuppoſed to have been worn by St. Bartholomew. Alcuin obſerves, that there was ſome difference between the *sandals* of biſhops, prieſts, and deacons.—Monks were not allowed to wear *sandals*, except in travelling; as is obſerved by Du Cange, *Salmatius*, &c.

SANDAL is also the name of a sort of slipper still worn by several congregations of reformed monks.

It consists of no more than a mere leathern sole, fastened with latches or buckles, all the rest of the foot being left bare.

The Capuchins wear *sandals*, the Recollects, clogs: the former are of leather, the latter of wood.

SANDARAC, **SANDARACHA**, in natural history, &c. a native mineral; or a preparation of orpiment, made by fusing it by a close fire into a red friable mass. See **ORPIMENT**. *Sandaracha* is the same with what is by some otherwise called *Realgar*.

It is sometimes also called *Sandaracha Græcorum*, in opposition to the gum *Sandarach*. Some distinguish two sorts of Grecian *Sandarac*: the natural which is the first above described; and the *fælitious*, which is only cerus exalted by the fire, and burnt into a kind of minium. Both the one and the other is a poison. See *Supplement*, article **SANDARACH**.

Gum SANDARACH, or **SANDARACHA Arabum**, a white gum oozing out of the trunk, and thick branches of the great juniper-tree, by incisions made in the heats of the summer.

The small or common juniper yields very little *Sandarach*: but its fruit yields oils, waters, salts, spirits and extracts of some repute in medicine.

The *Gum-Sandarach* is an ingredient in varnish. With this melted in oil of turpentine is made the fælitious varnish now used by painters and cabinet-makers.—It is also reduced into an impalpable powder, and used to prevent paper from imbibing ink.

The best is in fine white tears, free of dust: the English, Swedes, &c. drive a considerable trade therewith. Some will have it, that the gum of the juniper is not the right *Sandarach*, but that of the oxycedrus, or lesser cedar.

SAND-BAGS, in fortification, are bags holding each about a cubic foot of earth, or sand; used for raising parapets in haste, or to repair what is beaten down.

They are also of use when the ground is rocky, and affords not earth to carry on the approaches; because they can be easily brought on, and off at pleasure.

There are a lesser sort, which hold half what the former do, and are placed upon the upper talus of the parapet, to cover those who are behind, and who fire through the embrasures, or intervals, that are between them.

SANDEVER, or **SANDIVER**, the recement of glass; or the scum that arises from the ashes of the herb kali, used in the making of glass.

Some also use *sandever* for the kali, or glass-wort itself.

SAND-HEAT, or **SAND-BATH**, denotes one of the chymists fires; consisting of hot sand, wherein herbs, flowers, &c. are infused in a cucurbit.

The *sand-heat* is esteemed gentle, digestive, and alterative of many bodies.

SANDIVER. See the article **SANDEVER**.

SANDY X, a kind of minium, made of cerus, or rather lead, calcined and rubified; called also *fælitious sandarac*.

It is of little use in painting; the real minium, or red lead, to which it is substituted, making a much better, brighter, and more durable colour.

SANGUIFICATION, in the animal æconomy, the action whereby chyle is converted into blood.

Sanguification succeeds chylification, and is followed by nutrition.

Sanguification is thus effected. The chyle having passed the lacteals of the several kinds, is delivered into the blood at the subclavian; whence the two humours pass together to the right ventricle of the heart, where being yet more intimately mixed, they circulate together through the whole body; till, after several circulations and depurations at the several colatures and framers of the body, they become assimilated, or, as the chymists call it, *coagulatum*, so as only to make one uniform compound mass, which appears to be nothing else but chyle altered by the action of nature, and exalted into blood.—In effect it does not appear that any thing extraneous is mixed with the circulating liquor but chyle, excepting what was before separated from it for particular occasions; unless perhaps it should receive some portion of air in the lungs, which is a point long disputed, and yet scarce ascertained.

Indeed, that there is a quantity of air mixed with the blood and circulating with it, is granted; but whether this be any more than what was at first contained in the bodies whereof the chyle was formed, is much doubted. The principal arguments for it, are, the necessity of a ferment to give the blood colour, the blood receives in the lungs, and then flows in the pulmonary vein.—But the first is easily accounted for another way. See **RESPIRATION**.

The latter is chiefly supported by this experiment, that blood coagulates in a vacuum, and is hindered to coagulate, upon turn-

ing up, the bottom, which before was blackish, being now exposed to the air, acquires a white colour, like that which serves in the blood of the pulmonary vein.

The ancients were in great perplexity about the seat of *sanguification*, or the place where, and the instrument whereby it is effected: whether in the heart, or the liver, or the lungs? but, according to the doctrine of the moderns, the heart, liver, vessels, &c. contribute no otherwise to the changing of the chyle into blood, than the sun does to the changing of the mast into wine.

The ancients accounted for *sanguification* from a plastic power.—In the 11th century, when chymistry was introduced, *sanguification*, and almost every thing else, was to be effected by a ferment; and the physicians of those times, were very solicitous as to the particular officina where this ferment was prepared and kept. Some would have it the liver, others the spleen, &c. but the very notion of it is now exploded.

Of *sanguification* we may admit two degrees; the first amounting to no more than a confusion, or such an intimate mixture of parts, as suffices to confound the different coloured liquors, as that the whiteness of the chyle shall be lost or drowned in the redness of the blood, so as never more to appear in its own shape and colour.—This we suppose may be effected by repeated circulations alone: that how many circulations are necessary thereto, it is difficult to determine.

The second degree of *sanguification*, is, when the parts of the chyle are so exalted, or comminuted and subtilized, as to lose all tendency to a coagulatory separation, such as they have in chyle and milk.

To these two degrees may be added a third, wherein the fibres and filaments of the crude blood are so broken and blended with the serum, as not to be again separable from them.—This is a third degree of *sanguification*, such as happens in fevers, &c. attended with a bloody sweat, purple spots, &c. All these degrees of *sanguification*, Dr. Drake makes no doubt, are procured by reiterated circulations, wherein as well the intestine, as the progressive motion, conspire to the mixing and comminuting of the adventitious parts. Doubtless they have their stated period, wherein they are in perfection; though where precisely to fix it, we do not know.

SANGUINE, *bloody*; or a thing abounding in blood. See **BLOOD**.

SANGUINE Temperament, or *Constitution*, is that where blood, and heat predominate.

Sanguine constitutions require a frequent use of phlebotomy. *Sanguine* people are usually observed to be brisk, bold, daring, and even presumptuous.—Hence *sanguine* hopes, i. e. strong, assured, &c. hopes.

SANGUINE, in heraldry, the colour usually called *Murrey*; being made of red lake, tinged with a little Spanish brown. It is represented in engraving, by transverse hatchings like purple; and is mostly used in the coats of knights of the Bath.

When borne by nobles, it is rather called *Sardonyx*; and in the coats of sovereign princes *Dragon's Tail*.

SANGUINE Stone, *Lapis SANGUINALIS*, a kind of Jasper, brought from New-Spain, of a dark brown colour, marked with spots of a blood-red.

The Indians cut it in form of a heart, and use it in hæmorrhages, immoderate menses, and other fluxes of blood.—The patient applies it by grasping it in his right-hand, having first dipped it in water. It is sometimes also hung on the part whence the blood flows.

SANGUINIS Periodus. See the article **PERIODUS**.

SANGUIS, in medicine, &c. See **BLOOD**.

SANGUIS, in our ancient customs, denotes a right or power, which the chief lord of the fee anciently had to judge and determine cases where blood was shed.—*De murderia & rapitu, de igne, de Sanguine*, &c. Monast.

SANGUINEM Emere, was an obligation which the inhabitants of some manors, as that of Grendon, were under, to buy and redeem their villain blood, or tenure, and make themselves freemen.

SANGUIS Caprinus, or *Hircinus*, the blood of the he-goat, either wild or tame. This used to be prepared, with great precaution, to be used in medicine, and was supposed by many to have very extraordinary qualities.

The principal precautions are these: the goat is not to exceed four or five years of age; it is to be fed a considerable time with aromatic herbs, and especially those of the saxifrage kind; the blood to be drawn out of the throat, or the testicles, by cutting them; but neither what comes first, nor last is to be used, the former being too full of humidity, and the latter too thick; the operation to be only performed in July; and the blood put into earthen vessels, and dried either in the sun or the shade; and, lastly, bottled up to be used occasionally.

Among other specific virtues attributed to goat's blood, the two most considerable are, that, as they say, it cures the pleurisy without bleeding, and that it dissolves the stone in the bladder, by taking it in vessels proper for those diseases.—To be good, it is to be very hard, and difficult to pulverize.

SAP

SANOWIS Draconis, in pharmacy. See **DRAGON'S-BLOOD**.
SANHEDRIN*, or **SASHEDRIM**, **SYNEDRUM**, among the ancient Jews, the supreme council, or court of judicature of their republic; wherein were dispatched all the great affairs both of religion, and policy.

* The word is derived from the Greek *συνεδριον*, a council, assembly, or company of people sitting together; from *συν* con. together, and *εδρι* seat.

Many of the learned agree, that it was instituted by Moses, Numbers ch. xi. and consisted at first of seventy persons, all inspired of the Holy Ghost, who judged finally of all causes and affairs; and that they subsisted, without intermission, from Moses to Elders.—Others will have it, that the council of seventy elders, established by Moses, Numb. ch. xi. was temporary, and did not hold after his death; adding, that we find no sign of any such perpetual and intallible tribunal throughout the whole Old Testament.

The Jews, however, contend strenuously for the antiquity of their great *sanhedrin*: M. Simon backs and defends their proofs, and M. le Clerc attacks them.—He the origin and establishment of the *sanhedrin* how it will, it is certain it was subsisting in the time of our Saviour; that it was held at Jerusalem; and that the decision of all the most important affairs among the Jews belonged to it.—The president of this assembly was called *Nassi*.

There were several inferior *sanhedrim* in Palestine, all depending on the great *sanhedrin* at Jerusalem. The inferior *sanhedrim* consisted each of twenty-three persons; and there was one in each city and town. Some say, that to have a right to hold a *sanhedrin*, it was requisite there were one hundred and twenty inhabitants in the place. Where the inhabitants came short of the number of one hundred and twenty, they only established three judges.

Into the great as well as the inferior *sanhedrim* were admitted priests, levites, and laymen, of all the tribes, provided they were of noble extraction, rich, wife, without any blemish of body, and, as was pretended expert, in magic; which last was esteemed a necessary qualification, to enable them to obviate and destroy it: very old people and eunuchs were excluded.

In each *sanhedrin* there were two scribes: the one to write down the suffrages of those who were for condemnation; the other to take down the suffrages of those who were for absolution.

Selden has a learned work on the subject of the Jewish *sanhedrim*, de *Synhedriis*, printed at London in 1635, in three volumes, quarto.

SANIES, in medicine, a thin, limpid, ferous matter; issuing out of wounds, and ulcers: by the Greeks called *χολη*. Galen compares it to whey: it differs from *pus*, which is thicker and whiter.

SANTALUM, **SAUNDERS**, a hard, heavy, odoriferous, medicinal wood, brought from the East-Indies, of some repute, as a drier, absorbent, and sweetener.

There are *santals* of three different colours; *citrine*, *white*, and *red*. The trees whence they are taken are all of the same kind; and it is supposed their different colours only arise from the difference of the climates where they grow: some say from the different parts of the tree they are taken from.

They are all held to be a little astringent, to strengthen the heart and brain, and to stop vomiting; and are frequently used in diet-drinks, and medicated ales, against scorbutic complaints.

The tree is about the height of the European walnut-tree: its leaves resemble those of the lentiscus; its flowers are blue, bordering on black; its fruit is of the size of our cherry, green at first, but blackening as it ripens, and of a faint taste.

The *citrine santal* is esteemed the best: it is brought from China, and Siam; and is yellow, heavy, and of a good smell; it is used in medicine, as also by the perfumers.

The *white-santal* is less odoriferous; it is brought from the Isle of Timor.

The *red* has the least smell of the three; but is the most astringent; it is brought from the island Tamaslarin, and the coast of Comorondel.

SAP*, in speaking of plants, denotes *juice*.

* The word is formed from the Saxon *Sapra*, which signifies the *juice*; and that according to Mylius from the Greek *σαπρος*, *juice*.—Whence also the Latin *Sapa*, used for an undistilled juice. See **RON**.

Circulation of the SAP. See **CIRCULATION of the Sap**.

Procurement of the SAP for economical uses. See **TAPPING**.

SAP, or **SAPP**, in building. To *sap* a wall, &c. is to dig or open a trench in the ground at the foot of a wall, &c. so as to weaken it even all at once for want of support.

To *sap*, according to Daviler, is to undermine a work with hommers, pickaxes, mattocks, &c. viz. a bank, or bulwark, by propping it up, digging underneath it, and then burning the props, or stays; or a rock, by digging a mine underneath it.

To demolish the thick, firm walls of old castles, &c. *sapping* is much the readiest way.

SAP

SAP, in the military art, denotes a work carried on under ground, to gain the descent of a ditch, counter-scarp, or the like.

It is performed by digging a deep trench, descending by steps from top to bottom, under a corridor; carrying it as far as the bottom of the ditch, when that is dry, or as far as the surface of the water when wet.

When the covert-way is well defended by musketeers, the besiegers make their way down into it by *sapping*. *V. Tab. Fortif. fig. 21. n. 5.* When they are got near the foot of the glacis, the trench is carried on directly forwards; the workmen covering themselves with blind, wheel-packs, sand-bags, and mantelets upon wheels. They also make epaulements, or traverses, on each side, to lodge a good body of men.

The *sap* is usually made five or six fathom from the salient angle of the glacis, where the men are only covered side-ways; for which reason they lay planks over-head with hurdles, and earth above them.

When they have forced the enemy to quit the covert-way, the pioneers immediately with sand-bags, wool-packs, or other fences, make a lodgment, and cover themselves as well as they can, from the fire of the opposite bastion.

SAPATA. See the article **ZOPATA**.

SAPHENA, in anatomy, a vein which arising over the malleolus internus, and running up along the leg, and the inner part of the thigh, discharges itself, near the groin, into the crural vein. See *Tab. Anat. Angiol. fig. 6. n. 44*.

It is this vein they usually open when they bleed in the foot, for suppressions of the menfes.

It has its name, probably, from *σαφειν*, manifestus, as lying plain in sight.

SAPHETA, in architecture, is the board over the top of a window, placed parallel and opposite to the window-sill at the bottom.

SAPIENTIAL, **SAPIENTIALIS**, an epithet applied to certain books of scripture, calculated for our instruction and improvement in prudence, or moral wisdom; they are thus called in contra-distinction to the historical and prophetic books.

The *sapiential* books are Proverbs, Canticles, Ecclesiastes, the Psalms, and Job; though some reckon this last among the historical books.

SAPIENTLÆ Dentes, the two last or inmost of the dentes molares of the upper jaw, one on each side; thus called because they appear not till persons are grown.

SAPP. See the article **SAP**.

SAPPIC, in poetry, a kind of verse much used by the Greeks, and Latins; and so denominated from the inventress *Sappho*.

The *Sapphic* verse consists of eleven syllables, or five feet; whereof the first, fourth, and fifth, are trochees, the second a spondee, and the third a dactyl, as in

Integer vultu selerisq; purus,

Non eget Mauri javalis nec arcu.

HOR.

Three verses of this kind, closed with an Adonic verse, consisting of a dactyl and spondee, usually make a strophe.—Though we have some choruses in the ancient tragic poets, containing a much greater number of *Sapphicks* successively.—They generally run rough, unless they have the caesure after the second foot.

SAPPHIRE, or **SAPPHYR**, **SAPPHIRUS**, a precious stone of a beautiful azure, or sky-blue colour.

The *sapphire* is transparent, yet exceedingly hard, so as very difficultly to bear being engraven upon.

Different degrees of colour constitute different kinds thereof; the deepest blues being esteemed males, and the palest females.

The *sapphires* of Pegu are the most esteemed. They are found in the same mines with the rubies. There are some also brought from the kingdoms of Calecut, Cananor, and Ceylon; from which last place we should be furnished with abundance, if the king of the island did not prohibit all commerce thereof with foreigners.

The soft or *water-sapphires* of Bohemia and Silesia are of some account, though far inferior to the oriental ones, both in the brightness of their blue, and the firmness of their texture.

Many people value the *sapphire* beyond the ruby; and give it the second place among precious stones, viz. that next the diamond: others give that place to the ruby.

A *sapphire* being heated to a certain degree, between two crucibles luted together, loses all its blue, and becomes perfectly colourless; so as to deceive even the jewellers themselves, and pass for a diamond.

Our druggists sell two kinds of *sapphires* used in the confession of hyacinth; the one red, the other blackish. The last, by reason of the deep tincture they give that medicine, are very improperly used there: the former are little reddish stones, of the size of pin-heads, very hard, and difficult to pulverize.

Some rank the cat's eye, *oculus cati*, in the number of *sapphires*. This is a gem remarkable for a fine diversity of colours, as well as for its hardness, which bears a polish equal with that of the true *sapphire*.

The chymists make several preparations of *sapphirine*; as a salt, a tincture, an essence, a water, an oil, &c. and there are few diseases but they pretend themselves able to cure by remedies composed thereof.

The superstitious attribute still more strange virtues to this stone; as, that it grows foul, and loses its beauty, when worn by a person that is lecherous, &c.

The rabbins hold, that Moses's rod, and the tables he received on mount Sinai, were of *sapphire*.—The reason is, that in the Hebrew the finest things are all called *sapphires*; whence, in scripture, the throne of God is said to resemble a *sapphire*. See Supplement, article SAPPHIRE.

SAPPHIRE-RUBIES, are certain precious stones, between blue and red; which, in effect, are nothing but rubies, whose colour is mixed with blue.

SARABAITE*, *SARABAITE*, a name anciently given to vagabond and strolling monks.

* The word is derived from the Hebrew סרסר *sarab*, to rebel.

St. Benedict gives a frightful idea of these *Sarabaites* in the first chapter of his rule: Cassian does not speak a whit more favourably of them in his fourteenth conference; nor St. Jerom in his letter to Eustochium.

Cassian calls them, *Remitti*; *quia jugum regularis discipline non possunt*.

SARABAND, a musical composition in triple time; beings, in reality, no more than a minuet, whose motions are slow, and serious.

Saraband is also a dance to the same measure, usually terminating when the hand rises; whereby it is distinguished from the courant, which ends when the hand that beats time, falls.

The *saraband* is said to be derived originally from the Saracens, as well as the chacone: it had its name, according to some authors, from a comedian called *Sarabande*, who first danced it in France. Others derive the name from the Spanish *fandango*, a ball: it is usually danced to the sound of the guitarre, or castanettes.

SARCASM, *SARCA MUS*, in rhetoric, a keen, bitter irony, whereby the orator scoffs, and insults his adversary. Such was that of the Jews to our Saviour: *Thou who destroyest the temple, and raisest it in three days, save thyself*, &c. and again, *He saved others, himself he cannot save*. Or that of Turnus to a Trojan slain by him, in Virgil.

*En agens, & quam bello, Trojante, petisti
Hesperiam meliore jacens! Hec præmia qui me
Ferro ausi tentare ferunt: sic mania condunt!*

SARCOCELE*, *SARCOCELE*, in medicine, a fleshy, scirrhous excrescence, very hard, yet not very painful; rising up by little and little about the testicles, or on the inner membrane of the scrotum.

* The word is formed from the Greek σαρξ *sarx*, flesh, and κύμα *kuma*, tumour.

Sometimes indeed it is painful; in which case there is danger of its degenerating into a cancer.

It usually owes its origin to some external cause, as a blow, a bruise, or contusion. Such accidents occasion the nutritious juices to stop, and to be collected in great quantities in the relaxed or compressed pores of those parts, by which means is formed that kind of tumour called *sarcocele*, and by some *hernia carnis*.

It is a very troublesome and obstinate disease, and is frequently incurable by any other means than castration, or cutting out the testicle.

SARCOGOLLA, *SARCOGOLLA*, a gum oozing out of an oriental vegetable either with, or without incisions.

Neither authors, nor merchants are agreed as to the place where it grows: some say it is in Persia, others, in Arabia Deserta.—It comes either in grains, or in tears of different colours; sometimes white, sometimes yellow, and sometimes red, but all equally good, provided they be very dry. The taste is bitter, accompanied with somewhat of a disagreeable sweetness.

It is esteemed warm, and drying; very good to consolidate and heal wounds; whence its name—from the Greek, σαρξ *sarx*, flesh, and κύμα *kuma*, glue.

It is sometimes also used in collyria to stop defluxions, and take off specks in the eye.

SARCOLOGY, in anatomy, a discourse on the flesh, or the soft parts of the human body. See FLESH.

Anatomy is divided into two principal parts; *skeology* and *sarology*. The first whereof treats of the bones, and cartilages; the second of the flesh and soft parts. See ANATOMY.

SARCOMA, *SARCOMA*, in medicine, a fleshy, fungous excrescence arising in the nostrils, or other parts; nearly resembling a polypus.

The *sarcoma* chiefly differs from the polypus, as the latter grows from the part by several roots; the former by one continued root, or without any roots at all.

Every polypus is a *sarcoma*; but not vice versa.—The *sarcoma* frequently degenerates into a polypus.

SARCOMPHALUM*, *SARCOMPHALUM*, in medicine, &c. a hard excrescence of the navel.

* The word is formed from the Greek σαρξ *sarx*, flesh, and φάλαγξ *phalagx*, navel.

SARCOPHAGUS, *SARCOPHAGUS*, in antiquity, a sort of stone coffin, or grave, wherein the ancients laid those they had not a mind to burn.

The word, as derived from the Greek, literally signifies, *flesh-eater*; because at first, they used a sort of stones for the making of these tombs, which quickly consumed the bodies.—The quarries from whence they dug them were near a city of Troas, named *Aphum*.—I hey had the faculty to waste away a body to nothing, save the teeth, in forty days.

This stone resembled a reddish pumice-stone, and had a saltish taste; they also made vessels of it to cure the gout, into which they put their feet, not fearing them to continue there too long. See Supplement, article ASSIUT LAPI.

SARCOTICKS*, *SARCOTICKS*, in medicine, remedies proper to fill up wounds and ulcers with new flesh; the same as incarnatives. Such are farcocolla, dragon's-blood, frankincense, &c. See INCARNATIVE and EPULOTIC.

* The word is formed from the Greek σαρξ *sarx*, flesh.

SARDIAN, *SARDIN*, or *Lapis SARDIUS*, a precious stone of a blood colour, semi-transparent; the same with what we otherwise call a *Cornelian*.

The most beautiful *Sardians*, are those brought from about Babylon: those of Sardinia, whence they take their name, are in the second class. There are others, and those no contemptible ones, found near St. Mauro in Albania; and other, very small ones, about the Rhine, in Bohemia, Silesia, &c. To give them the greater lustre, it is usual in setting them, to lay silver-leaf underneath. The *Sardian* is most used for seals, as graving easily, yet taking a fine polish.

The author of the book falsely ascribed to Albertus Magnus, attributes several wonderful virtues to this stone. See Supplement, article SARDA.

SARDONIAN Laughter. See RISUS SARDONIUS.

SARDONYX, *SARDONYX*, a kind of belted or plated precious stone, partaking partly of the sardian, and partly of the onyx.

It is semi-transparent, and usually is reddish plated with white, somewhat like the nail of the hand: in some, the red inclines to a yellow. It is brought from the East-Indies, Arabia, and Belymia. It was anciently much used for fine vessels. See Supplement, article SARDONYX.

SARPLAR * of Wool, *SARPLERA Lana*, otherwise called a *packer*, i. half a tick. See SACK.

* In Scotland, it is called *Sarplath*.

SARRASIN, or *SARRAZIN*, in fortification, a kind of postcullie, otherwise called an *herse*, which is hung with ropes over the gate of a town, or fortifications, and let fall in case of a surprize.

SARSAPARILLA, *SALSAPARILLA*, or *SARSA*, a medicinal plant, growing in New Spain, Peru, &c. chiefly used in decoctions, and potions for the venereal disease; being esteemed a great absorbent and sweeter; and, on that score, sometimes taken as a tea.

Its root, which is the part in use, divides itself into a great number of filaments, six or seven foot long; of the thickness of a quill: it is brownish without sides, and white within, only marked with two red streaks. Its branches creep on the earth, or along the trunks of trees, &c. as the ivy does.

To be good, it must be very dry, its filaments long, easy to cleave; and, in cleaving, they must not yield any dust: when boiled in water, it must give it a reddish tincture.—Some physicians much doubt the medicinal virtue of this root; as it does not discover much, either in taste, smell or tincture.

There is another kind of *sarsa*, the filaments of whose root are thicker, growing in the island Marignan, on the coast of Brazil: this is not esteemed so good as the former.

There is a third kind brought from Mucovy, whose roots are still bigger, but good for nothing.

SARTORIUS, in anatomy, the *Taylor's muscle*; a muscle thus called, because serving to throw one leg across the other. It is also called *Longus tibiae*, and *Fascialis*; and is an antagonist to the popliteus.—See Tab. Anat. (Myol.) fig. 1. n. 49. fig. 2. n. 38. See also the article LONGUS.

SASSAFRAS, a yellowish, odoriferous wood, of a brisk, aromatic scent, somewhat resembling fennel; the produce of a tree whereof there are whole forests growing in Florida, Virginia, &c.

The natives call it *Pavama*, the Spaniards and French call it *Cinnamon-Wood*; because, at the conquest of that country, under Ferdinand Soto, in 1558, they imagined this to have been the true cinnamon tree.

The lignum *Sassafras*, and chiefly its bark, wherein its principal virtue is supposed to reside, was formerly sold at an incredible price, to be used with *Sarsaparilla* and China root, in the cure of the venereal disease. It is very drying and hot, though not quite so much so as the gualicum.

It is somewhat come into fashion in families, as a common tea, which the shavings of it make agreeable enough; but the scandal of being good in venereal cases, is a detriment to it, and prevents a deal of good being done by it.

It is esteemed in the gout, sciatica, and green sickness. Chuse that covered with a thick bark, reddish, and rough, of a sharp taste, and a strong aromatic smell.

SASSE, in some of our statutes, denotes a kind of wear with flood-gates, commonly used in navigable rivers for the damming, and looting the stream of water, as occasion requires, for the better passing of boats, and barges to, and from places.

This in the west of England, is called a *Lock*; in the river Lee, a *Turn-pike*, and in other places a *Sluice*.

SATELLITE, SATELLE, *Guard*; a person attending on another, either for his safety, or to be ready to execute his pleasure.

Among the eastern emperors, *Satellite* originally expressed the dignity or office of captain of the life-guard.

The term was afterwards applied to the vassals of lords; and afterwards, to such as held fees, called *Sergeanties*. See SERGEANTY.

SATELLITES, in astronomy, certain secondary planets, moving round the other planets, as the moon does round the earth; they are thus called, because always found attending them from rising to setting, and making the tour of the sun together with them.

The *Satellites* move round their primary planets, as their centres, by the same laws as those primary ones do round their centre, the sun.—For the physical cause of their motions, see GRAVITY.

The words moon, and *Satellite*, are sometimes used indifferently; and thus we say, either Jupiter's moons, or Jupiter's *Satellites*: but ordinarily we distinguish; restraining the term *moon*, to the earth's *Satellite*; and *Satellite* to the little moons lately discovered about Jupiter and Saturn.

The *Satellites* were unknown till our time; as needing the assistance of the telescope to render them visible.

We do not know of any *Satellites*, besides those just mentioned; nor is there any great foundation to hope that more shall be discovered hereafter, as the longest, and the most exquisite telescopes have already been applied.

SATELLITES of Jupiter, are four little secondary planets, performing their revolutions about Jupiter, as that planet does round about the sun.

Simon Marius, mathematician of the elector of Brandenburg, about the end of November in 1609, observed three little stars moving round Jupiter's body, and proceeding along with him; and in January 1610, he found a fourth.

—In January 1610, Galileo also observed the same in Italy; and the same year published his observations; from which time commenced the observation of the circumjovial *Satellites*.

Galileo, in honour of his patron, first called them *astra Medicea*, Medicean stars: Marius, the first discoverer, called that next Jupiter, *Mercurius Jovialis*, Jupiter's Mercury; the second, *Venus Jovialis*, Jupiter's Venus; the third *Jupiter Jovialis*, and the fourth *Saturnus Jovialis*, Jupiter's Saturn.

Indeed, Anthony Maria Schyrlaus de Rheita, a capuchin of Cologne, imagined, that, besides the four known *Satellites* of Jupiter, he had discovered five more, on the 29th of December, anno 1642, and in honour of Urban VIII. the pope then reigning, he denominated them *Siden Urbanotiviana*.—But upon Nauda's communicating the observation to Gassendus, who had observed Jupiter on the same day, he soon perceived that the monk had mistaken five fixed stars, in the effusion of the water of Aquarius, marked in Tycho's catalogue 24, 25, 26, 27 and 28, for *Satellites* of Jupiter: whence it is no wonder they should appear to the discoverer to move a contrary way to that of the rest, viz. from west to east. See *Epist. Gassend. ad Gab. Naud. de novem stellis circa Jovem visis*.

Phænomena and nature of Jupiter's SATELLITES.—1^o. They all disappear in a clear sky, when Jupiter interposes between them and the sun; that is, they are eclipsed by him.

Hence it follows, that they are destitute of light, when the sun's rays, which are propagated in right lines, are intercepted by Jupiter: and hence it follows, that they are opaque bodies like our moon, and are illuminated by the sun.—And hence, since Jupiter does not illumine his *Satellites* when placed behind him; he himself, in that side opposite to the sun, is destitute of all light.

2^o. When the *Satellites* are interposed between Jupiter and the sun, a round macula or spot is observed in Jupiter's disk; which is sometimes found bigger even than the *Satellite* itself.

Hence, since the *Satellites* are opaque bodies, and are illuminated by the sun, and must therefore project a shadow, opposite to the sun; the round spots seen in Jupiter, are the shadows of the *Satellites*.—Hence also, since the intersection of the shadow is a circle, the shadow itself is conical: and hence it follows, that the figure of the *Satellites*, at least, as to sense, is spherical.

3^o. If when the earth is between Jupiter and the sun, any of the *Satellites* happen to be between the same, its light disappears, and is lost in Jupiter's light.—Thus M. Maraldi tells us, that on the 26th of March 1707, through a telescope of thirty-four feet, he observed the fourth of Jupiter's moons passing over his body, in form of a dark spot;

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Lut it had no sooner got off the disk, than it resumed its usual brightness. A like spot he observed on the 4th of April, from an immersion of the third *Satellite*; but, on the 11th of April, upon watching an immersion of the same *Satellite*, he found it appeared wholly, without leaving any spot at all.—The same phenomenon was also observed at other times by M. Cassini.

In effect, both Cassini and Maraldi have frequently observed very surprising changes in the apparent magnitudes of the *Satellites*, when there was nothing in their distance, either from the earth, sun, or Jupiter, to occasion such variations.—E. gr. The fourth *Satellite*, which is frequently the least of all, sometimes appears the biggest: and the third, which is ordinarily the biggest, sometimes only appears equal, and sometimes less, than any of the rest.

Hence, since Jupiter's *Satellites* are illumined by the sun, even when immersed in the light of Jupiter, and yet, notwithstanding this, sometimes appear dark, and sometimes disappear; there must be some changes in their atmospheres, to prevent the equable reflection of the sun's rays, from the several parts of the atmosphere.—To the same cause also it is owing that their shadows are sometimes seen bigger than themselves.

Periodical times of Jupiter's SATELLITES.—The periods, or revolutions of Jupiter's *Satellites* are found from their conjunctions with Jupiter, after the same manner as those of the primary planets are found from their oppositions to the sun.

By this method, Cassini found the periods of the several *Satellites* to be as follow.

First <i>Satellite</i>	1 Day	18 Hours	28 Min.	36 Seconds
Second <i>Satellite</i>	3	13	18	52
Third <i>Satellite</i>	7	3	59	40
Fourth <i>Satellite</i>	16	18	05	06

Distance of Jupiter's SATELLITES from Jupiter.—As in the primary planets, with regard to the sun, so in the *Satellites*, with regard to their primaries, the squares of the periodical times are in a triplicate ratio of their distances therefrom.—To determine the distance by observation, they measure them with a micrometer, in semi-diameters of Jupiter.—These distances, according to Cassini, are as follow.

The first <i>Satellite</i>	is distant from Jupiter's centre,
The second <i>Satellite</i>	5 $\frac{1}{2}$ semi-diameters of Jupiter
The third <i>Satellite</i>	9 semi-diameters
The fourth <i>Satellite</i>	14 $\frac{1}{2}$
	25 and one 3d.

Hence, as the semi-diameter of Jupiter is equal to 27 $\frac{8}{9}$ semi-diameters of the earth, the distance of the first *Satellite* from the centre of Jupiter is 166 semi-diameters of the earth; that of the second 249 and a half; that of the third 388; and that of the fourth 884.

Eclipses of Jupiter's SATELLITES. See ECLIPSES. SATELLITES of Saturn, are five little stars revolving about Saturn.

The first was discovered by M. Huygens, anno 1655, March the 25th, by means of a telescope twelve foot long; and the other four, at different times, by M. Cassini, viz. those two next Saturn, in March 1684, by help of Campani's Glasses, of one hundred, and one hundred and thirty-six foot: the third in December 1672, by a telescope of Campani's, of thirty-five foot; and the fifth (that of Huygens being the fourth) in October 1671, by a telescope of seventeen foot. Most, perhaps all, of the phenomena observed of Jupiter's *Satellites*, are also found exhibited by those of Saturn. Thus, they are found sometimes bigger, and sometimes less: the fifth is sometimes, also, found eclipsed, &c. And hence, there is no doubt, but they are of the same nature, &c.

The periodical times of the SATELLITES of Saturn, according to M. Cassini, are as follow.

First <i>Satellite</i>	1 Day	21 Hours	18 Min.	31 Seconds.
Second <i>Satellite</i>	2	17	41	27
Third <i>Satellite</i>	4	13	47	16
Fourth <i>Satellite</i>	15	22	41	11
Fifth <i>Satellite</i>	74	7	53	57

The distances of Saturn's SATELLITES from his centre, according to the same M. Cassini, are as follow.

First <i>Satellite</i>	4 $\frac{1}{2}$ Semi-	1 $\frac{1}{2}$ Diameter
Second <i>Satellite</i>	5 $\frac{1}{2}$ diam.	1 $\frac{1}{2}$ Diameter
Third <i>Satellite</i>	8 $\frac{1}{2}$ of Sa-	1 $\frac{1}{2}$ of Saturn's
Fourth <i>Satellite</i>	18 turn,	4 ring.
Fifth <i>Satellite</i>	54 or	10 $\frac{1}{2}$

The great distance between the fourth and fifth *Satellite*, gave occasion to Huygens to suspect that there might be some intermediate one; or else, that the fifth might have some other *Satellite* moving round it, as its centre.

Dr. Halley, in the Philosophical Transactions, gives us a correction of the theory of the motion of the fourth or Huygenian *Satellite*.—Its true period he makes 15 day, 22 hours, 41 minutes, 6 seconds; its diurnal motion, 22 $^{\circ}$ 34' 38" 18"; its distance from the centre of Saturn, 4 diameters of the ring; and its orbit to be little or nothing distant from that of the ring, intersecting the orbit of Saturn under an angle of 23 $\frac{1}{2}$ degrees.

SATIR and SATIRE. See the article SATYR.

SATISFACIENDUM *capias ad.* See CAPIAS.

SATRAPA, or SATRAPES, in antiquity, a governor of a province among the ancient Persians.

King Darius usually walked attended by his principal lords, and *satrapes*, Q. Curtius. The kingdom of Persia was divided into *satrapies*, or jurisdictions of *satrapes*.

The word is originally Persian, signifying, strictly, admiral, or commander of a naval army; but it was afterwards applied indifferently to all governors of provinces.—In which sense it was also borrowed by the Greeks, who used the word *εσατραπης* in the same signification.

We also meet with the word in some ancient English characters of king Ethelred; where the lords, who sign next after the dukes, take the title of *satrapes* of the king.—Du Cange takes the word here to signify ministers of the king.

SATTIN*, or SATIN, a kind of filken stuff, very smooth, and shining, the warp whereof is very fine, and stands out; the woof coarser, and hid underneath: on which depends that gloss, and beauty, which gives it its price.

* The word comes from the French *Satin*, which Menage derives further from the Latin *Sato*, a bristle or hair; others from the Hebrew *Sadin*; or from the old French *Sade*, and *Sadinet*, handloom, gentle.

There are some *fattins* quite plain, others wrought, some flowered with gold or silk, others striped, &c.—All the varieties in the fabric of *fattins* are made by using new warps, or woofs. The finest *fattins* are generally said to be those of Florence and Genoa; yet, the French will not allow those of Lyons any thing inferior thereto.—The *fattins* of Bruges have their warp of silk, and their woof of thread.

Indian *fattins*, or *fattins* of China, are filken stuffs, much like those manufactured in Europe.—Of these, some are plain, either white, or of other colours; others worked, either with gold, or silk, flowered, damasked, striped, &c. They are mostly valued because of their cleanliness, and bleaching easily, without losing any thing of their lustre. In other respects they are inferior to those of Europe.

F. le Come observes, that the Chinese prepare their *fattins* in oil, to give them the greater lustre; but this makes the stuff liable to hang to them.

SATTINET*, or SATTINADE, a very slight, thin sort of sattin, chiefly used by the ladies for summer night-gowns, &c. and ordinarily striped.

* The word is a diminutive of *Satin*.

SATURANTIA, is sometimes used in the same sense as *Absorbents*. See ABSORBENT.

SATURDAY-STOP, a space of time, in which of old it was not lawful to take salmons, in the north, *viz.* from even-song on Saturday, till sun-rising on Monday.

SATURN, in astronomy, one of the primary planets; being that which is farthest from the earth, and the sun, and whose motion is the slowest: It is thus characterized, ♄.

Saturn shines but with a feeble light, by reason of its distance, on which account, also, though the biggest of all the planets, it appears the smallest.

The period of *Saturn*, or the space of time wherein he revolves round the sun, which makes his year, according to Kepler, is 29 years, 174 days, 4 hours, 58 minutes, 25 seconds, and 30 thirds; whence his diurnal motion must be 2 minutes, 0 seconds, 36 thirds. Though de la Hire makes his diurnal motion 2 minutes 1 second.—The inclination of his plane to that of the ecliptick, Kepler makes $2^{\circ} 32'$, de la Hire, $2^{\circ} 33'$. Its mean distance from the sun is 326925 semi-diameters of the earth; and from the earth 210000 of the same—Its smallest diameter, according to Huygens, is 30 seconds: the proportion of its diameter to that of the earth, as 20 to 1; of its surface to that of the earth, as 400 to 1; of its solidity to that of the earth, as 1 to 8000.

Dr. Halley observes, in the preface to his catalogue of the southern stars, that he has found *Saturn* to have a slower motion than is assigned him in the tables: this irregularity is abundantly rectified in his own tables.

It is doubted whether or no *Saturn*, like the other planets, revolves on his axis: it does not appear from any astronomical observations that he does; and there is one circumstance that should seem to argue the contrary, *viz.* that whereas the earth, and other planets, which we know do revolve on their axis, have their equatorial diameter greater than their polar, nothing like this is observed in *Saturn*.

The distance of *Saturn* from the sun being ten times greater than that of the earth from the same, it is found that the apparent diameter of the sun seen from him, will not exceed 3 minutes, which is but little more than twice the diameter of Venus.—The sun's disk, therefore, to an inhabitant of *Saturn*, will appear 100 times less than it does to us, and both its light and heat will be diminished in the same proportion.

The phases of *Saturn* are very various and extraordinary, and

long perplexed the astronomers, who could not give the meaning of such irregularities: thus Heydeus carried him to be sometimes *monophisoid*, sometimes *spheroid*, *spherico-anfated*, *elliptico-anfated*, and *spherico-cuspidated*.—But Huygens plainly shews, that all these monstrous appearances are owing to the imperfection of the telescopes that author had used. Huygens, upon observing him very attentively with much better glasses, reduced all his phases to three principal ones, *viz.* round, *brachiated*, and *anfated*.

One thing *Saturn* has peculiar to himself, *viz.* a ring which surrounds his middle like an arch, or like the horizon of a globe, without touching him any where; the diameter thereof is more than double that of the planet which it surrounds; the former containing 45 diameters of the earth, the latter only 20. When raised enough to be out of the shadow of the body of *Saturn*, it reflects the light of the sun very strongly. The thickness of the ring, Dr. Keill observes, takes up one half of the space between its outer or convex surface, and the surface of the planet.

This ring is found to be an opaque, solid, but smooth, and even body.—It was Galileo first discovered that the figure of *Saturn* was not round; but it was Huygens first found that its inequality was in form of a ring; the discovery of which he published in 1659, in his *Systema Saturnianum*.—It is doubted whether or no the ring revolves round the planet? its use and design are still a mystery.—For its phenomena, &c. see RING.

Saturn performs his course round the sun, attended with five satellites, or secondary planets; the periods, distance, &c. whereof see under SATELLITES.

SATURN, in chymistry, signifies lead; in regard that metal is supposed to lie immediately under the influence of this planet.

SATURN, in heraldry, denotes the black colour in the coats of arms of sovereign princes; answering to diamond in the coats of noblemen; and sable in those of gentlemen.

SATURNALIA, in antiquity, feasts celebrated among the Romans, in honour of the god Saturn.

The *Saturnalia* held three days; beginning on the 16th, others say, the 17th, and others the 18th day of December.

During this solemnity the slaves were reputed masters; they were allowed to say any thing; and in fine, they were served at table by the masters themselves.—Every thing run into debauchery and dissoluteness, and nothing was heard or seen in the city of Rome, but the din, riot, and disorder of a people wholly abandoned to joy, and pleasure.

M. Dacier observes, that the *Saturnalia* were not only celebrated in honour of Saturn, but also to keep up the remembrance of the golden age, when all the world was on a level. It was a piece of religion not to begin any war, or execute any criminal during this feast.

The *Saturnalia* were not only observed at Rome, but also in Greece; and were, in reality, much older than Rome itself.—Some ascribe their institution to the Pelagi, who were cast upon the island of Delos; others to Hercules, and others to Janus.—Grosopius Becanus makes Neph the author of them. *Orig. lib. 4.* That patriarch, he tells us, in the ark, instituted a feast to be held in the tenth month, in memory of this, that in that month, the tops of the mountains began to appear above the water; and thus he makes the origin of the *Saturnalia*: but it is very probable the year then began in autumn, and of consequence December could not be the tenth month. Vossius goes still farther, and will have it, that the Saturn, in honour of whom this feast was instituted, was Adam.

SATURNILLIANS. See the article SATURNINIANS.

SATURNINE, or SATURNIAN, a term applied to persons of dark, fullen, melancholic complexions; as being supposed under the predominancy of Saturn, or at whose births Saturn was the ascendant.

SATURNINIANS, or SATURNILLIANS, a sect of ancient Gnosticks; thus called from their chief *Saturnillus*, or *Saturninus*, a disciple of Menander, the famous Gnostick.

Saturnillus taught the same errors with his master, in Syria. See MENANDRIANS.

SATYR*, SATYRUS, SATYROS, in the heathen theology, a fabulous kind of semi-god, who with the Fauns and Sylphs, presided over groves, and forests, under the direction of Pan.

* The word is usually derived from *Sathe*, *εαθε* which, in the ancient Greek, signified the vine member; and thus the being supposed much addicted to intoxication.

The *Satyrs* were painted half men, and half goats: the upper part was human, excepting for horns on the head; the lower brutal, with the tail and legs of a goat; the whole covered with hair.

The poets usually confound the *Satyrs*, Silvens, Fauns, and Panes.

Nonnus, in his *Dionysiacs*, makes the *Satyrs* the offspring of Mercury, and a Dæmon nymph, called *Laphria*. *Satyrs* was us the names of several, *viz.* Pannius, *Τρυων*, *Παπα*, *Χρυση*, &c.

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chorus, Oriflas, Apæus, Phlegæus, Lycon, &c.—Memnon, in his book against the tyrants of Heraclea, derives the *Satyrs* from Bacchus, and a Naiad, called Nicæa.

*Satyr*s made part of the dramatic personæ in the ancient Greek tragedies, which gave rise to a new species of poetry, called *satyrical*. See the article following.

SATYR *, SATYRA, or SATIRA, in a literary sense, signifies all manner of discourse wherein any person is reprehended; but more particularly a poem, wherein mens follies; and vices are wittily exposed, in order to their reformation.

The origin of the word has been the occasion of a notable dispute among the critics. The common opinion followed by Scaliger, Heinsius and Vossius, deduces it from the Greek *Σάτυρος*, *Satyrus*, a sort of Sylvan deities, by the Romans called *Favni*, to whose petulance and wantonness this sort of composition is supposed to bear some resemblance.—On which *Σάτυρος* *satyr* is considered as a poem of a wanton, and licentious nature, which like the *Satyr*, turns things upside down to end occasion for censure, and ridicule.—Cafaubon, on the contrary, followed by Spanheim and Dacier, derives the Roman *satyr* not from the Grecian divinities called *Satyr*, to which they assert it bears no relation, but from the Latin *Satur*, used for *plenum* full, a thing to which nothing is wanting.—Thus it is that *satur color*, denotes what is which has sufficiently imbibed the colour, so that its dye cannot be further heightened: so *satur messis* denoted a plentiful harvest; and *satur gl'us*, a various one.—From this *satur* came *satura*, which was also written *satura* with an *s*, as *maximus* for *summus*; and *optimus* for *optumus*. But *satura*, it is to be observed, is an adjective, referring to a substantiv under stood, which here is *lanx*: *satura lanx* being the name of a bafon filled with all manner of fruits, which the Romans offered yearly to Ceres and Bacchus, as their first fruits. Thus the grammarian Diomedes. *Lex recepta carui multique pramitti, junci Cereris intertributi, & a cepia & faturati rari, satira vocabatur*. Hence also the word *satura* was applied to many other mixtures; particularly to a dish consisting of several sorts of meats. *Quod non genus facimus nulli rebus reformam satira ait occit* &c. *Varro* vocat. &c. And the same term was also translated to works of genius: thus *leges satira* de otio ludo ludo confisting of many words or titles, as in *Festus*. *Satura est ludo ludis aut ludo conferta*. And the ancient Greek *σάτυρα* *Nepos* παλλα πικρυα. Such, e. gr. is this, *Valerius*, *publique cum Jugurtha bellum confectum*, & *Judas satira*: *elephantus tradit, itum omnes transjugat*, &c.—Hence also a thing was said *per satira* *an firi*, when it was done hastily and confusedly: thus *per satiram legem ferre*, was to pass a law confusedly and in the lump, without collecting the votes.—Lastly, *satura* also became the title of several books, as of that of Psephenus *Festus*, who wrote *Historia* *et tractat*, or *per satiram*.—From the whole is inferred, that the *satyrical pieces* of the poets were so called, as being various, and miscellaneous compositions; or as Porphyrio explains it, *quod multis & variis rebus cum carum refertur est*.—On this principle it is urged, the word should be written in Latin with an *u*, *satiru* or *satira*, and in English only with an *i*. They who write it with a *y*, do it as supposing with Scaliger, and others, that the Sylvan *Satyr* gave name to this composition, and that the Roman *Satyr* came *satira*, which Cafaubon could never be improve, by shewing, that from *satira* could never be *satira*, but *satirica*, and by explaining the great difference between the Greek *satyr* poems and the Roman *satira*.—Scaliger nontheless defends the ancient etymon from the Greek *Σάτυρος*, which he makes to be the origin of the Latin *satur*, *satura lanx*, &c. which according to him were appellations first used in the sacrifices and ceremonies of Bacchus, where *satyr* were recheated: *Non a satira est lege sat lanx dicta est, ut fignia ex terebre satyrgi grammatici; quoniam haec satira dicta patet: cum lanabai enim probant, & casidii pomum cum genere pleni, quibus nymphas allucunt*.—In etim, *satyrical* poetry, according to this critick, may be naturally enough deduced from the wantonness of the *Satyr*; and what confirms it is, that *Σάτυρος* is rendered in ancient glosses by *ludo*; and *satyrical*, by *ludicrous*, *propterea*, &c. Thus Seneca's *satyr* is called *ludus*, and Horace and Petrus use *ludare* for *satirizare* *satyrica*.—V. Phin. *Hist. Nat.* l. 30. c. 6. Sever. in *Ætina*. v. 12. *Manil. l. 5. v. 480. *Diomed. l. 3. *Scal. Poet. l. i. c. 12. *V. Dan. *Reprint de Satyr*. Horatius. l. 2. Lugd. 1628, 12th Fab. Tab. p. 224th.

Satyr bears a near affinity to raillery, ridicule, lampoon, libel, &c. and stands opposed to panegyric. The reason why *satyr* generally pleases, and panegyrics tire the readers, seems to be, because the former are commonly true, and the latter false.—*Journ. des Sav. T. 81. p. 294.*

Horace calls his two books of *Satyræ*, indifferently either *Saturne*, or *Satyræ*, two words which at first sight present very different ideas.

The chief *satyriſt*'s among the ancients are, Horace, Juvenal and Perſius; among the moderns, Regnier and Boileau in French; and Dryden, Oldham, Rochefter, Buckingham, Pope, Young, &c. among the Engliſh.

A *satyr* ought to be lively, pleasant, moral, and full of variety; in this Juvenal and Horace excelled, though their *satyrs* ought not to be read without caution.—Among the qualifications requisite in a *satyrists*, one of the most essential is good-nature: all the sentiments which are beautiful in this way of writing must proceed from that quality in the author. It is good-nature produces that disdain of all baseness,

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vice and folly, which prompts the poet to express himself with immodesty against the errors of men, but without any bitterness towards their persons. It is this quality which keeps the mind in equanimity, and never lets an offence unfeelingly touch a man out of his character. When Virgil said, he that did not hate Bavius might love Mævius, he was in perfect good-humour, and was not so much moved at their absurdities, as passionately to call them fops, or blockheads in a direct invective, but laughed at them with a delicacy of scorn, without any mixture of anger.—The best good man with the worst-natured nufc, was the character among us of a gentleman as late as for his humanity, as his wit. In reality, the ordinary subjects for *satyr* are such as incite the greatest indignation of all in the best tempers, and consequently men of such a make are best qualified for speaking of them: such men can behold vice and folly, when they injure persons with whom they are wholly unacquainted, with the same severity with which others resent the ills they feel themselves.—In all the writings of Horace and Juvenal, there is not one ill-natured expression; not one sentence of severity which does not apparently proceed from the contrary disposition.—*V. Tail.* No 242. T. 4. p. 210. *fee.*

Satyr may be divided with regard to the measure, and kind of verse, as well as the manner of the poem, and the character, into *narrative, dramatick, mixed, &c.*

Narrative, is a simple narration or recital of abuses in the poet's own person.—Such is the first of Juvenal.

Dramatic, is that wherein several persons discourse together; whether they be nameless, as in the first of *Perfius*; or have names, as of *Catius* and *Damasippus*.

Mixt, is a compound of both the former; as that fine one of Horace, *Ibam fore etia sacre*.

"Grave, and animated, which inveigh with warmth and earnestness against corruption, and vice in every shape.—As those of Juvenal and Persius.

Sportive, and lighter, which seem to play with mens follies, but in playing omit no opportunity of making them feel the lash.—Such are those of Horace, which are hence said to be *sermoni propiora*.

The *grave* fort and handles a naked sword; the *festive* presents a thyrsus, like that of the ancient *Satyrs*; surrounded with vine leaves, with which it flabs unawares.—The heat of the former sometimes degenerates into fury, and indignation; and the calmness of the latter sometimes sinks to mere railery. But between the two extremes are a great number of intermediate species and degrees. The former, especially when dictated by passion, is much easiest: nothing is more difficult than to make people of taste laugh, even at the expense of others. The attaining of this must be the fruit of genius and talents, rather than rules: perhaps it may be unnecessary to explain either; since vanity, self-love, and even malice are masters more than sufficient for a poet who wants not wit, and judgment. Thus Juvenal: *Si natura negat, facit indignatio versum*; and Boileau: *La colère suffit & vaunt un Apollon*.—V. Mourg, *Traité de la poésie*. Franc. c. 4. *Mém. de Trev.* Nov. 1722. p. 2150.

In perusing the writings of the two leaders of the two forts of *satyr* last mentioned, it may not be unnecessary to consider, that they lived in very different times: Horace was intimate with a prince of the greatest goodness, and humanity; and his court was formed after his example: therefore the faults that poet falls upon were little inconfluences in behaviour, false pretences to politeness, or impetinent affectations of what men were not fit for. Vices of a coarser sort could not come under his consideration, because they could not enter the palace of Augustus.—Juvenal, on the other hand, lived under Domitian, in whose reign every thing great and noble was banished the habitations of the men in power. Therefore he attacks vice as it passes by in triumph, not as it breaks into conversation. The fall of an empire, contempt of glory, and a general degeneracy of manners, are before his eyes in all his writings.—In the days of Augustus, to have talked like Juvenal had been madness, or in those of Domitian, like Horace. Morality and virtue are every where recommended in Horace, as became a man in a polite court, from the beauty, propriety, and convenience of pursuing them: vice and corruption are attacked by Juvenal in a style which denotes, he fears he shall not be heard unless he calls to them in their own language, with a bare-faced mention of the villanies and obfecurities of his contemporaries.—*V. Tuti. T. 4. N. 242. p. 219. fagg.* The Italians divide *Juvenal* into *serius*, as that in common use; and *jocose*, *giocosa*, which they also call *bernesca*, and we *burlesque*.

Their chief *satyrists* in the *ferrous* way are, Dante (where they particularly call *Prince Satirice*) Ariosto, Aretino, Ercole Bentivoglio, Luigi Alamanni, Jacopo Sordani, Lorenzo Azzolino, Salvatore Rota, Luc. Accetti, and Benedetti. Menzini, — I hope who have excelled in the *jeffe* kind are, Francesco Berni (the inventor of it) Mauro, Brenzolini, Cafa, Coppetta Varchi Lucio, Caporali, — Simon V. Bianchin della *Sati a Italiano*, P. I. p. 2. *Grave*, *Letter d' Italia*, T. 20, p. 206. I. *Id.* *Id.* p. 25. Giorn. p. 210. *Jege*.

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Satyr is divided into *general*, which is levelled at common abuses wherein numbers are equally interested: and *personal*, which point out and exposes particular characters.—Thus last, as it affects mens reputation, on which their interest greatly depends, is scarce distinguishable from defamation, and scandal.

To this last class belong most of those which bear the title of *Anti*: as the *Anti-Baillet* of Menage, with which M. Baillet was so stung, that he composed a treatise expressly on *personal satyrs* which bear the title *Anti*; to shew the immorality, and unlawfulness of them, and their contrariety to the precepts of the gospel.

It is further objected to this kind of *satyr*, that a publick detection, far from producing the effect it is designed for, reformation, is apt to drive men to desperation, and harden them in their course. The excellent author of the treatise of the *Government of the Tongue*, speaking of uncharitable truths, says, a discovery of this kind serves not to reclaim, but only to enrage the offender, and precipitate him into farther degrees of ill. Modesty and fear of shame is one of those natural restraints which the wisdom of heaven has put on mankind: and he who once stumbles, may yet by a check of that bridle recover himself again. But when by a publick detection he is fallen under that infamy he feared, he will be then apt to discard all caution, and to think he owes himself the utmost pleasures of vice at the price of his reputation.—Nay, perhaps he advances farther, and sets up for a reversed sort of fame, by being eminently wicked: thus he who before was but a clandestine disciple, becomes a doctor of impiety.—Doubtless it was this sort of reasoning that induced our wise legislators lately to repeal the law which put the brand of infamy in the face of felons.—In effect, where crimes are enormous, the delinquent deserves little pity, yet the reporter may deserve less.—*V. Tat. N°. 74. T. 2. p. 154. seq.* See also *N°. 76. p. 166. seq.*

Greek SATYR.—Cafaubon makes a distinction between the *satyrical* poetry of the Greeks, and the *satyr* of the Romans, which he maintains was peculiar to themselves; in which also he seems to be justified by Quintilian.

For a like reason Horace calls *satyr*, *Græcis intantum carmen*, a sort of poetry unknown to the Greeks. Spanheim in his fine preface to the *Cæsar* of the emperor Julian, has shown five or six essential differences between those two poems. The Greeks chiefly reprehended vice, &c. in their drama's; though they had also a sort of narrative poems called *Silli*, like the Roman and our *satyrs*. These *Silli* were cutting, or faracick poems, as may be easily seen by the fragments of *Timon's Silli*; with this difference, that the Greek *Silli* were parodies from one end to the other, which cannot be said of the Roman *satyr*. Or if we find sometimes a parody in them, it is what the poet did not design, and consequently the parody does not make the essence of *satyr*, as it does that of the *Silli*.—*V. Quint. Inst. Orat. l. 10. c. 1. Hor. Sat. l. 1. v. 62. J. Cafaub. de Satyrica Græcor. Poesi & Romanor. Satyra. l. 2. Par. 1605.*—*See Mafcov. Exerc. Prior. in Horat. Satyr. § 10. Langheirich Diss. de Timon. Sillograph. Lipsi. 1720. & 1721. Stoll. Introduct. ad Lipsi. Liter. P. l. c. 5. § 38.*

Scaliger, notwithstanding all this, followed by some of the latest and best critics, scruples not to derive the *satyrical* poetry of the Latins from that of the Greeks. According to these authors, *satyr* in its origin was a sort of interlude in tragedy, wherein goat-footed *Satyr*s were introduced to alleviate the distress, and with their jeers and humour diversify the solemnity of the tragick scene: much like the mimes in comedy, and the fescennines in the Atellan sports.

At first it was only in the tragedies exhibited in the feasts of Bacchus, that *Satyr*s, the supposed companions and priests of that god, were introduced: but afterwards they made a part in the solemnities of the other deities. So that *satyr*, in its first institution was wholly dramatick.—*V. Scalig. Poet. l. 1. c. 11 & 12.*

Roman SATYR.—Dacier, after Cafaubon, traces the institution of the Roman *satyr* very minutely; and distinguishes three species or states of it: the first *dramatick*, the second *narrative*, the third that called the *Varronian* or *Menippean satyr*.

The ancient Romans had been without any fœnical entertainments for almost four hundred years; till chance and merriment in one of their festivals gave rise to the saturnine and fescennine verses, which for some years supplied the place of theatrical performances. These verses were rude, and without any measure, being extemporary, and the productions of a savage people, who had no other instructors than the fumes of wine. Accordingly they were stuffed with gross raileries, and accompanied with various gesticulations and dances. An idea of them may be formed by conceiving a knot of country fellows, dancing in a hobbling manner, tossing about their home-spun jokes, and exposing each other's failings. Thus Horace, *Epist. l. 1. lib. 2.*

*Fescennina per Lunæ inventa licentia morem
Versibus alternis opprobria iusticia fudit.*

The ancient Roman *satyrs* then were a sort of innocent farces, where the spectators and actors were indifferently rallied.—And thus they continued till the time of Livius Andronicus, who first attempted to write plays in imitation of the Greeks. This new entertainment appearing more noble and perfect, drew crowds of spectators, which occasioned the *satyrs* to be neglected for some time; but they were afterwards resumed, and tacked to the ends of comedies, much like the modern farces. They were annexed more peculiarly to the Atellane pieces, and on this occasion they changed their name *Satyr*s for that of *Exodia*, which they ever after retained.

After Livius Andronicus, Ennius having observed the eagerness of the Romans for *satyr*, imagined that poems not accommodated to the theatre, but retaining the gall, railery, and pleasantry of the theatrical *satyr*, would not fail of success. Accordingly, he wrote discourses under the title of *Satyr*s, in which he took the liberty of mixing several sorts of verse together, as hexameters with iambick trimeters, and trochaic tetrameters. In these pieces were found the same variety, railery, allusions, fables, and even dialogue, in a word every thing that constituted the character and beauty of the first *satyrs*, except the dancing and musick. Pacuvius succeeded, who also writ *satyr*s in imitation of his uncle, or according to others, his grandfather Ennius. When Pacuvius was in his prime, Lucilius was born; who also composed *satyr*s, somewhat of a new turn, endeavouring to imitate the character of the ancient Greek comedy, of which the Romans had but an imperfect image in their own *satyrs*. This seems to be what Horace meant when he said, *Satyr. l. 1. lib. 2.*

*Quid, cum est Lucilius ausus
Primus in hunc operis componere carmina morem.*

He could not mean, that the Romans had no *satyr*s before Lucilius, since that poet was preceded by Ennius and Pacuvius, whom he imitated. Horace's design was only to hint that Lucilius's manner and turn was new, that he had embellished this poem, inasmuch that he might be looked upon as its first author. But in fact, Lucilius only added to it a little more politeness and salt, without any other alteration. And though like Ennius he did not mix together several sorts of verse in the same piece, yet he composed different poems, some of which were entirely hexameter, others iambic, and others trochaic, as appears from his fragments.

The third kind of *satyr* was the *Varronian* or *Menippean*, so called from its author Varro, the most learned of the Romans, and because in this he imitated the manner of Menippus the Gaderenian, a cynic philosopher.

This *satyr* was not only a miscellany of different sorts of verse, but was also interlarded with prose, and mixed up Greek, and Latin.—Seneca's poem on the death of Claudius, Petronius's *Satyricon*, Lucian's Dialogues, the Golden ass of Apuleius, and the *Cæsar* of the emperor Julian, are so many *satyrs* in the *Varronian* taste.—To the same head may also be referred the *Catholicon* of Spain, the *Morie Encomium* of Erasmus, the *Don Quixot* of Cervantes, the *Advertisements* from Parnassus of Boccacini, the *Tale of a Tub* by Dr. S. &c.—*V. Dacier Discours sur la Satire, in Mem. de Liter. de l'Acad. R. des Inscrip. T. 3. p. 246. seqq.* And in the preface to his version of Horace's *Satyr*s. *V. Kapin Reflex sur la Poët. en Partic. § 28. Oeuw. Divers. T. 2. p. 205. seqq.*

SATYRICAL, something relating to, or that partakes of the nature of *satyr*.

We have *satyrical* poets; *satyrical* preachers, as South; *satyrical* historians, as Burnet and Mezeray; *satyrical* philosophers, as Apuleius and Montaigne.—In the heathen theology, we find a *satyrical* god, viz. Momus: Homer in his *Thersites* gives the character of a *satyrical* courtier. The Dutch have been often charged with *satyrical* prints, and medals; which have sometimes cost them dear.

Satyrical poetry had its origin at Athens: though its perfection be owing to the Romans. According to father Mourgues, and Bianchini, it was at first a sort of tragedy acted at the feasts of Bacchus, wherein *satyr*s were introduced conversing with heroes. Burette rather takes it for a sort of pastoral farce tacked to the ends of tragedies. One of the chief ornaments of it was a wild, grotesque sort of dance performed by *satyr*s, and called *Sicinnis*.—See DANCING.—*Mourg. Trait. de la Poës. Franc. c. 4. Mem. de Trev. Nov. 1723. p. 2149. Bianchini. Della Satira Italiana, P. l. p. 5. seqq. Giorn. de Lettere d'Ital. T. 20. p. 203. Buret. Mem. 2. sur la Danse, in Mem. Acad. R. Inscript. T. 2. p. 163. Buret. l. c. Averan. Prælect. ap. Bibl. Chisj. T. 22. p. 34.*

The *satyrical* shews of the Greeks were thorough masques: the actors herein were disguised variously, some in the habits of *Satyr*s, *Sileni*, *Centaur*s, *Mænades*, and other of Bacchus's crew; while others personated giants, cyclopes, monsters, and even beasts: the whole making a medley more romantick and extravagant than any thing on the modern stage.

stage, unless perhaps some of our late proteique pantomime entertainments^a. The only piece of the kind now extant is the *KRABOY* of Euripides^b.—^a V. Bond. *sur les Myq. & Habits de Theat.* des Anc. in Mem. Acad. R. Inscr. t. 5. p. 176, & 188. ^b V. Fabric. *Bibl. Græc.* l. 2. c. 18. § 2. p. 645.

SATYRIC Fountain. See the article FOUNTAIN.

SATYRION, or SATYRIUM, a root called by this name, because of its fancied promotion of lust.

Diofcorides did languisheth this from the orchis, but Mr. Dale properly makes it the fame. It pates for a great cordial and restorer; but its shape, resembling the humi in testicles, seems to be the chief foundation of the opinion of its virtues.

SAVAGES*, or SALVAGES, wild, barbarous people, without any fixed habitation, religion, law, or policy.

* The word is formed from the Italian *salvage*, of *salvaticus*, *salvaticus*, or *salvatus*, which we find used in the barbarous Latin for *scissilis*, belonging to the woods.

A great part of America is peopled with *savages*: many, some say most, of the *savages* are Anthropophagi. See ANTHROPOPHAGI.

SAVANT. See the article SCAVANT.

SAUCE—white SAUCE } See the articles } WHITE.

SAUCIDGE } SAUSAGE.

SAUCISSE, SAUSAGE, in the military art, a long train of powder sewed up in a roll of pitched cloth, about two inches in diameter; serving to set fire to mines, or caissons.

The length of the *saucesse* is to extend from the chamber of the mine, to the place where the engineer stands to spring it.

There are usually two *saucesse*s to every mine; that if the one should fail, the other may take effect.

SAUCISSON*, in fortification, a kind of faggot made of thick branches of trees, or of the trunks of shrubs bound together: whose use is to cover the men, and to serve as epaulements.

* The word is French, and signifies literally, a big sausage. See SAUSAGE.

The *saucession* differs from a *fascine*, which is only made of the small branches, and by its being bound at both ends and in the middle.

Anciently, they made the *saucession* 46 foot long, and 15 foot thick; since, it is usually 23 foot long, and 12 thick; bound strongly together with three bands strengthened with iron.

SAVE Appearance. See the article APPEARANCE.

SAVER DE FAULT, in law, signifies to excuse a fault: as when a man having made default in court, comes afterwards, and alleges good cause why he did it; as imprisonment at the time, or the like. See DEFAULT.

SAVIOUR.—Order of St. SAVIOUR, is the name of a religious order founded by St. Bridget, about the year 1344; thus called from an opinion, that Christ himself, the *Saviour* of the world, prescribed the rules and constitutions thereof. They are also called, from their foundress, *Brigettins*, or *Brigittins*.

Their origin was thus: Wilpho prince of Nericia, to whom St. Bridget had been married, being dead at Arras, in his return from Galicia; the widow thought of nothing but devoting herself to a religious life; and accordingly soon after, she built the monastery of Western in the diocese of Lincopen in Sweden, where she entered herself.

By the constitutions of this order, it is principally appointed for women, who are to pay a particular honour, and service to the virgin. The monks are only to afford them the spiritual assistances they may need, to administer them the sacraments, &c.

The number of nuns is fixed to sixty in each monastery, and that of monks to thirteen, according to the number of apostles, whereof St. Paul makes the thirteenth. Four of them are to be deacons, to represent the four doctors of the church, and eight converts; the whole number making twenty-two, the number of the disciples of our *Saviour*.

Setting aside these circumstances, and the habit; this order is under the rule of St. Augustine.—It was approved of by Urban V. and several succeeding popes. In 1603, Clement VIII. made some alterations in it, on account of the double monasteries which then began to be built in Flanders, &c.

SAULTS. See the article SALT.

SAUNDERS, See the article SANTALUM.

SAVOR, or SAVOUR, SAVOR. See the article TASTE.

SAUSAGE*, or SAUCIDGE, a term of some significance in commerce; denoting a popular food prepared of some crude meat, usually either pork or veal fired small, seasoned and put up in a skin, in manner of a pudding.

* The word comes immediately from the French *saucesse*, which signifies, the same, formed of the Italian *salvaticus*, and that according to *Salmasius*. from the Latin *salicium* wrote for *salicium* salted.

The most esteemed confectio of this kind, is the Bologna *saucesse*, which is much thicker than the common one, and is made with most success in some cities in Italy, particularly

ly Bologna, Venice, &c. whence great quantities are exported to other places.

It is made of raw pork, well beaten in a mortar, with a quantity of garlick, pepper in the grain, and other spices: the Italians are furnished with a great part of the skins or guts for their *saucesse*s from England: the quantities of that commodity yearly exported, are greater than one would imagine.

SAUSAGE, in w. See the article SAUCISSE.

SAUT, in the manage. See the article SALT.

SAW, SERRA, an instrument serving to divide into pieces, divers solid matters; as wood, stone, marble, ivory, &c. The *saw* is one of the most useful machines, in the mechanic arts, ever invented. The fable, which is perhaps founded on some furer tradition, attributes the invention thereof to Icarus; wao, vying with his father Dædalus, enriched the rising arts with several discoveries.—It is added, he took the first hint from the spine or backbone of a flat fish, such as the foal. The *saw* is made of steel, with teeth, but those differently filed, and turned, according to the use it is designed for.—There are also a kind of *saws* without teeth, used in the sawing of marbles and other stones.

The best *saws* are of tempered steel, ground bright and smooth; those of iron are only hammer-hardened: hence, the first, unlike their being stiffer, are likewise found smoother than the last.—They are known to be well hammered by the stiff bending of the blade; and well or evenly ground, by the bending into a bow.

The edge, wherein the teeth are, is always thicker than the back, in regard the back is to follow the edge.—The teeth are cut and sharpened by a triangular file; first fixing the blade of the *saw* in a whetting-block.

When filed, the teeth are to be set, that is, to be turned a-skew, or out of the right line, to make the wider kerf or fissure, that the back may follow the better. This is done by putting an instrument, called a *saw set*, between every other two teeth, and giving it a little wrench, which turns one of the teeth a little towards you, and the other a little from you.—The teeth are always set ranker for coarser cheap stuff, than for hard and fine; in regard the ranker the tooth is set, the more stuff is lost in the kerf; and if the stuff be hard, the greater is the labour of sawing it.

The workmen, who make the greatest use of the *saw*, are, the sawyers, carpenters, joiners, chymists, stone-cutters, carvers, sculptors, &c. The lapidaries too have their *saw*, as well as the workers in mosaic; but these bear little resemblance to the common *saws*.

But of all mechanicks, there are none have so many *saws* as the joiners, nor of so many different kinds.—The chief are as follow.

Pin-saw, a large two-handed *saw*, used to saw timber in pits.—It is set rank for coarse stuff, so as to make a kerf or fissure of almost a quarter of an inch; but for finer stuff, it is set finer.

Wrip-saw, which is likewise two-handed, used to saw such large pieces of stuff as the *land-saw* will not easily reach.

Hand-saw, is made for a single man's use: of which there are various kinds; as the

Bow or frame saw, furnished with checks; by the twisted cord and tongue in the middle of this saw, the upper ends are occasionally drawn close together, and the lower set the further apart.

Tenon saw, this being very thin, has a back to keep it from bending.

Compass saw, this is very small, and its teeth, usually, not set; its use is to cut a round, or any other compass kerf: hence, the edge is made broad, and the back thin, that it may have a compass to turn in.

The chirurgeons likewise use a *SAW*, to cut off bones.—It is to be very small, and light, in order to be managed with the more ease and freedom: the blade exceedingly fine, and the teeth exquisitely sharpened; to make its way more gently, and yet with more expedition in amputations of legs, arms, &c.

The *SAW* is also a gardener's instrument, used in the pruning of trees, &c.—It is chiefly applied in the cutting of odd, dry, and, consequently, hard woods, whether roots or branches, which might spoil the pruning-knife; and big branches, &c. which the knife could not well take off at one stroke.

Except on these occasions, Quintiney will have us always use the knife, rather than the *saw*.

SAWING, the application of the saw, in the dividing of timber, &c. into boards, &c.

There are wind-mills, and water-mills, which do the office of sawing wood, with infinitely more expedition, and ease than is performed by the hand. They consist of several parallel saws, which are made to rise and fall perpendicularly, by means of one of the grand principles of motion.—A very few hands are here needed, viz. only to push forward the pieces of timber, which are laid on rollers, or suspended by ropes; in proportion as the *sawing* advances. These mills are frequently used abroad; and were lately begun to be introduced in England; but the parliament, in consideration of this, that they would spoil the sawyers trade, and ruin great numbers of families, thought fit to suppress them.

M. Filibien mentions a kind of long saws, invented by one Miffon, inspector of the marble quarries in the Pyreneans; by means whereof stones are sawed even in the rock itself whence they are taken.—He adds, that some of them were made twenty-three foot long: but does not describe either their form, or application: he only says, they are of iron, and without teeth.

SAXIFRAGE*, *SAXIFRAGA alba*, a medicinal plant, thus called from its supposed virtue in dissolving the stone in the bladder.

* The word is compounded of the Latin *Saxum*, stone, and *frango* I break.

Its leaves are almost round, indented, succulent and shining, like those of ivy: in the middle of the leaves there rise stalks, about a foot high, which, at their extremities, bear little white flowers, consisting of five leaves, disposed in form of a rose. Its seed, which is very small, is inclosed in the capsule which is a roundish pod. Its root divides itself into several fibres, at the bottom whereof are found little reddish tubercles, like coriander-seed.

It is these grains that are commonly called the seed of the *saxifrage*, and are the part used in medicine.—The best manner of administration, is to take them infused in white-wine, or in a decoction in common water.

Some use the decoction of the whole root: it is held a great diuretic; though its lithontriptic virtue is but little seen in practice. It is certain, that the simple water thereof, sold in the shops, is good for nothing; the virtue of the plant, if it have any, consisting in something too gross to rise over the helm.

SAXON, or the *SAXON Language*. See **ENGLISH**.

SAY, or *SAYE*, in commerce, a kind of serge; or a very light crossed stuff, all wool; much used abroad for linings, and by the religious for shirts; and with us, by the quakers, for aprons, for which purpose it is usually dyed green.

There are very considerable manufactures hereof at Sudbury, near Colchester; also at Ypres, Houdicot, &c. in Flanders, &c.—Those made in England, are chiefly exported to Portugal, and Leghorn.

SCABELLUM, in the ancient architecture, a kind of pedicell, usually square, sometimes polygonous, very high and slender, commonly terminating in a kind of sheath or scabbard, or profiled in manner of a balluster. Its use is to support busto's, or other relievos, &c.

SCABIES, in medicine. See the article **ITCH**.

SCABIOUS, *SCABIOSA*, a medicinal plant, very common in corn fields, which has a great character among dispensatory writers, though it seems now to grow much out of use.

It passes for a fine pectoral, and is said to do great things in asthma's and pleurisy; and Etmuller gives it a great character in inward abscesses. It has a place also among alexipharmicks. But hardly any thing is in better esteem for the itch, and other cutaneous foulnesses; whence it has its name, viz. from *scabies*, itch; and upon which account it is often met with in decoctions, and sometimes in a syrup, among such things as are called sweeteners. See **Supplement**, article **SCABIOSA**.

SCAFFOLD*, a timber-work, raised in manner of an amphitheatre, to place spectators upon for the commodious viewing of some shew, or ceremony.

* Some derive the word from the German *scharbau*, which signifies the same, compounded of *scharben*, to look, view, and *bau*, house. Guyet derives it from the Italian *catafalco*, which signifies the same thing. Du Cange, from *Escharfaudans*, a word in the corrupt Latin, signifying a tribunal, or pulpit: he adds, that it might come originally from *cata*, a wooden machine used to carry earth to fill up ditches, and carry over the soldiers to the attack; whence the Italians termed their *catafalco*, the old French their *chafaut*, the Monks their *scaphault*, and finally the English their *scaffold*.

SCAFFOLD, is also used for a little stage, or theatre, raised in some public place, to execute criminals upon, either by beheading or breaking upon the wheel.

SCAFFOLD, or **SCAFFOLDING**, is also used for an assemblage of planks and boards sustained by tressels, or by pieces of wood fixed in the wall; whereon masons, sculptors, painters, &c. stand to work in high places, ceilings, &c.

SCALA, in anatomy.—The cochlea, or inner cavity of the ear, is divided by a septum into two canals, called *scale*: whereof the one, looking towards the tympanum, is called the *scala tympani*; the other, having a communication with the vestibulum, is called the *scala vestibuli*. See **COCHLEA**, **EAR**, **TYMPANUM**, and **VESTIBULUM**.

SCALA, in the ancient architecture, denotes what in the modern we call a *stair-case*. See **STAIR-CASE**.

SCALE, *Gemonie*. See the article **GEMONIE**.

SCALADO, or **SCALADE**, a furious assault made on the wall or rampart of a city, by means of ladders wherewith to mount without carrying on works in form to secure the men. Cities are now no longer taken by *scalade*, since the walls have been flanked.

SCALE, a mathematical instrument, consisting of one or more lines drawn on wood, metal or other matter, divided into equal or unequal parts, of great use in laying down distances in proportion, or in measuring distances already laid down.

There are *scales* of several kinds, accommodated to the several uses; the principal are, the *plain scales*, the *diagonal scale*, *Gunter's scale*, and the *plotting scale*.

Plain SCALE, or **SCALE of equal parts**, is made, by dividing a line, as AB (*Tab. Surveying fig. 37.*) into any number of equal parts, *e. gr.* 5 or 10, and then subdividing one of them, as *a b*, into 10 less parts.—This done, if one of the larger divisions represent 10 of any measure; *e. gr.* 10 miles, 10 chains, 10 poles, 10 feet or 10 inches; each of the lesser will represent one mile, or one chain; pole, foot, or inch. See **PLAIN** and **LINE**.

The use of this *scale* is very obvious. *E. gr.* To lay down a distance by it of 32 miles, or 32 poles, &c. I take in my compasses the interval of three of the larger divisions, which contain 30, and two of the smaller, for the two odd ones: this distance drawn on paper, will contain 32 by the *scale*.—Again, were I required to measure any line by a given *scale*: taking the length of the line in my compasses, I apply one foot in one of the great divisions of the *scale*, so that the other may reach over among the lesser; then the number of great and small divisions intercepted between the points, give the number of miles, &c.—See the use hereof further illustrated under the article **PLOTTING scale**.

Proportional SCALES, called also *logarithmetical*, are the artificial numbers, or logarithms, placed on lines for the ease and advantage of multiplying, dividing, &c. by means of compasses, or of sliding-rules.—They are, in effect, only many lines of numbers, as they are called by Gunter; but made single, double, triple, or quadruple; beyond which they seldom go.

Decimal SCALE, Gunter's SCALE, Plotting SCALE, Proportional SCALE, Reducing SCALE,	} See the articles	DECIMAL. GUNTER, and LINE. PLOTTING scale. PROPORTIONAL. REDUCING.

SCALE, in geography and architecture; a line divided into equal parts, placed at the bottom of a map or draught, to serve as a common measure to all the parts of the building, or all the distances and places of the map.

In maps of large tracts, as kingdoms and provinces, &c. the *scale* usually consists of miles; whence it becomes denominated *A scale of miles*.

In more particular maps, as those of manors, &c. the *scale* is usually of chains, sub-divided into poles or links.

The *scales* used in draughts of buildings, usually consist of modules, feet, inches, palms, fathoms, or the like.

To find the distance between two towns, &c. in a map, the interval is taken in the compasses, and set off in the *scale*, and the number of divisions it includes, gives the distance.—The same method serves to find the height of a story, or other part in a design.

Front SCALE, in perspective, is a right line in the draught, parallel to the horizontal line; divided into equal parts, representing feet, inches, &c.

Flying SCALE, is a right line in the draught, tending to the point of view, and divided into unequal parts, representing feet, inches &c.

SCALE, SCALA, in musick, is a denomination given to the arrangement of the six syllables invented by Guido Arctine, *ut re mi fa sol la*; called also *Gammut*.

It bears the name *scale* (*g. d. ladder*) by reason it represents a kind of ladder, by means whereof the voice rises to acute, or descends to grave; each of the six syllables being as it were one step of the ladder.

SCALE is also used for a series of sounds rising or falling towards acuteness or gravity, from any given pitch of tune to the greatest distance that is fit or practicable, through such intermediate degrees as make the succession most agreeable and perfect, and in which we have all the harmonical intervals most commodiously divided.

This *scale* is otherwise called an *universal system*, as including all the particular systems belonging to musick. See **SYSTEM**.

Origin and construction of the SCALE of musick.—Every concord or harmonical interval, is resolvable into a certain number of degrees or parts; the octave, for instance, into three greater tones, two less tones, and two semi-tones; the greater sixth, into two greater tones, one less tone; and two semi-tones; the less sixth, into two greater tones, one less tone, and two semi-tones; the fifth, into two greater tones, one less tone, and one semi-tone; the fourth, into one greater tone, one less tone, and one semi-tone; the greater third, into one greater tone, and one less tone; and the less third into one greater tone, and one less tone. It is true, there are variety of other intervals or degrees, besides greater tones, less tones, and semi-tones, into which the concords may be divided; but these three are preferred to all the rest, and these alone are in use.—For the reason whereof, see **TONE**. Further, it is not any order, or progression, of these degrees, that will produce melody: a number, for instance, of greater tones will make no musick, because no number of them is equal to any concord, and the same is true of the other

other degrees: there is a necessity, therefore, of mixing the degrees to make musick; and the mixture must be such, as that no two of the same kind are ever plac'd next each other.

A natural and agreeable order of these degrees Mr. Malcolm gives us in the following division of the interval of an octave; wherein (as all the lesser concords are contained in the greater) the divisions of all the other simple concords are contained.—Under the series are the degrees between each term, and the next.—In the first series, the progression is by the less third; in the latter by the greater third.

	great	2 ^d	gr.	3 ^d	4 th	5 th	6 th	7 th	8 th
Key	1	2	3	4	5	6	7	8	9
fund.	great	les	semi-	great	les	great	semi-	fund.	tone.

great second.

key	1	2	3	4	5	6	7	8	9
fund.	great	semi-	les	great	semi-	les	great	les	fund.

Now, the system of octave, containing all the original concords; and the compound concords being only the sums of octave and some less concord; it is evident, that if we would have the series of degrees continued beyond octave, they are to be continued in the same order through a second as through the first octave, and so on through a third or fourth octave, &c. and such a series is what we call the *Scale of musick*.

Of this, there are two different species; according as the less or greater 3^d. or the less or greater 6th. are taken in; for both can never stand together in relation to the same key or fundamental, so as to make an harmonical *scale*. But if either of these ways, we ascend from a fundamental or given sound, to an octave, the succession will be melodious; though the two make two different species of melody.—Indeed, every note is discord with regard to the next; but each of them is concord to the fundamental, except the 2^d. and 7th.

In continuing the series, there are two ways of compounding the names of the simple interval with the octave: thus, a greater or lesser tone or semi-tone above an octave, or two octaves, &c. or to call them by the number of degrees from the fundamental, as 9th, 10th, &c.

In the two *scales* above, the several terms of the *scale* are expressed by the proportionable sections of a line, represented by 1, the key or fundamental of the series.—If we would have the series expressed in the whole numbers, they will stand as follows; in each whereof the greatest number expresses the longest chord, and the other numbers the rest in order: so that if any number of chords be in these proportions of length, they will express the true degrees and intervals of the *scale* of musick, as contained in an octave continuously divided in the two different species abovementioned.

540	:	480	:	432	:	405	:	360	:	324	:	288	:	270
great		les		semi-		great		les		great		les		fund.

216	:	192	:	180	:	162	:	144	:	135	:	120	:	108
great		semi-		les		great		semi-		great		les		fund.

This *scale* the ancients called the *diatonic scale*, because proceeding by tones and semi-tones.

The moderns call it, simply, *The scale*, as being the only one now in use; and sometimes, *The natural scale*, because its degrees and their order are the most agreeable and concinnous, and are preferable, by the consent both of sense and reason, to all other divisions ever instituted.—Those others, are the *chromatic* and *enharmonic scales*, which, with *diatonic*, made the three *scales*, or *genera* of melody of the ancients.

The Design of the SCALE of Musick, is, to shew how a voice may rise and fall less than any harmonical interval, and thereby move from the one extreme of any interval to the other, in the most agreeable succession of sounds.—The *scale*, therefore, is a system, exhibiting the whole principles of musick; which are either harmonical intervals (commonly called *concords*) or concinnous intervals: the first are the essential principles, the others are subservient to them, to make the greater variety.

Accordingly, in the *scale*, we have all the concords, with their concinnous degrees, so placed, as to make the most perfect succession of sounds from any given fundamental or key, which is supposed to be represented by 1. It is not to be supposed, that the voice is never to move up and down by any other more immediate distances than those of the concinnous degrees; for though that be the most usual movement, yet to move by harmonical distances, as concords, at once, is not excluded, but is even absolutely necessary. In effect, the degrees were only invented for variety sake, and that we might not always move up and down by harmonic intervals, though those are the most perfect, the others deriving all their agreeableness from their subserviency to them.

Add that, besides the harmonical and concinnous intervals, which are the immediate principles of musick, and are di-

rectly applied in practice; there are other discord relations; which happen unavoidably in musick, in a kind of accidental and indirect manner: for, in the succession of the several notes of the *scale*, there are to be considered not only the relations of those that succeed others immediately; but also of those betwixt which other notes intervene. Now the immediate succession may be conducted so; as to produce good melody; and yet among the distant notes there may be very gross discords, that would not be allowed in immediate succession, much less in consonance.—Thus in the first series, or *scale* above delivered, though the progression be melodious, as the terms refer to one common fundamental; yet are there several discords among the mutual relations of the terms; e. gr. from 4th to 7th is 32 : 45, and from the greater 2^d to the greater 6th is 27 : 40, and from the greater 2^d to 4th is 27 : 32, which are all discords; and the same will happen in the second series.

From what we have observed here, and under the article KEY, it appears, that the *scale* supposes no determinate pitch of tune; but that being assigned to any key, it marks out the tune of all the rest, with relation to it: It also shews what notes can be naturally joined to any key, and thereby teaches the just and natural limitations of melody; and when the song is carried through several keys, yet it is still the same natural *scale*, only applied to different fundamentals.—If a series of sounds be fixed to the relations of the *scale*, it will be found exceedingly defective; but this imperfection is not any defect in the *scale*, but follows accidentally from its being confined to this condition, which is foreign to the nature and office of the *scale* of musick.

This is the case in musical instruments; and in this consists their great deficiency.—For, suppose a series of sound, as those of an organ or harp, fixed in the order of this *scale*; and the lowest taken at any pitch of tune; it is evident, 1^o. that we can proceed from any note, only by one particular order of degrees: since from every note of the *scale* to its octave, is contained a different order of the tones and semi-tones. Hence, 2^o. we cannot find any interval required from any note upwards or downwards; since the intervals from every note to every other, are also limited. And hence, 3^o. a song may be so contrived, that, beginning at a particular note of the instrument, all the intervals, or other notes, shall be found exactly on the instrument or in the fixed series; yet were the song, though perfectly diatonic, begun in any other note, it would not proceed.

In effect, it is demonstrable, that there can be no such thing as a perfect *scale* fixed on instruments, i. e. no such *scale*, as from any note upwards or downwards, shall contain any harmonical or concinnous interval required.

The only remedy for this defect of instruments whose notes are fixed, must be by inserting other notes and degrees betwixt those of the diatonic series.—Hence some authors speak of dividing the octave into 16, 18, 20, 24, 26, 31, and other number of degrees; but it is easy to conceive, how hard it must be to perform on such an instrument.

The best of it is, we have a remedy on earlier terms: for a *scale* proceeding by twelve degrees, that is, thirteen notes, including the extremes, to an octave, renders our instruments so perfect, that we have little reason to complain.—This, then, is the present *scale* for instruments, viz. between the extremes of every tone of the natural *scale* is put a note, which divides it into two unequal parts, called *semi-tones*; whence the whole may be called the *semitonic scale*; as containing twelve semi-tones, betwixt thirteen notes, within the compass of an octave.

And to preserve the diatonic series distinct, these inserted notes take either the name of the natural note next below, with the mark ♯ called a *sharp*; or the name of the natural note next above, with this mark ♭ called a *flat*.

For the SCALE of semi-tones,
For Guido's SCALE, commonly
called the *Gammut*
For the SCALE of the ancients,
commonly called the *Dia-*
gram,
See { SEMITONIC SCALE.
GAMMUT.
DIAGRAM.

SCALENE *, SCALENUM, or SCALENOUS triangle, in geometry, a triangle, whose sides and angles are all unequal.

* The word is formed from the Greek *scalenois*, which signifies oblique, unequal, &c.

A cylinder or cone, whose axis is inclined to its base, is also said to be *scalenus*.

SCALENUS, or SCALENUM, in anatomy, a name given to three pair of muscles, from their form; all of them serving to draw the ribs upwards, in conjunction with the *tetrastus superior pectus*, &c.—See *Tab. Anat. (Myol.) fig. 2. n. 5. fig. 1. n. 16.*

SCALENUS *Primus*, springs, fleshy, from the transverse processes of the second, third, and fourth vertebrae of the neck, where descending laterally, it is inserted into the first rib, which it helps to draw upwards.

SCALENUS *Secundus*, arises from the same processes, as likewise from those of the fifth vertebra of the neck; and is inserted into the second rib, and sometimes into the third.

SCALENUS *Tertius*, arises from the same processes with the former,

former, and from those of the sixth vertebra of the neck; and is inserted into the first rib.

SCALLOP *Tyles*. See the article **TYLES**.

SCALPEL, **SCAPPELLUM**, in chirurgery, a kind of knife chiefly used in dissections; but which may be occasionally used in many other operations, as in amputations, and to cut off the flesh and membranes that are between the two bones of an arm or leg, before the bones be sawed off.

There are two kinds of *scalpels*: the first cuts on both sides, and is fixed in an ebony or ivory handle, which being very flat and thin at the extremity, serves to part the membranous and fibrous parts in anatomical preparations.

The other has a back, that is, it only cuts on one side; this is crooked, and is very commodious for stripping the flesh off the bones in embalming, making skeletons, &c.

Scultetus, in his *Arsenal*, describes several other kinds of *scalpels*; as, a deceitful *scalpel*, thus called, because it deceives the patient by hiding its blade. It was much used by the ancients, in opening and dilating of sinu's; but as it is apt to deceive the chirurgeon himself, and is besides very flow, it is better using a common one.—A *scalpel*, sharp on both sides for fetons.—A little crooked *scalpel* for separating the coherence of the eyelids.—A sharp, double-cutting *scalpel*, with a bone handle, for the cutting off an agilis.—*Scalpels* like *Scolopomacharion*, &c. And even the *scolopomacharion* itself is a kind of *scalpel*.

SCALPER, **SCALPRUM**, or **SCALPING-Iron**, a surgeon's instrument wherewith to rasp, and scrape foul, carious bones.

SCALPTOR Ani, in anatomy. See **LATISSIMUS Dorsi**.

SCAMILLI *Impares*, in the ancient architecture, a term much contended about among the critics; though, in effect, it signify no more than certain zocco's or blocks, serving to raise the rest of the members of an order, column, statue or the like, and to prevent their being lost to the eye, which may chance to be placed below the level; or below the projection of some of the ornaments thereof.

These *Scamilli* are well enough represented by the pedestals of statues. See **PEDESTAL**.

SCAMMONY, **SCAMMONIUM**, in pharmacy, an inspissated juice, of the root of a plant of the same name, growing in the Levant, particularly about Aleppo and St. John de Acre.

This juice flows from an incision made in the root; and is afterwards thickened not by the sun, as it was long pretended, but in reality by the fire. The plant is much like an ivy, its leaves in form of hearts, its flowers white, and it creeps on the ground or climbs on other trees, walls, &c.

The good and genuine *scammony* of Aleppo, should be grey, tender, friable and refinous; the taste bitter, and the smell faintly, and disagreeable.

The *scammony* of Smyrna, and that of the East-Indies, are less valued; the first as being more heavy, hard and black; the latter, though light, friable, &c. is in reality only a composition of common resin with some other violent purgatives. Pomet asserts, that both these kinds are rather poisons than remedies.

The true *scammony* is one of the surest purgatives we have; but at the same time, one of the most violent: hence, it is seldom used without correcting it by some preparation with sulphur, quinces, or the like.

From this drug is drawn a resin of more virtue than the *scammony* itself. They also make a syrup of it, which is found a very good gentle purgative.

The *scammony* now in use, must be very different from that of the ancients, at least in the preparation; by reason the ancients, gave it in much greater doses: hence Fallopius conjectures, the modern *scammony* to be adulterated with juice of lithyal.

Some give the name of American *scammony* to Mechoacan.

SCANDAL, * **ΣΚΑΝΔΑΛΟΝ**, in the scripture language, denotes any thing that may draw us aside, or solicit us to sin.

* The word is formed by the Greek *σκάνδαλον*, or the Latin *periculum*, which, according to Varro, was originally used for a sudden, extemporary quarrel, *quæ subito inter aliquos scandit ad iram*.

In which sense, the word is used promiscuously with *offence*, and *blaming-bless*.

Scandal is either *active* or *passive*.

Active *scandal* is a real induction to sin; passive *scandal* is the impression which an active *scandal* makes on the person induced to sin.

SCANDAL, in the popular language, is some action, or opinion contrary to good manners, or to the general sense of a people.

SCANDAL also denotes a disadvantageous rumour, or report; or a action which one is affronted in publick.

SCANDAL is also, *Lapis Scandali*, or *Vituperii*, a stone raised in the ground in front of the capitol in Rome; whereon was engraven the figure of a lion; upon which bankrupts or cessant, being forced bare-breathed, cried with a loud voice,

Ca. h. linit, I surrender my effects; when, squatting their breech violently, three times on the stone, they were acquitted.

It was called the *Stone of Scandal*, because, thence-forward the cessant became inflexible, and incapable of giving any evidence.

Julius Caesar introduced this form of surrender, after abrogating that article of the laws of the twelve tables, which allowed the creditors to cut their insolvent debtors in pieces, and take each his member; or at least to make a slave of him.

SCANDALUM Magnatum, in law, denotes a scandal or wrong done to any high personage of the land, as peers, prelates, judges, or other great officers, by false or slanderous news or tales, whereby any debate or discord between them and the commons, or any scandal to their persons, might arise.

This offence has also given name to a writ granted to recover damages thereupon.

SCANNING *, **SCANSTO**, in poetry, the measuring of a verse, to see what number of feet and syllables it contains, and whether or no the quantities, that is, the long and short syllables, be duly observed.

* The word is formed from the Latin, *scandere*, to climb.

The term is chiefly used with regard to Greek and Latin verses; the quantities not being well settled and observed in the verses of the modern languages.

Hexameters are *scanned* one way, iambicks another, sapphicks another.

SCANTLING *, a measure, size, or standard, whereby the dimensions, &c. of things are to be determined.

* The word is formed from the French, *eschantillon*, a pattern or specimen.

SCAPHISM *, **SCAPHISMUS**, in antiquity, a kind of torture or punishment formerly in use among the Persians. It consisted in locking the criminal close up within the trunk of a tree bored to the dimensions of his body, only with five holes for his head, arms, and legs to come through. In this state he was exposed to the sun, and the parts thus appearing were anointed with honey and milk, to invite the wasps and flies.

* The word is Greek, *Σκαφισμός*; formed of *σκαφω*, digging, of *σκαρτα*, I dig, hollow.

To increase the torment, they forced the criminal also to eat abundantly, till his excrements, close pent up in the wood, rotted his body. Some authors observe, that persons ordinarily lived forty days in this condition.

The invention is ascribed to Parisatis queen of Persia, and mother of Artaxerxes Mnemon, and the young Cyrus. It is added, the first ordered it to be practised on the person who brought the tidings of the death of Cyrus.

SCAPHOIDS *, **ΣΚΑΦΟΙΔΗΣ**, in anatomy, a bone of the foot; called also *Navicular*. See **NAVICULARE**.

* The word is formed of the Greek, *σκαφος*, a boat, or bark; of *σκαρτα*, I hollow (because boats were originally made of trunks of trees hollowed, as are still the canoes of several savages; and *ειδος*, form.

SCAPULA, in anatomy, *omoplate*, or *shoulder-blade*; a large, broad bone, representing a scaleneus triangle, situate on each side of the upper and back part of the thorax.—*V. Tab. Anat. (Osteol.) fig. 7. n. 6, 6.*

The substance of the *scapula* is thin, but solid and firm; its outside is somewhat convex, and its inside concave; its upper edge is called *costa superior*, and its lower, *costa inferior*; its broad end is called its *basis*, which, with the two edges, make the upper and lower angles.

The *scapula* have each three processes, of which the first runs all along the middle of their outside, and is called their *spine*.—*Fig. 3. n. 4, 4. & fig. 7. n. 7, 7.* That end of the spine, which receives the extremity of the clavicle, is called *Acromium*.—The second process is a little lower than the acromium; it is short and sharp, like a crow's bill, therefore called *Coracoides*; these two processes are tied to one another by a strong ligament, which serves to keep the head of the humerus in the cavity of the third process, which is called *Cervix*.

This process is the extremity of the *scapula*, which is opposite to its basis. It has a round sinus, surrounded about its bint with a cartilage, which receives the head of the humerus. The use of the *scapula* is to receive the extremities of the clavicle and humerus, for the easier motion of the arm, and to give rise to the muscles, which move the arm.

SCAPULAR, **SCAPULARIS**, in anatomy, an epithet given to two arteries, and as many veins of the body.

The *SCAPULARIS interna* & *externa*, or inner and outer *scapular* arteries, arise out of the subclavian, and are spread over the *scapula*.

The *Inner and Outer SCAPULARY Veins* discharge themselves into the axillary, or vein of the arm-pits.

SCAPULAR *, or **SCAPULARY**, also denotes part of the habit of several orders of religious, worn over the gown, as a badge of peculiar veneration for the virgin.

* The word is formed from the French, *scapulaire*, which signifies the same; and that from the Latin, *scapula*, the shoulder blade.

The *scapular* consists of two narrow breadths or slips of cloth, covering the back and the breasts, and hanging down to the feet of the professed religious, and to the knees of the lay-brothers, &c.

The common opinion concerning the introduction of the *scapular*, is, that it was first given by the virgin herself, in an apparition she made to F. Stock, principal of the Carmelites, in the thirteenth century.—Which account of its origin is asserted, or at least supposed, in several bulls of the popes.

M. de Launoy, however, maintains, in an express treatise on the subject, that the apparition was false, and the fabbaine bull, which approves of the *scapular*, a mere counterfeit. In effect, the Carmelites themselves did not begin to wear the *scapular* till several years after it is pretended the virgin gave it to father Stock.

There is also a *Privy*, or *Fraternity of the SCAPULAR*; consisting of lay-brothers, who profess a particular devotion to the virgin, and who, in honour of her, wear a little *scapular*, in manner of a bracelet, or otherwise, representing the great one.—They are obliged to certain prayers, and to observe certain rules in their manner of life.

SCAPUS, in architecture, the flut or shaft of a column. See FUST.

SCAPUS, in botany, denotes the strait stalk, or stem of a plant, standing upright like a pillar or column.

SCAR. See the article ESCHAR.

SCARIFICATION*, SCARIFICATIO, in chirurgery, an operation whereby several incisions are made in the skin, with a lancet or other instrument proper for that purpose.

* Salmasius will have us write *scarificatio*, not *scarificatio*, in regard the word is derived from the Greek, *σκαρίζω*. See his notes on Solinus, p. 5. 9. where he thus corrects the reading of *Plin. lib. X. li. F. Harcourt* lets the old reading *scarificatio* stand; though he owns the MSS. have it *scarificatio*; but adds, that Tacod. Priscian writes *scarificatio*.

Scarification is chiefly practised after cupping.

It acts by stimulating and evacuating.

SCARIFICATOR, a chirurgial instrument used in *scarification*.

The *scarificator* is made in form of a box, wherein are fitted 10, 12, or 15 lancets, all perfectly in the same planes which being, as it were, cocked, by means of a spring, are all discharged at the same time, or pulling a kind of trigger, and driven equally within the *skin*.—Till of late, they used little sharp cutting wheels instead of these lancets.

The use of the *scarificator* is to evacuate the blood, and other humours, spread under the skin, by making a great number of apertures, or outlets, therein; which being thus all struck at once, gives much less pain than when struck successively.

SCARLET*, in dying, one of the seven kinds of good reds. See RED, COLOUR and DYING.

* Menage derives the word from the barbarous Latin, *scarletta*, or *scarlatina*; which is added as later from the German *schaltrich*, or the Flemish *schaltrich*, whence the English have formed *scarlet*, the Italian *scarlatto*, and the French their *écarlate*. Others derive it from the Celtic, *scarlatra*; Dalecampius will have it called *scarlatum*, by corruption, for *capulatum*, a barbarous word introduced into Spain; others fetch it from the Arabic *sqarlat*.

There are two kinds of scarlets; the one given with *hermes*, or *scarlet-grain*; the other with *cobineel*.

SCARLET-GRAIN, is a dyer's drug, used for giving a *scarlet* colour; and commonly taken for the fruit of a plant.

This imaginary fruit, called by the Arabs, *hermes*, is found on a kind of ilex, growing in great plenty in the uncultivated parts of Provence, Languedoc, Spain and Portugal.—That of Languedoc passes for the best, being big, and of a very bright red; that of Spain is the worst, being very small, and of a blackish red: it is to be gathered when ripe, and is only good while new, that is, within the compass of the year, after which time a kind of insect is found in it, that eats out the heart thereof.

F. Plumier has made some particular discoveries on the subject of *scarlet-grain*: the Arabic term *hermes*, which signifies little worms, he observes, agrees perfectly with the nature of this drug; which is of the animal kind, and not the grain or seed of a tree, as is generally supposed.—The shrub it is found on, is the flex aculeata cocci-glandiera; on the leaves, and little shoots whereof, appear, in the spring time, a kind of little vesiculae, at first no bigger than grains of millet, occasioned by the puncture of an insect, which deposits its eggs therein.—In proportion as these grow, they become covered with a kind of ash-coloured down, which hides the red colour underneath; and when arrived at maturity, which those who gather them know very well, they are taken from the tree, in form of little galls.

The bark, or skin of these galls, is very light, and brittle, covered with a fine membranous pellicle all around, except at the place where it grows to the tree: there is a second skin, under the first, which is full of a dust, partly red, and partly white.

As soon as the *hermes* are gathered, the juice, or pulp is ex-

pressed from them; and they are washed in vinegar, to destroy the little insect within-side, which, without such precaution, would grow, feed on the dust, and, at last, be hatched, and leave only empty shells.

The *scarlet-grain* is also of considerable use in medicine, where it is better known under its Arabic name of *hermes*. See Supplement, article KERMES.

SCARLETINA Febris, SCARLET-FEVER, the same as purple-fever. See PURPLE and FEVER.

SCARP, in fortification, the interior slope of the ditch of a place; that is, the slope of that side of a ditch which is next to the place, and faces the campaign. See DITCH.

The *scarp* commences from the liziere or foot of the rampart. The *scarp* is opposite to the counter*scarp*, which is the other side of the ditch.

SCARP, is also a term in heraldry, probably derived from the French *escharpe*; signifying the scarf, which military commanders wear for ornament.

It is borne something like a battoon finifer, but is broader, and is continued out to the edges of the field; whereas the battoon is cut off at each end.—He beareth argent, a *scarp* azure. *V. Tab. Herald. fig. 44.*

SCAVAGE, SCHEVAGE, SCHEWAGE, or SHEWAGE, in our ancient customs, a kind of toll or custom, exacted by mayors, sheriffs, &c. of merchants-strangers, for wares shewed; or offered to sale within their liberties. This custom is prohibited by stat. 19. Hen. VII. c. 7. though the city of London still retains the benefit of it.

SCAVANTS, or SAVANT, a term purely French, signifying learned; it is little used in our language, except in the phrase, *journal de savant*, denoting a journal of the works of the learned; *placet savant*, meaning a thing being the next work of that kind; and that men which all the rest have had their rise.

* Menage derives the word from the Latin *sapere*, to be wise, and on that footing he will have it two *scavants*; others from *savoir*, to know, and for that reason write it *scavours*. The latter etymology, and orthography, are followed by the academy; though all the ancient MSS. have it *savants*, *savours*, &c.

SCAVENGERS*, two officers chose yearly in each parish in London, and the suburbs, whose business it is to hire persons, called *rakers*, with carts to cleanse the streets, and carry away the dirt and filth thereof.

* The word is derived from the Saxon *scasfa*, or Dutch *schaven*, to scrape or shave away.

The *scavengers* are much the same with what were anciently called *street-wards*.—The Germans call them *drecksjenners*, from one Simon a famed *scavenger* of Marburg.

SCELOTYRBE*, *SKAOTYBE*, weakness and pains in the legs; generally attending scorbutick habits.

* The word is compounded of *σκαλός*, *scalos*, tumul; or uproar.

Scelotybe is also used for the scurvy itself; and sometimes applied to medicines contrived against such disorders. See SCORBUTUS.

SCENE*, SCENA, in its primary sense, denoted a theatre, or place where dramatic pieces, and other publick shews were represented.

* The word is originally Greek, *σκηνη*, signifying a tent, hut, booth, or the like, where dramatic pieces were anciently performed.

According to Rofinus, the *scene* in its proper, and original sense, was a series of trees disposed against each other, so as to form a continued arch, and shade, *scena*, to defend those underneath it from the injuries of the weather: for in such places it was, that, in ancient times, before theatres were built, they acted their plays. Thus also Cassiodorus derives the word *scene*, from the close shade of the grove, where, in the spring time, the ancient shepherds used to sing and play.

SCENE, was afterwards more particularly used for the decorations of a stage, or theatre.

The ancients, we are informed by Vitruvius, had three sorts of *scenes*, or scenical decorations in their theatres.—That in common use was a spacious front or range of building adorned with columns and statues; in which were three large openings, through which other buildings appeared in perspective, *viz.* a palace for tragedies, houses and streets for comedies, and forests for pastorals.

These decorations were either *veritatis*, *i. e.* they turned on pivots, as described by Vitruvius; or *ductilis*, *i. e.* slid along grooves, as those in our theatres.—And, as this or that side, or representation, was turned towards the spectators, the *scene* was called a *tragic*, a *comic*, or a *pastoral scene*. See several curious remarks on the ancient *scene* in M. Perrault's notes on Vitruvius, lib. 5. cap. 6.

SCENE, is also used for the place represented, or that where the action is conceived to have passed.

One of the grand laws of the drama, is to observe the unity of the *scene*, which we more usually call the *unity of place*.

In effect, to keep close to nature and probability, the *scene* should never be shifted from place to place, in the course of the play. The ancients were pretty severe in this respect

specit, particularly Terence: in some of his plays, the *scene* never shifts at all, but the whole is transacted before the door of an old man's house, whither, with imitable art, he brings all his actors, occasionally.

The French too are very strict in this respect: but the English plead for a dispensation from the rule; which they think confines them to too narrow bounds, and precludes them from that variety of adventures and intrigues, which an English audience will never be satisfied without.

However, the more judicious and accurate of our own writers are very moderate in the use of this licence; and take care not to deviate too far from probability, by shifting the *scene*, between the acts, much farther than the persons concerned may be supposed to have gone in the interval. Hence they seldom carry the *scene* out of the same town.—Though others, who own no subjection to the ancient rules, take larger liberties: with some of these 'tis nothing, when a fancied *scene*'s in view, to skip from Covent-Garden to Peru.—The great Shakespear is exceedingly faulty in this respect, in almost all his plays.

SCENE, is also a part, or division, of a dramatic poem, determined by a new actor's entering. Plays are divided into *acts*, and *acts* are subdivided into *scenes*.

In most of our printed plays, a new *scene* is never expressed to begin, but when the place is supposed to be changed by shifting, or drawing, the moveable *scene*; but this must be esteemed an oversight, since on our stage, the *scene* is, properly, the persons present at, or concerned in, the action on the stage at such time. Whenever, therefore, a new actor appears, or an old one disappears, the action is changed into other hands, and therefore a new *scene* then commences.

It is one of the laws of the stage, that the *scenes* be well connected: that is, that one succeed another, in such manner, as that the stage is never quite empty till the end of the *act*.

The ancients did not allow of above three persons on the stage at the same time, excepting in the chorus's, where the number was not limited: but the moderns have but little regard to this restriction.

SCENIC Games, *Ludi Scenici*, among the ancients, were entertainments exhibited on the *scenae*, or theatre; including what we now call *plays* of all kinds, with dancing, and other theatrical performances.

The Romans were 400 years without any *scenic games* at all: Livy observes, that they were first instituted in the year of Rome 392, under the consulate of C. Sulpicius Peticus, and C. Licinius Stolo. But the critics have observed a trip here in Livy; the consulate of those persons falling in the year 389, which, therefore, is held the era of the introduction of *scenic games*.

At first, some actors for these diversions, were sent for out of Hetruria; who, without reciting any thing, danced about to the sound of instruments: so that thus far was no more than a ball, or rather what the French call a *ballet*.—At length they began to rehearse verse.

Thus, by degrees, growing more and more perfect, their *scenical* shews were at last represented with a justness, and magnificence, beyond any thing the world elsewhere ever saw.—The fathers, in their writings, cry out loudly against the *scenical games*.

SCENOGRAPHY*, in perspective, a representation of a body on a perspective plane; or, a description thereof in all its dimensions, such as it appears to the eye.

* The word is formed from the Greek, *σκηνα* scene, and *γραφω* description.

The ichnography of a building, &c. represents the plan, or ground-work of the building. The orthography, the front, or one of the sides. And the *scenography*, the whole building, front, sides, height and all, raised on the geometrical plan.

To exhibit the SCENOGRAPHY of any body.—1°. Lay down the basis, ground-plot, or plan of the body, in the perspective ichnography, according to the method laid down under the article PERSPECTIVE. 2°. Upon the several points of the plan raise the perspective heights: thus will the *scenography* of the body be completed; excepting that a proper shade is to be added. The method of raising the heights is as follows.

On any point given as C, *Tab. Perspect. fig. 1. N° 2.* to raise a perspective altitude, answerable to an objective altitude P Q.—On the terrestrial line raise a perpendicular P Q, equal to the given objective altitude. From P and Q, to any point, as T, draw right lines P T and Q T. From the given point C draw a right line C K, parallel to the terrestrial line D E, meeting the right line Q T in K. In the point K, upon the line K C, erect a perpendicular I K. This I K is the *scenographic* altitude required.

The application of this general method of drawing the *scenography* of a body, is not so obvious, in every case, but that it may be necessary to illustrate it a little by a few examples.

To exhibit the SCENOGRAPHY of a cube, viewed by an angle.—

1°. As the basis of a cube viewed by an angle, standing on a geometrical plane, is a square viewed by an angle; draw a square, viewed angular-wise, on the perspective to b b, or plane. 2°. Raise the side H I (*fig. 2. N° 2.*) of the square perpendicularly on each point of the terrestrial line D E; and to any point, as V, of the horizontal line H R, draw the right line V I and V H. 3°. From the angles d, b and c, draw c 1, d 2, &c. parallel to the terrestrial line D E. 4°. From the points 1 and 2, raise L 1 and M 2, perpendicular to the same. Lastly, since H I is the height to be raised in a, L 1 in c and b, and M 2 in d; in a, raise the line f a perpendicular to a E; in b and c, raise b g and c e perpendicular to b c 1; and lastly, raise d h, perpendicular to d 2: and make a f = H I, b g = c e = L 1, and h d = M 2: if then the points g, h, e, f be connected by right lines, the *scenography* will be complete.

To exhibit the SCENOGRAPHY of a hollow quinquangular prism.

—1°. Since the base of a hollow quinquangular prism, standing on a geometrical plane, is a pentagon, with a limb or breadth of a certain dimension; and the appearance of this pentagon on a table, or plane. See PERSPECTIVE. 2°. On any point, as H, of the terrestrial line D E (*fig. 3.*) raise a perpendicular H I, equal to the objective altitude; and to any point, as V, of the horizontal line H R, draw the lines H V and I V. 3°. From the several angles, a, b, d, e, c, of the perspective ichnography, both the internal and external ones, draw right lines, as b 2, d 3, &c. parallel to the terrestrial line; and from the points 1, 2, 3, raise perpendiculars to the same, as L 1, M 2, n 3. If these, then, be raised in the correspondent points of the ichnography, as in the preceding article, the *scenography* will be complete.

To exhibit the SCENOGRAPHY of a cylinder.—1°. Since the base of a cylinder, standing on a geometrical plane, is a circle; seek the appearance of a circle. In the points a, b, d, f, g, h, g, e, c, (*fig. 8.*) raise the apparent altitudes, as in the preceding articles. If now their upper lines be connected by curve lines, as in the base, a, b, d, f, g, h, g, e, c, the *scenography* of the circle will be complete.

It is evident that those lines are to be omitted, both in the plan and in the elevation, which are not exposed to the eye; though they are not to be disregarded, from the beginning, as being necessary for the finding of other lines.—E. g. in the *scenography* of the cube, viewed angle-wise, the lines b d and d c, (*fig. 2. N° 2.*) in the base, and d h in the elevation, are hid from the eye, and are therefore omitted in the description. But since the upper point h is not to be found unless the point d be had in the ichnography; nor can the lines g h and d e be drawn without the height d h; the appearance of the point d is as necessary to be determined in the operation, as the height h d.

To exhibit the SCENOGRAPHY of a pyramid standing on its base.

—Suppose, e. g. it were required to delineate a quadrangular pyramid, viewed by an angle. 1°. Since the base of such a pyramid is a square seen by an angle, draw such a square. 2°. To find the vertex of the pyramid, i. e. a perpendicular let fall from the vertex to the base, draw diagonals mutually intersecting each other in e (*fig. 5. N° 2.*) 3°. On any point, as H, of the terrestrial line D E, raise the altitude of the pyramid H I; and drawing the right lines H V, and I V to each point of the horizontal line H R; produce the diagonal a b, till it meet the line V H in h. Lastly, from h draw h i parallel to H I. This being raised on the point e, will give the vertex of the pyramid K; consequently, the lines a k, k a, and k b, will be determined at the same time.

After the like manner is the *scenography* of a cone delineated.

To exhibit the SCENOGRAPHY of a truncated pyramid.—Suppose the truncated pyramid quadrangular; 1°. then, If from the several angles of the upper base be conceived perpendiculars let fall to the lower base, we shall have a pentagon, with another inscribed therein, whose sides are parallel to those of the former. This coincides with a pentagon, furnished with a rim or breadth, &c. and may therefore be delineated in the same manner.—2°. Raising the altitude of the truncated pyramid I H, (*fig. 6. N° 2.*) determine the *scenographic* altitudes, to be raised in the points a, b, c, d, e. If now the points higher f, g, h, i, k, be connected by right lines, and the lines l k, f m, g n, h o, be drawn, the *scenography* will be complete.—By drawing two concentric circles in a geometrical plane, and doing every thing else, as in this problem, the *scenography* of a truncated cone will be drawn.

To exhibit the SCENOGRAPHY of walls, columns, &c. or to raise them on the pavement.—1°. Suppose a pavement APHI (*fig. 7. N° 2.*) represented in a plan, together with the bases of the columns, &c. if there be any. 2°. Upon the terrestrial line let off the thickness of the wall B A and I 3.

3°. Upon A and B, as also upon 3 and 1, raise perpendiculars A D and B C, as also 3, 6, and 1, 7. 4°. Connect the points D and 6 with the principal point V, by the right lines D V and 6 V. 5°. Upon F and H raise perpendiculars H G and E F. Thus will all the walls be delineated. Now

Now to raise the pillars, &c. there needs nothing but, from their several bates (whether square or circular) projected on the perspective plan, to raise indefinite perpendiculars; and on the fundamental line, where intersected by the radius F A passing through the bates, raise the true altitude A D: for D V being drawn as before, the *scenographical* altitudes will be determined.

To exhibit the SCENOGRAPHY of a door in building.—Suppose a door required to be delineated in a wall D E F A; 1°. Upon the fundamental line set off its distance A N from the angle A, together with the breadths of the posts N I and L M, and the breadth of the gate itself L I. 2°. To the point of distance K, from the several points N, I, L, M, draw right lines K N, K I, K L, K M, which will determine the breadth of the door I i, and the breadths of the posts i n and m l. 3°. From A to O, set off the height of the gate A O, and from A to P, the height of the posts A P. 4°. Join O and P with the principal point, by the right lines P V and O V. 5°. Then, from n, i, l, m, raise perpendiculars, the middle ones whereof are cut by the right line O V in o, and the extremes, by the right line V P in p. Thus will the door be delineated, with its posts. If the door were to have been exhibited in the wall E F G H, the method would be nearly the same. For, 1°. Upon the terrestrial line, set off the distance of the door from the angle, and thence also the breadth of the door R T. 2°. From R and T, draw right lines to the principal point V, which give the breadth r t in the perspective plan. 3°. From r and t, raise indefinite perpendiculars to F H. 4°. From A to O, set off the true height A O. Lastly, from O, to the principal point V, draw the right line O V, intersecting E F in Z, and make r r and t t equal to F Z.—Thus is the door r r, t t, drawn; and the posts are easily added, as before.

To exhibit the SCENOGRAPHY of windows in a wall.—When you know how to represent doors, you will find no difficulty in adding windows; all that is here further required, being to set off the height of the window from the bottom of the ground. The whole operation is as follows. 1°. From r to 2, set off the thickness of the wall at the window; from 3 to 4, its distance from the angle 3; and from 4 to 5 its breadth. 2°. From 4 and 5, to the point of distance L, draw the right lines L 5 and L 4, which will give the perspective breadth 10, 9 of the window. 3°. From 10 and 9 raise lines perpendicular to the pavement, i. e. draw indefinite parallels to 6, 3. 4°. From 3 to 11 set off the distance of the window from the pavement 3, 11; and from 11 to 12, its height 11, 12. Lastly, from 11 and 12, to the principal point V, draw lines V 11 and V 12; which intersecting the perpendiculars 10, 13, and 9, 14, in 13 and 14, as also in 15 and 16, will exhibit the appearance of the window.

From these examples, which are all no more than applications of the first grand or general rule, it will be easily perceived what method to take to delineate any other thing, and at any height from the pavement.

For a mechanical method of exhibiting the SCENOGRAPHY of any obj. B, see DESIGNING.

SCENOPEGIA *, ΣΚΗΝΟΠΕΓΙΑ, a feast among the Jews, more usually called *feast of tabernacles*, instituted after the people of Israel were in possession of the land of Canaan, in memory of their having dwelt under tents in the wilderness.

* The work is Greek, formed of σκηνή, *scenē*, tabernacle, tent; and πέγνυμι, *pegnymi*, I fix.

The *scenopégia* was held for eight days successively, commencing on the fifteenth of September. The last day was much the most solemn; both on account of the conflux of persons, and of the extraordinary tokens they all gave of their joy.—It is of this eighth day, St. John must be understood to speak, when he tells us, our Saviour was at the feast of tabernacles, on the last and great day.

When the holy scripture says absolutely, *the feast*, it is usually to be understood of the *scenopégia*.

SCEPTER *, SCEPTRUM, a royal staff, or baton, borne, on solemn occasions, by kings, as a badge of their command and authority.

* Níced derives the word from the Greek, σκεπτήρ, which, he says, originally signified a javelin, which the ancient kings usually bore as a badge of their authority, in regard that instrument was in very great veneration among the heathens.—But, σκεπτήρ does not properly signify a javelin, but a staff to rest upon, from σκεπτός, *skēptós*, I lean upon.

The scepter is an ensign of royalty of greater antiquity than the crown. The Greek tragics, and other poets, put scepters in the hands of the most ancient kings they ever introduce.

Justin observes, that the scepter, in its original, was a *hastula*, or spear: he adds, that in the most remote antiquity, men adored the *hastula*, or scepters, as immortal gods; and, that it was upon this account, that even in his time, they still furnished the gods with scepters.—Neptune's scepter is his trident.

Tarquín, the elder, was the first who assumed the scepter

among the Romans.—Le Gendre tells us, that in the first race of the French kings, the scepter was a golden rod, almost always of the same height with the king who bore it, and crooked at one end like a crozier.—Frequently, instead of a scepter, kings are seen on medals with a palm in their hand.

SCEPTER, SCEPTRUM, in astronomy, one of the six new constellations of the southern hemisphere, consisting of 17 stars; one of the 4th magnitude, 8 of the 5th, and as many of the 6th.

SCEPTICISM, the doctrine and opinions of the scepticks; called also *Pyrrhonism*, from the name of its author.

The ancient scepticism consisted in doubting of every thing, in affirming nothing at all, and in keeping the judgment in suspense on every subject. Sextus Empiricus makes *scepticism* to consist in a faculty of opposing all appearances, of making all, even contrary things, equally probable, and of proceeding first to an *επικρισις*, or suspense of mind, and then to intire undisturbedness or tranquillity.

Hence these great maxims of theirs: Ου μάλιστ' αὐτοῖς η̄ κενὸν τὸ νοῦν, this no more than that: Πᾶσι λόγον λογιέσθαι, Every reason has another against it; and Οὐδὲν εἶναι, I determine nothing.

The proper character then of *scepticism*, is an *ακαταληψία*, neutrality, or such a disposition of mind as does not, upon any occasion, incline to any thing more than the contrary thing.

This hesitancy of the scepticks is well described by Aristotle in *Eusebi. de prepar. evan.* All things are equally indifferent, uncertain and undeterminate: neither our senses, nor our opinions give us either truth or falsehood: therefore, neither the one, nor the other are to be credited; but all things to be left on a level, without admitting any opinion, inclination or motion of the mind at all.—It is added, that the scepticks carried this suspense of theirs so far, as even to deny, that any thing is either good or evil, just or unjust, true or false; or that any thing is this, more than that.

It is from this *acatalepsia* of the scepticks, that Des Cartes seems to have borrowed his great principle of doubting of all things; as is owned by many of his followers.—It must be owned, indeed, that there is some difference between the doubting of the scepticks, and that of the Cartesians. In physical matters, it is true, there does not seem a great deal of difference; and Des Cartes, in that respect, may, without much injustice, be deemed a sceptick: but this may be said in his favour, that the great Socrates was so far a sceptick himself; physical and sensible things, he held, were all dubious, and, at best, but probable.

The origin of *scepticism* is somewhat obscure. Pyrrho, who lived under Alexander the Great, and made the tour of India in his retinue, is usually reputed its author; whence the words Pyrrhonians and scepticks are ordinarily used indifferently.

It must be owned, however, that the great dogma of the scepticks had been countenanced, and even cultivated before Pyrrho, by Democritus, Heraclitus, &c.—Sextus Empiricus says, expressly, that all that Pyrrho did, was to improve, illustrate and enforce the dogma, and form the retainers thereto into a sect.

Democritus's philosophy was near akin to *scepticism*; for upon his observing, that honey seemed sweet to some, and bitter to others, he concluded, that it was neither sweet nor bitter; and thereupon pronounced *μάλιστ', ὅτι μάγις*, which is pure *scepticism*.—Yet the same Sextus adds, that Democritus was no sceptick.

Though Plato argues very strenuously against the *acatalepsia* of the scepticks; yet it is certain that dogma received a great part of its encouragement from Socrates's school, and from Plato's academy. Nay, it was a great controversy among the ancients, whether Plato himself were a sceptick or dogmatist? Indeed Plato's decisive way of speaking, in many cases, seems to leave no great room for such a doubt; but it is certain, his followers of the new academy founded by Arcelidas, gave much into this way; and *nihil scitu*, was held by them a principle.

Sextus Empiricus observes, that Socrates himself had a tincture of *scepticism*; some even make him the author of it, from that customary saying of his, *I know nothing but this, that I know nothing*. If this were the origin of *scepticism*, it must be owned, it was mightily improved afterwards, ere Metrodorus said, *I know nothing, not even this, that I know nothing*. The same Sextus however adds, that Plato, introducing his master in his gymnastic dialogues, disputing with the sophists, makes him act the part of a sceptick.

Some have even charged Job, and Solomon, with *scepticism*; from their propounding a great number of questions, without deciding any of them. The philosopher of Kiel, who has published a dissertation on *scepticism*, fetches its origin still higher: he will have the devil the author thereof, who made our first parents doubt of the word of God himself; and drew them in, the first proselytes to *scepticism*.

SCEPTICKS*, *Sceptici*, a sect of ancient philosophers, founded or improved by Pyrrho. Their distinguishing tenet was, that all things are uncertain and incomprehensible; contraries equally true; and that the mind is never to assent to any thing; but to keep up an absolute hesitancy or indifference.

* The term *sceptic*, in its original Greek, *σκιπτικός*, properly signifies *contemner*, and *inquirer*; or a man who is ever weighing the reasons on one side and the other, without ever deciding between them: it is formed from the verb *σκιπώ*, I consider, look about, deliberate.

Laertius notes, that the followers of Pyrrho had various denominations: from their master, they were called *Pyrrhoni*; from their *coima*, *aporia*, that is, doubters, of *ασφα*, to doubt.—From their suspension and hesitation, *επαιστικοί*, of *επιστη*, to stay, to keep back.—And from their never getting beyond the search of truth, *ζητητικοί*, seekers.

Plato refutes the great principle of the *scepticks* thus: when you say, that all things are incomprehensible, do you comprehend or conceive that they are thus incomprehensible, or do you not? if you do, then something is comprehensible; if you do not, there is no reason we should believe you, since you do not comprehend your own assertion.

SCHAR-PENNY, *Schar Penny*, or *Schorr-Penny*.—It appears from our old books, that some customary tenants were obliged to pen up their cattle at night in the pound or yard of their lord, for the benefit of their dung, or *fecern*, as the Saxons called it.—In defect of this, they were to pay a small compensation; which was hence called *scharr-penny*.

SCHLAF or SEAT, in astronomy, a fixed star of the second magnitude in the juncture of the leg with the left shoulder of Pegasus.

Some call it *sebat alphas*, and some *sebat Pegasi*. Its Longitude, according to Mr. Flamsteed, is $25^{\circ} 2' 13''$, its latitude $31^{\circ} 2' 0''$ north.

SCHEDULE*, *SCHEDULE*, a scroll of paper, or parchment, annexed to a will, lease, or other deed; containing an inventory of goods, or some other matter, omitted in the body of the deed.

* The word is a diminutive of the Latin *scheda*, or Greek *σκηδα*, a leaf or piece of paper.

SCHIFFER's fortification. See **FORTIFICATION**.

SCHISMATISM, *σχισματισμός*. See the articles **FIGURE** and **TROPE**.

SCHLME*, a draught, or representation of any geometrical, or astronomical figure, or problem by lines sensible to the eye; or of the celestial bodies in their proper places for any moment.

* The word is formed from the Greek, *σχημα*, habitus.

SCHEM arches. See the article **ARCH**.

SCHEVAGE. See the article **SCHEWAGE**.

SCHIFFER. See the article **SHIPPER**.

SCHIREMOTE, or **SCYREMOT**. See **SCYREMOT**.

SCHISM*, *SCHISMA*, in the general, signifies *division*, or *separation*; but it is chiefly used in speaking of separations happening through diversity of opinions among people of the same religion, and faith.

* The word is formed from the Greek, *σχίσμα*, cleft, fissure.

Thus, we say, the *schism* of the ten tribes of Israel, from the two tribes of Juda and Benjamin; the *schism* of the Persians, from the Turks and other Mahometans, &c.

Among ecclesiastical authors, the *great schism of the west*, in that which happened in the times of Clement VII. and Urban VI. which divided the church for forty or fifty years, and was at length ended by the election of Martin V. at the council of Constance.

The Romanists number thirty-four *schisms* in their church.—They bestow the name, *English schism* on the reformation of religion in this kingdom.—Those of the church of England again apply the term *schism* to the separation of the non-conformists, viz. the presbyterians, independents, and anabaptists, who contend for a further reformation.

Some call the separation of the protestants from the church of Rome, a *schism*, because that church cut them off from her communion.

Negative Schism. See the article **NEGATIVE**.

SCHONOBATES*, *ΣΧΟΝΟΒΑΤΗΣ*, a name which the Greeks gave to their rope-dancers; by the Romans called *funambuli*.

* The word is formed from the Greek, *σχοιν*, a rope; and *βάτης*, I walk.

The *schonobates* were slaves, whose masters made money of them, by entertaining the people with their feats of activity.—*Mercurialis de arte gymnastica*, lib. III. gives us five figures of *schonobates* engraven after ancient stones.

SCHOLAR *Μαθητήριον*. See **DISCIPULUS**.

SCHOLASTIC, *ΣΧΟΛΑΣΤΙΚΟΣ*, something belonging to the schools; or that is taught in the schools. See **SCHOLASTIC**.

SCHOLASTIC, **SCHOLASTICUS**, was a long time a title of honour; at first only given to such as distinguished themselves by their eloquence, in declaiming, &c.

After Nero, the appellation **SCHOLASTICUS** was also given to the advocates; and among others, to Socrates and Eusebius, the ecclesiastical historians, who were advocates at Constantinople. Constant. Harmenopolus also bore it in the twelfth century, with several others.

Afterwards, **SCHOLASTICUS** became restrained to such as had the government of the ecclesiastical schools, established under the first race of French kings, who instructed the clerks of each church, first in the humanities, then in the theology and the liturgy.—These were also called *primiciarii scholasticæ*, and *theologaux*; and if the church were situated in a city, the *scholasticus* was called the *chancellor*.

Among the Greeks, **SCHOLASTICUS**, *Σχολαστικός*, was also the name of an office, or dignity; answering to our *divine* or *theologian*.—Indeed, Genebrard observes, it was only properly applied to people of general learning, and fine parts, and who were well known to the world in that character.

Thus, St. Jerom mentions, that Serapion was furnished *Scholasticus*, by reason of the delicacy of his wit: Valafred Strabo, calls the poet Prudentius, *scholasticus*; and Fortunatus was called *scholasticissimus*.

SCHOLASTIC divinity, is that part or species of divinity which clears, and resolves questions, by reason, and arguments. In which sense, it stands, in good measure, opposed to *positive* divinity, which is founded on the authority of fathers, councils, &c.

The *school divinity*, like Plato's school, has had its three several ages, or periods: the *ancient*, the *middle*, and the *new*.

The *ancient* began under Lanfrank, archbishop of Canterbury, or, more properly, under Peter Lombard, the master of the sentences; and held about 200 years; ending under Albertus Magnus.

This was succeeded by the *middle school divinity*, which lasted about 100 years, to the time of Thomas Aquinas; during which time, the paripatetic philosophy was raised to its utmost reputation.

The third age began under Durandus, who set himself up against Thomas, the chief of the *middle* age. After his time people's wits became more and more subtle; and the school began to be wholly taken up in frivolous questions. They disputed, with great heat, about mere formalities; and even raised phantoms on purpose to combat withal.

The *school divinity* is now fallen into the last contempt; and is scarce regarded any where, but in some of the universities, where they are still obliged by their charters to teach it.

SCHOLIAST, *ΣΧΟΛΙΑΣΤΗΣ*, *commentator*; a grammarian who writes *scholia*, that is, notes, glosses, &c. upon ancient authors who have written in the learned languages.

SCHOLIUM, *ΣΧΟΛΙΟΝ*, a note, annotation, or remark occasionally made on some passage, proposition, or the like.

The term is much used in geometry, and other parts of mathematics; where, after demonstrating a proposition, it is frequent to point out how it might be done some other way; or to give some advice, or precaution, in order to prevent mistakes; or add some particular use or application thereof.

Wolffius has given us abundance of curious and useful arts, and methods, and a good part of the modern philosophy, the description of mathematical instruments, &c. all by way of *scholia* to the respective propositions in his *Elementa Mathematica*.

SCHOOL*, *SCHOLA*, a public place, wherein the languages, humanities, or other arts and sciences are taught.

* The word is formed from the Latin, *schola*, whence, as to the origin of the word, it was anciently used, in the general, for all places, where several persons met together, either to study, to converse, or to do any other matter. Accordingly, their were *schools of philosophy*, being the several posts where the philosophers' guards were placed; *schools of music*, *schools of law*, &c. At length the term passed also to civil magistrates; and accordingly in the code, we meet with *schola consularium*, *schola æqueum*, &c. and even to ecclesiastical, as *schola cantorum*, *schola scriptorum*, &c.

Thus we say, a grammar *school*, a writing *school*, a *school* of natural philosophy, &c.

SCHOOL, is also used for a whole faculty, university, or sect: as Plato's *school*, the *school* of Epicurus, the *school* of Paris, &c. The *school* of Tiberias was famous among the ancient Jews; and it is to this we owe the *massora*, and *masoretes*.

SCHOOL, in painting, is used as a term to distinguish the different manners of places, and persons.

Thus, we say, the Roman *school*, the Venetian *school*, the Flemish *school*, &c. Raphael's *school*, Titian's *school*, da Vinci's *school*, &c. meaning their disciples, pupils, &c.

SCHOOL of Athens, is the name of a celebrated piece of Raphael, now in the Vatican.—It contains a great number of figures, representing philosophers, mathematicians, and other persons engaged in the arts, and sciences.

Several authors have wrote of this painting, and given different explanations thereof: Vasari will have it to be, the

agreement of philosophy, and astronomy, with theology.—The engravers, by the inscription they add at the bottom of the print thereof, shew, that they take it for a painting of St. Paul preaching at Athens.—An Augustin of Venice takes the philosopher who is writing, for St. Mark; and he at his knees, for the angel Gabriel.

M. de Piles rejects all these explications of the *school of Athens*, and especially the last: his opinion is, that it is nothing more than an image of philosophy, which Raphael here represents under all the philosophers he has painted.

In behalf of the Venetian engravers it may be said, that they do not pretend to explain the painting, but have only copied such of the figures as they thought proper to represent, St. Mark, Gabriel, &c.

SCHOOL philosophy, theology, &c. the same with *scholastic*. Charity SCHOOLS. See the article CHARITY.

SCHOUBIAH, a sect among the musfulmen, whose distinguishing tenet it is, that the Sunnites are not a whit preferable to the Shiites or Rafadites, i. e. the orthodox to the heterodox; but that both the one and the other are equally true believers.

The *Schoubiah*, therefore, should be properly, the Latitudinarians in Mahometanism: yet are not they regarded by either party, as much better than Gentiles, or Heathens, as their name in that language imports.

There are abundance among the musfulmen, who give into this sect, only secretly; Mahometanism, like all other false religions, being an avowed enemy to toleration.

SCHÖRN-PENNY. See the article SCHAR-PENNY.

SCIAGRAPHY, or SCIOGRAPHY, the profile, or section of a building, to shew the inside thereof.

SCIAGRAPHY, in astronomy, &c. is a term some authors use for the art of finding the hour of the day or night, by the shadow of the sun, moon, stars, &c. See DIAL.

SCIAMANTIA*, SCIAMANCY, or SCIOMANCY, a kind of divination, otherwise called *pychomancy*.—*Sciamancy*, among the ancients, was the art of raising and calling up the manes or souls of deceased persons, to give intelligence of things to come. The witch who conjured up the soul of Samuel, to foretel Saul the event of the battle he was about to give, did it by *sciamancy*.

* The word is formed from the Greek, *scia*, shadow, used metaphorically for the soul, and *manco* divination.

SCIATICA, in medicine, the gout in the hip. See GOUT.

SCIE.—*Feuille de SCIE*. See FEUILLE de scie.

SCIENCE*, in philosophy, a clear and certain knowledge of any thing, founded on self-evident principles, or demonstration.

* The word is formed from the Latin, *scientia* of *scire*, to know.

In this sense, *doubting* is opposed to *science*; and *opinion* is the middle between the two.

The scepticks profess to deny, that we have any such thing as *science*; that is, any clear, or certain notices of any thing capable of producing absolute conviction.

Divines suppose three kinds of *science* in God: the first, *science of mere knowledge*, whereby God knows himself, and all things possible.—The second, *science of vision*, whereby he knows all things he has resolved to do, or to permit, in the same order wherein he has resolved to do, and to permit them.—The third, a *mediate or intermediate science*, whereby he knows what angels and men will do, in certain cases and certain circumstances, if he resolve to bring them about.

It is greatly disputed among school divines, whether or no there be such a mediate *science* in God? the reason why some call it in question is, because it does not consist well with their particular schemes of preience, &c.

SCIENCE of conditions. See CONDITIONAL.

SCIENCE, is more particularly used for a formed system of any branch of knowledge; comprehending the doctrine, reason and theory of the thing, without any immediate application thereof to any uses or offices of life.

In this sense, the word is used in opposition to *art*.

Indeed, the precise notion of an art, and *science*, and their just, adequate distinction, do not seem to be yet well fixed. See the PREFACE to this work.

As to the number, and division of the *sciences*, Mr. Locke limits them thus: all that can fall within the compass of human understanding, is, first, either the nature of things, their relations, and their manner of operation: or, secondly, that which man himself ought to do as a voluntary and rational agent, for the attainment of any end, especially of happiness: or, thirdly, the ways and means, whereby the knowledge of both of these is attained and communicated: whereupon, *science* may be properly divided into these three sorts.

First, the knowledge of things, their constitutions, properties and operations, whether material or immaterial.—This, in a little more enlarged sense of the word, may be called

Quies, or *natural philosophy*.—The end of this is bare speculative truth, and whatsoever can afford the mind of man any such, falls under this branch; whether it be God himself, angels, spirits, bodies, or any of their affections; as number, figure, &c.

Secondly, *practica*, the skill of right applying our own powers and actions for the attainment of things good and useful.—The most considerable under this head, is *ethicks*, which is the seeking out those rules and measures of human actions, which lead to happiness, and the means to practise them. The end of this is not bare speculation; but right, and a conduct suitable thereto.

Thirdly, *cruciales*, or the doctrine of signs.—The most usual being words, this is aptly enough termed *logick*; the business whereof is to consider the nature of those signs which the mind makes use of for the understanding of things, or conveying its knowledge to others. Things are represented to the mind by ideas; and mens ideas are communicated to one another by articulate sounds or words. The consideration then of ideas and words, as the great instrument of knowledge, makes no despicable part of their contemplation who would take a view of human knowledge in the whole extent of it.

This seems the first, and most general, as well as the most natural division of the objects of our understanding: for a man can employ his thoughts about nothing, but either the contemplation of things themselves for the discovery of truth; or about the things in his own power, which are his actions, for the attainment of his own ends; or the signs the mind makes use of, both in the one and the other, and the right ordering of them, for its clearer information.—All which three, *viz.* things as they are in themselves knowable; actions, as they depend on us, in order to happiness; and the right use of signs in order to knowledge, being *totò cælo*, different, they seem to be the three great provinces of the intellectual world, wholly separate and distinct one from another.

Academy of SCIENCES. See the article ACADEMY.

SCIENTIFIC, or SCIENTIFICAL, something relating to the pure, sublimer sciences; or that abounds in science, or knowledge.

A work, a method, &c. is said to be *scientific*, when it is founded on the pure reason of things, or conducted wholly on the principles thereof.

In which sense, the word stands opposed to narrative, arbitrary, opinionative, positive, tentative, &c.

SCILLA, or SQVILLA, *squill*, the *sea-onion*; a medicinal plant, of the onion-kind, but very large; chiefly brought from Spain: used principally in infusion, and that generally in vinegar, which it renders emetic.

There are two kinds of *squills*, the *male* and *female*: the *male* are whitish, and the *female* reddish; whence they are also distinguished by the appellations of *white squills*, *scillæ albæ*, and *red squills*, *scillæ rubræ*.

Their infusion, when boiled to the consistence of a syrup, with honey, is called *oxymel scilliticum*, in the shops, and retains the same properties.

Squills powerfully deterge, and scour off the viscid adhesions in the bowels; and gently irritate the stomach to ejection.

They are also, as all of the onion-kind are, very diuretic, and therefore in great esteem, with some, in dropies: if their infusion be mixed with cinnamon-water, they will seldom vomit, but work downwards, and that very forcibly, by urine: in asthma, and all obstructions, or infarctions of the lungs, which are to be removed by detergives and expectoration, there is scarce any thing more effectual. They are also esteemed alexipharmick, and upon that account have a place in the theriaca Andromachi.

SCILLITICUM vinum. See the article VINUM.

SCIOPTICK, a sphere or globe of wood, with a circular hole or perforation wherein a lens is placed.—It is so fitted, that, like the eye of an animal, it may be turned round every way; to be used in making experiments of the darkened room.

SCIRE-FACIAS, a judicial writ, most commonly used to call a man to shew cause to the court whence it issues, why execution of a judgment passed, should not be made out?

This writ is not granted, till a year and a day be elapsed after a judgment given.

Scire facias, upon a fine, lies only after a year and a day after the fine levied.—Otherwise, it is the same with the writ of *habere facias possessionem*. See HABERE facias, &c.

SCIRRHUS*, SKIRPOZ, in medicine, a hard, indolent tumor, formed gradually, in the soft, glandulous parts of the body; sometimes internal, and sometimes external.

* The word is Greek, formed of *scir*, a piece of marble.

There are two kinds of *scirrhus*; the one only beginning, and frequently painful when pressed by the fingers; the other, confirmed and senseless.

The *scirrhus* arises from a thick, viscid, and probably gritty matter,

matter, detained and indurated in the pores and other minute passages of the parts affected.

There are some *scirrhus*'s as hard as stones; some are even painful in their confirmed state, and partake of the nature of a cancer. See *Supplement*, article *SCIRRHUS*.

CITE E. See the article *SITE*.

SLAVONIC, the language of the Slavi, an ancient people of Scythia Europæa; who, about the year 518, quitting their native country, ravaged Greece and established the kingdoms of Poland and Moravia, and at last settled in Illyria: which thence took the name of *Slavonia*.

The *Slavonic* is held, after the Arabic, the most extensive language in the world: it is spoke from the Adriatic to the north sea, and from the Caspian to Saxony, by a great variety of people; who are all, the descendants of the ancient Slavi, viz. the Poles, Muscovites, Bulgarians, Carinthians, Bohemians, Hungarians, Prussians, Saxonians, &c. each of whom, however, have their particular dialect; only the *Slavonic* is the common mother of their several languages, viz. the Polish, Russian, Hungarian, &c.

By a Latin chronicle of the Slavi, composed by Helmold, a priest of Bosow, and Arnold abbot of Lubec, and corrected by M. Leibnitz, it appears, that the Slavi anciently inhabited the coasts of the Baltic sea, and were divided into eastern and western: in the latter whereof, were the Russians, Poles, Bohemians, &c. And in the former, the Vandals.

Dom. Maur. Orbini Rauser, abbot of the order of Malta, in an Italian history of the Slavi, intitled, *Il regno de gli Slavi*, printed in 1701, will have them to be originally of Finland in Scandinavia. Laur. Pribevo, a Dalmatian, in an express discourse on the origin of the Slavi, maintains them to be originally of Thrace, and the same with the Thracians, the posterity of Thiras, who was the seventh son of Japhet. Theod. Polycarpowitz, in a Greek, Latin and *Slavonic* dictionary, printed at Moscow in 1704, observes, that the word *Slava*, whence *Slavonic* is formed, signifies in their language, *glory*.

SCLEROPHTHALMIA, ΣΚΛΗΡΟΦΘΑΛΜΙΑ, a kind of ophthalmia, wherein the eye is dry, hard, red and painful; and the eyebrows likewise; so as not to be opened after sleep, without great pain. See *OPHTHALMIA*.

SCLEROTICA*, in anatomy, one of the common membranes of the eye, situate between the adnata and the uvea; it is very firm and opaque behind; but transparent before.—Though in strictness, it is only the hind-part that is called *sclerotica*; the fore-part being properly called the *cornea*.

* The word is formed from the Greek, σκληρός, hard, whence also *scleretic*. See *SCLEROTICKS*.

The *sclerotica* is a segment of a larger spheroid than the cornea. See *EYE*.

SCLEROTICKS, medicines, proper to harden and consolidate the flesh, &c. of parts they are applied to.

Such are purslain, house-leek, flea-wort, garden night-shade, &c.

SCOLDING.—The punishment allotted by our laws for *scolds* or *scolding* women, is, to be set in a trebuchet, commonly called a *ducking-stool*, placed over some deep water, into which they are to be let down, and plunged thrice, under water, to cool their heat and cholera. See *DUCKING-STOOL*.

SCOLOPOMACHÆRION, ΣΚΟΛΟΠΟΜΑΧΑΙΡΙΟΝ, in chæurgery, a kind of scalpel, thus called, by the Greeks, from its resembling a woodcock's bill.

Its use is to open, and dilate narrow wounds of the breast, abscesses, &c.—Aqua pendente recommends it for tapping in dropsies.

It is usually furnished with a little button at the point, that it may be used to open wounds of the breast without danger of wounding the lungs.

SCONCES, small forts, built for the defence of some pass, river, or other place. See *FORT*.

Some *sconces* are made regular, of four, five, or six bastions; others are of smaller dimensions, fit for passes, or rivers; and others for the field.—Such are

1. Triangles with half bastions; which may be all of equal sides, or they may be something unequal. However it be, divide the sides of the triangle into three equal parts, one of these three parts will set off the capitals and the gorges; and the flanks, being at right angles with the sides, make half of the gorge.—2. Square, with half bastions; whose sides may be betwixt 100 and 200 feet, and let one third of the side set off the capital and the gorges, but the flank (which raise at right angles to the side) must be but one half of the gorge or capital, that is, on the sixth part of the side of the square.

—3. Square with half bastions and long.—4. Long squares.

—5. Star redoubt of four points.—6. Star redoubt of five or six points.—7. Plain redoubts, which are either small, or great. The small are fit for court of guards in the trenches, and may be squares of 20 feet to 30. The middle forts of redoubts may have their sides from 30 to 50 feet; the great ones from 60 to 80 feet square.

The profiles (that is, the thickness and height of the breast-works) to be set on these several works, and the ditches, are to be accommodated to the occasion.

SCOPER-HOLES, or **SCUPER-HOLES**, in a ship, are holes made through the sides, close to the deck, to carry off the water that comes from the pump, or any other way.

These holes in the lower or covert deck, have round leathers nailed over them, to keep the sea-water from coming up into the ship, these are called *scuper leathers*.

And the short nails, with broad heads, which fasten these leathers down, are called *scuper-nails*, or *scuper-nail*.

SCORBUTUS, or **SCORBUTUM**, the *scurvey*; a disease very frequent in the northern countries, particularly in fenny, wet, humid places, much exposed to the north, &c. It is accompanied with a great variety of symptoms, attacking the several parts of the body all at once: hence Willis says, it is not any particular disease, but a legion of diseases.

—The most usual symptoms are bleedings, coughing, vomiting, difficulty of breathing, loquels, a relaxation of the parts, sweating, a fetid smell of the gums, a falling out of the teeth, thinking breath, reddish or yellow livid spots, pains of the arms and legs, weariness, faintings, head-ach, &c. Some distinguish the *scurvey* into *hot* and *cold*; but there is little foundation for such a distinction, as the cause is the same in all, viz. according to Barbet and Decker, a too thick pituitous lymph; whence arise various symptoms in various temperaments.

Charleton observes, that it arises chiefly from sharp, saline particles, taken in by inspiration, from salt and corrupted meats eaten, from bad waters drank, from nausies, deep chagrins, &c. He adds, that it is contagious.

Quincy will have the *scurvey* to consist in such a constitution, wherein the blood is unequally fluid: and hence he observes, it is best remedied by stimuli, exercise, and such means as promote sanguification.

The cure is very difficult; and when the disease is rooted, next to impossible. It sometimes goes off in a flux by stool, sometimes by the hemorrhoids, and sometimes by urine; but more often it degenerates into a dropsy, atrophy, apoplexy, epilepsy, or convulsion.

A very exact diet is less effect in the *scurvey*, than the best medicines; without this it becomes incurable. Bleeding does not avail; strong purgatives are hurtful: so is leger, and all figured things: mercurius dulcis used internally, so as not to salivate, but only raise a sweating, is found excellent.

Dolrus undertakes to cure any *scorbutus* in twelve days time, by the use of this alone; only the patient is to drink nothing all that time, but a proper decoction, and to abstain from acids, and hog's flesh. Charleton recommends a continued use of milk, as also of milky emulsions of sweet almonds, decoctions of china, broths, and other anti-acids and analepticks.

Etmmuller makes the basis of the cure of the *scorbutus* and the hypochondriacal disease the same, viz. crispus vomiting. Strong catharticks, he observes, are prejudicial; but gentle ones good; for the body is to be kept open. He adds, that vinegar is hurtful, and yet the acid juices of fruits and vegetables are wholesome. Accordingly the use of lemon juice is much recommended by Lister. Milk, and all milky things, while the stomach is yet able to digest them, are excellent. So are martials. Etmmuller, instead of mercurials, recommends antimonial.

Thus much in the general: for the particular symptoms, particular medicines adapted thereto, are to be used; only mixing antiscorbuticks with them all.

The chief simple antiscorbuticks are, horse-radish, sorrel, butter-bur, scorzonera, fow-thistle, zedoary, polypody, elecampane, guaiacum, sassafras, mustard-seed, nasturtium aquaticum, trifolium paludosum, oranges, lemons, juniper-berries, cream of tartar, tartarum vitriolatum, &c. See *Supplement*, article *SCORBUTUS*.

SCORE, in music, denotes *partition*, or the original draught of the whole composition, wherein the several parts, viz. treble, second treble, bass, &c. are distinctly *scored*, and marked.

SCORPIO, **SCORPION**, in astronomy, the eighth sign of the zodiac; denoted by the character, ♏.

The stars in *scorpio*, in Ptolemy's catalogue, are 20; in that of Tycho 10; in that of M. Flamsteed 49: the longitudes, latitudes, magnitudes, &c. whereof, are as follow;

Names and situations of the stars.

In the first fourth foot
Subseq. in the first foot
Contiguous to this
That preced. fourth of forehead
In third fourth foot

Longitude
Latitude
Magn.

26 48 50
27 18 08
27 30 49
27 55 47
28 48 52

5
South of 3 in the forehead
Middle of the forehead
North of the forehead
North 2 of the contiguous ones
South 3 under north. star of forehead

28 37 25
28 15 50
28 52 56
29 21 45
29 32 09

5 26 32 1 6
4 51 13 5
4 46 16 1
5 43 48 A 6
8 33 25 A 4 3

5 25 46 A 3
1 50 31 A 3 2
1 03 09 B 2
0 16 05 B 5
0 05 56 B 5

Names

Names and situations of the stars.	Signs.	Longitude.	Latitude.	Magn.
	0	0	0	0
	1	1	1	1
	2	2	2	2
	3	3	3	3
	4	4	4	4
	5	5	5	5
	6	6	6	6
	7	7	7	7
	8	8	8	8
	9	9	9	9
	10	10	10	10
	11	11	11	11
	12	12	12	12
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	15	15	15	15
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	96	96	96	96
	97	97	97	97
	98	98	98	98
	99	99	99	99
	100	100	100	100

SCORPION, *SCORPIO*, is also the name of an ancient, military engine, used chiefly in the defence of walls, &c. Marcellinus describes the *scorpio*, as consisting of two beams bound together by ropes. From the middle of the two, rose a third beam, to be disposed, as to be pulled up and let down at pleasure; and on the top of this, were fastened iron hooks, where was hung a sling, either of iron or hemp: And under the third beam lay a piece of hair-cloth full of chaff, tied with cords.

To use the engine, a round stone was put into the sling, and four persons on each side, loosening the beams bound by the ropes, drew back the erect beam to the hook: when, the engineer standing on an eminence, giving a stroke with a hammer on the cord to which the beam was fastened with its hook, set it at liberty; so that hitting against the soft hair-cloth, it struck out the stone with a vast force.

It had its name *scorpio*, because when the long beam or tiller was erected, it had a sharp top, in manner of a sting.—More modern times have given it the name *snager*, wild ass, because that animal, when hunted, flings back stones.

SCORPION, an insect. See *Supplement*, article *SCORPIO*.

SCORIA, ΣΚΡΙΑ, the recement, or dross of any metal remaining after melting, or refining the same.

The *scoria* of iron, is the scum taken from that metal in forges where it is melted.

The *scoria* of iron, is the sulphurous part of the iron; which uniting with the sulphurous part of the coals makes together, those porous masses, resembling sponges, frequently seen in the smiths forges. See *IRON*.

SCOTUM. See the article *SCOTUM*.

SCOT, *SCOTTA*, or *SCOTTUS*, a customary contribution laid upon all subjects, according to their ability.

Whoever are affected to any contribution, though not by equal portions, are said to pay *scot and lot*.

Church SCOT. See the article *CHURCH SCOT*.

SCOTIA *, in architecture, a semi-circular cavity or channel between the cores, in the bases of columns.—See *Tab. Archit.* fig. 4.

* The *scotia* is a concave, dark moulding; whence its name, viz. from σκιά, obscurity, darkness.

The *scotia* has an effect just opposite to that of the quarter-round.—Our workmen frequently call it the *casement*.

It is also called *trochilus*, partly from its form. See *TROCHILUS*.

In the Ionic and Corinthian base, there are two *scotias*, the upper whereof is the smaller.—V. *Tab. Archit.* fig. 32. lit. b, c, and fig. 26. lit. i, k.

According to Felibien, the cavetto is a fourth part of the *scotia*. See *CAVETTO*.

SCOTISH terms. See the article *TERMS*.

SCOTTISTS, a sect of school divines and philosophers; thus called from their founder, J. Duns Scotus, a Scotish, or as others say, an Irish cordelier; who maintained the immaculate conception of the virgin, or that she was born without original sin; in opposition to Thomas Aquinas and the Thomists.

As to philosophy, the *Scotists* were, like the Thomists, peripatetics; only distinguished by this, that in each being, as many different qualities as it had, so many different formalities did they distinguish; all distinct from the body itself; and making, as it were, so many different entities: only these were metaphysical, and, as it were, superadded to the being.

SCOTOMIA, or *SCOTOMA*, in medicine, a dizziness, or swimming in the head, wherein the animal spirits are so whirled about, that external objects seem to turn round. See *VERTIGO*.

SCOTTA, or *SCOTTUS*. See the article *SCOT*.

SCRATCHES, among farmers, a distemper incident to horses, consisting of dry scabs, chops or rifts, that breed between the heel and the pattern joint.

There are various kinds of *scratches*, distinguished by various names, as crepences, ruts-tails, malles, lites, pains, &c. which are all so many species of the same malady; engendered from some hot humour issuing on the legs, or from the fumes of the hearth's own dung lying under his heels, or near them; or for want of rubbing his heels, especially after a journey, from over hard riding, &c.

The disorder begins first, with dry scabs in the pattern joint, in several forms. It is known by the flaring, dividing and curling of the hair on the Part.

SCRATCH-WORK, *scraffiata*, a way of painting in fresco, by preparing a black ground, on which is laid a white plaiter; which white being taken off with an iron bodkin, the black appears through the holes; and serves for shadows. See *SGRAFFIATA*.

This kind of work is lasting; but being very rough, it is unpleasant to the sight.

SCREW, or *SCRUE*, *cachlea*, in mechanics, one of the five mechanical powers; chiefly used in pressing or squeezing bodies close, though sometimes also in raising weights.

The *screw* is a right cylinder, as AB, (*Tab. Mechanicks*, fig. 11.) furrowed spiral-wise: it is generated by the equable motion of a right line FG, around the surface of a cylinder; while, at the same time, the point I, descends equably from F towards G.

If the furrowed surface be convex, the *screw* is said to be male; if concave, it is female.

Where motion is to be generated, the male and female *screw* are always joined; that is, whenever the *screw* is to be used as a simple engine, or mechanical power.—When joined with an axis in peritrochois, there is no occasion for a female; but in that case, it becomes part of a compound engine.

Doctrine of the SCREW.—1°. If, as the compas described by the power in one turn of the *screw*, is to the interval or distance between any two immediate threads or spiral windings, as BI (measured according to the length of the *screw*) so is the weight or resistance, to the power; then the power and the resistance will be equivalent one to the other; and, consequently, the power being a little increased, will overcome the resistance.

For it is evident, that in one turn of the *screw*, the weight is so much lifted up, or the resistance so much removed, or the thing to be pressed, is squeezed so much closer together, as is the distance between two immediate spirals; and in the same time, the power to be moved is so much, as is the compas described by the said power in one turn of the *screw*. Wherefore the velocity of the weight (or whatsoever answers thereto) will be to the velocity of the power, as is the said distance between the spirals to the compas described by the power, in one revolution or turning round of the *screw*: so that the gaining in power, is here recompensed by the loss in time.

2°. As the distance between two threads, BI, is less; the power required to overcome the said resistance is less; therefore the finer the thread, the easier the motion.

3°. If the male *screw* be turned in the female, at rest, a less power will be required to overcome the resistance, as the lever or scytala, BD (fig. 12.) is the longer.

4°. The distance of the power from the centre of the *screw*, CD, the distance of two threads I K, and the power to be applied in D, being given, to determine the resistance it will overcome: or, the resistance being given, to find the power necessary to overcome it:

Find the periphery of a circle described by the radius CD: then to the distance between the two threads, the periphery just found, and the given power: or, to the periphery found, the distance of the two threads, and the given resistance, find a fourth proportional. This in the former case will be the resistance that will be overcome by the given power; and in the latter, the power necessary to overcome the given resistance.

E. gr.

E. gr. Suppose the distance between the two threads, 2, the distance of the power from the centre of the screw C D, 25, and the power 30 pounds; the periphery of the circle to be described by the power, will be found 157. Therefore, as 3, 157 : 30, 1570, the weight to which the resistance is equal.

5°. The resistance to be overcome by a given power, being given; to determine the diameter of the screw, the distance of two threads I K, and the length of the cylinder or handle: the distance of the threads, and the diameter of the screw may be assumed at pleasure, if the male be to be turned in the female by a handle. Then, as the given power is to the resistance it is to overcome, so is the distance of the threads to a fourth number, which will be the periphery to be described by the handle C D, in a turn of the screw. The semi-diameter of this periphery, therefore, being sought, we have the length of the handle C D. But if the female screw be to be turned about the male, without any handle; then the periphery and semi-diameter found, will be very nearly those of the screw required.

E. gr. Suppose the weight 6000, the power 100, and the distance of the threads 2 lines; for the periphery to be passed over by the power, say, as 100, 6000 : 2, 120; the semi-diameter of which periphery being $\frac{1}{4}$ of 120 = 40 lines will be the length of the handle, if any be used; otherwise the side of the female screw must be 40 lines.

Endless SCREW. If a screw be so fitted as to turn a dented wheel D F (fig. 13.) it is called an *endless*, or *perpetual screw*; in regard it may be turned for ever, without coming at an end. From the scheme, it is evident enough, that while the screw turns once round, the wheel only advances the distance of one tooth.

Doctrine of the endless SCREW.—1°. If the power applied to the lever, or handle of an *endless screw* A B, be to the weight, in a ratio compounded of the periphery of the axis of the wheel E H, to the periphery described by the power, in turning the handle, and of the revolutions of the wheel D F, to the revolutions of the screw C B; the power will be equivalent to the weight.

Hence, 1°. as the motion of the wheel is exceedingly slow; a small power may raise a vast weight, by means of an *endless screw*: for this reason, the great use of the *endless screw*, is either where a great weight is to be raised through a little space; or, where a very slow, gentle motion is required. On which account it is very useful in clocks and watches.

2. The number of teeth, the distance of the power from the centre of the screw A B, the radius of the axis H F, and the power, being given; to find the weight it will raise.

Multiply the distance of the power from the centre of the screw A B, into the number of teeth: the product is the space of the power passed through, in the time the weight passes through a space equal to the periphery of the axis. Find a fourth proportional to the radius of the axis, the space of the power now found, and the power. This will be the weight the power is able to sustain. Thus, if A B = 3, the radius of the axis H F = 1; the power 100 pounds; number of teeth of the wheel D F 48; the weight will be found 14400: whence it appears, that the *endless screw* exceeds all others, in increasing the force of a power.

Archimedes's SCREW, or the *spiral pump*, is a machine for the raising of water, invented by Archimedes.

Its structure is as follows: a leaden tube is wound round a cylinder A B (Tab. *Hydraulicks*, fig. 1.) after the same manner as the spiral thread is drawn in the common screw above described. This cylinder is inclined to the horizon, in an angle of about 45 degrees, and the orifice of the tube B is immersed under water.—If then, the screw be turned about by the handle I, against the water; the water will rise up the spiral, and at length be discharged in A.

This machine, with a very little strength, is able to raise a great quantity of water: whence it is found of good use, in the emptying of lakes, &c.

If the water be to be raised to any considerable height, one screw will not suffice; but water drawn up by one, is to be there taken by another, and so successively.

SCRIBE, SCRIBA, a principal officer in the Jewish law, whose business was to write, and interpret scripture.

We find no mention of *scribes*, in the Old Testament, before Eldad; whence some learned men have concluded, that the office was brought from Chaldaea, and Assyria, and first established by the Jews after their return from the Babylonish captivity.

The *scribes* were in great credit and esteem among the Jews, and had even the precedence of the priests, and sacrificers.—Indeed, there were three kinds of *scribes*, whereof those just mentioned, properly called *scribes of the law*, were the first, and most considerable: the decisions of these were received with almost the same respect as the law of God itself. The second kind, properly called *scribes of the people*, were a sort of magistrates, among the Romans, as well as among the Jews. See the following article.

The third kind were public notaries, or secretaries of the council: these were the least considerable.

SCRIBE, SCRIBA, was also the title of an officer, among the Romans, who wrote decrees, or acts, and made out authentic copies thereof.

Every magistrate had his *scriba*, or secretary, so that there were *scribae aedilitii, praetorii, quaestorii*, &c.

The *scribae* were not admitted to the management of the principal offices of the republic, unless they relinquished their profession.

In the time of the emperors, they were also called *notarii*, and this because they made use of abbreviations, and short notes in writing.

SCRIBING, in joinery, &c. a term used, when one side of a piece of stuff being to be fitted to the side of some other piece, which last is not regular; to make the two join close together all the way, they *scribe* it.

That is, they lay the piece of stuff to be *scribed* close to the other piece they intend to *scribe* to, and open their compasses to the greatest distance the two pieces any where stand from each other; then, bearing one of the legs against the side to be *scribed* to, with the other point they draw a line on the stuff to be *scribed*.—Thus have they a line on the irregular piece parallel to the edge of the regular one; and if the stuff be wrought away exactly to the line, when the two pieces are put together, they will seem a joint.

SCRIPTORIUS calamus. See the article CALAMUS.

SCRIPTURARY, among the Jews. See CARAITES.

SCRIPTURE, or **SCRIPTURES.** See BIBLE.

SCROBICULUS cordis, the same as *anticardium*. See ANTICARDIUM.

SCROLL. See the article ESCROLL.

SCROPHULE *, in medicine, scirrhous tumours, arising usually about the neck, and sometimes on other glandulous parts; called also *ferreae*, and popularly, the *king's evil*, or simply, the *evil*. See EVIL.

* The word is Latin, formed by diminution, from *scropha*, fow.

SCROTUM, or **SCORTUM**, in anatomy, the common capula or membrane wherein the testicles are contained; thus called from its resembling a pouch or purse of leather, called by the ancients *sortea*.

The *scrotum* consists of two membranes; the exterior whereof is only a production of the cuticula or cutis, which is here very thin, and without any fat underneath it.

The inner, called *dartos*, is only an expansion of the panniculus carnosus, which, together with the cutis, is drawn into the figure of a purse externally: it is divided longitudinally into two parts, right and left, by a line, called the *seam of the scrotum*; answering to which inwardly is a membrane, called the *septum*, which divides the cavity into two parts; being only a production of the *dartos*.

It is divisible into lamellae, and the testicles are on each side loosely connected to it by means of their outer proper tunic.

—Its use is to sustain them, to prevent their collision, as also their falling too low, and to promote the corrugation of the *scrotum*.

SCROTUM cordis, the same as *pericardium*. See PERICARDIUM.

SCROWLS, or **SCROLLS**, in architecture. See VOLUTES.

SCRUE. See the article SCREW.

SCRUPLE, **SCRUPULUS**, **SCRUPULUM**, or **SCRIPULUM**, the least of the weights used by the ancients; which amongst the Romans was the twenty-fourth part of an ounce, or the third part of a dram.

SCRUPLE is still a weight among us, containing the third part of a dram, or 20 grains.

Among goldsmiths, the *scruple* is 24 grains.

SCRUPLE, in chronology.—The Chaldee **SCRUPLE** is $\frac{1}{24}$ part of an hour, called by the Hebrews, *helakin*. These *scruples* are much used by the Jews, Arabs, and other eastern people in computations of time.

SCRUPLES, in astronomy.—**SCRUPLES eclipsed**, that part of the moon's diameter which enters the shadow, expressed in the same measure wherein the apparent diameter of the moon is expressed. See DIGIT.

SCRUPLES of half duration, an arch of the moon's orbit, which the moon's centre describes from the beginning of an eclipse to its middle.

SCRUPLES of immersion, or *incidence*, an arch of the moon's orbit, which her centre describes from the beginning of the eclipse, to the time when its centre falls into the shadow. See IMMERSION.

SCRUPLES of emersion, an arch of the moon's orbit, which her centre describes in the time from the first emersion of the moon's limb, to the end of the eclipse.

SCRUTINY, **SCRUTINIUM**, in antiquity, an examination, or probation, practised in the last week of lent, on the catechumens, who were to receive baptism on the Easter-day.

The *scrutiny* was performed with a great many ceremonies: exorcisms and prayers were made over the heads of the catechumens.—On palm-sunday, the Lord's prayer and creed were given them; which they were afterwards made to rehearse.

The process was called *scrutinium*, *scrutiny*; because hereby the

the hearts of the catechumens were scrutinized, or searched, that the priests might understand who were fit to be admitted to baptism.

This custom was more in use in the church of Rome, than any where else: though it appears, by some missals, to have been likewise used, though much later, in the Gallican church. It is supposed to have ceased about the year 860.

SCRUTINY is also used, in the canon law, for a ticket, or little paper billet, wherein, at elections, the electors write their votes privately, so as it may not be known for whom they vote.

Among us **SCRUTINY** is chiefly used for a strict perusal, and examination of the several votes hastily taken at an election; in order to find out any irregularities committed therein, by unqualified voters, &c.

SCRUTOIRE, or **SCRUTOIR** (from the French *écrivire*) a kind of cabinet, with a door or lid opening downwards, for convenience of writing on, &c.

SCULK, amongst hunters, denotes a company; as, a *sculk* of foxes.

SCULPTURE, **SCULPTURA**, the art of cutting, or carving wood, stone, or other matter, and forming various figures or representations therein; as also of fashioning wax, earth, plaster, &c. to serve as models, or moulds, for the casting of metalline figures.

Sculpture, in its latitude, includes both the art of working in creux, properly called *engraving*; and of working in relief, which is what we more strictly call *sculpture*.

The antiquity of this art is past doubt; as the sacred writings, the most ancient and authentic monuments we have of the earliest ages, mention it in several places: witness Laban's idols stolen away by Rachel, and the golden calf which the Israelites set up in the desert, &c. But it is very difficult to fix the original of the art, and the first artists, from prophane authors; what we read thereof, being greatly intermixed with fables, after the manner and taste of those ages.

Some make a potter of Sicyon, named Dibutades, the first sculptor: others say, the art had its origin in the isle of Samos, where one Idocus, and after him Theodorus, performed works of this kind, long before Dibutades's time. It is added, that Demaratus, father of Tarquin the elder, first brought it into Italy upon his retiring thither; and that by means of Eucirapus and Eutygrammus, two excellent workmen herein, who communicated it chiefly to the Tuscans; among whom it was afterwards cultivated with great success. They add, that Tarquin sent for Taurianus, one of the most eminent among them to Rome, to make a statue of Jupiter, &c. of baked earth; for the frontispiece of the temple of that deity.

Soon after this time, there were many sculptors, both in Greece and Italy, who wrought altogether in earth: some of the most noted were, Chalciotheses, an Athenian, who made himself and his house famous, by the great number of earthen figures he adorned it withal; and Demophilus and Gorfanus, two painters, who enriched the temple of Ceres with great variety of painting and earthen images. In effect, all the first statues of the heathen deities, were either of earth or wood; and it was not so much any frailty of that matter, or unfitness for the purpose, as the riches and luxury of the people, that first induced them to make images of marble, and other more precious stones.

Indeed, how rich soever the matter were, whereon they wrought, yet they still first used earth, to form models thereof: and to this day, whether they be for cutting marble statues with the chisel, or for casting them in metal, they never undertake the one or the other, without first making a perfect model thereof in earth. Whence, doubtless, arose the observation of Praxiteles, that the art of moulding earthen figures, was the natural mother of that of making marble and metalline ones; which last never appeared in perfection, till about 300 years after the building of Rome; though the first was at its height long before.

Phidias of Athens, who came next, surpassed all his predecessors, both in marble, in ivory, and in metals: and about the same time, appeared several others, who carried *sculpture* to the highest perfection it ever arrived at; particularly, Polyctetus at Sicyon; and after him Myron; Lysippus, who alone was allowed the honour of casting Alexander's image in brass: Praxiteles and Scopas, who made those excellent figures, now before the pope's palace at Montecavallo: Brixias, Timotheus and Leochares, who, with Scopas, wrought at the famous tomb of Mausolus king of Caria; Cephisiodorus, Canachus, Dædalus, Buthieus, Niccratus, Euphranor, Theodorus, Xenocrates, Pyromachus, Stratonicus, Antigonus, who wrote on the subject of his art; the famous authors of the Laocoon, viz. Agelander, Polydore, and Athenodorus, and infinite others, the names of some whereof have passed to posterity; while those of others have perished with their works: for though the number of statues in Asia, Greece, and Italy, was so immense, that in Rome alone, as we are informed, there were more than there were living persons, yet we have but few now left, at least very few of the finest.

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When Marcus Scavrus was ædile, his office obliging him to provide what was requisite towards the public rejoicings, he adorned the stately theatre which he erected, with 3000 brazen statues; and though L. Mummius, and Lucullus, brought away a great number out of Asia and Greece, yet, there were still above 3000 remaining in Rhodes, as many at Athens, and more at Delphos.

But what is most extraordinary, was the bigness of the figures, which those ancient artists had the courage to undertake: amongst those Lucullus brought to Rome, there was one of Apollo, 30 cubits high; the Colossus of Rhodes, made by Carces of Lyndos, the disciple of Lysippus, far exceeded this; Nero's statue, made by Xenodorus, after that of Mercury, was also of an extraordinary size being 110 feet high.

Sculpture, however, did not continue above 150 years, after Phidias's time, before it began insensibly to decline; not but that there were still some fine pieces of workmanship made both in Greece and Italy, though not performed with so good a fancy, and such exquisite beauty as some of the former works. Besides that the Greek statues are most esteemed for the workmanship; there is a special difference between them, and those of the Romans, in that the greatest part of the first are naked, like those who wrestle or perform some other bodily exercise, wherein the youth of those times placed all their glory; whereas, the others are clad or armed, and particularly have the toga on, which was the greatest mark of honour amongst the Romans.

To perform any thing in the way of **SCULPTURE**, they begin with making a model of earth, or wax.—For earthen models, they use but few instruments: their hands and fingers do almost the whole.—For waxen models, to a pound of wax they put half a pound of colophony; some add turpentine, melting the whole with oil of olive: and some add a little vermilion, or other matter, to give it a colour. This is wrought and molded with the fingers, like the earth.

For **SCULPTURE** in wood, which we properly call *carving*, the first thing required, is, to chuse a wood proper for the particular kind of work.—If it be any thing large, and require a great deal of strength and solidity; the hardest and most durable wood is to be chosen, as oak, or chestnut: for smaller works they use pear-tree, and service-tree. But as these woods are very hard, for little delicate works, they use softer woods, only clove, and of a fine grain: such is the linden-tree, which the chisfel is found to cut more easily, and cleanly, than any other wood.

As to statues, we find the ancients have made them of almost all kinds of wood: at Sicyon was an image of Apollo in box; at Ephesus, that of Diana was in cedar. As these two kinds of wood are very hard, and even held incorruptible, especially cedar; Pliny observes, they were judged particularly suitable for representations of the deities. In a temple, on mount Cyllenius, dedicated to Mercury, was an image of that god formed of the wood of the lemon-tree: others there were of the palm-tree, olive tree, ebony, and even of the vine.

For large works, if it be only single figures, it is better they consist of several pieces, than of a single one, by reason of the liability of the latter to warp; for every large piece may probably not be dried to the heart, however it may appear without side.—Observe, also, that the wood will not be fit for working, till after it have been cut at least ten years.

SCULPTURE in marble and stone.—In this work, the first thing they do, is out of a great block of marble to saw another of the size required, which is performed with a smooth steel saw without teeth, casting water and sand thereon, from time to time: then they fashion it, by taking off what is superfluous with a stubbed point, and a heavy mallet; after this, bringing it near the measures required, they reduce it still nearer with another finer point.—They then use a flat cutting instrument, having two notches in its edge, or three teeth; and then a chisfel to take off the scratches the former has left.—This last instrument they use with a deal of delicacy, giving thereby a softness, and tenderness to their figure; till, at length, taking raips of different degrees of fineness, by degrees they bring their work into a condition for polishing.—To polish, or make the parts smooth and sleek, they use pumice-stone and final; then tripoli, and when a still greater lustre is required, they use burnt straw.

When any considerable work is undertaken, as a statue, baso-relievo, or the like, they always make a model, beforehand, of clay; but as this shrinks in drying, and easily cracks and breaks, they only use it to make a mould of plaster, or stucco, wherein they cast a figure of the same matter, which serves them thenceforth for a model, and by which they adjust all their measures and proportions.

To proceed the more regularly; on the head of the model, they place an immovable circle, divided into degrees, with a moveable ruler, or index fastened in the centre of the circle, and divided likewise into equal parts. From the end of the ruler hangs a thread with a plummet, which serves to take all the points to be transferred thence to the block of marble, from whose top hangs another plummet like that of the model.—See *Tab. Architect.*

S E A

To this end they had two wooden rollers, or cylinders, perfectly alike, and equal; one whereof was kept in the city, and the other by the person to whom the letter was directed. For the letter, a skin of very thin parchment was wrapped round the roller, and thereon was the matter wrote; when done, it was taken off, and sent away to the party, who

They have another way of making a *sea-yoke*, by taking

double turn about the end of the helm with a single rope; the ends being laid to the ship sides, by means whereof they guide the helm.

Head SEA,
High SEA,
Lie under the SEA,
Pacific SEA,
Reflux of the SEA,
Trough of the SEA,
Under the SEA,

See the articles

HEAD SEA.
HIGH.
LIE.
PACIFIC.
REFLUX.
TROUGH.
UNDER.

SEAL, *sigillum*, a punchon, or piece of metal, or other matter, usually either round or oval; whereon is engraven the arms, device, &c. of some prince, state, community, magistrate, or private person, often with a legend or inscription: the impression whereof in wax serves to make acts, instruments, &c. authentic.

The king's great-seal is that whereby all patents, commissions, warrants, &c. coming from the king, are sealed. The keeping hereof is in the hands of the lord high chancellor, who is hence also denominated lord keeper.—Indeed, there is some difference between the lord chancellor and lord keeper; not in office, but in the manner of creation, the latter being made by the delivery of the great-seal to him by the king; but the former having likewise a patent.

The king's privy-seal, is a seal usually first set to grants that are to pass the great-seal.

The use of seals is very ancient: in Daniel, chap. xiii. we read that Cyrus set his seal on the temple of Bel: but seals are still older than this; for Jezebel, in 1 Kings, chap. xxi. seals the orders the sent for Naboth's death with the king's ring.—In effect, as the ancient seals were all engraven on the collets, stones, &c. of rings, and as the original use of rings, it is asserted, was only to be in readiness for the sealing of acts, instruments, &c. seals should seem as ancient as rings themselves.

These sealing-rings, called *annuli signatorii*, *sigillares*, *cerographi* or *cerographi*, it is said in ancient authors, were first invented by the Lacedæmonians, who, not content to shut their chests, armories, &c. with keys, added seals to them: and to this end, at first, they made use of worm-eaten wood, the impressions whereof they took on wax, or soft earth: but they at length found the art of engraving figures, or rings, the impressions of which they took in the same manner.—This, however, must be granted, that even in Moses's time, the art of engraving, not only on metals, but also on precious stones was known.

Indeed, it does not appear that the ring had any other use among the primitive Jews besides ornament: but at length it was used to seal instruments, contracts, diplomas, letters, &c. instances whereof we have in the third book of Kings, xxi. 8. Esther viii. 10. Xenophon. Hellen. lib. I. Quint. Curt. lib. vi. Just. lib. xliii. cap. iii. where we learn, the keeping of the emperor's seal was become a particular office.—Lucian adds, that Alexander gave his seal to Perdicas, thereby appointing him his successor.

Pliny observes, that in his time there were no seals used any where but in the Roman empire: at Rome, he tells us, they were become of absolute necessity, inasmuch that a testament was null without the testator's seal, and the seals of seven witnesses: but it does not appear that the Romans had any such things as public seals; nor that their edicts, and contracts, were sealed, not even in the times of the emperors.

In France the custom anciently was, instead of signing their instruments, &c. only to seal them; as appears from an infinity of ancient charters, which are not signed at all: the reason whereof was, that in those days very few people were able to write; scarce any body, indeed, could read and write but clerks. In England, the first sealed charter we find extant, is that of Edward the confessor, upon his founding of Westminster-Abbey: yet, we read of seals in the MS. history of king Offa.

Before the time of William the conqueror, the English did not seal with wax, but only made a golden cross on the parchment, and sometimes an impression on a piece of lead, which hung to the grant with a silken string, and was deemed an abundant authorizing of the grant itself, without either signing or witnesses.—The colour of the wax wherewith this king's grants were sealed, was usually green, to signify that the act continued for ever fresh, and of force. The usual impression on all laymen's seals, till the year 1218; was a man on horseback, with a sword in his hand; afterwards, they began to engrave their coats of arms on their seals: only the archbishops, and bishops, by a decree of cardinal Otto, who was legate here in 1237, were to bear in their seals, their title, office, dignity, and even their proper names.

Du Clesne observes, that none below the dignity of a knight had any right to a pendent seal, called *authentivum*.

The emperors long sealed all their acts of importance with a golden seal; and the golden bull of Charles IV. for the election of an emperor, takes its name from the gold seal hanging to it, which is called *bull*.

The pope has two kinds of seals: the first used in apostolical, briefs, and private letters, &c. called, the *fisherman's ring*.—This is a very large ring, wherein is represented St. Peter, drawing his net full of fishes.

The other is used in bulls, representing St. Peter's head on the right, that of St. Paul on the left, with a cross between the two: on the reverse is sometimes the pope's name, and arms.

The impressions of the first seal are taken in red wax, but those of the second, always in lead.

Theod. Hopingk, a German lawyer, has furnished the world with a learned and curious work on the subject of seals: it consists of sixteen chapters, the 18. whereof treats of the name seal, *sigillum*. The 21. Of the antiquity of the sealing-rings, mentioned in Genesis, their inventors, the reasons of bearing them, their kinds, and differences, forms, ornaments, hieroglyphicks, ends, uses, effects, and abuses. 3°. Of bulls, in the same method, and under the same circumstances. 4°. Of different kinds of seals; which he divides into public and private, proper and foreign, formed and unformed, ordinary and extraordinary, known, and unknown, true and false: and, lastly, ratificative and confirmative, of authority, solemnity, testimony and consent. 5°. Of such as have a right to bear seals. 6°. Of the keeping of seals. 7°. Of things seals are put to. 8°. Of the images, figures, arms, characters, inscriptions, &c. and of the places where seals are to be put, and the order to be observed therein. 9°. Of the number and multitude of seals, and the advantage they bring. 10°. Of their use, end, effects, force, &c. 11°. Of the proof of seals in general, and particular, public and private. 12°. Of the verifying of seals. 13°. Of the manner of censuring and disputing seals. 14°. Of subscriptions that have a regard to seals. 15°. Of other particulars that have a regard thereto; as the signatures of emperors, kings, chancellors, secretaries, notaries, all in the same order and method. The book was printed in 1642, at Nurembergh, in quarto, under the title, *De sigillorum prisio & nova jure, tractatus practicus*, &c.—We have another work of the like kind, by Heineccius, in folio, printed at Francfort, and Leipzig, in 1709, under the title, *De secretis Germanorum aliarumque nationum sigillis, eorumque usu & præstantia, synagoga histericum*.

HERMETICAL SEAL. See the article HERMETICAL.

SEAL is also used for the wax or lead, and the impression thereon, affixed to the thing sealed.

The manufacturers seal frequently applied to their stuffs, &c. is to be of lead. That of knights by the French law is to be of hard wax; that of agents, of soft wax.

Some seals are stamped on the paper or parchment itself; others hung by silken strings.

The French seal their edicts with green wax, arrets with yellow wax; expeditions for Dauphine with red wax. And the letters of the French academy are sealed with blue wax. See WAX.

SEALER, an officer in chancery, appointed by the lord chancellor, or keeper of the great-seal, to seal the writs and instruments there made in his presence.

SEALING, in architecture, the fixing a piece of wood or iron in a wall, with plaister, mortar, cement, lead, or other solid binding.

For staples, hinges, and joints, plaister is very proper.

SEALING wax. See the article WAX.

SEAM or SEME of corn, is a measure of eight bushels.

SEAM of glass, is the quantity of 120 pounds, or 24 stone, each five pound weight.—The Seam of wood, is an horse-load.

MONK SEAM. See the article MONK.

SEARCE. See the article SIEVE.

SEARCHER. See the article ALNAGER.

SEAR-CLOTH *, or CERE-CLOTH, in chirurgery, denotes a form of external remedy, somewhat harder than an unguent, yet softer than an emplaster; though it is frequently used, both for the one, and the other.

* The word *sear-cloth* is supposed to be a corruption of *cer-cloth*, and to be derived originally from the Greek *κερω*, wax.

The *sear-cloth* is always supposed to have wax in its composition, which distinguishes, and even denominates it. In effect, when a liniment or unguent has enough wax in it, it does not differ from a *sear-cloth*.

Sear-cloths are a kind of substitutes to friction, and are sometimes used for other purposes: the best are compounded of resolvent drugs, as saffron, myrrh and aloes, incorporated with wax and gums, as galbanum, gum ammoniac, and sagapenum: the whole tempered with wine.

SEASE. See the article SEIZE.

SEASONING of timber. See TIMBER.

SEASONINGS, in the West-Indies, a kind of aquist distemper, which foreigners are much subject to at their first coming.

SEASONS *, in cosmography, certain portions or quarters of the year, distinguished by the signs which the sun then enters, or by the meridian altitudes of the sun; consequent

on which, are different temperatures of the air, different works in tillage.

* The word is formed from the French, *saïson*, which Menage derives from the Latin, *statio*, whence the Italians have formed *stagione*: Nicod derives it from *fatia*; *tempus fatianis*, sowing time.

The year is divided into four *seasons*, spring, summer, autumn, and winter. The beginnings and endings of each whereof, see under its proper article, *SPRING*, &c.

It is to be observed, the *seasons* anciently began differently from what they now do: witness the old verses,

Dat Clemens hyemem; dat Petrus ver catbedratus;

Astuat Urbanus; autumnat Bartholomæus.

SEAT, in astronomy. See the article *SHEAT*.

SEAT, in medicine. See the article *ANUS*.

SEAZE. See the article *SEIZE*.

SEBACEÆ glandula. See the article *GLANDULÆ*.

SEBESTEN, SEBESTENA, *myxa*, in pharmacy, &c. a fruit resembling a little plum or prune; which when ripe, is of a deep red colour, bordering on black; very sweet, and the flesh, or pulp, glutinous, or sticky.

The Syrians make a kind of glue or birdlime, of the *sebesteni*, called *birdlime of Alexandria*. The fruit is esteemed pectoral, cooling, and emollient; though not much used now in medicine. The stone within it is triangular.—It brought its name from Arabia, whence Pliny observes it came in his time into Italy.

SEBUEI, a sect among the ancient Samaritans; whom St. Epiphanius accuses of changing the time expressed in the law, for the celebration of the great annual feasts of the Jews.

Serrarius conjectures, that they were thus called, from their celebrating the feast of the passover on the seventh month, called by the Hebrews *seba*, seventh.—Drusius rather takes them to have been denominated from *Sebaia*, the leader of a sect among the Samaritans; as the followers of Dositheus, were denominated *Dositheii*; which two sects, some Jewish doctors suppose to have subsisted at the same time.—Scaliger derives the name from the Hebrew, *seba*, week; as who should say, *Hebdomaditer*, because of their celebrating every second day of the seven weeks, between Easter and Whit-tuesday. Yet the same Scaliger, in his answer to Serrarius, gives a very different explication.—In effect, all that has hitherto been advanced on the point, is mere conjecture.

SEBURAI *, SEBURÆI, a name which the Jews give to such of their rabbins or doctors, as lived and taught some time after the finishing of the talmud.

* The word is derived from סבור, *sabar*, I think, whence סבירא, *sabira*, opinion, sentiment; and thence סבוראי, *saburai*, or *sburai*, opinionative.

The reason of this appellation, say the rabbins, is that the Talmud being finished, published, and received in all the schools and synagogues, these doctors had nothing to do, but to dispute for, and against, the Talmud and its decisions. Others say, it was because their sentiments were not received as laws or decisions; as those of the Mischnic and Gemaric doctors were; but were held as mere opinions. Others, as the author of *Schalscheleth Hakkabala*, or chain of tradition, tell us, that the persecution, the Jews underwent in those times, not allowing them to teach quietly in their academies, they only proposed their opinions on the composition of the Mischna.

The first and chief of the *Seburai*, was R. Josi, who began to teach in the year 787 of the æra of contracts; which, according to R. David Gautz, falls on the year of the world 4236; and who, according to R. Abraham, was 38 years president of the Jewish academy.

This æra of contracts is the same with that of the *Seleucidæ*, the 787th year whereof, falls on the year of Christ 476, which of consequence, is the æra of the origin of the *Saburai*; whose reign did not hold long: Buxtorf says, not above 60 years; R. Abraham and others, say not 50. The last of them was R. Simona.—They were succeeded by the Gaons or Geonim.

SECANT, in geometry, a line that cuts another, or divides it into two parts. See *LINE*, &c.

Thus the line A M (*Tab. Geometry*, fig. 12.) is a *secant* of the circle A E D, &c. as it cuts the circle in B.

It is demonstrated by geometers; 1^o. That if several *secants* M A, M N, M E, &c. be drawn from the same point M, that passing through the centre M A, is the greatest, and the rest are all so much the less, as they are more remote from the centre. On the contrary, the portions thereof without the circle M D, M O, M B, are so much the greater, as they are further from the centre. The least, is that of M A, which passes through the centre.

2^o. That if two *secants* M A and M E, be drawn from the same point M; the *secant* M A, will be to M E, as M D to M B.

SECANT, in trigonometry, denotes a right line, drawn from the centre of a circle, which cutting the circumference, proceeds, till it meets with a tangent, to the same circle. See *CIRCLE* and *TANGENT*.

Thus the line F C (*Tab. Trigonometry*, fig. 1.) drawn from the centre C, till it meet the tangent E F, is called, a

secant; and particularly, the *secant* of the arch A E, to which E F is a tangent.

The *secant* of the arch A H, which is the complement of the former arch to a quadrant, is called the *co-secant*, or *secant of the complement*.

The line of an arch, A D, being given; to find the *secant* thereof F C, the rule is, as the co-sine A D C is to the sine A D, so is the whole sine E C, to the *secant* C F.

To find the logarithm of the *secant* of any arch, the sine of the complement of the arch being given; multiply the whole sine of the logarithm by two, and from the product subtract the logarithm of the sine complement; the remainder is the logarithm of the *secant*. See *LOGARITHM*.

Line of SECANTS. See the article *SECTOR*.

SECK.—Rent SECK. See the article *RENT SECK*.

SECOND, in anatomy. See *SECUNDI generis*.

SECOND, in geometry, astronomy, &c. the sixtieth part of a prime, or minute; either in the division of circles, or in the measure of time.

A degree, or an hour, are each divided into 60 minutes, marked thus: a minute is sub-divided into 60 *seconds*, marked thus: a second into 60 thirds, marked thus, &c. We sometimes say a *second minute*, a *third minute*, &c. but more usually, simply, *second*, *third*, &c.

A pendulum three feet, three inches, and two tenths of an inch long, vibrates *seconds*, according to Sir Jonas Moor's reduction of Huygen's three feet eight lines and a half of Paris measure, to English measure.

SECOND, in music, denotes one of the musical intervals; being only the distance between any found, and the next found, whether higher or lower.

As in the compass of a tone, there are reckoned nine sensibly different founds, which form those little intervals, called *commas*; one might, in strictness, say, there are eight kinds of *seconds*. But as these minute intervals, though sensible, are not yet so far, as to contribute much to the harmony, they usually only distinguish four sorts.

The first, called the *diminished second*, containing four *commas*; being the difference, for instance, of a natural *ut*, and an *ut* raised four *commas* higher.

The second, called the *lesser second*, contains five *commas*, and is made either naturally, as from *mi* to *fa*, or from *si* to *ut*; or accidentally, by means of *b*, as from *la* to *si*, *b* flat; or from *fa* dis to *sol*; or otherwise called a *major semitone*, or *imperfect found*, by the Italians, *semitono*.

The third is the *greater second*, containing the nine *commas*, which compose the tone. This the Italians call *tono* or *perfect found*.

The fourth is the *redundant second*, composed of a whole tone and a minor semi-tone. See *tone*, *SEMI-TONE*, &c.

SECOND captain, is a reformed captain, who acts as lieutenant of another, into whose company he is incorporated. See *CAPTAIN*.

SECOND cause. See the articles *CAUSE* and *EFFICIENT*.

SECOND flank, } See the articles { FLANK.
SECOND notion, } NOTION.
SECOND order of curve, } CURVE.
SECOND rate, } RATE.

SECOND sight, an odd qualification, which many of the inhabitants of the western islands of Scotland are said to be possessed of.—The thing is attested by many credible authors (among whom is Mr. Martin, author of the natural history of these islands, and a member of the royal society) and notwithstanding the strangeness of it, many have steadfastly believed it.

The *second sight*, is said to be a faculty of seeing things to come, or things doing at a great distance, represented to the imagination as if actually visible, and present.

Thus if a man be dying, or about to die, his image, it is pretended, shall appear distinctly in its natural shape, in a shroud, and with other funeral apparatus, to a *second-sighted* person, who, perhaps, never saw his face before: immediately after which, the person so seen, certainly dies.

This quality of *second-sightedness*, they say is not hereditary: the person who has it, cannot exert it at pleasure: nor can he prevent it, or communicate it to another; but it comes on him involuntarily, and exercises itself on him arbitrarily: And often, especially in the younger *second seers*, to their great trouble and terror.

There are a great number of circumstances said to attend these visions; by observation whereof, the particular circumstances as to time, place, &c. of the death of the person, &c. are learnt.—The method of judging of them, or interpreting them, grows into a kind of art; which is very different in different persons. *Second-sightedness* is held a discredit in the country; so that none, they say, will counterfeits it; but that many conceal and dissimble it.

SECOND terms, in algebra, those where the unknown quantity has a degree of power less than it has in the term where it is raised to the highest.

The art of throwing these *second terms* out of an equation; that is, of forming a new equation, where they have no place, is one of the most ingenious and useful inventions in all algebra.

SECOND title. See the article **TITLE**.

SECONDARY, or SECONDARY, an officer who acts as second, or next to the chief officer.

Such are the *secondaries* of the fine-office.—The *secondaries* of the compters, who are next the sheriffs of London in each of the two compters.—*Secondary* of the office of the privy seal.—Two *secondaries* of the pipe.—*Secondary* to the remembrancers, &c.

SECONDARY, is more frequently used in an adjective sense, by way of opposition to primary or principal. See **PRIMARY**.

SECONDARY actors, } See the articles } **ACTOR**.

SECONDARY affections, } See the articles } **AFFECTION**.

SECONDARY circles, of the ecliptick, are circles of longitude of the stars; or circles which passing through the poles of the ecliptick, are at right angles to the ecliptick.

By the help of these, all points in the heavens are referred to the ecliptick; that is, any star, planet or other phenomenon, is understood to be in that point of the ecliptick, which is cut by the *secondary* semi-circle, which passes through such star or phenomenon.

If two stars be thus referred to the same point of the ecliptick, they are said to be in conjunction; if in opposite points, they are said to be in opposition: if they be referred to two points at a quadrant's distance, they are said to be in quadrature; if the points differ a sixth part of the ecliptick, they are said to be in sextile aspect.

In the general, all circles which intersect one of the six greater circles of the sphere at right angles, may be called *secondary circles*.—As, the azimuth or vertical circles in respect of the horizon, &c. the meridian in respect of the equator, &c.

SECONDARY collateral points, } See } **COLLATERAL**.

SECONDARY dials, } See } **DIAL**.

SECONDARY fever, is that which arises after a crisis, or the discharge of some morbid matter: as, after the declension of the small pox, or measles. See **FEVER**, **Small Pox**, &c.

SECONDARY motion, } See the articles } **MOTION**.

SECONDARY place, } See the articles } **PLACE**.

SECONDARY planets, those moving round other planets, as the centres of their motion, and along with them round the sun.

Saturn, Jupiter, and the Earth, are each attended with *secondary planets*: Jupiter with four, and Saturn with five, called the *satellites* of those two planets.

The earth has one *secondary planet*, called the *moon*.

The motion of the primary planets, is very simple and uniform, as being compounded only of a projectile motion, forward in a right line, which is a tangent to the orbit; and a gravitation towards the sun at the centre. Add, that being at such vast distances from each other, the effects of their mutual gravitation towards one another are insensible.—But the matter is far otherwise, in respect of the *secondary planets*; for every one of these, though it chiefly gravitate towards its respective primary one, as towards its centre, yet at equal distances from the sun, it also is attracted towards him with equally accelerated gravity, as the primary one is towards him; but at a greater distance with less, and at a nearer distance with greater: from which double tendency towards the sun, and towards their own primary planets, the motion of the satellites, or *secondary planets*, comes to be mightily compounded, and affected with many inequalities: as for instance, 1. The satellite shall be continually accelerated in its motion, from the time of its quadrature with the sun, to the next following conjunction or opposition; but contrary-wise from the syzygies to the quadratures, it shall be retarded; and therefore it will always move swifter in or near the syzygies, and slower near the quadratures. From whence will follow that,

2. The orbits of these *secondary planets* will be of a figure more circular in the quadratures than in the syzygies, where the swiftness of the motion will make the figure of the orbit more rectilinear, and therefore the satellite will run farther from its primary planet at the quadratures, than at the syzygies: so that the orbit will be a little elliptical, having the primary planet for its centre, and the longer diameter will coincide with the line of the quadratures, and the shorter with that of the syzygies.—Which irregularities will arise, if the sun's power of disturbing the motion of the satellite be excluded, and the orbit be concentric with that of the primary planets: for if the orbit be excentrick, it may happen that the satellite shall be farther off from the primary one in the syzygies, and so move slower than it does at the quadratures: and when this is the case, that the satellite's orbit is not a circle concentric to the primary orbit, but an ellipsis, in one of whose focus's the primary planet is placed, then, the motion of the satellite will be so disturbed by the sun, that as it proceeds in its orbit, the apses of the orbit will be moved sometimes in *consequencia*, and sometimes in *antecedentia* (whereas the nodes and apses of the primary planets are at rest.)

3. When the plane of the satellite's orbit is inclined to the

plane of the primary orbit, the line of the nodes of the *secondary* orbit will be moved in *antecedentia*, with an angulat motion, and an unequal velocity; for it will recede most swiftly, when the nodes are in quadrature to the sun; after which, it will move slower; and at the time of the nodes being in the syzygies, it will be perfectly at rest.

4. The inclination also of the plane of the *secondary* orbit, to the primary one, will be continually varying, and will be greatest, when the nodes are in the syzygies with the sun, and less, *cæteris paribus*, when they are in the quadratures; and from the time of the nodes being in the syzygies, to the quadratures, it will be always decreasing, and from the time of their being in the quadratures to the syzygies, it will be always increasing: and all these irregularities, whether in any excentrick or concentrick orbit, will always be something greater, when the satellite is in conjunction with the sun, than when he is in opposition to him.

SECONDARY qualities, } See the articles } **QUALITY**.

SECONDARY rainbow } See the articles } **RAINBOW**.

SECONDRINE. See the article **SECUNDINE**.

SECRETARY, an officer, who, by order of his master, writes letters, dispatches, and other instruments, which he renders authentic by his signature.

Of these there are several kinds, as *secretary of state*, *secretary of war*, *secretary of the treasury*, *secretary of the admiralty*, *secretary of the lord chancellor*, &c.

SECRETARIES of state, are officers attending the king, for the receipt and dispatch of letters, grants, petitions, and many of the most important affairs of the kingdom, both foreign and domestic.

The king's *secretaries* were anciently called the *king's clerks*, and *notaries, regi a commentariis*.—For the name *secretary*, it was as first applied to such as being always near the king's person, received his commands, and were called *clerks of the secret*; whence was afterwards formed, the word *secretary, regi a secretis*: and as the great lords began to give their clerks also the quality of *secretaries*, those who attended the king, were called, by way of distinction, *secretaries of the commands, regi a mandatis*. This continued till the reign of our Henry VIII. 1557; when, at a treaty of peace between the French and Spaniards, the former observed, that the Spanish ministers, who treated for Philip II. called themselves *secretaries of state*. Upon which the French *secretaries des commandements*, out of emulation, assumed the same title; which thence passed also into England.

Till the reign of king Henry VIII. there was only one *secretary of state*: but then business increasing, that prince appointed a second secretary; both were of equal power and authority, and both styled *principal secretaries of state*.—Before queen Elizabeth's time, the *secretaries* did not sit at the council-board; but that prince admitted them to the place of privy-counsellors; which honour they have held ever since, and a council is never, or at least very seldom, held without one of them.—On the union of England and Scotland, queen Anne added a third *secretary*, on account of the great increase of business, which, as to Britain, is equally and distinctly managed by all the three, although the last is frequently styled *secretary of state for North Britain*.

They have under their management and direction, the most considerable affairs of the nation, and are obliged to a constant attendance on the king: they receive and dispatch whatever comes to their hands, be it for the crown, the church, the army, private grants, pardons, dispensations, &c. as likewise petitions to the sovereign, which, when read, are returned to the *secretaries* for answer; all which they dispatch according to the king's command and direction.

As to the foreign affairs, they are divided into two provinces, or departments, comprehending all the kingdoms and nations which have any intercourse or business with Great Britain; each *secretary* receiving all letters and addresses from, and making all dispatches to, the several princes and states comprehended in his province: which division still subsists, notwithstanding the addition of a third *secretary*.—Ireland and the plantations are under the direction of the elder *secretary*, who has the southern province.

Of these three principal *secretaries*, the two for South Britain, have each two *under secretaries*, and one chief clerk; and the other for North Britain has one *under secretary*, and one chief clerk, with an uncertain number of other clerks and translators, all wholly depending on them.

The *secretaries of state* have the custody of that seal, properly called the *signet*, and the direction of the signet office; wherein there are four clerks employed, who prepare such things as are to pass the signet, in order to the privy, or great seal. All grants signed by the king are returned hither, which, transcribed, are carried to one of the principal *secretaries of state*, and sealed, and then called signets, which being directed to the lord privy-seal, are his warrant.

On the *secretaries of state*, is likewise dependant another office, called the *paper-office*, wherein all public writings, papers, matters of state, &c. are preserved.

All the *under secretaries* and clerks are in the choice of the

secretary of state, without reserve to any person: the under secretary receive orders and directions from them, for writing dispatches, foreign and domestick, which they give to the chief clerk, who distributes them to the under clerks.

SECRETARY of an embassy, is a person attending an ambassador, for the writing of dispatches relating to the negotiation.

There is a deal of difference between the *secretary of the embassy*, and the *ambassador's secretary*; the first is a domestick or menial of the ambassador's; the first a servant or minister of the prince.

SECRETION, **SECRETIO**, in medicine, the act whereby the several juices, or humours in the animal body, are separated from the blood, by means of the glands.

In the bodies of animals, we observe a great number of juices of different natures, viz. the blood, lymph, saliva, stomach-liquor, intestinal juices, pancreatic juice, bile, urine, &c.—Now, the blood is the general source of all; and from it they are all secreted by particular organs, called *glands*.

The manner wherein this *secretion* is effected, has been greatly enquired into in these last ages; though not with the greatest success. The ancient physicians, indeed, contented themselves to assert certain particular virtues, or faculties inherent in the several viscera; whereby they were determined to separate one liquor rather than another; without troubling themselves much about the manner wherein this was done. But the moderns, according to the genius of their philosophy, must have this point cleared, and the modus of *secretion* rendered intelligible.—Hence, as the exceeding smallness of these organs prevented any regular search, they have imagined various manners of explaining it.

Some, full of the effects they have observed from fermentations, maintain, that there are ferments in the several parts; by aid whereof, certain kinds of particles mixed in the blood, are separated therefrom; after the same manner as we see in must, or new wine, from which, while fermenting, certain parts are detached in form of froth.—But this opinion has so many inconveniences to grapple withal, that it is almost universally abandoned.

Others consider the glands as a kind of sieves, whose holes having different figures, will only let pass certain particles or molecules, whose figures resemble those of the holes.—But the falsity of this hypothesis was soon found out; and it was thought sufficient to fix some proportion between the diameters of the pores and that of the molecules that were to pass through them, to account why very subtle parts should pass through the glands, through which the coarser could not pass.—Yet this opinion was not found perfectly satisfactory: for on this supposition, the most subtle parts of the blood must pass in such quantity through the largest pores, that there would not be enough left to furnish the little ones with what they needed: and for the same reason, those parts whose pores are biggest, ought to furnish liquors much fuller of subtle parts, than those whose pores are smaller; which yet is contrary to experience. For the serosity separated in the kidneys, under the name of *urine*, consists of parts much subtler and smaller than the bile separated in the liver: why then does not this serosity escape in the liver? the pores whereof must be much greater than those of the kidneys.

This inconvenience, many naturalists being aware of, it has made them have recourse to *imibition* (if the word may be allowed us for want of a better.) They maintain, then, that besides the different diameters of the pores, it is required that the several parts be already imbu'd or moistened with a liquor like to that they are to filter.—This opinion is rather the result of reason than of experiment, and the maintainers hereof, well pleas'd they had something to satisfy their reason withal, never troubled themselves whether it were true or not: till M. Winflow fell into it.

Dr. Keil, whose theory prevails most in England, accounts for *secretion*, from the joint consideration of the different diameters of the vessels, the different velocity of the blood, the different angles the ducts make with the arteries, and the different attraction of the different parts under all these different circumstances.—His theory see at length, under the article *ANIMAL secretion*.—But even in this, there is something arbitrary and conjectural: besides, the reasoning is carried such a length, that, in a thing, the principles whereof are so obscure, the parts or organs so imperfectly known, and the whole process carried on out of sight, the mind can scarce safely acquiesce in it.

M. Winflow, of the royal academy of sciences at Paris, seems to have taken a better course for the discovery of this important action of *secretion*. He does not take up with conjectural principles, nor draw a plausible scheme of reasoning therefrom through the dark; but applies himself to experiment, and investigates, in nature herself, and the structure of the parts, the manner *secretion* is performed in. From a strict examination of the several kinds of glands, both in men and other animals, he finds, with some other

anatomists, that the glands are only bundles or plexus's of vessels: but the vessels peculiar to the gland, and which constitute the principal part thereof, M. Winflow first discovered to be tubes, furnished, on the infide, with a kind of down or lanugo, or rather with a very fine, spongyous tissue, which fills the whole cavity of those vessels like a pith or marrow. This he finds in all the glands, of all animals: in different glands, it appears of different colours, and this different colour is even found in the different glands of fœtus's themselves.

The gland, then, is, or at least its main part is, a compound of these downy or spongyous vessels, which, from their office, we will call *secretory vessels*, or *ducts*, and which frequently do, almost of themselves, form what we call a *gland*, or *glandulous body*: though beside these vessels, we usually remark four other kinds, viz. arteries, veins, excretory ducts and nerves. The *secretory ducts* we distinguish from the excretory ones; in that the former, by the peculiar texture of their down, serve to separate a particular liquor; and that the latter only serve to receive the liquor thus *secreted*, and to carry it to the place it is destined for. For a more particular account of the structure and organization of the glands, see *GLAND*.

For the manner wherein the glands act, in separating the several liquors from the body, M. Winflow lays it down thus: it is a thing well known by physicians and chymists, that a piece of brown paper, which is only an assemblage of small fibres impacted close to each other, having once imbibed oil or water, will never let any other liquor pass through it, but of the same kind with what it is impregnated withal. All others it stops. And the like is observed of a wick of cotton or other matter, which having first imbibed its fill of oil or water, and being then dipped at one end, in a vessel full of oil and water together; the wick that had imbibed the oil, will only raise and distill oil, and that with water, only water. Now, in the *secretory ducts* of the glands, we find a parallel structure: an assemblage or plexus of fine threads or filaments bound close together, much as in brown paper, or a cotton-wick; only differently disposed. This plexus, then, having once imbibed a certain juice, will not let pass any of the liquors which arrive at the orifices of these ducts, but that which it had first imbibed.—The cause of this phenomenon is, doubtless, to be referred to the great principle of attraction, which is found stronger between the homogeneous than the heterogeneous parts of the same fluid.

As the blood, then, is not a homogeneous liquor; but a compound of an infinity of different parts or molecules, some oily, others mucilaginous, aqueous, saline, subtle, gross, &c. in its motion along the arteries of the gland, it becomes divided into all the little ramifications thereof; by which means its velocity is exceedingly abated, and its molecules are obliged to go off one by one, through the narrow passage of the artery into the vein, and of consequence to pass over the orifices of the *secretory ducts* of the glands, whose down is already tinged with a juice of a certain nature. Such of the molecules therefore, as are found of the same nature with the juice they meet withal at the entrance of the *secretory duct*, join themselves to them, and enter the ducts, driven on by others that follow them. Thus they pass, successively, through the whole vessel, and at length go out of it into the excretory duct; while the rest, which are of a different kind, run over the orifice of the *secretory vessel*, without ever mixing with the juice thereof, and thus arriving in the vein, they are carried back to the heart.

All that remains, is, to explain how these parts should have first imbibed the particular juices necessary for their respective *secretions*: how, for instance, the bile should come to be separated in the liver, for the first time, preferably to any other liquor? To this M. Winflow answers, that having observed the glands of the smallest fœtus to be coloured, much as in adults; it appears highly probable they had been imbu'd with the juices they were to filtrate, at the first formation of the animal; or at the same time when the solid parts of the fabric themselves were framed.

SECT, SECTA, a collective term, comprehending all such as follow the doctrines or opinions of some famous divine, or philosopher, &c.

The *sects* of philosophers among the ancients, particularly in Greece, were numerous; as the Pyrrhonians, Platonists, Epicureans, Stoicks, Peripateticks, Academicks, &c. See each under its proper article.

At present the *sects* of philosophy are chiefly reduceable to three, viz. the Cartesian, Peripateticks, and Newtonians. See *CARTESIAN*, &c.

In theology, the *sects* are much more numerous; yet the ancients had many legions now extinct; as Manichees, Gnosticks, Montanists, &c.

The principal now on foot, are the Lutherans, Calvinists, Anabaptists, Arians, Socinians, and Arminians. The rise, progress, and fate, with the distinguishing characters and opinions of each, see under its respective head, *LUTHERAN*, *CALVINIST*, &c.

Ionic SECT. } See the articles { **IONIC.**
Italic SECT. } **ITALIC.**
SECTA. in law. See the article **SUIT.**
Hundred SECTA. See the article **HUNDRED.**
SECTIO Casarea. See the article **CASAREAN section.**
SECTION*, **SECTIO,** a part of a thing divided; or the division itself. See **DIVISION** and **DISSECTION.**
 * The word is formed from the Latin *seco*, I cut.

Such, particularly, are the sub-divisions of chapters, by others called *paragraphs*, and sometimes *articles*.—The mark of a *section* is §.
 The ancients neglected to divide their books into chapters, and *sections*; that was a task left for future editors, and critics.

SECTION, in geometry, denotes a side or surface appearing of a body, or figure cut by another; or the place wherein lines, planes, &c. cut each other.

The common *section* of two planes is always a right line, being the line supposed to be drawn by the one plane in its cutting or entering the other.

If a sphere be cut in any manner, the plane of the *section* will be a circle, whose centre is in the diameter of the sphere. The *sections* of the cone are four, viz. a circle, parabola, hyperbola and ellipsis. See each under its proper article. See also **CONE**.

Conic SECTIONS. See the article **CONIC section.**

Axis of a conic SECTION, } See { **AXIS.**
Center of a conic SECTION, } **CENTER.**
Diameter of a conic SECTION, } **DIAMETER.**
Tangent of a conic SECTION, } **TANGENT.**

Following SECTIONS, sections sequentes, in conics, may be thus conceived: suppose two right lines, as AB, CD (*Tab. Conics, fig. 5.*) mutually intersecting one another in E, which point E is supposed to be the common centre of the opposite hyperbolic *sections*, FG, HI, and whose common asymptotes, the proposed lines AB, CD also are.—In this case, the *sections* GF and HI, are called *sections sequentes*, because they are placed following one another in the contiguous angles of two intersecting right lines.

If the determinate diameter HG, of one of the *sections sequentes*, (which is coincident with the supposed indeterminate diameter of its opposite) be equal to the vertical tangent KL, applied between the asymptotes in the point G, of the diameter GF, then, Apollonius calls such *sections*, *conjugate sections*.

Opposite SECTIONS, } See the articles { **OPPOSITE.**

Similar SECTIONS, } **SIMILAR.**

SECTION of a building, denotes its *profile*; or a delineation of its heights and depths raised on the plan; as if the fabric was cut asunder to discover the inside.

Horizontal SECTION. See the article **ICHOGRAPHY.**

SECTOR, in geometry, a part of a circle comprehended between two radii, and the arch.

Thus the mixt triangle ACD (*Tab. Geometry, fig. 13.*) comprehended between the radii AC and CD and the arch AD, is a *sector of the circle*.

It is demonstrated by geometricians, that the *sector* of a circle, as ACD, is equal to a triangle, whose base is the arch AD, and its altitude the radius AC.

If from the common centre of two concentric circles, be drawn two radii, to the periphery of the outer, the two arches included between the radii, will have the same ratio to their peripheries; and the two *sectors*, the same ratio to the areas of their circles.

To find the area of a *sector* DCE; the radius of the circle CD, and the arch DE being given. To 100, 314 and the radius AC, find a fourth proportional number; this will be the semi-periphery. Then to 180°, the given arch DE, and the semi-periphery just found, find another fourth proportional; this will give the arch DE in the same measure in which the radius AC is given. Lastly, multiply the arch DE into the semi-radius, and the product is the area of the *sector*.

SECTOR also denotes a mathematical instrument, of great use in finding the proportion between quantities of the same kind, as between lines and lines, surfaces and surfaces, &c. whence the French call it the *compas de proportion*.

The great advantage of the *sector* above the common scales, &c. is, that it is made so as to fit all radii's, and all scales.—By the lines of chords, sines, &c. on the *sector*, we have lines of chords, sines, &c. to any radius betwixt the length and breadth of the *sector* when opened.

The *sector* is founded on the fourth proposition of the 6th book of Euclid, where it is demonstrated, that similar triangles have their homologous sides proportional: an idea of its foundation may be conceived thus.—Let the lines ABAC (*fig. 14.*) represent the legs of the *sector*, and AD, AE two equal *sections* from the centre. If now the points CB and DE be connected, the lines CB and DE will be parallel; therefore the triangles ADE, ACB will be similar; and consequently the sides A D, D E, A B and B C proportional: that is, as AD:DE::AB:BC; whence if A D be the half, third or fourth part of A B; D E will be a half, third or fourth part of B C: and the same holds of all the rest. If,

therefore, A D be the chord, sine, or tangent of any number of degrees to the radius A B; D E will be the same to the radius B C. See **CHORD**, **SINE**, &c.

Description of the SECTOR.—The instrument consists of two equal rules, or legs of brass or other matter, rivetted together; but so as to move easy on the rivet. See its figure, *Tab. Geometry, fig. 15.* On the faces of the instrument are placed several lines; the principal are the line of equal parts, line of chords, line of sines, line of tangents, line of secants, and line of polygons.

The line of *equal parts*, called also *line of lines*, marked L, is a line divided into 100 equal parts; and, where the length of the leg will allow it, each of these is sub-divided into halves, and quarters. It is found on each leg, on the same side; and the divisions numbered 1, 2, 3, 4, &c. to 10, which is near the extremity of each leg. Note, in practice, 1 is taken for 10, or 100, or 1000, or 10000, &c. as occasion requires; in which cases 2 represents 20, or 200, or 2000, &c. and so of the rest. The line of chords, marked C on each leg, is divided after the usual manner, and numbered 10, 20, 30, &c. to 60. The line of sines, denoted on each leg by the letter S, is a line of natural sines, numbered 10, 20, 30, &c. to 90. The line of tangents, denoted on each leg by the letter T, is a line of natural tangents, numbered 10, 20, 30, &c. to 45: besides which, there is another little line of tangents on each leg, commencing at 45°, and extending to 75°, denoted by the letter t. Line of secants, denoted on each leg by the letter S, is a line of natural secants, numbered 10, 20, 30, &c. to 75, and commencing, not from the centre of the instrument, but at two inches distance therefrom. The line of polygons, denoted by the letter P on each leg, is numbered 4, 5, 6, &c. to 12, which falls 3 inches short of the centre of the instrument.

Beside these lines, which are essential to the *sector*, there are others placed near the outward edges on both faces, and parallel thereto, which are in all respects, the same as in Gunter's scale, and used after the same manner. Such are the line of artificial sines marked S; the line of artificial tangents; a line of 12 inches, marked M; and Gunter's line of numbers, marked N. For the uses of all which, see **Gunter's SCALE**. There are sometimes, other lines placed, to fill the vacant spaces, as the lines of hours, latitudes, and inclinations of meridians, which are used the same as on the common scales.

The lines found by the *sector* are of two kinds, lateral and parallel. The first are such as are found by the sides of the *sector*, as A B, A C, *fig. 14.* The latter, such as go across from one leg to the other, as D E, C B. Note, the order of the lines in the newer *sectors*, is different from what it is in the old ones; for the same line is not now put at the same distance from the edge on both legs; but the line of chords, e. gr. is innermost upon the one, and the line of tangents on the other. The advantage hereof is, that when the instrument is set to a radius for the chords, it serves also for the sines and tangents without stirring it; for the parallel betwixt 60 and 60 of the chords, 90 and 90 of the sines, and 45 and 45 of the tangents, are all equal.

Use of the line of equal parts on the SECTOR.—1°. To divide a given line into any number of equal parts, e. gr. seven. Take the given line in your compasses, and setting one foot in a division of the line of equal parts, that may easily be divided by 7, e. gr. 70, whose seventh part is 10; open the *sector* till the other point fell exactly on 70 in the same line, in the other leg. In this disposition, applying one point of the compasses to 10 in the same line; shut them till the other fall in 10 in the same line of the other leg. This aperture will be the 7th part of the given line. Note, if the line to be divided be too long to be applied to the legs of the *sector*, only divide one half, or one fourth by 7, and the double or quadruple thereof will be the 7th part of the whole.

2°. To measure the lines of the perimeter of a polygon, one of which contains a given number of equal parts. Take the given line in your compasses, and set it over, upon the line of equal parts, to the number of parts on each side expressing its length. The *sector* remaining thus, set off the length of each of the other lines parallel to the former; and the numbers each of them falls on will express their lengths.

3°. A right line being given, and the number of parts it contains, e. gr. 120, to take from it a less line, containing any number of the same parts, e. gr. 25. Taking the given line in your compasses, open the *sector* till the two feet fall on 120 on each leg; then, the distance from 25 to 25 gives the line required.

4°. To find a third proportional to two given lines, and a fourth to three. For the first, take the length of the first given line in your compasses, and lay it off on the line of equal parts from the centre, to find the number where it terminates: then open the *sector*, till the length of the second line be included in the aperture of the extreme of the first: the *sector* remaining thus, lay off the length of the second line on one of the legs, from the centre; and note the number where it terminates; the distance between that number

ter on the two legs, gives the third proportional.—For the second, take the second line in your compasses, and opening the *sector*, apply this extent to the ends of the first, laid off from the centre on both legs. The *sector* thus opened, lay off the third line from the centre, and the extent between the number whereon it terminates on both legs, is the fourth proportional.

5°. To divide a line in any given proportion, *e. gr.* into two parts, which shall be to each other as 40 to 70. Add the two numbers together, their sum is 110. Then, between your compasses take the line proposed, which suppose 165, and open the *sector* till this distance reach from 110 to 110 on both legs. The *sector* thus opened, take the extent from 40 to 40, as also from 70 to 70; the first will give 60, the last 105, which will be the parts proposed, for 40 : 70 : 60 : 105.

6°. To open the *sector*, so as the two lines of equal parts may make a right angle: find three numbers that may express the sides of a right-angled triangle, as 3, 4 and 5, or their equimultiples, as 60, 80 and 100. Take then, in your compasses, the distance from the centre to 100; and open the *sector*, till one point being set upon 80, the other fall upon 60 in the other leg; then will the two lines of equal parts include a right angle.

7°. To find a right line equal to the circumference of a circle. The diameter of a circle being to the circumference, nearly as 50 to 157, take the diameter in your compasses, and set it over on the legs of the *sector*, from 50 to 50. The *sector* thus opened, take the distance from 157 to 157 in your compasses. This will be your circumference required.

Use of the line of chords on the SECTOR.—1°. To open the *sector*, so as the two lines of chords may make an angle of any number of degrees, *e. gr.* 40°. Take the distance from the joint to 40°, the number of degrees proposed, on the line of chords; open the *sector*, till the distance from 60 to 60, on each leg, be equal to the forefaid distance of 40; then does the line of chords make the angle required.

2°. The *sector* being opened, to find the degrees of its aperture. Take the extent from 60 to 60, and lay it off on the line of chords from the centre: the number, whereon it terminates, shews the degrees of its opening.—By applying sights on the line of chords, the *sector* may be used to take angles, as a surveying instrument.

3°. To make an angle of any given number of degrees, with a given line. On the given line describe a circular arch, the centre whereof is the point whereon the angle is to be made. Set off the radius from 60 to 60; and the *sector* remaining thus, take the distance of the two numbers on each leg, expressing the proposed degrees, and lay it from the line upon the arch described. Lastly, drawing a line from the centre, through the end of the arch, it will make the angle proposed.

4°. To find the degrees which a given angle contains. About the vertex describe an arch, and open the *sector*, till the distance from 60 to 60 on each leg, be equal to the radius of the circle: then taking the chord of the arch between the compasses, and carrying it on the legs of the *sector*, see what equal number, on each leg, the points of the compasses fall on: this is the quantity of degrees, the given angle contains.

5°. To take an arch, of any quantity, from off the circumference of a circle. Open the *sector*, till the distance from 60 to 60 be equal to the radius of the given circle: then take the extent of the chord of the number of degrees, on each leg of the *sector*, and lay it off, on the circumference of the given circle. By this use may any regular polygon be inscribed in a given circle, as well as by the line of polygons.

Use of the line of polygons on the SECTOR.—1°. To inscribe a regular polygon in a given circle. Take the semi-diameter of the given circle, in the compasses, and adjust it to the number 6, on the line of polygons, on each leg of the *sector*: then the *sector* remaining thus opened, take the distance of the two equal numbers, expressing the number of sides the polygon is to have. *E. gr.* The distance from 5 to 5 for a pentagon, from 7 to 7 for a heptagon, &c. These distances being carried about the circumference of the circle, will divide it into so many equal parts.

2°. To describe a regular polygon, *e. gr.* a pentagon, on a given right line. Take the length of the line in the compasses, and apply it to the extent of the number 5, 5, on the lines of polygons. The *sector* thus opened, upon the same lines take the extent; from 6 to 6, this will be the semi-diameter of the circle the polygon is to be inscribed in. If, then, with this distance, from the ends of the given line, you describe two arches of a circle, their intersection will be the centre of the circle.

3°. On a right line, to describe an isosceles triangle, having the angles at the base, double that at the vertex. Open the *sector*, till the ends of the given line fall on 10 and 10 on each leg; then take the distance from 6 to 6. This will be the length of the two equal sides of the triangle.

Use of the lines of sines, tangents, and secants, on the SECTOR.—

By the several lines disposed on the *sector*, we have scales to several radius's; so that having a length, or radius, given, not exceeding the length of the *sector* when opened, we find the chord, sine, &c. thereto. *E. gr.* Suppose the chord, sine, or tangent, of 10 degrees, to a radius of 3 inches, required: make 3 inches the aperture, between 60 and 60, on the

lines of chords of the two legs: then will the same extent reach from 45 to 45 on the line of tangents, and from 90 to 90 on the line of sines on the other side; so that to whatever radius the line of chords is set, to the same are all the others set. In this disposition, therefore, if the aperture between 10 and 10, on the lines of chords, be taken with the compasses, it will give the chord of 10 degrees. If the aperture of 10 and 10 be in like manner taken on the lines of sines, it will be the sine of 10 degrees. Lastly, if the aperture of 10 and 10 be in like manner taken on the lines of tangents, it gives the tangent of 10 degrees.

If the chord, or tangent, of 70 degrees were required; for the chord, the aperture of half the arch, *viz.* 35, must be taken, as before; which distance, being repeated twice, gives the chord of 70°. To find the tangent of 70° to the same radius, the small line of tangents must be used, the other only reaching to 45: making, therefore, 3 inches the aperture between 45 and 45 on the small line; the extent between 70 and 70 degrees, on the same, will be the tangent of 70° to 3 inches radius.

To find the secant of an arch, make the given radius the aperture between 0 and 0 on the line of secants; then will the aperture of 10 and 10, or 70 and 70, on the said lines, give the tangent of 10°, or 70°.

If the converse of any of these things were required; that is, if the radius be required, to which a given line is the sine, tangent, or secant, it is but making the given line, if a chord, the aperture on the line of chords, between 10 and 10, and then the *sector* will stand at the radius required; that is, the aperture between 60 and 60, on the said line, is the radius. If the given line were a sine, tangent or secant, it is but making it the aperture of the given number of degrees; then will the distance of 90 and 90 on the sines, of 45 and 45 on the tangents, of 0 and 0 on the secants, be the radius.

Use of the SECTOR in trigonometry.—1°. The base and perpendicular of a rectangled triangle being given, to find the hypotenuse. Suppose the base A C (*Tab. Trigonomet. fig. 2.*) 40 miles, and the perpendicular A B 30; open the *sector* till the two lines of lines make a right angle: then for the base, take 40 parts on the line of lines on one leg; and for the perpendicular take 30 on the same line on the other leg: then the extent from 40 on the one, to 30 on the other, taken in the compasses, will be the length of the hypotenuse, which line will be found 50 miles.

2°. The perpendicular A B of a right-angled triangle A B C, being given, 30, and the angle B C A, 37°, to find the hypotenuse B C. Take the given side A B, and set it over, on each side, upon the sine of the given angle A C B; then the parallel distance of radius, or of 90 and 90, will be the hypotenuse B C; which will measure 50 on the line of sines.

3°. The hypotenuse and base being given, to find the perpendicular. Open the *sector*, till the two lines of lines be at right angles; then lay off the given base on one of those lines from the centre. Take the hypotenuse in your compasses, and setting one foot in the point of the given base, let the other fall on the line of lines, on the other leg: the distance from the centre to the point where the compasses fall, will be the length of the perpendicular.

4°. The hypotenuse being given, and the angle A C B, to find the perpendicular. Make the given hypotenuse a parallel radius, *i. e.* make it the extent from 90 to 90 on the lines of sines; then will the parallel sine of the angle A C B be the length of the side A B.

5°. The base and perpendicular A B given, to find the angle B C A. Lay off the base A C on both sides the *sector*, from the centre, and note its extent: then take the given perpendicular, and to it open the *sector*, in the terms of the base; the parallel radius will be the tangent of B C A.

6°. In any right-lined triangle, two sides being given, with the included angle, to find the third side. Suppose the side A C 20, the side B C 30, and the included angle A C B 110°; open the *sector*, till the two lines of lines make an angle equal to the given angle, *viz.* 110°. Lay off the given sides of the triangle from the centre of the *sector*, on each of the lines of lines; the extent between their extremes is the length of the side A B sought.

7°. The angles C A B and A C B given, and the side C B, to find the base A B. Take the given side C B, and turn it into the parallel line of its opposite angle C A B; and then the parallel sine of the angle A C B will be the length of the base A B.

8°. The three angles of a triangle being given, to find the proportion of the sides. Take the lateral lines of the several angles, and measure them in the line of lines; the numbers answering thereto, give the proportion of the sides.

9°. The three sides being given, to find the angle A C B. Lay the sides A C, C B, along the line of lines, from the centre; and set over the side A B in their terms: so is the *sector* opened, in these lines, to the quantity of the angle A C B.

10°. The hypotenuse A C (*fig. 3.*) of a right-angled spherical triangle A B C given, *e. gr.* 43°, and the angle C A B 20°; to find the side C B. The rule is: As radius is to the sine of the given hypotenuse 43°, so is the sine of the given

given angle 20° to the fine of the perpendicular CB. Take, then, 20° from the centre, along the line of fines, in your compasses, and set the extent, from 90 to 90, on the two legs; and the parallel fine of 43° , the given hypotenuse, will, when measured from the centre on the line of fines, give $12^\circ 30'$, the side required.

11°. The perpendicular BC, and the hypotenuse AC given, to find the base AB. As the fine complement of the perpendicular BC is to radius, so is the fine complement of the hypotenuse to the fine complement of the base.—Therefore, make the radius a parallel fine of the given perpendicular, *e. gr.* $76^\circ 30'$; then the parallel fine of the complement of the hypotenuse, *e. gr.* 47° measured along the line of fines, will be found $49^\circ 25'$, the complement of the base required: consequently the base itself will be $40^\circ 35'$.

Particular uses of the SECTOR in geometry, &c.—1°. To make a regular polygon, whose area shall be of any given magnitude. Let the figure required be a pentagon whose superficial area is 125 feet: extract the square root of $\frac{1}{5}$ of 125, it will be found 5. Make a square, whose side is 5 feet; and, by the line of polygons, as already directed, make the isosceles triangle CGD (*Tab. Geom. fig. 14, N. 2.*) so as that CG being the semi-diameter of a circle, CD may be the side of a regular pentagon inscribed therein, then let fall the perpendicular GE. Then continuing the lines EG and EC, make EF equal to the side of the square before made: and from the point F, draw the right line FH parallel to GC; then a mean proportional between GE and EF will be equal to half the side of the polygon sought, which doubled, will give the whole side. The side of the pentagon thus had, the pentagon itself may be described, as above directed. 2°. A circle being given, to find a square equal thereto. Divide the diameter into 14 equal parts, by the line of lines, as above directed: then will 12.4 of those parts found by the same line, be the side of the square sought.

3°. A square being given, to find the diameter of a circle equal thereto. Divide the side of the square into 11 equal parts, by means of the line of lines; and continue that side to 12.4 parts; this will be the diameter of the circle required.

4°. To find the side of a square, equal to an ellipsis whose transverse and conjugate diameters are given. Find a mean proportional between the transverse and conjugate diameters; which, being divided into 14 equal parts; $12\frac{4}{5}$ thereof, will be the side of the square required.

5°. To describe an ellipsis in any given ratio of its diameter; the area whereof shall be equal to a given square. Suppose the proportion of the transverse and conjugate diameters be required, as 2 to 1; divide the side of the given square into 11 equal parts: then, as 2 is to 1, so is $11 \times 14 = 154$ to a 4th number; the square whereof is the conjugate diameter sought. Then, as 1 to 2, so is the conjugate diameter to the transverse. Now,

6°. To describe an ellipsis, by having the transverse and conjugate diameters given. Suppose AB and ED (*Tab. Con. fig. 21.*) to be the given diameters; take AC in your compasses, and to the extent thereof open the sector, till the distance from 90 to 90, on the lines of fines, be equal thereto. Then may the line AC be divided into a line of fines, by taking the parallel extents of the fine of each degree, on the legs of the sector, in your compasses, and laying them off from the centre C. The line thus divided into fines (in the figure it is only done into every 10th fine) from each raise perpendiculars both ways; then, find points in those perpendiculars through which the ellipsis must pass, thus: take the extent of the semi-conjugate diameter CE between your compasses, and open the sector, till the aperture of 90 and 90 on the lines of fines be equal thereto: then take the parallel fines of each degree of the lines of fines of the sector, and lay them off on those perpendiculars drawn through their complements in the lines of fines AC; thus will you have two points in each perpendicular, through which the ellipsis must pass. *E. gr.* The sector still remaining the same, take the distance from 80 to 80 on the lines of fines, in your compasses, and setting one foot in the point 10, on the line AC, with the other, make the points *a* and *m* in the perpendiculars passing through that point: then will *a* and *m* be the two points in the perpendicular, through which the ellipsis must pass. All the other points, found after the same manner, being connected, will give the semi-ellipsis DAE; and the other half will be drawn after the same manner.

Use of the SECTOR in surveying.—The bearings of three places, as A, B, C, (*Tab. Surveying, fig. 4, N. 2.*) to each other, *i. e.* the angles ABC, BCA and CAB, being given; and the distance of each, from a fourth standing among them, as D, *i. e.* BD, DC, and AD being given; to find the distances of the several places A, B, C, from each other, *i. e.* to find the lengths of the sides AB, BC, AC. Having drawn the triangle EFG (*fig. 4, N. 3.*) similar to ABC, divide the side EG in H, so as that EH may be to HG, as AD to DC, after the manner already directed: and, after the like manner, must EF be divided in I, so as EI may be to IF, as AD to

DB. Then continuing the sides EG, EF, say, as EH—HG is to HG, so is EH+HG to GH; and as EI—IF is, to IE, so let EI+IF be to FM; which proportions are easily wrought by the line of lines on the sector. This done, bisect HK and IM, in the points L, N; and about the said points as centres, with the distances LI and NI, describe two circles intersecting each other, in the point O; to which, from the angles E, F, G, draw the right lines EO, FO, and OG, which will have the same proportion to each other, as the lines AD, BD, DC: now, if the lines EO, FO, and GO, be equal to the given lines AD, BD, DC, the distances EF, FG, and EG, will be the distances of the places required. But if EO, OF, OG, be less than AD, DB, DC, continue them, till PO, OR, and OQ be equal to them: then the points P, Q, R, being joined, the distances PR, RQ, and PQ, will be the distances of the places sought. Lastly, if the lines EO, OF, OG, be greater than AD, DB, DC, cut off from them lines equal to AD, BD, DC, and join the points of section by three right lines; the lengths of the said three right lines will be the distances of the three places sought. Note, if EH be equal to HG, or EI to IF, the centres L and N, will be infinitely distant from H and I; that is, in the points H and I, there must be perpendiculars raised to the sides EF, EG, instead of circles, till they intersect each other; but if EH be less than HG, the centre L will fall on the other side of the base continued; and the same is to be understood of EI, IF.

The sector is of especial use for facilitating the projection of the sphere, both orthographic and stereographic.

SECULAR, something that is temporal: in which sense, the word stands opposed to ecclesiastical.

Thus we say, secular power, secular arm, secular jurisdiction. See POWER, ARM, JURISDICTION, &c.

SECULAR, is more peculiarly used for a person who lives at liberty in the world; is not shut up in a monastery, nor bound by vows, or subjected to the particular rules of any religious community.

In which sense the word stands opposed to regular. See REGULAR.

The Romish clergy is divided into regular and secular. The regulars pretend that their state is much more perfect than that of the seculars. Secular priests may hold abbies and priories both simple and conventual, though not regularly, but only in commendam.

It is a maxim, in their canon law, *secularia secularibus, i. e.* secular benefices are only to be given to secular persons; regular only to regular.

SECULAR corporation. See the article CORPORATION.

SECULAR games, *ludi SECULARES*, in antiquity, these were solemn games, held among the Romans, once in an age; or, in a period deemed the extent of the longest life of man, called by the Greeks, *seis*, and by the Latins, *seculum*.

The secular games were also called *Terentine games, ludi Terentini*, either by reason Manius Valerius Terentinus gave occasion to their institution; for that having been wanted, in a dream, to dig in the ground in a place near the Camp of Mars, called *Terentum*, he there found an altar dedicated to Dis, or Pluto and Proserpine: upon which, as had been foretold him in his dream, three of his children born blind, recovered their sight; and he, in gratitude, performed sacrifices, on the same altar, for three days and three nights successively.—Or finally, by reason here was an altar of Pluto buried deep under ground, because the water of the Tyber *terram tereret*, eat into the ground in this place.

The secular games lasted three days, and as many nights; during which time, sacrifices were performed, theatrical shows exhibited, with combats, sports, &c. in the circus. Their origin, and institution, is delivered at length by Val. Maximus: the occasion thereof, according to this writer, was, to stop the progress of a plague.—The first who had them celebrated at Rome, was Valerius Publicola, the first consul created after the expulsion of the kings, in the year of Rome 245.—The ceremonies to be observed therein were found prescribed in one of the books of the Sibyls.

At the time of the celebration of the secular games, heralds were sent to invite all the world to a solemnity which nobody had ever yet seen, nor was ever to be again.

Authors are not agreed as to the number of years wherein these games returned; partly because the quantity of an age or *seculum* among the ancients is not known; and partly on other accounts: some will have it, that they were held once every hundred years, and that the *seculum, gr.* age, was our century.—This Varro and Livy seem to express in very plain terms; yet others will have it, that *seculum* comprehended 110 years, and that the secular games, only returned in that period, that is, at the beginning of every 111th year; which opinion is countenanced by Horace, in his *secular poem*, v. 21.

Be this as it will, it is certain they sometimes did not stay for the 111th, nor even for the 100th year, for the celebration of these games. Augustus, for instance, held them in the

year of Rome 736; and Caligula again in the year of Rome 800, and of Christ 38, viz. 64 years after the former; and Domitian, again, in still less time, viz. in the year of Christ 87, at which Tacitus assisted in quality of quinquaginta, as he himself tells us, *Annal. lib. xi. c. 11.* and this was the seventh time that Rome had seen them from their first institution. The emperor Severus exhibited them the eighth time, that is, 110 years after those of Domitian: Zosimus says, these were the last; but he is mistaken, for in the year of Rome 1000, that is, fifty years after those of Severus, the emperor Philip, had them celebrated with greater magnificence than had ever been known.—We find them represented on many medals.

SECULAR poem. See the article **SECULARE carmen**.

SECULAR year, the same with jubilee. See **JUBILEE**.

SECULARE carmen, **SECULAR poem,** a poem sung, or rehearsed, at the secular games. See **SECULAR games**.

Of this kind we have a very fine piece among the works of Horace: it is a Sapphic ode, which usually comes at the end of his epodes.—In some editions, the twenty-first ode of the first book, is also called *carmen seculare*.

SECULARIZATION, the action of secularizing, or of converting a regular person, place, or benefice, into a secular one.

Almost all the cathedral churches were anciently regular, i. e. the canons were to be religious; but they have been since secularized.

For the secularization of a regular church there is required the authority of the pope, that of the prince, the bishop of the place, the patron, and even the consent of the people.—And in France all this must be confirmed by parliament.

Religious that want to be released from their vows, obtain briefs of secularization from the pope.

SECUNDA aqua, among chymists, &c. denotes aqua-fortis which has been already used to dissolve some metal.

SECUNDARY, or **SECONDARY.** See **SECONDARY**.

SECUNDI generis, in anatomy, a distinction among the lacteal vessels.—There are two kinds of lacteals, viz. *primarij*, or those of the first kind, *primi generis*; and *secundi generis*, *secundary*, or of the second kind.

The first carry the chyle from the intestines into glands dispersed in great numbers throughout the mesentery.—The second carry it from these glands, after its being diluted there with lymph, into the common receptacle. See **LACTEAL**.

SECUNDI internodij pollicis extensor. See **EXTENSOR**.

SECUNDINE, or **SECUNDINES,** **SECUNDINEÆ,** in medicine, the several coats or membranes wherein the foetus is wrapped up, in the mother's womb; as the chorion and amnios, with the placenta, &c.—See **Tub. Anat.** (Splanchn.) fig. 16. lit. b. b.

They are thus called, because they come out in the second place, i. e. after the child, in delivery.—The good women and midwives call them the *after-birth*, as being esteemed a second burthen, whereof the mother is freed. Others call them, the *delivery*, because when these are out, the woman is reckoned to be perfectly delivered.

The *secundine* must never be left in the matrix; it is a foreign body, which would destroy the mother: it is dangerous even to have the least piece of it left behind.

Hippocrates observes, that twins have always the same *secundine*.

Dr. Grew, in his anatomy of plants, applies the term *secundine* to the fourth and last coat or cover of seeds; by reason this performs nearly the same office in plants, that the membranes investing the foetus do in animals. And indeed Pliny, Columela, Apuleius, &c. have used *secundine* in the same sense.

SECUNDO.—*Propositio de SECUNDO adjacente.* See the article **PROPOSITION**.

SECUNDUS puerus, } See the articles } **PERONÆUS.**
SECUNDUS puerus, } **SCALÆNUS.**

SECURIFATE pueri, a writ, which lies for one who is threatened with death, or danger; against the person who so threatens him.—It is taken out of chancery, directed to the sheriff. See **SURETY**.

SECUTORES*, in antiquity, a kind of gladiators among the Romans, who fought against the retiarii. See **GLADIATOR**.

* The word is formed from the verb *sequi*, to follow; because the *secutores* used to pursue the retiarii. See **RETIARI**.

The *secutores* were armed with a sword, and a buckler, to keep off the net, or noose, of their antagonists, and they wore a calk on their head—some compound the *secutores* with the *mimicantes*, because both had nearly the same weapons.

SECUTOR, was also a name given to such gladiators, as took the place of those killed in the combat; or, who fought the conqueror. This post was usually taken by lot.

In ancient inscriptions we also meet with *secutor tribunus*, *secutor militis*, &c. who were officers attending the tribunes, and generals; perhaps like our aids de camp.

SECULENDENDO, a plea for him who is charged with

the death of another; alledging, that he was forced to do what he did, in his own defence, the other for assaulting him, that had not been done as he did, he must have been in danger of his own life.

To have this plea admitted, the danger must appear inevitable.—Though the party justly its being done *se defendendi*, yet he is driven to procure his pardon of course from the lord-chancellor, and forfeits his goods to the king.

SEDER OLAM, in philology, a Hebrew term, literally signifying, *order of the world*; being the title of two chronicles in that language.

They are both very short, though the one more so than the other; for which reason the one is called *seder olam rabba*, that is, the *great seder olam*; and the other, *seder olam zuta*, i. e. *little seder olam*.

The *great SEDER OLAM* commences at the creation of the world, and comes down as low as the war of the pseudo-messiah Barchochabab, under Adrian, 52 years after the destruction of the temple of Jerusalem, and, of consequence, to the 122d year of Christ.—It is almost all taken from the scripture, excepting the end. It is the work of R. Josa, son of Hhelepta of Tispora, who lived in the second century, about the year 130, and was master of the famous R. Juda Hakkadosch, the compiler of the *Mishna*.

The *lesser SEDER OLAM* is an abridgment of the former, brought down as far as Mar Sutra, who lived 450 years after the destruction of the temple, or 522 years after Christ.—F. Morin, continually bent upon diminishing the antiquity of the principal books of the Jews, endeavours to prove this to have been wrote about the year of Christ 1124, as indeed it is expressed at the beginning: but R. Dav. Gantz has overthrown this opinion in his *Tsemah David*, and shewn, that the date, in the beginning, is an interpolation.

The two chronologies were first printed at Mantua in 1514, quarto; again, at Basil, by Frobenius in 1580, octavo: at Venice in 1545, quarto; and at Paris, with a Latin version of Genebrard, in 12°.—They have been since re-printed at Amsterdam, in 1711.

SEDIMENT*, the settlement, or dregs, of any thing; or that gross, heavy part of a fluid body, which, upon resting, sinks to the bottom of the vessel.

* The word is formed from the Latin, *sedimentum*, which Matthias Sylva derives à *disturna fide*.

Some physicians have found means to discover much of the nature of the disease, from the *sediment* of the urine.

Dr. Woodward maintains, that at the deluge, the whole terrestrial globe was dissolved into one uniform mass, and that the new world arising thence was perfectly spherical, and without any inequalities, consisting of several strata, which the earthy *sediment* gradually produced, as it drained.

SEDR, or **SEDRÉ,** the high priest of the sect of Ali, among the Persians. See **MAHOMEDANISM**.

The *sedr* is appointed by the emperor of Persia, who usually confers the dignity on his nearest relation.

The jurisdiction of the *sedr* extends over all effects destined for pious purposes, over all mosques, hospitals, colleges, sepulchres, and monasteries. He disposes of all ecclesiastical employments, and nominates all the superiors of religious houses.—His decisions, in matters of religion, are received as so many infallible oracles: he judges of all criminal matters, in his own house, without appeal, and is, without contradiction, the second person in the empire.

The *sedr*, however, has not any indelible character, but frequently quits his post, for another purely secular one.—His authority is balanced by that of the mudshahid, or first theologue of the empire.

SEED, SEMEN, a matter prepared by nature, for the reproduction, and conservation of the species, both in men, animals, and plants.

Some naturalists add, that even stones, minerals, and metals themselves have each their proper *seed* in their mines, and are produced and perpetuated thereby.

SEED, SEMEN, in the animal economy, is a white, liquid matter, or humour, the thickest of any in the body, separated from the blood in the testicles, and reserved in proper vessels, to be the means of generation.—By chymical analysis it is found to consist almost intirely of oil, and volatile salts, blended together by the mediation of a little phlegm. Its activity Dr. Drake takes to be derived from the salts, wherewith it abounds, far more than any other animal liquor.

The parts concerned in the preparation of the *seed* are the spermatic arteries, which bring the blood to be secreted into the testicles; the testicles, and parastates, where the secretion itself is chiefly effected; the vasa deferentia, which convey the secreted matter out of the testicles; and the vesiculae feminales, which receive and preserve it to be emitted in coition. See each of these parts described under its proper article **TESTICLE, &c.**

The blood received, in small quantities, into the spermatic arteries, and there, by the particular structure of the parts, much

much diminished of its velocity, is yet farther retarded about the corpus pyramidale, or varicosum, and its redder, and thicker parts, carried off by canals opening into the veins. Thus rendered paler, and flower, it is received into the winding recesses of the testicles, where, almost stagnant, it assumes an ash-colour, and is further prepared, thickened, &c. in the ductus Highmorianus, whence, it is slowly driven into the epididymide, or parastate, it is then further prepared and elaborated in the folds and complications thereof, and, at length, creeps slowly into the vasa deferentia, or ejaculatoria. These consist, at their beginnings, of a thick, fungous matter, and are very narrow, but growing sensibly wider, and then again narrower, in the winding meanders hereof the humour is collected, its motion abated, it is further elaborated, and concocted, and at last driven into the vesiculae feminales, in the various cells and meat's whereof it is received, laid up, fixed, thickened, whitened, and raised to its last perfection; in which state it is called *seed*.

It is observable, that no humour in the body is generated so slowly, or meets with so many means to retard it, or to elaborate, and concoct it, when at rest, as the *seed*. Some imagine that, in its whole retarded progress, besides what is apparent, there is something still added to it from the minute nervous vesicles; and something taken away, by the various lymphatics, and discharged thereby into the venous vesicles of the corpus pyramidale, and the little veins of the vesiculae feminales; and thence into the humours of the whole body: Boerhaave takes both the one and the other to be very probable.

The *seed*, or humour, thus formed in the testicles, parastate, vasa deferentia, and vesiculae feminales, being, while fresh, diluted with a little warm water, and viewed with a good microscope, seems to consist of innumerable, little, oblong, living, nimble animalculæ floating in the other part of this humour.—This is said to be always observed in the seed of all men, quadrupeds, birds, fishes, amphibious animals, and insects.

Upon comparing this with the bulk, figure, place, change, &c. of the carina of the chick described by Malpighi, and with the known law of nature observed in the generation of frogs; it appears highly probable, that the animalculæ of the male *seed*, contain the rudiments, or flamina, of the future human body; and the more so, since, whenever the testicles, or this humour is wanting, there is always sterility on the side of the male.

M. Leewenhoeck, the first discoverer of these animalculæ, and many after him, make no scruple to call them true *seminis*, or little men; and some have even pretended to discover somewhat of the human figure therein.—But Verheyen, and others after him, deny the existence of any such animalculæ; maintaining, that it is only the intestine motion of the parts of the *seed* kept on foot by the warmth thereof, that exhibits this appearance, which fanciful persons have improved into frisking animalculæ; and urging, in confirmation hereof, that no sooner is the warmth gone, than all appearance of animals ceases.—But notwithstanding this, the doctrine of the animalculæ in femine, seems now pretty generally received.

Some admit of four several kinds of *seed*: the *seed* of the testicles, that of the vesiculae feminales, that of the prostates, and that of the glands of the penis.—The two first, which we have described as one and the same humour, only in different stages, those authors take to be different, as not being able to find any strict communication between the deferentia and the vesiculae; but that communication is fully shewn by Dr. Drake, so that nothing needs further, to shew these *seeds* the same.—The liquor of the prostates, and that of the glands of the penis, are generally allowed not to be any true *seed*, no more than that emitted by women: nor is there any good reason why either of them should be called so, as their appearance is very different, and as other sufficient uses are assigned for them, *viz.* to line and lubricate the parts, that the *seed*, urine, &c. may pass more freely, and without adhering.

The seminal liquor, however, such as emitted for use, is a mixture of several fluids, poured at the same time into the common canal of the urethra, either from the glands that have secreted them, or the reservoirs that have kept them.—M. du Verney observes, that in different species, the number and structure of these organs is different. In man, the principal are the vesiculae feminales, and the prostates, besides what was discovered by Mr. Cowper, *viz.* a number of new glandular bodies on each side the urethra, whose excretory ducts open into the urethra, towards the root of the penis. M. du Verney has found, that the same are likewise in most other animals, and placed in the same manner.

It is controverted, whether or no the liquor filtrated hereby, be necessary to generation. M. du Verney thinks it is; and his chief reason is, that in animals that have been castrated, these glands, as well as all the other sources of generation, are found dried up and decayed.—M. Littere objects to this, that the vesiculae feminales, and prostates, having little cells,

where their filtrated liquor is deposited, it is easily conceived that their humours may wait some time, for an occasion of being emitted; but that these new prostates, or glands, of Mr. Cowper, having no such reservoirs, their liquor must ooze out into the cavity of the urethra, in proportion, as it is separated, and be defined for some continual, not for any momentary, or occasional use. He adds, that as the excretory ducts of these glands traverse the spongy body of the urethra, for two inches, before they penetrate into its cavity, and that in the file more into which the liquor should be discharged, to emit in generation, that spongy body is extremely dilated, and its sides in a state of compression, and the liquor must be then less disposed to a discharge than ever.

For the fate of the *seed* when lodged in the uterus: see CONCEPTION.

SEED, in botany, is the last product of a plant, whereby the species is propagated.

The *seed* is frequently the fruit of the plant, as is the case in many herbs.

Sometimes it is only a part inclosed in the fruit, and that in form, either of grain, kernel, or berry.

The *seed* is the natural offspring of the flower, and that for whose production all the parts of the flower seem intended; so that when this is once well formed, the several parts of the flower dwindle, and disappear.

It is produced from the farina of the apices, let fall on the head of the pistil, and thence forwarded to an uterus at the bottom thereof, which usually is divided into several cells; where, coming to receive the nutritious juice of the plant, it is first softened, then swelled, and increased both in matter and bulk, and at length comes to its state of maturity.—For a more particular account of the manner of the generation of the *seed*, see GENERATION.

That the whole plant is contained in the *seed*, is an opinion as old as Empedocles, and it is still the prevailing doctrine among the generality of naturalists. Experience, the microscope, and the modern philosophy, give it great countenance. In effect, by the use of good microscopes, we discover, in the *seed*, several of the parts of the future tree, only in miniature; particularly a little root, called the *radicle*, and the stem called the *plumule*.

In Malpighi's life, we have a debate between him and signior Triumphetti, provost of the physic garden, at Rome, whether the whole plant be actually contained in the *seed*?

The affirmative is maintained by Malpighi, with elegant arguments; among which this is one, that in a kidney bean ere sown, the eye, assisted with a microscope, easily discovers leaves, a bud, and even the knots, or implantations of the leaves on the stem. The stem itself also is very conspicuous, and plainly consists of woody fibres, and series of little utricles.—And whereas signior Triumphetti had objected, that by poverty, transplantation, &c. several plants degenerate into others, particularly wheat into tares, and tares again into wheat; in answer to this, which is one of the strongest objections against that opinion, Malpighi replies, that he is not fully satisfied as to the truth of the objection; for that both himself, and his friends, making the experiment, no metamorphosis of the wheat into tares; but granting the metamorphosis, it is the soil, or the culture, that is in the fault. Now, from a morbid, and a vicious condition of nature, there is no inferring her genuine and permanent state.

To the same effect, Mr. Leewenhoeck, after a nice observation of an orange-kernel which he had made to germinate in his pocket, &c. concludes, "Thus we see how small a particle, no bigger than a coarse sand, is increased, &c." A plain demonstration, that the plant, and all that belongs to it, was actually in the *seed*, *viz.* the body, root, &c.—Mr. Derham adds, that of all the *seeds* he has viewed, except the napel, this plant appears the plainest to the naked eye in the nux vomica.

The fecundity of plants, in the production of *seeds*, is very surprizing. M. Dodart, in the memoirs of the French academy of sciences, computes, that an elm, living two years, ordinarily produces of itself 33000000 of *seeds*, and adds, that had its crown, or head, been cut off, it would have put forth as many branches, within half an inch of the place where it was cut, as it had before; and that at whatever height it were cut off, the effect would have been still the same.—Hence he concludes, that the whole trunk, from the ground to the top of the branches, is full of the principles, or little embryo's of branches, which, it is true, cannot all appear at once, but which being conceived, as separated by circular rings, half an inch high, can give so many sets of branches, each whereof is ready to appear, and will really appear, if the head be lopped off, or split over it.

Now these invisible branches exist as truly as those which appear, for whence else should they come? the trunk cannot produce them, as being itself no more than a packet of fibres, destitute of all action: nor can the sap, which, like the blood, is first to nourish the parts, but not to form any new one.—The branches therefore existed before the tree was

hopped; and if they had appeared, they would have bore an equal number of *seeds* as those which did. These *seeds* therefore, they must already contain in little.

On which footing, the tree may be said actually to contain in itself 15840000000 *seeds*, wherewith to multiply itself, as many times.—But what shall we say, if each *seed*, or grain of a tree, contain in itself another tree, containing the same number of *seeds*? and, if we can never come either at a *seed* which does not contain trees, nor at a tree which does not contain *seed*? by this means we shall have an increasing geometrical progression, the first term whereof is 1, the second 15840000000, the third, the square of 15840000000; the fourth, its cube, &c. to infinity.

Several species of plants have been long supposed to be destitute of *seeds*, in regard no observation, no microscope, no anatomy had discovered any thing like them: such are the capillaries, the several kinds of fuci, sea plants, mosses, &c.—But the happy industry of the present age has discovered the *seeds* of some of them; and has left us out of all doubt, that the rest are not without the same.

The *seeds* of fern, and the capillary-plants, were first discovered by Cæsius; and since, more fully and critically by Mr. W. Cole. The *seeds* of some sea-plants, were discovered by the Count de Marigli, and those of others, by M. Reaumur, the first mentioned in the history of the French academy for the year 1712, and the latter for the year 1711. The *seeds* of some kinds of fuci have been discovered also, by Mr. Samuel Doody; those of some coralloid shrubs, by Dr. Isaac Robinson, as also, those of several fungi, particularly truffles, and crepitis lupi's, or puff-balls; and those of some other by Dr. Lister. See MUSHROOM: under which article, a new theory of the propagation of these apparently seedless plants is laid down.

Echinate SEEDS, } See the articles { ECHINATE.
Naked SEEDS, } { NAKED.
Winged SEEDS, } { WINGED.

SEEDS, in gardening, and agriculture.—Mr. Bradley observes, that the *seeds* of plants, though exceedingly good, will degenerate from the mother-plant, if they be sown on the same ground, whence they were gathered; so that there is a great necessity for a yearly change of *seeds* of forest trees, as acorns, mast, &c. If the place be too cold to sow them when gathered in August, they may be kept barrelled, or potted up, in moist sand or earth, *stratum super stratum*, during the winter; at the end of which time they are found sprouted, and it gently sown, will be as forward, as if they had been sown in autumn, besides their missing the vermin to which the winter *seed* is much exposed.

The *seed* is not to be chosen from the most fruitful trees, so much as from the most solid and fair; nor are we to covet the largest acorns, but the most weighty, clean and bright. Porous, insipid, mild sorts of *seeds*, are to be sown as soon as ripe: hot, bitter *seeds* ought to be kept a year before sown.

The shape and weight of *seeds*, direct how they are to be set: most of them, when they fall, lie on one side, with the small end towards the earth, which shows that posture to be best to set any stone or nut in: if they be heavy, sow them the deeper. Acorns, peaches, &c. are to be sown two or three inches deep.

SEEDS; in pharmacy, &c.—The medicinal *seeds*, especially those imported from the Indies, Levant, &c. are severally described under their respective articles, which see.

Among those used with us, the principal are the four greater hot, and the four greater cold *seeds*, as they are called.—The first are those of anise, fennel, cummin, and caraway: the latter, those of gourd, citrul, melon, and cucumber.

The chief use of the four cold *seeds*, is for the making of emollients, cool refreshing drinks, puffs for the hands, and oils used by the ladies for the complexion.

Amber SEED, } See the articles { AMBER seed,
Anise SEED, } { ANISE seed,
Line SEED, } { LINE seed,
Almond SEED, } { MUSTARD seed,
Worm SEED, } { WORM seed.

SEED OF pearls. See the article PEARL.

SEEDLINGS, among gardeners, denote such roots of gilliflowers, &c. as come from seed sown.—Also, the young tender shoots of any plants, that are newly sown.

SEEING, the act of perceiving objects by the organ of sight; or it is the sense we have of external objects, by means of the eye. See SIGHT.

For the apparatus, or disposition of the parts necessary to seeing, see EYE.—For the manner wherein seeing is performed, and the laws thereof, see VISION.

Our best anatomists differ greatly as to the cause, why we do not see double with the two eyes?—Galen, and others after him ascribe it to a coalition or decussation of the optic nerve behind the eyeballs. But whether they decussate or coalesce, or only barely touch one another, is not so well agreed. The Bartholini and Vesalius say expressly, they are united

by a perfect confusion of their substance: Dr. Gibbon allows them to be united by the closest conjunction, but not by a confusion of their fibres.

Des Cartes, and others, account for the effect another way, viz. by supposing that the fibrille constituting the medullary part of those nerves, being spread in the retina of each eye, have each of them corresponding parts in the brain; so that when any of those fibrille are struck by any part of an image, the corresponding parts of the brain are affected thereby.—Somewhat like which is the opinion of Dr. Briggs; who takes the optic nerves of each eye to consist of homologous fibres, having their life in the thalamus nervorum opticorum, and being thence continued to both the retinae which are composed of them: and farther, that those fibrille have the same parallelism, tension, &c. in both eyes; consequently, when an image is painted on the same corresponding, sympathizing parts of each retina, the same effects are produced, the same notice carried to the thalamus, and so imparted to the soul.—Hence, is that double vision ensuing upon an interruption of the parallelism of the eyes; as when one eye is depressed by the finger, or their sympathy is interrupted by disease. But Dr. Briggs maintains, that it is but in few subjects, that there is any decussation; and in none, any conjunction more than mere contact.

Whence it is that we see objects erect, when it is certain, the images thereof are painted invertedly on the retina, is another difficulty in the theory of seeing!—Des Cartes accounts for it hence; that the notice the soul takes of the object, does not depend on any image, nor on any act coming from the object, but merely on the situation of the minute parts of the brain, whence the nerves arise. E.g. the situation of a capillament of the optic nerve, corresponds to a certain part of the brain, which occasions the soul to see all these places lying in a right line therewith.

But Mr. Molyneux gives us another account: the eye, he observes, is only the organ, or instrument: it is the soul that sees. To enquire, then, how the soul perceives the object erect by an inverted image, is to enquire into the soul's faculties. Again, imagine that the eye receives an impulse on its lower part, by a ray from the upper part of an object; must not the visive faculty be hereby directed to consider this stroke as coming from the top rather than the bottom of the object, and consequently, be determined to conclude it the representation of the top? See SIGHT, VISIBLE, &c.

SEEING faith. See the article FAITH.

SEEING. A horse is said to *see*, when he begins to have white eye-brows; that is, when there grows on that part about the breadth of a farthing of white hairs, mixed with those of his natural colour: which is a mark of old age. It is said a horse never *sees* till he is fourteen years old, and always does before he is sixteen.—The light sorrel and black sooner *see* than any other.

Horse-jockeys usually pull out those hairs with pincers; but if there be so many, that it cannot be done, without making the horse look bald and ugly, then they colour their eye-brows, that they may not appear old.

SEEM, or SENE. See the article SEAM.

SEGMENT of a circle, in geometry, a part of a circle comprehended between an arch and the chord thereof.—Or, it is a part of a circle comprehended between a right line less than a semi-circle and a part of the circumference.

Thus the portion AFB (Tab. Geometry, fig. 23.) comprehended between the arch AFB, and the chord AB, is a segment of the circle ABED, &c. a segment of so many degrees.

As it is evident every segment of a circle must either be greater or less than a semi-circle; the greater part of the circle cut off by a chord, i.e. the part greater than a semi-circle, is called the greater segment, as ADEB; and the lesser part, or the part less than a semi-circle, the lesser segment, as AFB, &c.

The angle which the chord AB, makes with a tangent LB, is called the angle of a segment. See ANGLE.

Some also call the two mixt angles comprehended between the two extremes of the chord, and the arch, angles of the segment.

Angle in the SEGMENT. See the article ANGLE.

Similar SEGMENTS. See the article SIMILAR.

The height of a SEGMENT DE, fig. 22, and half its base or chord AE, being given, to find the area of the segment. Find the diameter of the circle. On this describe a circle, and draw the base of the segment AB; draw the radii AC, BC; and find the number of degrees of the arch ADB. From the diameter had, and its ratio to the periphery, find the periphery itself; and from the ratio of the periphery to the arch ADB, and the periphery itself, find the length of the arch ADB. This done, find the area of the sector ADBCA. And that of the triangle ACB. Lastly, subtract the triangle from the sector, and the remainder is the area of the segment.

If the area of the greater segment BFA, were required, the triangle ACB must be added to the sector ADEBC.

SEGMENT

SEGMENT of a sphere, is a part of a sphere terminated by a portion of its surface, and a plane which cuts it off; passing somewhere out of the centre.

This is more properly called a *section* of a sphere.

The base of such a *segment*, it is evident, is always a circle whose centre is in the centre of the sphere.

The solid content of a *segment* of a sphere is found, by multiplying the surface of the whole sphere by the altitude of the *segment*, and then dividing the product by the diameter of the sphere, and to the quotient adding the area of the base of the *segment*.—Or, if it be less than a hemisphere, thus; take the altitude of the *segment* from the radius of the sphere, and by the difference multiply the area of the base of the *segment*; and subtract this product, from that which will arise by multiplying the semi-axis of the sphere into the convex surface of the *segment*; then divide the remainder by 3, and the quotient is the solidity sought.

This latter method supposes the axis of the sphere to be given; if not, it may be found thus: let the altitude of the *segment* be called *a*, and its semi-diameters, then will $as : s :: s : a$; add a to *a*, and that shall give the axis sought.

Resistance of a *SEGMENT*. See the article **RESISTANCE**.

SEGMENT is sometimes also extended to the parts of ellipses, and other curvilinear figures.

Line of SEGMENTS. On Gunter's sector there are usually two lines, called *lines of segments*; they are numbered with 5, 6, 7, 8, 9, 10, and lie between the lines of sines, and those of supericies. They represent the diameter of a circle, so divided into 100 parts, as that a right line drawn through those parts, and normal to the diameter, shall cut the circle into two *segments*, of which the greater shall have that proportion to the whole circle, which the parts cut have to 100.

SEGMENT leaves, a denomination given by botanists to those leaves that are cut and divided into many fingers, or slices; as fennel, &c.

SEGMOIDAL valves, in anatomy, are little valves of the pulmonary artery; thus called from their resembling segments of circles; but more usually called semilunar valves.

SEGREANT, is the herald's word for a griffon, when drawn in a leaping posture, and displaying his wings, as if ready to fly.

SEJANT, is a term used in heraldry, when a lion or other beast, is drawn in an escutcheon, sitting like a cat, with his fore-feet freight.

SEIGNEUR, or **SEIGNOUR**, *lord*. See **SIRE**, **SIEUR**, **MONSEIGNEUR**, **LORD**, &c.

SEIGNORAGE, or **SEIGNOURAGE**, a right or due belonging to a seigneur, or lord.

SEIGNORAGE is particularly used for a duty belonging to the prince for the coining of money, called also *coinage*; and in the baser Latin *monetarium*.

This duty is not always the same; but changes according to the pleasure of the prince, and the occasions of state. It is in some measure for the discharge of this duty that alloy was invented; that is, the mixture of other metals with gold and silver.

Under our ancient kings, for every pound of gold brought in the mints to be coined, the king's duty was five shillings; one shilling, and sometimes eighteen-pence whereof went to the master of the mint. Under Edward III. the *seignorage* of every pound weight of silver, was eighteen-penny weight, which was then equivalent to a shilling. Under Henry V. the king's *seignorage* for every pound of silver was fifteen-pence.—At present, the king claims no *seignorage* at all, but the subject has his money coined at the publick expence: nor has the king any advantage therefrom, but what he has by the alloy.

In France, under Philip Augustus, the *seignorage* was one third of the profit made by the coining: St. Louis fixed it at one fifteenth part of the value of the money coined: king John at three livres the mark of gold: Charles VII. by reason of the distressed state of his finances, raised it to three fourths of the value: Louis XIII. fixed it at six livres the mark, or eight ounces of gold, and ten sols the mark of silver.—Louis XIV. took away the right of *seignorage* in 1679; though it was re-established in 1689, on the foot of seven livres, ten sols the mark of gold, and twelve sols, six deniers the mark of silver.

It must be observed, that for the levying of this duty of *seignorage*, the just value of the money is augmented by the value of the duty.

SEISIN, **SEISINA**, in law, signifies possession. See **POSSESSION**.

In this sense we say, *primer seisin*, for the first possession, &c. See **PRIMER**.

Seisin is two-fold; *seisin in fact*, and *seisin in law*.

SEISIN in fact, is, when an actual and corporal possession is taken.

SEISIN in law, is, when something is done, which the law accounteth a *seisin*, as an inclosure.

This in law gives a right to lands and tenements, though

the owner be by wrong disseized of them.—He who hath but an hour's possession quietly taken, hath *seisin de facto*, & de *clame*, whereof no man may disseize him by known force, or subtlety, without process of law. See **DISSEISIN**. The civilians call the latter *civilis possessio*, and the former *naturalem*.

SEISINAM habere facias. See the article **HABERE**.

SEISOR. See the article **DISSEISOR**.

SEIZE, **SPAZE**, or **SEASE**, in the sea language, is to make fast, or bind; particularly to fasten two ropes together, with rope-yarn.

The *seizing*, *sealing*, or *seasen* of a boat, is a rope tied to a ring, or little chain in the foreship of the boat, by which means it is fastened to the side of the ship.

SEIZING, in falconry, is when an hawk gripes her prey, or any thing else fast between her claws.

SEIZURE, in commerce, an arrest of some merchandize, moveable, or other matter, either in consequence of some law, or of some express order of the sovereign.

Contraband goods, those fraudulently entered, or landed without entering at all, or landed at wrong places, are subject to *seizure*.

In *seizures*, among us, one half goes to the *finder*, or informer, and the other half to the *king*.—In France, had the painted linens, &c. seized, used to burnt, and the other half sent abroad: but in 1715, by an arret of council, the whole was ordered to be burnt.

SELENITE*, **SELENITES**, in natural history, the *moon-stone*; a stone said to be found in China, which has the remarkable property, that it increases and decreases, as the moon waxes and wains.—It is said, there are some of these *selenites* preserved in the palace of Peking, valued at an incredible rate. Martinus.

* The word is formed from the Greek. *selene*, moon.

SELENITES, among the ancient naturalists, denotes a white, or transparent figured stone; thus called from its representing the moon as in a glass.

Some give the same appellation to Mercury tal., from an opinion, that its brightness increases and diminishes with the moon. See **SUPPLEMENT**, article **SELENITES**.

SELENOGRAPHY*, a branch of cosmography, which describes the moon, and all the parts and appearances thereof; as geography does those of the earth.

* The word is formed from *selene*, moon, and *grapho*, description.

Since the invention of the telescope, *selenography* is vastly improved. We have now distinct names for most of the regions, seas, lakes, mountains, &c. visible in the moon's body. Hevelius, a celebrated astronomer, who was a burgher-master of Dantzick, and who published the first *selenography*, named the several places of the moon from those of the earth; and Ricciolus named them afterwards, from the names of the celebrated astronomers and philosophers.—Thus what the one calls *mons Periphris*, the other calls *Aristarchus*. What the one calls *Ætna*, *Sinai*, *Athos*, *Apenninus*, &c. the other calls, *Copernicus*, *Possidonius*, *Tycho*, *Gassendus*, &c. See **MOON**.

At the royal observatory at Paris, they continue to make *selenographic* maps. And M. Cassini has published a work called *Instructiones Seleniquæ*.

SELEUCIAN S, **SELEUCIANI**, a sect of ancient hereticks, called also *Hermiani*. See **HERMIANS**.

Seleucus and Hermias joining forces, and dogmatizing together, taught, that God was corporeal; that the elementary matter was co-eternal with him, and that the human soul was formed by the angels, of fire and air.—They also denied that Jesus Christ sat at the right hand of God; asserting, that he had quitted that right, and had removed his throne into the sun.

SELEUCIDÆ, in chronology.—Æra of the **SELEUCIDÆ**, or the Syro-Macedonian æra, is a computation of time, commencing from the establishment of the *Seleucidae*, a race of Greek kings, who reigned as successors of Alexander the Great in Syria; as the Ptolemy's did in Egypt.

This æra we find expressed in the book of Maccabees, and on a great number of Greek medals struck by the cities of Syria, &c.—The Rabbins and Jews call it, the æra of *contracts*, because being then subject to the kings of Syria, they were obliged to follow their method of computing in all contracts.

The Arabs call it *tharik dikharnain*, æra of two horns, which some say signifies the æra of Alexander the Great; by reason that prince bore two ram-horns on his crest, in imitation of Jupiter Ammon, whose son he would needs be.—But others understand it much better of the two kingdoms of Syria and Egypt, which were now chosen or divided; and of one single empire parted into two monarchies.

The grand point, is to know the year wherein the separation was made; or, which is the same thing, when Seleucus Nicator, one of Alexander's captains, and the first of the *Seleucidae*, established his throne in Syria.—Without detailing the various sentiments of various authors, it may suffice to observe, that, according to the best accounts, the last year,

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of the era falls in the year 311 before Christ, which was 12 years after Alexander's death.

SELF *αὐτός*, } See the articles **ABUSE**,
SELF *examination*, } **EXAMINATION**.

SELL, in building, is of two kinds, viz.—*Ground-sell*, which denotes the lowest piece of timber in a timber-building, and that whereon the whole superstructure is raised.

Window-sell, called also *window-sill*, is the bottom piece in a window-frame.

SELLA *equina, turcica*, or *sphenoides*, is a name given the four apophyses of the os sphenoides, or cuneiforme, in the brain; in regard of their forming a resemblance of a saddle, which the Latins call *sella*.

They are sometimes also called by the Greek name *clinoides*. Herein is contained the pituitary gland, and in some beasts, the *rete mirabile*.

SEMBIANI, **SEMBIANS**, a sect of ancient hereticks, denominated from their leader, *Sembius*, or *Semlianus*, who condemned all use of wine, as evil of itself; persuaded his followers, that the wine was a production of Satan and the earth; denied the resurrection of the dead, and rejected most of the books of the Old Testament. Jovet.

SEMBRADOR, an engine, invented by Don Jos. de Lucatello, for the evenly sowing of seeds; described in the Philosophical Transactions, under the title of the *Spanish Sembrador*.

The perfection of agriculture is allowed to consist much in setting plants at proportional distances, and giving sufficient depth to the roots, that they may spread, and receive their necessary nourishment: yet there is very little care taken in the practice of this important part of husbandry; but all sorts of grains are sown by handfuls, cast at random; by which means four parts in five of the seed are lost.—To remedy this inconvenience, the *sebrador* or sower is invented, which being fastened to the plough, the whole business of ploughing, sowing, and harrowing is done at once; the seed-man's trouble is saved, and the grain spread at equal distances, and equally deep at the bottom of the furrow.

An experiment hereof was made before the emperor Leopold in the fields of Luxemburg in Austria, where the land usually yields four or five-fold; but the crop from the ground sowed by this instrument, was sixty-fold; as appears by a certificate of the emperor's officer, appointed to see the experiment: signed Vienna, August 1, 1663.

A figure of the *sebrador*, we have in the Transactions, No. 60, by the earl of Castlemain.

SEMI, or **SEME**. See the article **SEAM**.

SEMEIOSIS, *σημειωσις*, in medicine. See **SEMEIOTICA**.

SEMEIOTICA*, *σημειωτική*, that part of medicine, which considers the signs, or indications of health, and diseases; and enables the physicians to judge what is, was, or will be the state, degree, order and effect of health or sickness.

* The word is formed from the Greek, *σημαίνω*, of *σημαίνω*, *figo, signum*.

SEMLN *semen, or fontanum*. See **WORM-SEED**.

SEMENTINE *faris*, in antiquity, feasts held annually among the Romans, to obtain of the gods a plentiful harvest.

They were celebrated in the temple of Tellus, or the earth; where solemn sacrifices were offered to Tellus and Ceres.

The time of the celebration was about seed time, usually in the month of January; for Macrobius observes, they were moveable feasts.—They had their name from *semen*, seed.

SEMETs, **SUMMETs**, or **SUMMITs**, in botany, are used by Dr. Grew, and others, for the apices of the attire of plants. See **APICES**.

SEMI, a word borrowed from the Latin, signifying *half*; but only used in composition with other words, as in the following articles.

The French, instead of *femi*, frequently use *demi*; the Greeks *hemi*.

In music, *femi* has three several usages: first, when prefixed to the name of a note, it expresses a diminution of half its value; as in *femi-breve*, &c.

Secondly, when added to the name of an interval, it expresses a diminution, not of half, but of a lesser semi-tone, or four commas in the whole compass; as in *femi-diatente*, &c.

Thirdly, it sometimes also signifies an imperfection: thus, *femicirculo* or *circulo mezzo*, signifies an imperfect circle, which is the mark of imperfect time, that is, of double time; whereas, the circle, being a character of perfection, marks triple time.

SEMI-ARIANS, a branch of the ancient Arians; consisting, according to Epiphanius, of such as, in appearance, condemned the errors of that heresiarch, but yet acquiesced in some of the principles thereof; only palliating and hiding them under softer, and more moderate terms.

It is true, they separated from the Arian faction; but yet would never be brought to acknowledge, that the Son was

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homoeousios, that is, consubstantial, or of the same substance with the Father.—They would only allow him to be homoeousios, that is, of a like substance with the Father. See **HOMOEUSIAN**, &c.

Though, as to expression, they only differed from the orthodox by a single letter; yet were they, in effect, in the error of the Arians, as they placed the Son in the rank of creatures.—It did not avail the teaching, that there was no other creature of the same class with him; since by denying him consubstantial with God, they effectually precluded him from being truly God.

Yet some, even among the orthodox, use the word homoeousios, in speaking of the Son; applying such an idea to it, as, it seems, is consistent with orthodoxy.

But the name *femi-arians* is also given by the second general council to another branch of Arians, who believed orthodoxy of the Father and Son, but denied the deity of the Holy Ghost; thus rejecting that part of the Arian heresy relating to the Son, but still retaining that which related to the Holy Ghost.

As the zeal of the Arians was chiefly leveled against the second person in the trinity, that of the *femi-arians* was bent against the third; whence as the former were sometimes called *zooteristes*, the latter were denominated *πνευματομαχοι*. Macedonius, bishop of Constantinople made an innovation in this sect in 360, and gave rise to a new branch of Macedonian *femi-arians*, or pneumatomachi; who allowed the Son not to be *homoousios*, of the same substance, but *oiousios*, of like substance, with the Father; and at the same time openly asserted the Holy Ghost to be a creature.

SEMI-BREVE, in music, a note, or measure of time, comprehending the space of two minims, or four crotchets, or half a breve.

The *femi-breve* is accounted one measure of time; or the integer, in fractions and multiples whereof the time of the other notes is expressed.

Thus the minim is expressed by $\frac{1}{2}$; a crotchet by $\frac{1}{4}$, &c. i. e. by $\frac{1}{2}$ of a measure or *femi-breve*. A breve by 2; and a long by 4, that is, by 4 measures or *femi-breves*.

The character of the *femi-breve* is O.

SEMI-CIRCLE, in geometry, a figure comprehended between the diameter of a circle, and half the circumference.

Two *femi-circles* can only cut each other in one point.

SEMI-CIRCLE, is also an instrument in surveying, sometimes called the *graphometer*.

It consists of a *femi-circular* limb, as **FIG** (*Tab. Surveying, fig. 16.*) divided into 180 degrees, and sometimes subdivided diagonally or otherwise, into minutes. This limb is subtended by a diameter F G, at the extremities whereof are erected two sights. In the centre of the *femi-circle*, or the middle of the diameter, is fixed a box and needle. On the same centre is fitted an alidade or moveable index, carrying two other sights, as H I. And the whole is mounted on a staff, with a ball and socket.

The *femi-circle*, then, is nothing else but half a theodolite; with this only difference, that whereas the limb of the theodolite, being an entire circle, takes in all the 360° successively; in the *femi-circle* the degrees only going from 1 to 180, it is usual to have the remaining 180°, or those from 180° to 360°, graduated in another line on the limb, within the former.

To take an angle with a **SEMI-CIRCLE**.—Place the instrument in such manner, as that the radius CG may hang over one leg of the angle, to be measured, and the centre C over the vertex of the same. The first is done by looking through the sights F and G at the extremities of the diameter, to a mark fixed up in one extremity of the leg: the latter is had by letting fall a plummet from the centre of the instrument. This done, turn the moveable index H I on its centre towards the other leg of the *femi-circle*, till through the sights fixed on it, you see a mark in the extremity of the leg. Then, the degree which the index cuts on the limb, is the quantity of the angle.

For further uses of the *femi-circle*, they are the same with those of the theodolite. See **THEODOLITE**.

SEMICIRCULAE *arches*, } See the articles **ARCH**,
Canales **SEMICIRCULARES**, } **CANALES**.

SEMI-COLON, in grammar, one of the points or stops, used to distinguish the several members of sentences from each other.

The mark or character of the *femi colon* is (;)—It has its name, as having a somewhat less effect than a colon, or as demanding a shorter pause.

The use of the *femi-colon*, the grammarians generally say, is, to mark a sense less complex than the colon, and more complex than the comma; but this only conveys a very obscure idea. In effect, the precise office of the *femi-colon*, or what office it is distinguishes it from the colon, is a thing very little known in the world. Our best authors seem to use them promiscuously. See **COLON**.

Mr. Ward, professor at Gresham, we believe, is the first who

who settled a just use of the *semi-colon*. His position is, that the *semi-colon* is properly used to distinguish the conjunct members of sentences.—Now, by a conjunct member of a sentence, he means, such a one as contains at least two simple members.

Whenever, then, a sentence can be divided into several members of the same degree, which are again divisible into other simple members, the former are to be separated by a *semi-colon*.

For an instance: If fortune bear a great sway over him, who has nicely flated and concerted every circumstance of an affair; we must not commit every thing, without reserve to fortune, lest he have too great a hold of us. Again, *Si quantum in agro locisque desertis audacia potest, tantum in foro atque judicii impudentia valuit; non minus in causa cederet Aulus Cæcinnæ Sextii impudentiæ, quam tum in vi faciendæ esset audaciæ.* An instance in a more complex sentence we have in Cicero. *Res familiaris primam bene partem, nullius turpi questu; tum quam plurimis, modo dignis, se utilem præbeat; deinde augetur ratione, diligentia, parsimonia; nec libidini potius luxurique, quam liberalitati & beneficentiæ parcat.*

But though the proper use of the *semi-colon*, be to distinguish conjunct members, it is not necessary that all the members divided hereby, be conjunct. For upon dividing a sentence into great and equal parts, if one of them be conjunct, all those other parts of the same degree are to be distinguished by a *semi-colon*.—Thus: Whoever is overtaken with poverty, the fame will find, that coldness, contempt, injuries, &c. are not far behind: or thus: *Nihil est tam molle, tam tenerum, tam aut fragile, aut flexibile; quam volucris civium.* Sometimes also it happens, that members that are opposite to each other, but relate to the same verb, are separated by a *semi-colon*: thus Cicero. *Ex hac parte pudor, illinc petulantia; hinc fides, illinc fraudatio; hinc pietas, illinc scelus, &c.* Hither likewise may be referred such sentences, where the whole going before, the parts follow: as, The parts of rhetoric are four; invention, disposition, elocution, and pronunciation.

SEMI-CROMA, *sextuple of*. See the article **SEXTUPLE**.

SEMI-CUPIUM, a half bath, wherein the patient is only placed up to the navel.

SEMI-DIAMETER, a right line drawn from the centre of a circle or sphere, to its circumference; the same with what we otherwise call a *radius*.

The distances, diameters, &c. of the heavenly bodies, are usually estimated by astronomers in *semi-diameters* of the earth.

To find the *semi-diameters* of the primary planets in *semi-diameters* of the earth.—Since the sun's true *semi-diameter* is 152 *semi-diameters* of the earth; and we have the ratio of the diameters of the primary planets to that of the sun, their *semi-diameters* are easily found by the rule of three.—Thus the *semi-diameter* of Saturn will be found 20 $\frac{2}{3}$; that of his ring 45 $\frac{1}{2}$; that of Jupiter 27 $\frac{1}{2}$; that of Mars 11; that of Venus 4; and that of Mercury $\frac{1}{2}$.

SEMI-DIAPENTE, in music, a defective fifth, called usually by the Italians, *falsa quinta*, and by us a *falsa fifth*.

SEMI-DIAPASON, in music, a defective octave; or an octave diminished by a lesser semi-tone, or four commas. See **DIAPASON**.

SEMI-DIATESSARON, in music, a defective fourth, called, properly, a *falsa fourth*. See **FOURTH**.

SEMI-DITONE, *diapason*, } See **DIAPASON**.

Dis-Diapason **SEMI-DITONE**, } See **DIS-DIAPASON**.

SEMI-DOUBLE, in the Romish breviary, a term applied to such offices and festivals as are celebrated with less solemnity than the double ones; but yet with more than the single ones.

The *semi-double* office has double vespers, and nine lessons at matins; but the anthems are not redoubled.—It is performed on sundays, on the octaves, and on the feasts marked for *semi-double* in the calendar.

SEMI-FISTULAR flowers. See the article **FLOWERS**.

SEMI-LUNAR valves, in anatomy, are three little valves or membranes of a *semi-lunar* figure, placed in the orifice of the pulmonary artery; to prevent the relapse of the blood, into the heart at the time of its dilatation.—See *Tab. Anat. (Angeiol.) fig. 1. lit. a.*

SEMINAL, **SEMINALS**, in medicine, spermatic, or something belonging to the semen or seed.

SEMINARY, a place appointed for the instruction of young persons destined for the sacred ministry, in the duties, ceremonies, and offices thereof; first instituted, as Thomassin tells us, by St. Augustin.

Of these *seminaries* there are many abroad, furnished with halls for the assemblies of the exercitants, and little chambers, or cells, where each person retires, studies, and prays apart.—Such is the *seminary* of St. Sulpitius at Paris.

The council of Trent decrees, that children exceeding 12

years of age, be taken, brought up, and instructed in common, to qualify them for the ecclesiastical state; and that there be a *seminary* of such belonging to each cathedral, under the direction of the bishop.

In France, the establishment of *seminaries* is somewhat different from the decree of the council: none are taken in but young people ready to study theology, and to be ordained: so that the *seminaries* are a kind of houses of probation where the vocation of clerks is examined, and they are prepared to receive orders.

For the subsistence of these *seminaries*, there are several unions of benefices, or else the clergy of the diocese are obliged to contribute to maintain them.

Pope Pius IV. having established a *seminary* at Rome, in consequence of the decree of the council of Trent; by the advice of the cardinals, it was given to the Jesuits, who have made very good use thereof.

Among the canons of St. Augustin, **SEMINARY** is used for a kind of college, or school, where penitents are kept, and instructed in the classical, and other learning.

The houses of the society de *propaganda fide*, established for the preparing of ecclesiastics for missions among infidels and heretics, are also called *seminaries*.—The principal whereof is that at Rome, called, the *apostolical college, apostolical seminary, pastoral seminary, seminary of the propaganda, &c.*

SEMINATION, **SEMINATIO**, in natural history, &c. the act of sowing, or shedding seed; particularly that of vegetables.

As soon as the seed is ripe, Dr. Grew observes, nature takes several methods for its being duly sown: not only by the opening of the uterus, but in the make of the seed itself.

Thus, the seeds of many plants, which affect a peculiar soil or seat, as arum, poppy, &c. are heavy and small enough, without farther care, to fall directly down to the ground. Others, that are large, and light enough to be exposed to the wind, are often furnished with one or more hooks to stay them from straying too far from their proper place: thus, the seeds of avens have each a single hook; those of agrimony and goose-grass, many; both the former loving a warm bank, and the last a hedge for its support.

On the contrary, many seeds are furnished with wings, or feathers, partly with the help of the wind to carry them, when ripe, off the plant, as those of ash, &c. and partly to enable them to make their flight more or less abroad, that they may not, by falling together, come up too thick; and that if one should miss a proper soil or bed, another may hit.

—So the kernels of pines have wings, though short ones, whereby they do not fly in the air, but only flutter on the ground. But those of typha, dandelion, and most of the pappous kind, have numerous long feathers, by which they are wafted about every way.

Others are sown by being laid in springy elastic cases, which, when they crack and burst, dart their seed out to convenient distances: thus, wood-forrel having a running root, nature sees fit to sow the seed at some distance, the doing of which is effected by a white, starchy, tendinous cover, which beginning to dry, bursts open on one side in an instant, and is violently turned inside outwards. The seed of harts-tongue, and coddled armist, is also flung, or shot away, by means of a spring, wound or girt round the seed-case. When the spring is become tense enough, it suddenly breaks the case into two halves, like little cups, and so flings out the seed.

Divers notable means of *semination* are observed by authors: a quantity of fern-feed, Mr. Ray tells us, laid in a lump, on a paper, the seminal vesiculæ are heard to crackle, burst, and, by a microscope, the seeds are seen to be projected to a considerable distance from each other.—Dr. Sloane observes, that the gentianella flore cæruleo, requiring wet weather, to be sown in, as soon as the least drop of rain touches the end of the seed-vesicle, with a smart noise, and a sudden leap, it opens itself, and, with a spring scatters its seed.

The plants of the cardamine family, throw their pods open and dart out their seed upon a slight touch of the hand. Nay, Mr. Ray adds, that the pods of the cardamine impatiens not only burst upon the slightest touch, but even by an approach of the hand to touch them, without any real contact.

Other plants sow their seeds by inviting birds, by their agreeable taste and smell, to feed on them, swallow them, and carry them about; thereby also fertilizing them, by passing through their bodies.—In such manner is mistletoe usually sown and propagated.

SEMI-ORDINATES, in geometry, the halves of the ordinates or applicates. See **ORDINATE**.

SEMI-PARABOLA, in geometry, a curve defined by the equation, $ax^m = y^m$; as $ax = y^2$, $ax^2 = y^3$, &c.

In *semi-parabolas* $y^m = ax^m$; $ay^m = ax^m$; $ay^m = ax^m$; or the powers of the *semi-ordinates* are as the powers of the ab-

scissels one degree lower; *e. gr.* in cubical *semi-parabolas*, the cubes of the ordinates y^3 and z^3 are as the squares of the abscissas x^2 and z^2 .

SEMI-PELAGIANS, a name anciently, and even at this day, given to such as retain some tincture of Pelagianism.

S. Prosper, in a letter to St. Augustin, calls them *reliquias Pelagii*.

Many learned men, principally among the Gauls, who could not come into St. Augustin's doctrine of grace, &c. were accused of *Semi-pelagianism*: they were also called *Maffilian*, or *priests of Marfeilles*, in regard their errors had their first rise in that city.

Cassian, who had been a deacon of Constantinople, and was afterwards a priest at Marfeilles, was the chief of these *Semi-pelagians*: S. Prosper, who was co-temporary with him, and who attacked him very vigorously, tells us, that Cassian endeavouring to keep I know not what medium between the Pelagians and the orthodox, did not agree either with the one or the other.

The *Semi-pelagians*, with the orthodox, allowed of original sin; but they denied, that man's free agency could be so wounded by this sin, that he could not of himself do something which might induce God to afford his grace to one man more than another.—They also taught, that the grace which saves men, was not given them of the mere will of God, but according to his eternal prescience, whereby he foreknew who they were that would believe in him.—They owned, that the vocation or call to the gospel, was gratuitous; but they added at the same time, that it was common to all, inasmuch as God desired all should be saved.—As to election, they held, that it depended on our perseverance; God only chusing such to eternal life, as should persevere in the faith.

SEMI-PROOF, an imperfect proof. See **PROOF**.

In the French law, the depositions of a single evidence only make a *semi-proof*.

The testament of a person deceased, is deemed a *semi-proof*.—In enormous cases, the *semi-proof* frequently determines them to try the torture.

SEMI-QUARTILE, or **SEMI-QUADRATE**, is an aspect of the planets, when distant from each other 45 degrees, or one sign and an half.

SEMI-QUAVER, in music. See the article **QUAVER**.

SEMI-QUINTILE, is an aspect of the planets, when at the distance of 36 degrees from one another.

SEMI-SEXTILE, or **SEMI-SEXTUS**, or **S.S.** an aspect of two planets, wherein they are distant from each other, one twelfth part of a circle of 30 degrees.

The *semi-sextile* was added to the ancient aspects by Kepler; and, as he says, from meteorological observations.

SEMI-SPINATUS, in anatomy. See **TRANSVERSALIS dorsif**.

SEMITA luminosa, a name given to a kind of lucid tract in the heavens, which, a little before the vernal equinox, or after the autumnal, may be seen about six a clock at night, extending from the western edge of the horizon, up towards the pleiades.

The phenomenon has been taken notice of by Cassini and Facio, who both evince, that this light comes diffused from both sides of the sun.—Its brightness is much the same with that of the via lactea, or the tail of a comet: it is seen plainest with us about the beginning of October, or the latter end of February.

Facio conjectures, that the bodies, or rather the congeries or aggregate of bodies, which occasion this light, conforms to the sun like a lens; and takes it to have even been the same; but Cassini thinks it arises from a vast number of small planets, which encompass the sun, and give this light by reflexion; esteeming it also not to have existed long before he observed it.

SEMI-TEINTS. See the article **TEINTS**.

SEMI-TONE, in music, one of the degrees, or concinnous intervals of concords. See **DEGREE** and **CONCORD**.

There are three degrees, or lesser intervals, by which a sound can move upwards and downwards successively from one extreme of any concord to the other, and yet produce true melody; and, by means whereof, several voices and instruments are capable of the necessary variety in passing from concord to concord.—These degrees are the greater and lesser tone, and the *semi-tone*. The ratio of the first is 8:9; that of the second 9:10.

The ratio of the *semi-tone* is 15:16, its compass is five commas; which interval is called a *semi-tone*, not that it is geometrically the half of either of the tones, for it is more; but because it comes somewhat near it. It is also called the *natural semi-tone*, and the greater *semi-tone*, because greater than the part it leaves behind, or its complement to a tone, which is four commas.—The Italians also call it *seconda minore*, or a lesser second. See **SECOND**.

Every tone of the diatonic scale is divided into a greater and less, or a natural and artificial *semi-tone*. Mr. Malcolm observes, it was very natural to think of a division of each tone, where 15:16 should be one part in each division, in regard the halves are an undividable and necessary part of the natural tones, which naturally occur as a fifth degree, and the

more, as it is not far from an exact half-tone. In effect, the *semi-tones* are so near equal, that, in practice, at least, on most instruments, they are accounted equal, so that no distinction is made into greater or less.

These *semi-tones* are called *fictitious notes*, and, with respect to the natural ones, are expressed by characters called *flats* and *sharps*.

Their use is to remedy the defects of instruments, which having their sounds fixed, cannot always be made to answer to the diatonic scale.

By means of these we have a new kind of scale, called the **SEMI-TONIC scale**, or the *scale of semi-tones*: a scale or system of music, consisting of 12 degrees, or 13 notes, in the octave, being an improvement on the natural or diatonic scale, by inserting between each two notes thereof, another note, which divides the interval or tone into two unequal parts, called *semi-tones*.

The use of this scale is for instruments that have fixed sounds, as the organ, harp, &c. which are exceedingly defective on the foot of the natural or diatonic scale.—For the degrees of the scale being unequal, from every note to its octave there is a different order of degrees; so that from any note we cannot find any interval in a series of fixed sounds: which yet is necessary, that all the notes of a piece of music carried through several keys, may be found in their just tune, or that the same song may be begun indifferently at any notes as may be necessary for accommodating some instrument to others, or to the human voice, when they are to accompany each other in unison.

The diatonic scale, beginning at the lowest note, being first settled on an instrument, and the notes thereof distinguished by their names *a. b. c. d. e. f. g.*; the inserted notes, or *semi-tones*, are called *fictitious notes*, and take the name or letter below with a \sharp as *c* \sharp called *c sharp*; signifying that it is a *semi-tone* higher than the sound of *c* in the natural series; or this mark \flat called a *flat*, with the name of the note above, signifying it to be a *semi-tone* lower. Now $\frac{1}{2}$ and $\frac{1}{4}$ being the two *semi-tones* the greater tone is divided into; and $\frac{1}{2}$ and $\frac{1}{4}$, the *semi-tones* the lesser tone is divided into; the whole octave will stand as in the following scheme, where the ratio's of each term to the next, are wrote fraction-wise between them below.

Scale of SEMI-TONES.

c. c \sharp *d. d* \sharp *e. f. f* \sharp *g. g* \sharp *a. b. b* \sharp *c*

For the names of the intervals in this scale it may be considered, that as the notes added to the natural scale are not designed to alter the species of melody, but leave it still diatonic, and only correct some defects arising from something foreign to the office of the scale of music, viz. the fixing and limiting the sounds: we see the reason why the names of the natural scale are continued, only making a distinction of each into a greater and less.—I thus an interval of one *semi-tone* is called a *lesser second*; of two *semi-tones*, a *greater second*; of three *semi-tones*, a *lesser third*; of four, a *greater third*, &c.

A second kind of *semitonic-scale* we have from another division of the octave into *semi-tones*; which is performed by taking an harmonical mean between the extremes of the greater and less tone of the natural scale, which divides it into two *semi-tones* nearly equal.—Thus the greater tone 8:9 is divided into 16:17, and 17:18; where 17 is an arithmetical division, the numbers representing the lengths of chords; but if they represent the vibrations, the length, of the chords are reciprocal, viz. as 1: $\frac{1}{16}$: $\frac{1}{17}$: $\frac{1}{18}$, which puts the greater *semi-tone* $\frac{1}{16}$ next the lower part of the tone, and the lesser $\frac{1}{18}$ next the upper, which is the property of the harmonical division.—And after the same manner the lesser tone 9:10 is divided into the two *semi-tones* 18:19 and 19:20, and the whole octave stands thus:

c. c \sharp *d. d* \sharp *e. f. f* \sharp *g. g* \sharp *a. b. b* \sharp *c*

This scale, Mr. Salmon tells us, in the Philosophical Transactions, he made an experiment of, before the Royal Society, on chords, exactly in these proportions, which yielded a perfect concert with other instruments, touched by the best hands.—Mr. Malcolm adds, that having calculated the ratio's thereof, for his own satisfaction, he found more of them false than in the preceding scale; but then their errors were considerably less, which made amends.

SENA, or **SENNÄ**, in medicine, a purgative leaf, much used in draughts and compositions of that intention.

The shrub which bears it, is cultivated in several parts of the Levant, and grows five or six foot high: it puts forth woody branches, furnished with oblong leaves, its flowers are yellow, its fruit is a greenish flat pod, containing several lodges or cells of seeds, resembling grape-stones.—These pods some physicians prefer to the leaves themselves.

There is also a kind of *sena* growing about Florence; but it is inferior to that of the Levant, as is owned by the Italians themselves. Father Plumier mentions also a third kind growing in the Antles Islands.

M. Lemery distinguishes three sorts of *sena* of the Levant: the

the first brought from Seyda, called *sen* of *Apallo*, that is, *cinnamon sen*, by reason of the cinnamon and the fragrance, for the privilege of exporting it: the second comes from Tripoli: the third is called *sen* of *Mocha*.

The best of these kinds is the first, which Pomel directs us to choose, in narrow leaves, of a moderate size, sharp like the end of a spear point, of a pale green colour, a pungent smell, soft to the touch, &c.

The *sen* of Tripoli holds the second rank in goodness: its difference from that of Seyda, consists in its colour, which is green; its smell, which is very weak; and in a certain harshness, or roughness, which it discovers upon the touch. Besides these three kinds of *sen*, and the *ropes*, the druggists sell the dust found at the bottom of the bales, which is a very poor commodity, and yet much better than what they call the *small sen*, which comes with it in the bales, by way of package, and which many hold to be a plant of no virtue, put in by chance, or, at best, to increase the weight.

The best *sen*, ordinarily found in our shops, is that which is sharpest leaves, and smells freest: the bitterness of its colour, and quickness of its taste, are also indications of its goodness; for when it has lost its scent, and grows dully, it is good for little.

Sen, at first taking, is apt to nauseate the stomach; but usually, if a little cinnamon, or a dram or two of its distilled water be added, it passes through with less sickness. This is exactly conformable to the sentiments of Ludovicus, who says, that the purgative quality of this herb resides in its mucilaginous or gummy juice; which, the more it is divided, gripes the less in its operation.

Rulandus imagined there was a sudorific quality in *sen*; and accordingly ordered it in some compositions of that intention.

SENATE, SENATUS, an assembly or council of senators; that is, of the principal inhabitants of a state, who have a share in the government.

Such were the *senates* of Rome, of Carthage, &c. among the ancients; and such are the *senates* of Venice, of Genoa, &c. among the moderns.

The *senate* of ancient Rome, was, of all others, the most celebrated, during the splendor of the republic. The Roman *senate* exercised no contentious jurisdiction: it appointed judges either out of the *senate*, or among the knights; but it never stooped to judge any process in a body.—The *senate* converted matters of war; appointed who should command the armies; sent governors into the provinces; took order, and disposed of the revenues of the commonwealth.—Yet did not the whole sovereign power reside in the *senate*: it could not alone elect magistrates, make laws, nor decide of war and peace: but in all these cases, the senators were to consult the people.

Under the emperors, when the *senate* became deplored of most of its other offices, they began to hear causes. For those of less consequence they appointed particular judges; the rest, principally criminal causes, they referred for their own cognizance, to be judged by them in a body, and that frequently in the emperor's presence. This was put in their way to keep their heads from state affairs. Nero further committed to the *senate*, the judgment of all appeals: but this did not hold long; nor do we find any footstep thereof any where but in the 62d novel.

The *senate* assembled on certain stated days, viz. ordinarily on the calends, nones and ides of each month: their extraordinary meetings were on any other days; when the consul, dictator, or tribune, thought fit to call them. Their place of meeting, was either the temple of Concord at the Capuan gate, or in the temple of Bellona.—The consul presided as chief of the *senate*.

Till Augustus's time, the *senate* was always opened with a sacrifice: but that prince, in lieu thereof, appointed, that each senator before he took his place, should offer wine and incense on the altar of the god in whose temple they were met; and take an oath, that he would give his vote according to his conscience.

Halicarnassicus, and other authors, mention it as a great defect in the authority of the Roman *senate*, that they had no persons under their command, to execute their orders. Hence the least tribune had it in his power to obstruct their decrees; and hence it is, that when they gave their orders to the consuls, and pretors, they did it with a kind of submission, *præstita obsequio*; if they think fit.

SENATOR, a member of a senate.

There were two orders, or degrees, among the Roman nobility; that of the *senators*, and that of the *knights*: after these two, came the people.—The first hundred *senators* were appointed by Romulus, and called *patres*, fathers.—Upon the union with the Sabines, Romulus, or as others say, Numa, added a second hundred, called *patres majorem gentium*, the first hundred then from a third hundred added by the elder Numa, and called *patres minorem gentium*, fathers of the lower rank.

The number of *senators* was not fixed: in the time of Gracchus, it was 300.

Thus they were 300: during the civil wars, they were reduced to 300. Julius Cæsar augmented that number to 900; and Augustus brought them back again to 300. The choice of *senators* began a little after the kings, first to the consuls, then to the centuries, who in their census surveyed every fifth year, appointed new *senators* out of those dead or degraded: but at length fell into the hands of the tribunes, for a long time, but the tribunes lost the dignity of *senators*, but those most considerable in the republic, but yet some regard was afterwards had to their condition, if the dignity should become debased by poverty.—For the *senatorial* dignity, a yearly revenue of 1000 sesterces was required, which amounts to nearly 100 pounds of our money. Half as much was required for the qualification of the knights. The *senators* who furnished this revenue, were discarded, and expunged out of the list by the census.

The *senators* were ordinarily choicé from among the knights, or from among such as had bore the principal offices.—At first the magistrates were taken wholly from among the *senators*; whence Tacitus calls the *senate*, the *senatorial* of all dignities: but after the people had been admitted to magistratures, *senators* were taken from among such as had discharged those offices, though, before plebeians.

The *senators* carried their children with them to the *senate*, to inform them betimes of affairs of state: though these children had not admittance till 17 years of age.

Some make a distinction among the *senators*: and say that besides the *senators* who were allowed to speak, and were asked their opinions, there were others, who, without speaking, or being ever asked their judgment, were only to follow the opinion of those they thought the most reasonable, and were hence called *pedarii*. A. Gellius gives us another notion of the *pedarii*, and says, those were thus called, who having never bore the office of curule magistrate, were obliged to go to the *senate* on foot.

The *senators* alone were allowed to wear the habit called *latus clavus*. They had a right to sit, and be carried in curule chairs, to assist at plays and shows, in the circus, at feasts of the gods, &c. All which privileges were reserved to such as Augustus (in the reform he made of the too numerous *senate* of Julius Cæsar) set aside.

They had the name *senators*, q. d. *old men*, given them in imitation of the Greeks, who called their *senators* *gerontes*. So when the Athenians assembled the people to consult about the affairs of the public, the officers summoned none but such as were at least fifty years old. The Egyptians and Persians followed the same example, after the Hebrews: and the Lacedæmonians and Carthaginians received none but such as were sixty years of age.

SENATUS-CONSULTUM, a vote, or resolution of the Roman *senate*, pronounced on some question, or point of law proposed to it.

The *senatus consultum* made a part of the Roman law: when passed, they were deposited in the temple of Ceres, under the custody of the ædiles, and at last they were carried, by the censor, to the temple of liberty, and put up in an armory called *tabularia*.

SENEGA. See the article *Gum senega*.

SENECHAL, SENESCALLUS, a name anciently used for a steward or majordomo; formed from the German *sen*, house or family, and *schalk*, servant. See *MAJORDOMO*.

Thus the *seneschal* of a lord or a baron, is his steward or bailiff, who holds his courts, and manages his demesne lands and the *sub-seneschal*, his under steward.

High seneschal of England, is the high steward of England: *high seneschal del hotel du Roi*, is the steward of the king's household.

The ancients used the term *senescallus* indifferently with that of *dapifer*, whence we are sure it signifies *steward*.

SENNA. See the article *SENA*.

SENOUPLE. See the article *SINOUPLE*.

SENSATION, the act of perceiving external objects, by means of the organs of sense.

To conceive the manner wherein *sensation* is effected; observe, that all the organs consist of little filaments, or nerves which have their origin in the middle of the brain, are diffused thence throughout all the members which have any sense, and terminate in the exterior parts of the body: that when we are in health, and awake, one end of these nerves cannot be agitated or shaken, without shaking the other; by reason they are always a little stretched; as is the case of an extended chord, one part of which cannot be stirred without a like motion of all the rest.

Observe, further, that these nerves may be agitated two ways; either at the end out of the brain, or at that in the brain.—If they be agitated from without, by the action of objects, and their agitation be not communicated as far as the brain: as frequently happens in sleep, when the nerves are in a state of relaxation; the soul does not then receive any new *sensation*.—But if the nerves happen to be agitated in the brain, by the flux of the animal spirits, or any other cause, the soul perceives something, though the parts of these nerves, that are out of the brain, are stirred through

the several parts of the body, remain at perfect rest: as likewise is frequently the case in sleep.

Lastly, observe, that experience tells us, we may sometimes feel pain as if in parts of the body that have been intirely cut off; by reason the fibres in the brain corresponding to them, being agitated in the same manner as if they were really hurt; the soul feels a real pain in those imaginary parts.

All these things seem to shew, that the soul resides immediately in that part of the brain wherein the nerves of all the organs of sense terminate: we mean, that it is there it perceives all the changes that happen with regard to the objects that cause them, or that have been used to cause them; and, that it only perceives what passes out of this part, by the mediation of the fibres terminating in it.

These things premised, it will not be difficult to explain how *sensation* is performed: the manner whereof may be conceived from what follows. When the point of a needle, for instance, is thrust against the hand, that point stirs and separates the fibres of the flesh; which fibres are extended from that place to the brain, and when we are awake, are in such a degree of tension, as that they cannot be stirred without shaking also the fibres of the brain. If then the motion of the fibres of the hand be gentle, that of the fibres of the brain will be so too; and if the first be violent enough to break any thing in the hand, the last will be stronger and more violent in proportion.—In like manner, if the hand be held to the fire; the little particles of the fuel it throws off in great numbers, and with a great deal of violence, striking against these fibres, and communicating a part of their agitation thereto; if the action be moderate, that of the extremities of the fibres of the brain corresponding to those of the hand, will be moderate likewise: if it be violent enough to separate any of the parts of the hand, as it happens in burning; the motion of the fibres in the brain will be proportionably more violent.—This is what befalls the body, when objects strike upon it. We are now to consider how the mind is affected.

The mind, we have observed, resides principally, if we may be allowed to say so, in that part of the brain where all the fibres of the nerves terminate. It attends here, as its sensory, or office, to look to the preservation of all the parts of the body; and, of consequence, it must be here adverted to all the changes that happen, and must be able to distinguish between those agreeable to the constitution of the body, and those hurtful thereto. Any other absolute knowledge, without a relation to the body, were useless.—Thus, though all the changes in our fibres, do, in reality, consist in motions, which ordinarily only differ as to more and less; it is necessary the soul should consider them as changes essentially different; for though in themselves they differ but very little, yet, with regard to preservation of the body, they are to be looked on as essentially different.

The motion, for instance, which causes pain, frequently differs exceedingly little from that which occasions a pleasing titillation: it is not necessary that there should be an essential difference between these two motions; but it is necessary there be an essential difference between the pain and the tickling, which those two motions occasion in the soul; for the agitation of the fibres, which accompanies the titillation, informs the soul of the good state of the body, that it is able to resist the impression of the objects, and that it need not apprehend its being hurt: but the motion which occasions pain, being somewhat more violent, is capable of breaking some of the fibres of the body; wherefore it is necessary the soul be adverted hereof by some disagreeable *sensation*, that it may provide against it.

Thus, though all the motions which pass in the body only differ in themselves, as to more or less, yet, when considered with regard to the preservation of life, they may be said to be essentially different: for this reason it is, that the soul does not perceive the shakes, or motions themselves, which objects excite in the fibres of the flesh: it would be useless to perceive them; and she would never be able, thence, to learn whether the objects were capable of doing hurt or good. But she perceives herself affected with *sensations*, which differ essentially, and which shewing precisely the qualities of the objects, as they regard the body, make her perceive distinctly, whether or no those objects are capable of hurting it.

In effect, from a strict examination of the several senses, it appears, that sensible objects act no otherwise upon the body, for the producing of *sensation*, than by exciting a change in the extreme surface of the fibres of the nerves: the quality of which change depends on the figure, bulk, hardness, and motion of the object; so that according to all appearance, the most different objects, which should agree in these four circumstances, would produce the same *sensation*.

From the various texture of the object, the diversity of the nerve affected, the different fabric of the organ of sense, the different place in the medulla of the brain where the nerve arises, and the different degree of motion wherewith the action of the object is applied, there arise various *sensations*, and ideas, in the mind; none of which represent any thing

in the action of the object, or in the passion of the creature. And yet the same action of the same object, on the same organ, always produces the same *sensation* or idea; and the same ideas necessarily follow the same constitution of the same sensible organ, in the same manner as the idea perceived, were the natural and necessary effect of the action on the organ.

SENSE, a faculty of the soul, whereby it perceives external objects, by means of some action or impression made on certain parts of the body, called *organs of sense*, and propagated by them to the sensory.

Some use the word *sense* in a greater latitude; and define it a faculty whereby the soul perceives ideas or images of objects, either conveyed to it from without, by the impression of objects themselves, or excited within by some effort of the soul on the sensory itself.

Under this notion, *sense* becomes distinguishable into two kinds, *external* and *internal*: corresponding to the two several manners wherein the images of the objects perceived, are occasioned, and presented to the mind, viz. either immediately from without, or from within; that is, either by what we commonly call the *five external senses*, hearing, seeing, &c. or by the *internal ones*, imagination, memory, and attention; to which some also add hunger and thirst.

But as these *internal senses* are not ordinarily considered in the notion of *senses*, nor implied under the word *sense*; but are thus only denominated by analogy; we shall wave them to be further considered, under their respective articles, IMAGINATION, MEMORY, &c.

External SENSES, or, simply, **the SENSES**, in their general signification, are the means whereby the soul apprehends, or takes cognizance of external objects: the means, we mean, both on the part of the mind, and on that of the body.

The means, on the part of the mind, are in all cases the same; it being one and the same faculty, whereby we see, hear, &c.—The means, on the part of the body, are different; as different as are the objects we are concerned to perceive: for the being, and well-being of the animal, being the end, nature had in view in giving him any perception of external bodies; by this, the measure and manner of that perception is regulated: and we have so many ways of perceiving, so many things, as the relation we bear to external bodies renders necessary for the preservation, &c. of our being.

Hence those several organs of *sense*, called *eye, ear, nose, palate*, and the universal one *cutis*; each of which is so disposed as to give some representation and report to the mind, of the state of external things, the nearness, convenience, hurtfulness, and other habitudes; and each of them a different one, according to the degree, and immediateness, &c. of the danger, or convenience. And hence the several exercises of those organs, hearing, seeing, smelling, tasting, and feeling.

A late excellent author gives us a more ingenious, extensive, and philosophical notion of *sense*.—On his principle, *sense* is defined, a power of perception, or, a power of receiving ideas; at least if what is absolutely passive may be properly called a power.

On some occasions, instead of power, he chuses to call it, a determination of the mind to receive ideas.—And the ideas thus perceived, or raised in the mind, he calls *sensations*.

Sense, he considers, either as natural or moral: and the natural, either as external or internal: though the distribution is chiefly founded on the common ways of conceiving; for, in reality, they appear to be all natural, and necessary: some reasons, however, for the distinction, will be shewn under the several articles thereof.

External SENSES, then, are powers of perceiving ideas, upon the presence of external objects.—On such occasions, we find the mind is merely passive, and has not power directly to prevent the perception, or idea, or to vary it at its reception; as long as the body is continued in a state fit to be acted upon by the external object.

When two perceptions are intirely different from each other, or agree in nothing but the general idea of sensation; the power of receiving those different perceptions, is called *different senses*. Thus seeing and hearing denote the different powers of receiving the ideas of colours, and sounds. And though colours, as well as sounds, have vast differences amongst themselves; yet is there a greater agreement among the most opposite colours, than between any colour and a sound: and hence all colours are deemed perceptions of the same *sense*.

All the several *senses* seem to have their distinct organs, except feeling, which is, in some degree, diffused over the whole body.

Internal SENSES, are powers, or determinations of the mind, to be pleased with certain forms, and ideas, which occur to our observation, in objects perceived by the external *senses*. Of these there are two different species, distinguished by the different objects of pleasure, viz. pleasurable or beautiful forms of natural things, and pleasurable or beautiful actions,

or characters of rational agents: whence the *internal senses* become divisible into natural and moral; though what others call the *internal natural sense*, our author calls simply, and by way of eminence, the *internal sense*.

In reflecting on our external *senses*, we plainly see, that our perceptions of pleasure, and pain, do not depend directly on our will. Objects do not please us according as we incline they should: the presence of some objects necessarily pleases us, and the presence of others as necessarily displeases us; nor can we, by our will, any otherwise procure pleasure, or avoid pain, than by procuring the former kind of objects, and avoiding the latter. By the very frame of our nature, the one is made the occasion of delight, and the other of dissatisfaction. In effect, our sensitive perceptions are pleasant, and painful, immediately, and without any knowledge of the cause of this pleasure and pain, or of the manner how they excite it, or are occasions of it, or without our seeing to what further advantage, or detriment, the use of such objects might tend. Nor would the most accurate knowledge of these things vary either the pleasure, or the pain, of the perception; however it might give a rational pleasure distinct from the sensible; or might raise a distinct joy, from prospect of further advantage in the object, or another aversion, from apprehension of evil. There is scarce any object, which our minds are employed about, but is constituted the necessary occasion of some pleasure or pain. Thus we shall find ourselves pleased with a regular form, a piece of architecture, or painting, a composition of notes, a theorem, an action, an affection, a character; and we are conscious that this pleasure naturally arises from the contemplation of the idea then present to the mind, with all its circumstances, though some of those ideas have nothing of what we call sensible perception in them; and in those which have, the pleasure arises from some uniformity, order, arrangement, and imitation; and not from the simple ideas of colour, or sound, or mode of extension separately considered.

It seems hence to follow, that when instruction, education, or prejudice of any kind, raise any desire or aversion toward an object, this desire, or aversion, is founded on an opinion of some perfection, or deficiency, in those qualities, for perception whereof we have the proper *senses*. Thus, if beauty be desired by one who has not the *sense* of sight; the desire must be raised by some apprehended regularity of figure, sweetness of voice, smoothness, softness, or some other quality perceivable by the other *senses*: without relation to the ideas of colour.

The only pleasure of *sense*, which our philosophers seem to consider, is that which accompanies the simple ideas of sensation; but there are vastly greater pleasures in those complex ideas of objects, which obtain the names of beautiful and harmonious.—The power, then, whereby we receive ideas of beauty, and harmony, has all the characters of a *sense*. It is no matter, whether we call these ideas of beauty and harmony, perceptions of the external *senses* of seeing and hearing, or not: we should rather chuse to call these ideas an *internal sense*, were it only for the convenience of distinguishing them from other sensations of seeing and hearing, which men may have without perception of beauty and harmony.

Moral SENSE, is a determination of the mind, to be pleased with the contemplation of those affections, actions, or characters of rational agents, which we call good or virtuous.

This moral *sense* of beauty, in actions, and affections, may appear strange at first view: some of our moralists themselves are offended at it in lord Shaftsbury, as being accustomed to deduce every approbation, or aversion, from rational views of interest. Our gentlemen of good taste can tell us of a great many *senses*, tastes and relishes for beauty, harmony, imitation in painting and poetry; and may we not find, too, in mankind, a relish for a beauty in characters, in manners? The truth is, human nature does not seem to have been left quite indifferent in the affair of virtue, to form to itself observations concerning the advantage or disadvantage of actions, and accordingly to regulate its conduct. The weakness of our reason, and the avocations arising from the infinity and necessities of our nature, are so great, that very few of mankind could have framed those long deductions of reason, which may shew those actions to be, in the whole, advantageous, and their contraries pernicious. The author of nature has much better furnished us for a virtuous conduct, than our moralists seem to imagine; by almost as quick and powerful instructions, as we have for the preservation of our bodies: he has made virtue a lovely form, to excite our pursuit of it, and has given us strong affections, to be the springs of each virtuous action.

For the general manner wherein our **SENSES** act; or, more properly, the manner wherein we become *sensible*, that is, perceive external objects; see SENSATION.

For the particular **SENSES**, or, more properly, the particular manners wherein we become sensible, by the particular organs of *sense*; see HEARING, SEEING, SMELLING, &c.

For the several organs of **SENSE**, ministering to the several

manners of *sensation*; see EYE, EAR, NOSE, &c.

Pany observes, that of all the *senses*, seeing and tasting are those which man enjoys in the greatest perfection.—As to seeing, he says, he is excelled by the eagle, &c. as to smelling, by the vulture, &c. and as to hearing, by the mole, even when hid under ground. *Nat. Hist. lib. 10.*

The *senses* have been sometimes found greatly sharpened and improved by diseases: Mr. Boyle mentions a gentleman, who, during a distemper he had in his eyes, had his organs of sight brought to be so sensible, that when he waked in the night, he could, for a while, plainly see and distinguish colours, and other objects; and the same author gives an instance of another person, who, after getting half-fuddled with claret, if he waked in the night, could see, for some time, to read a moderate print.

Grimaldi tells us that some women of Megara were able, by their eyes alone, to distinguish between eggs layed by black hens, and those by white ones. *Grimald. de Lum. & Col.*

In the Philosoph. Trans. N^o. 312. we have an account of Dan. Frazer, who continued deaf and dumb, from his birth to the 17th year of his age; when, upon recovering from a fever, he perceived an uneasy motion in his brain, after which he began to hear, and, by degrees, to speak.

SENSIBLE *horizon*, } See the articles { **HORIZON.**
SENSIBLE *point*, } **POINT.**
SENSIBLE *qualities*, } **QUALITY.**

SENSITIVE or **SENSIBLE** *feels*, the soul of brutes, or that which man is supposed to have in common with brutes.

It is thus called, either as intimating its utmost faculty, to be that of sensation; or, perhaps, because it is supposed to be material, and to come under our senses.

Lord Bacon asserts, that the *sensible* or brute soul, is plainly no more than a corporeal substance, attenuated by heat, and thus rendered invisible; or a kind of aura or vapour partly of an aerial, and partly of a fiery nature; endued with the softness of air, to be fit to receive impressions; and with the vigour of fire, to communicate its action; fed partly with oily matters, and partly with aqueous ones; inclosed in the body, and in the more perfect animals, principally in the head; moving along the nerves; and restored and repaired by the spirituous blood of the arteries. *Bac. de Augment. Scient. lib. IV.* See LIFE.

SENSITIVE plants, a species of plants, called by the ancients *eschynomenus*, and by us *sensitive*, *irving* or *muscle plants*, as giving some sort of tokens of sense.

These are such whose frame and constitution is so nice and tender, that at the touch, or least pressure of one's hand, they will contract their leaves and flowers, as if *sensible* of the contact.

Botanic writers mention many kinds hereof; some of which contract with the hand, or a stick; others with heat, others with cold.—The truth is, many, if not most, vegetables expand their flowers, down, &c. in warm, sun-shiny weather, and again close them towards even or in rain, &c. especially at the beginning of flowering, or after the flowers are fallen, whilst the seed is yet young and tender: as is very evident in the down of dandelion, &c. and in the flower of the pimpernel, the opening and shutting whereof are the country-man's weather-wiser; whereby, Gerard says, he foretels what weather shall follow next day: for if the flowers be close shut up, it betokens rain and foul weather; if they be spread abroad, fair weather. *Ger. Herb. lib. 11.*

SENSORY, **SENSORIUM** *commune*, the seat of the common sense; or that part or place where the sensible soul is supposed more immediately to reside.

The *sensory* is supposed to be that part of the brain wherein the nerves from all the organs of sense, terminate: which is generally allowed to be about the beginning of the medulla oblongata: Des Cartes will have it in the conation, or pineal gland.

Sir Isaac Newton describes the *sensorium* of animals as the place to which the sensible species of things are carried through the nerves and brain, that they may be there perceived by their immediate presence to the soul.—The organs of sense are not intended for enabling the soul to perceive the species of things, in its *sensory*: but only for conveying them thither.

The same great author considers the universe, as the *sensory* of the godhead.

SENTENCE, in law, *doom*: a judgment passed in court by the judges, upon some process either civil, or criminal. *Sentences* are either *definitive*, or *interlocutory*, *contradictory*, &c.

There are *sentences* of absolution, excommunication, &c. Superior judges may either confirm or annul the *sentences* of inferior ones.

Three *conformable SENTENCES*, *res SENTENTIAE conformes*: in the Romish ecclesiastical law, it is allowed to appeal three times; so that there must be three *conformable sentences* ere the decisions of the judges can take effect.—The first degree of jurisdiction is in the bishop's official: from him an appeal lies to the metropolitan; and from the metropolitan to

to the primate, or immediately to the pope. If the appeal come from the metropolitan to the pope, the pope is obliged to delegate judges *in partibus*; and then if the three sentences passed in these three stages be *conformable*, there is no further appeal: but if one of them annul another, new judges are to be required of the pope for a fourth sentence; and thus they sometimes proceed to a sixth, or seventh sentence.—This number of jurisdictions is found infinitely prejudicial to the public, and vexatious to private persons.

SENTENCE, in grammar, denotes a period; or a set of words comprehending some perfect sense, or sentiment of the mind.

Every sentence comprehends at least two words.

The business of pointing, is to distinguish the several parts and members of sentences, so as to render the sense thereof the clearest, aptest and fullest possible.

In every sentence there are two parts necessarily required; a noun for the subject, and a definite verb; whatever is found more than these two, affects one of them, either immediately, or by the intervention of some other, whereby the first is affected.

Again, every sentence is either simple or conjunct: a simple sentence is that consisting of one single subject, and one finite verb.—A conjunct sentence contains several subjects and finite verbs, either expressly or implicitly.

A simple sentence needs no point, or distinction; only a period to close it: as, *A good man loves virtue for itself*.—In such a sentence, the several adjuncts affect either the subject or the verb in a different manner. Thus the word *good* expresses the quality of the subject, *virtue* the object of the action, and, *for itself*, the end thereof.—Now none of these adjuncts can be separated from the rest of the sentence: for if one be, why should not all the rest? And if all be, the sentence will be minced into almost as many parts as there are words.

But if several adjuncts be attributed in the same manner either to the subject or the verb, the sentence becomes conjunct, and is to be divided into parts.

In every conjunct sentence, as many subjects, or as many finite verbs as there are, either expressly, or implied, so many distinctions may there be. Thus, *My hopes, fears, joys, pains, all centre in you*; and thus Cicero, *Catiline abiit, excessit, evasit, erupit*.—The reason of which pointing is obvious; for as many subjects or finite verbs as there are in a sentence, so many members does it really contain. Whenever, therefore, there occur more nouns than verbs, or contrariwise, they are to be conceived as equal. Since, as every subject requires its verb, so every verb requires its subject, wherewith it may agree: excepting, perhaps, in some figurative expressions.

Indeed, there are some other kinds of sentences which may be ranked amongst the conjunct kind, particularly the absolute ablative, as it is called: Thus, *Physicians, the disease once discovered, think the cure half wrought*: where the words, *disease once discovered*, are equivalent to, *when the cause of the disease is discovered*.—So also in nouns added by apposition; as, *The Scots, a hardy people, endured it all*; so also in vocative cases, and interjections; as, *Thou, my friend, you must allow me*: And, *What, for heaven's sake! would he be at it?*

The case is much the same, when several adjuncts affect either the subject of the sentence, in the verb, in the same manner; or at least something, whereby one of them is affected: as, *A good, wise, learned man, is an ornament to the commonwealth*: where the several adjectives denoting so many qualities of the subject, are to be separated from one another.—Again, when I say, *Your voice, countenance, gesture terrified him*: the several nominative cases denote so many modes of the verb, which are likewise to be distinguished from each other. The case is the same in adverbs; as, *He behaved himself modestly, prudently, virtuously*.—In the first example, the adjuncts immediately affect the subject; in the third, the verb; in the following one, another adjunct: as, *I saw a man laden with ages, sickness, wounds*.

Now, as many such adjuncts as there are, so many several members does the sentence contain; which are to be distinguished from each other, as much as several subjects, or finite verbs: and that this is the case in all conjunct sentences, appears hence, that all these adjuncts, whether they be verbs or nouns, &c. will admit of a conjunction copulative, whereby they may be joined together.—And, where-ever there is a copulative, or room for it, there a new member of a sentence begins.—For the other partitions, &c. of sentences, see COLON, SEMICOLON, and PERIOD.

SENTENCE, is also used in rhetoric and poetry, for a short, pithy remark, or reflection, containing some sentiment or idea in the conduct of life.

Such are, *Discite a stultum mori, & non temere vivos*; or, *A teneris assuece multum est*, &c.

Sentences, rather than odes, render poems useful; and, besides, add I know not what lustre and spirit, which pleases. But there is no virtue which is not accompanied with some dangerous vice. Too many sentences give a poem too philosophical an air, and sink it into a kind of gravity,

this is left fit for the study of a poet, than the study of a learned man, and the quarrels of a philosopher. Sentences though not only certain, but inspiring, a certain calm wisdom, which is directly opposite to the passions, and comes then, both in the manner, and in the subject. Lastly, the affliction of speaking, renders less a passion to talking and impertinent ones, instances whereof we have, in abundance, in some of our tragicians.—Let us recommend it to authors, to argue their points, that they may not find glaring above the third or fourth of the discourse.

SENTIMENTS, in poetry, and particularly dramatic, are the thoughts which the several persons express; whether they relate to matters of opinion, passion, business or the like.

The manners form the tragic action, and the sentiments explain it; discovering its causes, motives, &c.—The sentiments are to the manners, what thine are to the fable.

In the sentiments, regard is to be had to nature and probability; a madman, for instance, must speak as a madman; a lover as a lover; a hero as a hero.—The sentiments, in great measure, are to sustain the character.

SENTINEL,*, **CENTINEL**, or **SETRY**, in war, a private soldier taken out of a corps de garde of foot, and placed in some post to watch any approach of the enemy, to prevent surprizes; and to stop such as would pass without orders, or without discovering who they are.

* The word is modern: it is not long since they said, *To be on the sent, in the time of the war now on, to find fault*, &c. Manage deserves the word a *sentado*, most perceiving.

Sentinel perdu, is a sentinel placed at some very advanced and dangerous post, whence it is odds that he never returns. See **PERDU**.

The sentinel's word, when he challenges, is, *Who is there? Qui vive, or Qui va la? Stand! Demure la!*

SEPARABLE modes. See the article **MODE**.

SEPARATE affliction. See the article **AFFLICTION**.

SEPARATE of the **SEPARATE**. See **PENULTIMATE**.

SEPARATION, in navigation, the same with what we more usually call *departure*. See **DEPARTURE**.

SEPARATION of man and wife. See **DIVORCE**.

Waters of **SEPARATION**. See the article **WATER**.

SEPARATISTS, a religious sect in England, so denominated from their setting up a separate church, in opposition to that established by law. See **DISSENTERS**, &c.

At present, *separatists*, is rather the name of a collection of sects, than of any particular one; but nearer their original, there was that agreement among them, that one name served them all. Their division into presbyterians, anabaptists, independents, &c. is a modern thing.

The *separatists*, Hornius tells us, *Hist. Ecl.* are such as under Edward VI. Elizabeth and James I. refused to conform to the church of England: and who were first called *puritans*, then *separatists*, and lastly *nonconformists*.

The first leader of the *separatists*, was Bolton; who, upon quitting the party he had formed, was succeeded by Robert Brown, from whom the *separatists* were called *Brownists*, a name they long retained: though Brown himself deserted the sect, and, in imitation of Bolton, abjured his errors.

He was succeeded by Barrow, who was hanged at the infestation of the bishops: the fourth chief was Johnson, who set up a church at Amsterdan; which afterwards divided into several sects, at the head of one whereof was Johnson's brother, who excommunicated him, and was reciprocally excommunicated by him. Soon afterwards, a fifth, named Smith, erected a like church at Leyden, but it dwindled away after his death: and *separatism* was brought very low, when Robinson appeared, and raised its head.—He softened the dogma's of Brown, and set on foot a good understanding among the *separatists* in general; but was not able to unite the whole sect. Part of them still adhered to the rigid opinions of their old master Brown, and part of them followed Robinson. The first retained the old name of *separatists*, and the latter assumed that of *semi-separatists*, and these at length degenerated into *independents*, which is the name whereby they are now usually called, both in New and Old England.

Hornius mentions another order of *separatists*, called *semi-separatists*, that is, *separatists*, and a half. Some will have these to be a distinct sect; others, the same with the *semi-separatists*: for it is added, that the *semi-separatists*, under pretence of taking a medium between the Brownists and the church of England, went further even than the Brownists themselves, and under the name of *semi-separatists* degenerated into *separatists* and a half.

SEPIUM, **SEPIÆ**, or **SEPIA**, cuttlefish bone; is a white, spongy, testaceous substance, growing on the back of the cuttlefish; and seeming almost to be calcined by the sun.

It is rough and absorbent, and chiefly used in medicine as a dentrifice.

SEPTA, in antiquity, were inclosures, or rails, made of boards; through which persons went in, to give their votes, in the assemblies of the Romans.

The word also signifies divisions, and, in that sense, is used to express the plates of spar, which separate or divide the tall of the Lodus Helmontii, thence called, by Mr. Hill, *Septaria*. See *Supplement*, article *SEPTARIA*.

SEPTEMBER, the ninth month of the year, reckoned from January; and the seventh, from March: whence its name, viz. from *septimus*, seventh.

The Roman senate would have given this month the name of *Tiberius*; but that emperor opposed it: the emperor Domitian gave it his own name *Germanicus*: the senate under Antoninus Pius gave it that of *Antoninus*: Commodus gave it his surname *Herculeus*; and the emperor Tacitus, his own name, *Tacitus*.—But these appellations are all gone into disuse.

SEPTENVIR, in antiquity. See *QUINQUEVIR*.

The Germans sometimes use the word *septenvirate*, for the seven electors of the empire. See *ELECTOR*.

SEPTENTRIO*, or **SEPTENTRIONES**, in astronomy, a northern constellation of stars, more usually called *ursa minor*, or the little bear; and by the people, *Charles's wain*. See *URSA minor*.

* The word is formed from the Latin, *septem*, seven; and *triones*, bullocks, which, in the ancient constellation, were yoked to the plough.

SEPTENTRIO, in cosmography, the same with *north*; thus called from the ancient constellation *septentrio*, one of whose stars is the pole-star.

Hence also **SEPTENTRIONAL**, **SEPTENTRIONALIS**, something belonging to the north; as *septentrional signs*, *septentrional parallels*, &c. are those on the northern side of the equator.

SEPTIER or **SETIER**, a French measure, differing according to the species of the things measured. For liquors, the *septier* is the same thing with the chopine or half-pint.

For dry measure, the *septier* is very different, in different places and different commodities; as not being any vessel of measure, but only an estimation of several other measures.—At Paris, the *septier* of wheat consists of two mines, the mine of two minots, and the minot of three bushels. The *septier* of oats is double that of wheat.

SEPTIZON, **SEPTIZONIUM**, in the ancient architecture, a term almost appropriated to a famous mausoleum of the family of the Antonines; which Aur. Victor tells us, was built in the tenth region of the city of Rome: being a large insulated building, with seven stages or stories of columns.

The plan was square; and the upper stories of columns falling back much, rendered the pile of a pyramidal form: terminated a-top, with the statue of the emperor Septimius Severus, who built it.

It had its name *septizon*, *septizonium*, from *septem* and *zona*, *q. d.* seven zones or girdles, by reason of its being girt with seven rows of columns.

Historians make mention of another *septizon*, more ancient than that of Severus, built near the Thæmæ of Antoninus.

SEPTUAGESIMA*, in the calendar, denotes the third Sunday before lent; or before quadragesima; as *quingagesima* is the next before quadragesima, then *hexagesima*, and *septuagesima*: these were all days appropriated by the church to acts of penance and mortification, by way of preparation for the devotion of the lent ensuing.

* It is supposed by some to take its name from its being about 70 days before Easter: pope Telephorus first made it a feast day, and appointed lent to commence from it.

The laws of king Canutus ordained a vacation from judicature, from *septuagesima* to *quindena pasche*. See *QUINQUAGESIMA*. From *septuagesima* to the octaves after Easter, marriage is forbidden by the canon law.

SEPTUAGINT*, **LXX**, or the **SEVENTY**, a term famous among divines and critics, for a version of the Old Testament, out of Hebrew into Greek, performed by seventy-two Jewish interpreters, in obedience to an order of Ptolemy Philadelphus.

* The word is formed from the Latin, *septuaginta*, seventy.

The ancients, till Jerom's time, universally believed, that the *seventy* were inspired persons, not mere translators; grounding their belief on a fabulous history of this version, given by Aristeas: who tells us, that the high priest Eleazer, chose six doctors out of each tribe for this office, which made the number of seventy-two; and that these being shut up each in his several cell, each translated the whole; and without seeing what any of the rest had done, they were all found to agree to a letter.

Chronology of the SEPTUAGINT, or **SEVENTY**, is an account of the years of the world, very different from what is found in the Hebrew text, and the vulgate; making the world 1466 years older than it is found in these latter.

The books are much divided, as to the point of preference.

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Batonius prefers the account of the *seventy*: and H. Vossius makes an apology for it.—The two best and most strenuous advocates, in this dispute, are rather Pezron, a Bernadine, and father le Quen, a Dominican; the first of whom defends the chronology of the *septuagint*, and the latter that of the Hebrew text.

SEPTUM, in anatomy, a term literally signifying an inclosure or partition; applied to several parts of the body, which serve to separate one part from another.

SEPTUM lucidum, or *pellucidum*, is a partition separating the two upper ventricles of the brain; thus called, as being transparent.

SEPTUM medium, or *cruris*, is a separation between the two ventricles of the heart.—It is about a finger thick, fleshy, and of the same substance with the heart itself; consisting of muscular fibres, which assist it in its motions. Some have imagined it to be perforated with a great number of holes; but mistakenly.

SEPTUM transversum, is the separation of the two bellies, or venters, called also *diaphragm*. See *DIAPHRAGMA*.

SEPTUM narium, the partition of the nostrils. See *NOSE*.

SEPTUM bulbi, divides the bulb of the urethra lengthwise. See *URETHRA*.

SEPTUM gallinaginis. See *CAPUT GALLINAGINIS*.

SEPTUM clitoridis, a membranous partition running all along between the two corpora cavernosa of the clitoris, from the glans to its divarication at the os pubis.

SEPTUM auris. See the article *EAR*.

SEPTUM testium. See the article *TESTICLE*.

SEPULCHRAL, **SEPULCHRALIS**, something belonging to sepulchres or tombs.

SEPULCHRAL inscriptions are the surest monuments we have of antiquity.

SEPULCHRAL lamps, are those said to have been found burning in the tombs of several martyrs, and others. See *LAMP*.

SEPULCHRAL column, is a column erected over a tomb, with an inscription on its shaft.

SEPULCHRAL, or *SEPULCHRALIS*, is also the appellation of a sect; thus called, from their principal error, which was, that by the word *hell*, whither the scripture tells us, Jesus Christ descended after his death, they understood no more than his grave or sepulchre.

The *sepulchrales*, or *sepulchral* hereticks, maintained, that Jesus Christ only descended into hell according to the flesh; that this hell was nothing else but the grave where he was laid, and wherein his soul could not rest. Prateolus.

SEPULCHRALIS pecunia. See the article *PECUNIA*.

SEPULCHRE, **SEPULCHRUM**, a tomb, or place destined for the interment of the dead.

The term is chiefly used in speaking of the burying-places of the ancients: those of the moderns we usually call *tombs*.

Besides the usual *sepulchres* for the interment, either of the whole body, or of the ashes of the body burnt, the ancients had a peculiar kind, called *cenotaphia*; being empty *sepulchres* made in honour of some person, who, perhaps, had no burial at all; from a superstitious opinion, that the souls of those who wanted burial, wandered an hundred years, before they were admitted to pass into the Elysian fields.

The pyramids were built to serve as *sepulchres* for the kings of Egypt. And the obelisks had generally the same intention.

Sepulchres were held sacred, and inviolable; and the care taken thereof was deemed a religious duty; grounded on the fear of God, and the belief of the soul's immortality. Those who searched or violated them, have been odious to all nations, and always severely punished.

The Egyptians called their *sepulchres*, *eternal houses*, in contradistinction to their houses and palaces, which they called *inns*; by reason of the short sojourn we have in the one, in comparison of our long stay in the other.

The eastern pilgrimages are all made with design to visit the holy *sepulchre*, that is, the tomb of Jesus Christ. Nobody enters here but bare-footed, and with a world of ceremonies. The Turks exact 24 crowns of each pilgrim, whom devotion carries to the holy *sepulchre*.

St. **SEPULCHRE**, or the *holy SEPULCHRE*, gives the denomination to an order of regular canons, anciently instituted in Jerusalem, in honour of the holy *sepulchre*.

They ascribe their institution to Gregory of Bologna; who, they say, upon his taking Jerusalem in the year 1099, placed canons in the patriarchal church of the holy *sepulchre*; which indeed, is true; but then they were not regular.—In effect, it was Arnoul, who, of archdeacon of the church of Jerusalem, got himself elected patriarch thereof, that in 1114, first obliged his canons to live in community, and to follow the rule of St. Augustin.

From the holy land, numbers of these canons were brought into Europe, particularly into France by Louis the younger; into England by king Henry; into Poland by James a Polish gentleman; and into Flanders by the counts thereof.

But the order was afterwards suppressed by Innocent VIII.

and its effects given to that of our lady of Bethlehem, which itself ceasing, they were bestowed in 1484, on that of the knights of St. John of Jerusalem.—But the suppression did not take place in Poland, nor in several provinces of Germany, where they still subsist: their general is in Poland: their habit, father Helyot observes, has been different in different places.

St. SEPULCHRE, or the *holy SEPULCHRE*, is also the name of a military order, established in Palestine.

Most writers who mention this order, carry its institution as far back as the time of the apostle St. James, bishop of Jerusalem, or at least to that of Constantine; pretending that Godfrey of Boulogne, and Baldwin, were only the restorers thereof: but this antiquity is chimerical. It is not even certain, that it was founded so early as Godfrey of Boulogne, or his successor Baldwin; though Favyn and de Belloy attribute it to this latter.

It is certain, there were nothing but canons in the church of St. Sepulchre, till the year 1114; and it is more than probable, the knights were only instituted upon the ruins of the canons 400 years after, and that by pope Alexander VI. in order to excite rich and noble persons to visit the holy places, by giving them the title of *knights of the holy sepulchre*, and to this end, instituting an order under that name, whereof he reserved the quality of master to himself and his successors.—Leo X. and Clement VII. granted to the guardian of the religious of St. Francis, in the holy land, the power of making these knights, which power, first granted *viva voce*, was afterwards confirmed by a bull of Pius IV.

In 1558, the knights of this order in Flanders, chose Philip II. king of Spain, their master; and afterwards his son; but the grand master of the order of Malta prevailed on him to resign; and when afterwards the duke of Nevers assumed the same quality in France, the same grand master, by his interest and credit, procured a like renunciation of him, and a confirmation of the union of this order to that of Malta.

SEPULCHRI primum. See the article **PRIMUM**.

SEQUELLA, *SEQUELA*, in logic, a consequence drawn from some preceding proposition.

As, if I say, *The human soul is immaterial; and therefore immortal*, the last member of the sentence is a *sequel* of the first.

SEQUENCE, in gaming, a series or set of cards immediately following each other in the same suit, or colour.

We say, a *sequence* of four cards, of five, &c.—At picquet, these are called tierces, quarts, quints, &c.

SEQUESTRATION, *SEQUESTRATIO*, in common law, the act of separating a thing in controversy, from the possession of both parties, till the right be determined by course of law.

This is of two sorts; *voluntary* and *necessary*.

Voluntary SEQUESTRATION, is that which is done by consent of both parties.

Necessary SEQUESTRATION, is that which the judge doth by his authority, whether the parties will, or not.

SEQUESTRATION, in the civil law, is the act of the ordinary, disposing of the goods and chattles of one deceased, whose estate no man will meddle with.

A widow is also said to *sequester*, when she disclaims having any thing to do with the estate of her deceased husband.

Among the Romanists, in questions of marriage, where the wife complains of impotency in the husband, she is to be *sequestered* into a convent, or into the hands of matrons, till the process be determined.

SEQUESTRATION, is also used for the act of gathering the fruits of a benefice void, to the use of the next incumbent.

In the time of the civil wars, *sequestration* was used for a seizing of the estates of delinquents, for the use of the commonwealth.

SEQUIN, *ZECHIN*, *ZECCHINO*, a gold coin struck at Venice, and in several parts of the grand seignior's states, particularly Cairo, which last are called *Turkish sequins*, or *chakshi*. See **Coin** and **MONEY**.

* Mancourt derives the word from *sequam*, or *dissequium*; as supposing the *sequin* first struck at Constantinople: Menage, from the Italian *zecchin*, of *zucca*, the name of the mint at Venice.

At Constantinople, the ducats struck in several parts of Germany, are called *Hungarian sequins*.

The value of these *sequins* is different; those of Venice exceeding those of Turkey and Germany, by one fifteenth. In the East Indies the difference is still more sensible: the Venetian *sequin* being current for four rapiers, and six peggas, compared thereto; and the Turkish *sequin*, only for four rapiers.

SERAGLIO, among the Levantines, the palace of a prince, or lord.

At Constantinople, they say, the *seraglio* of the ambassador of England, of France, &c.—The word is originally Persian, where it has the same signification.

The *SERAGLIO* is also by way of eminence for the palace of

the grand seignior at Constantinople, where he keeps his court, and where his concubines are lodged, and where the youth are trained up to the exact posts of discipline.

It is a triangle about two miles round, wholly within the city, at the end of the promontory *Chrystos*, now called the *seraglio point*.—The buildings run back to the top of the hill, and from thence are gardens that reach to the edge of the sea.—The outward appearance, du Loir tells us, is not beautiful, in regard the architecture is irregular, being cantoned out into separate edifices and apartments, in manner of pavilions and domes. No stranger has ever yet been admitted to the inmost parts of the *seraglio*.

The old *seraglio* is the place where the emperor's old mistresses are kept.

Balzac observes, that the *seraglio* at Constantinople, is only a copy of that which Solomon anciently built at Jerusalem, for his wives and concubines.

SERAPH, or **SERAPHIN**, in the hierarchy of angels, a spirit of the first, or highest rank.

The *seraphs*, or rather *seraphim*, make that class of angels supposed to be the most inflamed with divine love, by their nearer and more immediate attendance on the throne; and to communicate their heat to the inferior, and remoter orders.—Hence their name, which is formed from the Hebrew root, שרף, to burn, inflame.

SERAPHICK, something belonging to the seraphim.

Mr. Boyle has a treatise of *seraphick love*, i. e. of divine love or the love of God.

In the schools, St. Bonaventure is called the *seraphick doctor*, from his abundant zeal and fervour.

St. Francis, founder of the Cordeliers and Franciscans, is called the *seraphick father*, in memory of a vision he saw on mount Alverna, after a fast of forty days, accompanied with many other feverities: when, falling into an ecstasy, he saw a seraph glide rapidly from heaven upon him; which impressed on him certain stigmata or marks, representing the wounds which the nails and the spear made in our Saviour's body, at his crucifixion.

SERAPHIM. See the article **SERAPH**.

SERENADE, *SERENATA*, a kind of concert given in the night-time by a gallant, at his mistress's door, or under her window.

Sometimes it consists wholly of instrumental music; sometimes voices are added; and the pieces composed or played on these occasions, are also called *serenades*.

We do not know whence the word should be derived, unless from the French, *seren*, the dew falling in the night-time.

SERENA gutta, in medicine, the same as *amarastris*. See **GUTTA serena**.

SERENE, *SERENUS*, a quality or title of honour given to certain princes, and chief magistrates of republics.

The king of England is styled, *the most serene*: the same term is also applied to the doge of Venice.—The pope, and the sacred college writing to the emperor, to kings, or the doge, give them no other title but that of *most serene*. Indeed the Venetians set the title of *serenity* above that of highness.

In 1646, Wicquefort observes, there was a clashing between the courts of France and Vienna; because the emperor refused the king of France any other title than that of *serene*.—Bishops also anciently were addressed under the title of *serene*.

The kings of France of the first and second race, speaking of themselves, use no other quality, but *notre serenité*. The emperor gives no other title to the king of England, nor even to any other king, excepting the king of France. The king of Poland, and other kings, give it to the electors. The emperor, writing to the electors or other princes of the empire, only uses the term *dilection*; but in treating with them, he uses *electoral serenity* to the electors; and *ducal serenity* to the other princes.

SERGE, in commerce, a woollen quilted stuff, manufactured on a loom with four treadles, after the manner of rateens, and other stuffs, that have the whale.

The goodness of *serges* is known by the quilting, as that of cloths by the spinning.

Of *serger* there are various kinds, denominated either from the different qualities thereof, or from the places where they are wrought.—The most considerable is the *London serge*, now highly valued abroad, particularly in France, where a manufacture is carried on with good success, under the title of *serge façon de Londres*.

Manufacture of London SERGES.—For wool, the longest is chosen for the warp, and the shortest for the woof. Before either kind is used, it is first scoured, by putting it in a copper of liquor, somewhat more than lukewarm, composed of three quarts of fair water, and one of urine. After having stayed long enough therein for the liquor to dissolve, and take off the grease, &c. it is stirred briskly about with a wooden peel; taken out of the liquor; drained and washed in a running water; dried in the shade; beaten with sticks on a wooden rack, to drive out the coarser dust and dirt; and then picked clean.

clean with the hands.—Thus far prepared, it is greased with oil of olives, and the longest part, destined for the warp, is combed with large combs, heated in a little furnace for the purpose.—To clear off the oil again, the wool is put in a liquor composed of hot water, with soap melted therein: whence being taken out, wrung, and dried, it is spun on the wheel.

As to the shorter wool, intended for the woof, it is only carded on the knee, with small fine cards, and then spun on the wheel, without being scoured of its oil.—Note, the thread for the warp is always to be spun much finer, and better twisted, than that of the woof.

The wool, both for the warp, and the woof, being spun, and the thread divided into skains; that of the woof is put on spools (unless it have been spun upon them) fit for the cavity or eye of the shuttle; and that for the warp is wound on a kind of wooden bobbins, to fit it for warping. When warped, it is stiffened with a kind of size, whereof, that made of the threads of parchment is held the best; and when dry, is put on the loom.

When mounted on the loom; the workman raising and falling the threads (which are passed through a reed) by means of four treadles placed underneath the loom, which he makes to act transtively, equally, and alternately, one after another, with his feet, in proportion as the threads are raised and lowered, throws the shuttle across from one side to the other; and each time that the shuttle is thrown, and the thread of the woof is crossed between those of the warp, strikes it with the frame to which the reed is fastened through whose teeth the threads of the warp pass; and this stroke he repeats twice, or thrice, or even more, till he judges the crossing of the *serge* sufficiently close: thus he proceeds, till the warp is all filled with woof.

The *serge* now taken off the loom is carried to the fuller, who fulls, or scours it, in the trough of his mill, with a kind of fat earth, called fullers earth, first purged of all stones and filth. After three or four hours scouring, the fuller's earth is washed out in fair water, brought, by little and little, into the trough, out of which it is taken when all the earth is cleared: then, with a kind of iron pincers, or plyers, they pull off all the knots, ends, straws, &c. sticking out on the surface, on either side: and then return it into the fulling trough, where it is worked with water somewhat more than luke-warm, with soap dissolved therein, for near two hours. It is then washed out, till such time as the water becomes quite clear, and there be no signs of soap left: then it is taken out of the trough, the knots, &c. again pulled off, and then put on the tenter to dry, taking care, as fast as it dries, to stretch it out both in length and breadth, till it be brought to its just dimensions. When well dried, it is taken off the tenter, and dyed, shorn, and pressed.

SERGEANT, or SERJEANT, a term in our law, applied to sundry offices.—**SERGEANT at law**, or of the *coif*, is the highest degree taken in the common law, as that of doctor is in the civil law.

Sergeants were anciently called *servientes ad legem*, and *servientes narratores*: Mr. Selden adds, that they were also called *doctores legis*; though others are of opinion, that the judges are, more properly, the *doctores legis*, and *sergeants*, the bachelors of law.—Spelman observes, that however a *sergeant* may be richer than all the doctors of the commons, yet a doctor is superior in degree to a *sergeant*; for the very name of a doctor is magisterial, but that of a *sergeant* ministerial. Hence the doctors are seated and covered when they plead; but the *sergeants* stand uncovered at the bar, excepting for their coif.

As these are supposed the most learned and experienced; there is one court appropriated for them to plead in by themselves, which is the common-pleas, where the common law of England is most strictly observed.—But they are not prohibited pleading in other courts, where the judges (who must first be *sergeants*) call them *brothers*.

They are called by the king's mandate, or writ, directed to them; commanding them to take upon them that degree, by a day assigned.

Out of these, one is made the king's *sergeant* (more may be) to plead for him in all causes, especially in cases of treason.

SERGEANT at arms, is an officer appointed to attend the person of a king, to arrest traitors, and persons of quality offending, and to attend the lord high-steward, when he sits in judgment on any traitor.

Of these by statute there are not to be above 30 in the realm.

—There are now eight at court, at 100 l. *per annum* salary each: they are called the king's *sergeants at arms*, to distinguish them from others: they are created with great ceremony; the person kneeling before the king, his majesty lays the mace on his right shoulder, and says, *Rise up, sergeant at arms, and observe for ever*. They have, besides, a patent for the office, which they hold for life.

They have their attendance in the presence-chamber, where the band of gentlemen-pensioners wait; and receiving the king at the door, they carry the maces before him to the

chapel-door, whilst the band of gentlemen stand before, and make a line for the king, as they also do when the king goes to the house of lords.

There are four other *sergeants at arms*, created in the same manner; one, who attends the lord chancellor; a second, the lord treasurer; a third, the speaker of the house of commons, and a fourth, the lord mayor of London, on solemn occasions.

They have a considerable share of the fees of honour, and travelling charges allowed them, when in waiting, *viz.* five shillings *per day*, when the court is within ten miles of London, and ten shillings when twenty miles off London: the places are in the lord chamberlain's gift.

SERGEANT, or SERJEANT, in war, is an inferior officer in a company of foot, or troop of dragoons; armed with a halbard, and appointed to see discipline observed, to teach the soldiers the exercise of their arms, to see due distances kept, and to order, stratagem, and form ranks, files, &c.

SERGEANTY, or SERJEANTY, a service anciently due to the king for lands held of him; and which could not be due to any other lord.

It is divided into *grand* and *petty serjeanty*.

Grand SERJEANTY, is where one holds land of the king by service which he ought to do in his own person; as to bear the king's banner, or spear, assist at his coronation, or do some office in his court.

Petit SERJEANTY, is where a man holds land of the king to yield him yearly some small thing towards his wars; as a sword, dagger, bow, spurs, &c.

Coke, on Littleton, tells us, that Sir Richard Rockeford held lands at Seaton, by *grand serjeanty*, to be *quartrarius regis*, *i. e.* the king's fore-lootman, when he went into Gasconne, till he had worn out a pair of shoes of the price of fourpence.

By the statute, 12 Car. II. all tenures of any honours, manors, lands, &c. are turned into free and common socage; but the honorary services of *grand serjeanty* are thereby continued.

SERIES, a continued succession of things in the same order, and which have some relation or connection with each other. Medals are formed into *series* or *series's*, both with regard to the metal, and to the subject. The different metals of medals, constitute three different *series's*, in the cabinets of the curious; we mean, as to the order and arrangement of the several medals.—The gold *series*, for instance, of imperials, amounts to about 1000 or 1200; that of silver may amount to 3000; and that of copper, in all the three sizes, great, middle, and small, to 6 or 7000.—Of these, the *series* of middle copper is the most complete and most easily formed, as it may be brought down to the fall of the empire in the west, and the time of the Palæologi in the east.

With regard to the subject, the *series's* of medals are usually formed from the side called the *head*: in the first class, is disposed the *series* of kings: in the second, that of Greek and Latin cities; in the third, the Roman consular *series*; in the fourth, the imperial; in the fifth, the deities; and to these may be added a sixth *series*, consisting of medals of illustrious persons.

There are also *series's* of modern medals: that of the popes only commences from Martin V. in 1430. From that time we have a *series* of papal medals, tolerably complete, to the number of 5 or 600.—One might likewise have a *series* of emperors from Charlemain; provided one took in the current coins: but, in practice they commonly commence with Frederick II. in 1163.—The *series* of kings of France is the most numerous and most considerable of all the modern kings.

SERIES, in algebra, denotes a rank of progression of quantities, increasing or decreasing in some constant ratio; which, in its progress, approaching still nearer and nearer to some sought value, is called a *converging series*; and if infinitely continued, becomes equal to that quantity: whence its usual appellation of *infinite series*.

Thus $\frac{1}{2} + \frac{1}{4} + \frac{1}{8} + \frac{1}{16}$, &c. make a *series*, which always converges, or approaches to the value of 1, and infinitely continued, becomes equal thereto.

The doctrine and use of *infinite series's*, one of the greatest improvements of the present age, we owe to Nic. Mercator of Holstein, who however, seems to have taken the first hint of it from Dr. Wallis's *arithmeticæ infinitarum*.—It takes place principally in the quadratures of curves; where, as we frequently fall upon quantities, which cannot be expressed by any precise definite numbers, such as is the ratio of the diameter of a circle to the circumference; we are glad to express them by a *series*, which, infinitely continued, is the value of the quantity required.

Nature, origin, and use of infinite SERIES's.—Though arithmetic furnish us with very accurate and intellectual expressions for all rational numbers, yet it is very defective as to irrational ones; which are more and more numerous than the other, there being, for instance, an infinity of them between 1 and 2. Since it was proposed to find a mean proportional between 1 and 2, it was found that no such mean alone

alone are clearly intelligible, (the root of 2 being certainly a very obscure idea) we could still approach nearer and nearer to the just value of the quantity required, but without ever arriving at it: thus, if for the mean proportional between 1 and 2, or the root of 2, we first put 1, it is evident we have not put enough; if we add $\frac{1}{2}$ we put too much, for the square of $1\frac{1}{2}$ is greater than two. If then we take away $\frac{1}{4}$, we shall find we have taken away too much, and if we return $\frac{1}{8}$, the whole will be too great: thus may we proceed, without ever coming at the just quantity sought.—These numbers thus found, and those found after the same manner to infinity, being disposed in their natural order, make what we call an *infinite series*.

Sometimes the *series*'s do not proceed by alternate additions and subtractions, but by simple additions, or by an infinity of subtractions; according to the position of the first term. In all these *infinite series*'s it is visible, that as all the terms are only equal to a finite magnitude, they must be still decreasing; and it is even convenient that they be so, as much as possible, that one may take only a certain number of the first terms for the magnitude sought, and neglect all the rest.

But it is not irrational numbers only, that are expressed in rational ones, by *infinite series*'s. Rational numbers themselves may be expressed in the same manner: 1, for instance, being equal to the *series* $\frac{1}{2} + \frac{1}{4} + \frac{1}{8} + \frac{1}{16} + \frac{1}{32} + \frac{1}{64} + \frac{1}{128} + \frac{1}{256} + \frac{1}{512} + \frac{1}{1024} + \frac{1}{2048} + \frac{1}{4096} + \frac{1}{8192} + \frac{1}{16384} + \frac{1}{32768} + \frac{1}{65536} + \frac{1}{131072} + \frac{1}{262144} + \frac{1}{524288} + \frac{1}{1048576} + \frac{1}{2097152} + \frac{1}{4194304} + \frac{1}{8388608} + \frac{1}{16777216} + \frac{1}{33554432} + \frac{1}{67108864} + \frac{1}{134217728} + \frac{1}{268435456} + \frac{1}{536870912} + \frac{1}{1073741824} + \frac{1}{2147483648} + \frac{1}{4294967296} + \frac{1}{8589934592} + \frac{1}{17179869184} + \frac{1}{34359738368} + \frac{1}{68719476736} + \frac{1}{137438953472} + \frac{1}{274877906944} + \frac{1}{549755813888} + \frac{1}{1099511627776} + \frac{1}{2199023255552} + \frac{1}{4398046511104} + \frac{1}{8796093022208} + \frac{1}{17592186044416} + \frac{1}{35184372088832} + \frac{1}{70368744177664} + \frac{1}{140737488355328} + \frac{1}{281474976710656} + \frac{1}{562949953421312} + \frac{1}{1125899906842624} + \frac{1}{2251799813685248} + \frac{1}{4503599627370496} + \frac{1}{9007199254740992} + \frac{1}{18014398509481984} + \frac{1}{36028797018963968} + \frac{1}{72057594037927936} + \frac{1}{144115188075855872} + \frac{1}{288230376151711744} + \frac{1}{576460752303423488} + \frac{1}{1152921504606846976} + \frac{1}{2305843009213693952} + \frac{1}{4611686018427387904} + \frac{1}{9223372036854775808} + \frac{1}{18446744073709551616} + \frac{1}{36893488147419103232} + \frac{1}{73786976294838206464} + \frac{1}{147573952589676412928} + \frac{1}{295147905179352825856} + \frac{1}{590295810358705651712} + \frac{1}{1180591620717411303424} + \frac{1}{2361183241434822606848} + \frac{1}{4722366482869645213696} + \frac{1}{9444732965739290427392} + \frac{1}{18889465931478580854784} + \frac{1}{37778931862957161709568} + \frac{1}{75557863725914323419136} + \frac{1}{151115727451828646838272} + \frac{1}{302231454903657293676544} + \frac{1}{604462909807314587353088} + \frac{1}{1208925819614629174706176} + \frac{1}{2417851639229258349412352} + \frac{1}{4835703278458516698824704} + \frac{1}{9671406556917033397649408} + \frac{1}{19342813113834066795298816} + \frac{1}{38685626227668133590597632} + \frac{1}{77371252455336267181195264} + \frac{1}{154742504910672534362390528} + \frac{1}{309485009821345068724781056} + \frac{1}{618970019642690137449562112} + \frac{1}{1237940039285380274899124224} + \frac{1}{2475880078570760549798248448} + \frac{1}{4951760157141521099596496896} + \frac{1}{9903520314283042199192993792} + \frac{1}{19807040628566084398385987584} + \frac{1}{39614081257132168796771975168} + \frac{1}{79228162514264337593543950336} + \frac{1}{158456325028528675187087900672} + \frac{1}{316912650057057350374175801344} + \frac{1}{633825300114114700748351602688} + \frac{1}{1267650600228229401496703205376} + \frac{1}{2535301200456458802993406410752} + \frac{1}{5070602400912917605986812821504} + \frac{1}{10141204801825835211973625643008} + \frac{1}{20282409603651670423947251286016} + \frac{1}{40564819207303340847894502572032} + \frac{1}{81129638414606681695789005144064} + \frac{1}{162259276829213363391578010288128} + \frac{1}{324518553658426726783156020576256} + \frac{1}{649037107316853453566312041152512} + \frac{1}{1298074214633706907132624082305024} + \frac{1}{2596148429267413814265248164610048} + \frac{1}{5192296858534827628530496329220096} + \frac{1}{10384593717069655257060992658440192} + \frac{1}{20769187434139310514121985316880384} + \frac{1}{41538374868278621028243970633760768} + \frac{1}{83076749736557242056487941267521536} + \frac{1}{166153499473114484112975882535043072} + \frac{1}{332306998946228968225951765070086144} + \frac{1}{664613997892457936451903530140172288} + \frac{1}{1329227995784915872903807060280344576} + \frac{1}{2658455991569831745807614120560689152} + \frac{1}{5316911983139663491615228241121378304} + \frac{1}{10633823966279326983230456482242756608} + \frac{1}{21267647932558653966460912964485513216} + \frac{1}{42535295865117307932921825928971026432} + \frac{1}{85070591730234615865843651857942052864} + \frac{1}{170141183460469231731687303715884105728} + \frac{1}{340282366920938463463374607431768211456} + \frac{1}{680564733841876926926749214863536422912} + \frac{1}{1361129467683753853853498429727072845824} + \frac{1}{2722258935367507707706996859454145691648} + \frac{1}{5444517870735015415413993718908291383296} + \frac{1}{10889035741470030830827987437816582766592} + \frac{1}{21778071482940061661655974875633165533184} + \frac{1}{43556142965880123323311949751266331066368} + \frac{1}{87112285931760246646623899502532662132736} + \frac{1}{174224571863520493293247799005065324265472} + \frac{1}{348449143727040986586495598010130648530944} + \frac{1}{696898287454081973172991196020261297061888} + \frac{1}{1393796574908163946345982392040522594123776} + \frac{1}{2787593149816327892691964784081045188247552} + \frac{1}{5575186299632655785383929568162090376495104} + \frac{1}{11150372599265311570767859136324180752990208} + \frac{1}{22300745198530623141535718272648361505980416} + \frac{1}{44601490397061246283071436545296723011960832} + \frac{1}{89202980794122492566142873090593446023921664} + \frac{1}{178405961588244985132285746181186892047843328} + \frac{1}{356811923176489970264571492362373784095686656} + \frac{1}{713623846352979940529142984724747568191373312} + \frac{1}{1427247692705959881058285969449495136382746624} + \frac{1}{2854495385411919762116571938898990272765493248} + \frac{1}{5708990770823839524233143877797980545530986496} + \frac{1}{11417981541647679048466287755595961091061972992} + \frac{1}{22835963083295358096932575511191922182123945984} + \frac{1}{45671926166590716193865151022383844364247891968} + \frac{1}{91343852333181432387730302044767688728495783936} + \frac{1}{182687704666362864775460604089535377456991567872} + \frac{1}{365375409332725729550921208179070754913983135744} + \frac{1}{730750818665451459101842416358141509827966271488} + \frac{1}{1461501637330902918203684832716283019655932542976} + \frac{1}{2923003274661805836407369665432566039311865085952} + \frac{1}{5846006549323611672814739330865132078623730171904} + \frac{1}{11692013098647223345629478661730264157247460343808} + \frac{1}{23384026197294446691258957323460528314494920687616} + \frac{1}{46768052394588893382517914646921056628989841375232} + \frac{1}{93536104789177786765035829293842113257979682750464} + \frac{1}{187072209578355573530071658587684226515959365500928} + \frac{1}{374144419156711147060143317175368453031918731001856} + \frac{1}{748288838313422294120286634350736906063837462003712} + \frac{1}{1496577676626844588240573268701473812127674924007424} + \frac{1}{2993155353253689176481146537402947624255349848014848} + \frac{1}{5986310706507378352962293074805895248510699696029696} + \frac{1}{11972621413014756705924586149611790497021399392059392} + \frac{1}{23945242826029513411849172299223580994042798784118784} + \frac{1}{47890485652059026823698344598447161988085597568237568} + \frac{1}{95780971304118053647396689196894323976171195136475136} + \frac{1}{191561942608236107294793378393788647952342390272950272} + \frac{1}{383123885216472214589586756787577295904684780545900544} + \frac{1}{766247770432944429179173513575154591809369561091801088} + \frac{1}{1532495540865888858358347027150309183618739122183602176} + \frac{1}{3064991081731777716716694054300618367237478244367204352} + \frac{1}{6129982163463555433433388108601236734474956488734408704} + \frac{1}{12259964326927110866866776217202473468949912977468817408} + \frac{1}{24519928653854221733733552434404946937899825954937634816} + \frac{1}{49039857307708443467467104868809893875799651909875269632} + \frac{1}{98079714615416886934934209737619787751599303819750539264} + \frac{1}{196159429230833773869868419475239575503198607639501078528} + \frac{1}{392318858461667547739736838950479151006397215279002157056} + \frac{1}{784637716923335095479473677900958302012794430558004314112} + \frac{1}{1569275433846670190958947355801916604025588861116008628224} + \frac{1}{3138550867693340381917894711603833208051177722232017256448} + \frac{1}{6277101735386680763835789423207666416102355444464034512896} + \frac{1}{12554203470773361527671578846415332832204710888928069025792} + \frac{1}{25108406941546723055343157692830665664409421777856138051584} + \frac{1}{50216813883093446110686315385661331328818843555712276103168} + \frac{1}{100433627766186892221372630771322662657637687111424552206336} + \frac{1}{200867255532373784442745261542645325315275374222849104412672} + \frac{1}{401734511064747568885490523085290650630550748445698208825344} + \frac{1}{803469022129495137770981046170581301261101496891396417650688} + \frac{1}{1606938044258990275541962092341162602522202993782792835301376} + \frac{1}{3213876088517980551083924184682325205044405987565585670602752} + \frac{1}{6427752177035961102167848369364650410088811975131171341205504} + \frac{1}{12855504354071922204335696738729300820177623950262342682411008} + \frac{1}{25711008708143844408671393477458601640355247900524685364822016} + \frac{1}{51422017416287688817342786954917203280710495801049370729644032} + \frac{1}{102844034832575377634685573909834406561420991602098741459288064} + \frac{1}{205688069665150755269371147819668813122841983204197482918576128} + \frac{1}{411376139330301510538742295639337626245683966408394965837152256} + \frac{1}{822752278660603021077484591278675252491367932816789931674304512} + \frac{1}{1645504557321206042154969182557350504982735865633579863348609024} + \frac{1}{3291009114642412084309938365114701009965471731267159726697218048} + \frac{1}{6582018229284824168619876730229402019930943462534319453394436096} + \frac{1}{13164036458569648337239753460458804039861886925068638906788872192} + \frac{1}{26328072917139296674479506920917608079723773850137277813577744384} + \frac{1}{52656145834278593348959013841835216159447547700274555627155488768} + \frac{1}{105312291668557186697918027683670432318895095400549111254310977536} + \frac{1}{210624583337114373395836055367340864637790190801098222508621955072} + \frac{1}{421249166674228746791672110734681729275580381602196445017243910144} + \frac{1}{842498333348457493583344221469363458551160763204392890034487820288} + \frac{1}{1684996666696914987166688442938726917102321526408785780068975640576} + \frac{1}{3369993333393829974333376885877453834204643052817571560137951281152} + \frac{1}{6739986666787659948666753771754907668409286105635143120275902562304} + \frac{1}{13479973333575319897333507543509815336818572211270286240551805124608} + \frac{1}{26959946667150639794667015087019630673637144422540572481103610249216} + \frac{1}{53919893334301279589334030174039261347274288845081144962207220498432} + \frac{1}{107839786668602559178668060348078522694548577690162289924414440996864} + \frac{1}{215679573337205118357336120696157045389097155380324579848828881993728} + \frac{1}{431359146674410236714672241392314090778194310760649159697657763987456} + \frac{1}{862718293348820473429344482784628181556388621521298319395315527974912} + \frac{1}{1725436586697640946858688965569256363112777243042596638790631055949824} + \frac{1}{3450873173395281893717377931138512726225554486085193277581262111899648} + \frac{1}{6901746346790563787434755862277025452451108972170386555162524223799296} + \frac{1}{13803492693581127574869511724554050904902217944340773110325048447598592} + \frac{1}{27606985387162255149739023449108101809804435888681546220650096895197184} + \frac{1}{55213970774324510299478046898216203619608871777363092441300193790394368} + \frac{1}{110427941548649020598956093796432407239217743554726184882600387580788736} + \frac{1}{220855883097298041197912187592864814478435487109452369765200775161577472} + \frac{1}{441711766194596082395824375185729628956870974218904739530401550323154944} + \frac{1}{883423532389192164791648750371459257913741948437809479060803100646309888} + \frac{1}{1766847064778384329583297500742918515827483896875618958121606201292619776} + \frac{1}{3533694129556768659166595001485837031654967793751237916243212402585239552} + \frac{1}{7067388259113537318333190002971674063309935587502475832486424805170479104} + \frac{1}{14134776518227074636666380005943348126619871175004951664972849610340958208} + \frac{1}{28269553036454149273332760011886696253239742350009903329945699220681916416} + \frac{1}{56539106072908298546665520023773392506479484700019806659891398441363832832} + \frac{1}{113078212145816597093331040047546785012958969400039613319782796882727665664} + \frac{1}{226156424291633194186662080095093570025917938800079226639565593765455331328} + \frac{1}{452312848583266388373324160190187140051835877600158453279131187530910662656} + \frac{1}{904625697166532776746648320380374280103671755200316906558262375061821325312} + \frac{1}{1809251394333065553493296640760748560207343510400633813116524750123642650624} + \frac{1}{3618502788666131106986593281521497120414687020801267626233049500247285301248} + \frac{1}{7237005577332262213973186563042994240829374041602535252466099000494570602496} + \frac{1}{14474011154664524427946373126085988481658748083205070504932198000989141204992} + \frac{1}{28948022309329048855892746252171976963317496166410141009864396001978282409984} + \frac{1}{57896044618658097711785492504343953926634992332820282019728792003956564819968} + \frac{1}{115792089237316195423570985008687907853269984665640564039457584007913129639936} + \frac{1}{23158417847463239084714197001737$

tient will be found $1-2+4-8+16-64+128$, &c. One term, 1 exceeds; by an excess of 1; two terms comes short by 1; three terms exceed by 1; four fall short by 1, &c. If the series be supposed to terminate in -8 ; then

will $1-2+4-8+16$. But $1-2+4-8$

$= -5 = -\frac{1}{2}$. Therefore, $-\frac{1}{2} = \frac{1}{2} - \frac{1}{2} = \frac{1}{2}$. Sup-

pose the general series to terminate in $-c$; then will

$= 1 - c + c^2 - c^3 + \dots = \frac{1}{1+c}$

$1 + c - c^2 + c^3 - c^4 + c^5 - c^6 + c^7 = 1$

To find an infinite series by extracting of roots, To find an infinite series by a presupposed series, To extract the roots of an infinite series, See { QUADRATURE of the circle.

Reversion of SERIES. See the article REVERSION.

SERMOLOGUS, SERMOLOGUE, an ecclesiastical book composed of sermons, or homilies of popes, and other persons of eminence and sanctity, formerly read at the feasts of the confessors, the Purification, All Saints, and on every day from Christmas to the octave of the Epiphany. See HOMILY.

SERMON, funeral. See the article FUNERAL.

SERMONES, the title which Horace gives his satyrs. See the article SATYR.

Criticks are divided about the reason of the name: the opinion of father Bosli seems best grounded. A mere observance of feet, and measure, such as we find in Terence, Plautus, and in Horace's satyrs, he thinks is not sufficient to constitute verse, to determine the work to be poetical, or to distinguish it from prose: unless it have some further air, or character of poetry; somewhat of the fable, or the sublime.

Hence he judges it is, that Horace calls his satyrs, *prose*, or *sermones*.—His odes have quite another air, and are therefore called, *poems*, *carmina*.

SERMONIUM, in old records, a kind of interlude or historical play, which the inferior orders of clergy, assisted by boys, &c. used at times to act in the body of the church, suitable to the solemnity of some festival or high procession day. This is supposed to have been the origin of the modern drama.

SERON of almonds, is the quantity of two hundred weight; of anise-seeds, it is from 3 to 400; of cattle-soap, from 200 and a half to 300 and 3 quarters.

SEROSITY, in medicine, an aqueous liquor, or lymph, found in the blood and other humours.

Degori defines it, a sharp, bilious juice, approaching nearly the nature of blood; but which, being extravasated, does not coagulate like the blood.

Disorders of the spleen are attended with *serosities*: the kidneys help to purge off *serosities*.

SERPENS, in astronomy, a constellation in the northern hemisphere, called more particularly *serpens ophiuchi*.

The stars in the constellation *serpens*, in Ptolemy's catalogue are 17; in Tycho's 19; in the Britannic catalogue 59. The longitudes, latitudes, magnitudes, &c. whereof are as follow.

Names and situations of the stars.	Serps.	Longitude	Latitude North.	Magn.
	♄	7 33 45	16 00 52	7
		8 42 07	16 21 30	7
		10 33 31	22 10 00	6
Inform. preceding the neck and head of the serpent		12 04 08	17 50 23	6
		12 30 00	19 27 06	6
5		13 17 04	18 32 06	6
		11 29 35	29 59 11	7
		14 26 37	17 01 48	7
		9 57 20	32 48 55	6
		14 45 18	20 07 02	6
10		16 49 57	17 27 54	6
First of three under the jaw		11 29 35	34 01 52	7
That in first bend of the neck		14 00 35	28 54 23	3
Preced. in 2d bend of the neck		17 35 18	18 17 38	6
		11 53 15	35 48 44	6
15		14 36 42	28 31 00	7
		13 00 57	33 24 38	6
Middle under the jaw		12 40 02	34 23 28	6
Third and subsequent		13 57 54	34 36 12	5
1st from the neck		15 12 31	31 34 09	6
30		12 51 05	38 08 21	5
Preced. in the \square of the head, or in extrem. of the cheek		13 23 17	36 59 54	5
Preced. of 2 before the 2d bend		18 42 50	21 45 03	6
The lucid one of the neck		17 43 23	25 31 56	2
Posterior in the 2d bend	♄	20 19 46	17 29 45	6

Names and situations of the stars.	Serps.	Longitude	Latitude North.	Magn.
That following the lucida to north, by Tycho reckon. the 10 oph.	♄	14 36 34	36 02 33	6
South of \square in root of the neck		18 04 56	26 44 53	4
		15 37 03	34 21 30	3
		21 31 46	15 41 03	6
A small one under that		16 21 09	33 09 36	6
30		21 57 08	16 16 11	4
Behind 2d bend before oph. hand		20 27 05	21 47 38	6
Subsequent before the 2d bend		15 20 47	37 08 50	4
In mouth, in middle of \square of head		21 57 13	16 41 49	6
Subsequent behind the 2d bend		19 59 22	24 02 05	3
That following the lucida to the fourth		15 11 21	40 01 39	4
North against the nostrils in the \square of the head		18 16 18	32 41 18	6
		19 58 18	28 15 34	7
In temples, 1 subsequent of \square		18 23 04	35 19 32	3
That without the head to north		17 48 23	42 28 52	4
40		23 12 27	30 15 16	6
		23 45 58	28 58 33	7
		21 23 30	37 03 08	4
		22 23 59	37 03 33	6
That following preced. oph. hand		29 05 54	22 16 02	5
45		28 11 31	28 07 57	6
1st of 3, behind oph. hind thigh	♄	11 07 23	9 44 45	6
These 3 Tycho ranks am. note of oph.		15 57 39	10 18 11	4
South of 2 following this		16 12 46	10 08 59	6
50		20 13 43	7 59 05	4
North of these		21 07 05	10 32 52	3
In last bend, behind oph. hand		25 47 32	9 47 52	3
Last but one of the tail	♄	1 31 03	0 31 56	3
Of three small ones following that		3 06 51	23 29 53	6
		3 38 38	21 17 24	6
55		4 19 15	22 14 04	5
Middle and subsequent		11 31 28	30 19 27	6
In extremity of the tail		11 26 30	26 54 41	3
Small one adjacent to this	♄	11 31 48	25 13 45	6

SERPENT, a musical instrument, serving as a basis to the cornet, or small shawm, to sustain a chorus of singers in a large edifice.

It has its name *serpent*, from its figure; as consisting of several folds or wreaths, which serve to reduce its length, which would otherwise be six or seven feet.

It is usually covered with leather; and consists of three parts; a mouth-piece, a neck, and a tail.—It has six holes, by means whereof it takes in the compass of two octaves.

SERPENTARIA, a medicinal plant, called by the ancients *psyllotrichia*, and *dracunculus*; by us popularly, *snake-root*, and sometimes *serpentary*.

The ancients were only acquainted with two kinds of *serpentaria*, the *great* and the *small*: but since the discovery of America, botanists have added several others; as, the *serpentaria Virginiana*, or *Virginia snake-root*: besides that of Canada, and that of Brasil.

They are supposed to be alexipharmicks, or counter-poisons; and as such are ingredients in the Venice-treacle. The herb *dragon's*, is also, called by some writers, the *great serpentaria*, by the ancients *dracunculus major*; this has its stem very straight, smooth, and marked with red spots, like the skin of a serpent; whence, probably, as much as from its virtues, it is, that it takes its name.—Its root is big, round and white, covered with a thin skin.

The *smaller serpentaria*, of this kind, has its stalk much like that of the larger, only its leaves are like those of ivy; whereas those of the larger are digitated, after the manner of bastard hellebore.—Its root is round and bulbous.

The *serpentaria of Virginia*, called also *calabaria Virginiana*, *asarum Virginianum*, *serpentaria nigra*, and the *contrayerva of Virginia*, has its leaves green and large, a most in figure of a heart; its fruit round, and its root, which is of a very strong aromatick smell, has, at bottom, an infinite number of long small filaments, representing a kind of beard.

It was first brought into Europe from Virginia by the English; and is by the Americans esteemed a sovereign antidote against the bite of the rattle snake.—We are told by travellers, that this root not only cures the bite of the rattle snake, but that that animal flies the very smell thereof: for which reason the Indian, and other travellers, always carry it with them on the end of a staff, by way of a preservative from that creature.

SERPENTARIUS, in astronomy, a constellation of the northern hemisphere, called also *Ophiuchus*, and anciently *Esculapius*.

The stars in the constellation *serpentarius* in Ptolemy's catalogue are 29; in Tycho's 25; in the Britannic catalogue they are 69. The longitudes, latitudes, magnitudes, &c. whereof are as follow.

Names and situations of the stars.	Serps.	Longitude	Latitude North.	Magn.
North in the preceding hand	♄	20 58 15	17 17 15	3
South and subsequent		29 10 45	16 28 20	3
North in the preceding knee	♄	0 58 20	13 00 18	5

SER

Names and situations of the stars.	Longitude Degr. ' " "	Latitude " " " "	Magn.
South in the preceding leg	2 3 14 18	1 36 09 N	5
Under the foal of preceding foot	4 07 58	1 42 35 S	6
5			
Middle in the preceding leg	M 28 53 05	26 22 14 N	6
North of these	2 3 40 25	3 16 32 N	4
In preceding heel	4 21 26	5 14 41 N	5
In the cubits of preceding arm	5 19 53	0 28 40 N	5
10	1 15 38	23 35 38 N	4
	1 03 21	27 08 34 N	6
	M 29 53 43	33 00 52 N	5
	2 3 23 19	19 34 17 N	6
South in preceding knee	4 53 55	11 25 27 N	5
Informis between the legs	6 58 10	4 28 25 N	5
15			
	3 30 28	26 10 57 N	5
	4 17 45	23 12 34 N	6
	5 20 03	23 11 30 N	6
	4 12 41	30 41 18 N	6
	5 38 12	24 17 04 N	6
	5 18 15	27 27 47 N	5
	8 03 05	11 38 00 N	5
	5 41 28	29 30 33 N	5
	6 54 17	23 55 16 N	6
	8 42 16	10 22 01 N	6
25			
Preceding of 2 in fore shoulder	6 17 51	32 32 16 N	4
Subsequent	7 30 12	31 52 20 N	4
	10 09 14	18 28 18 N	6
	8 12 22	30 42 00 N	6
	8 38 08	30 15 20 N	6
30			
	8 42 45	36 13 35 N	6
Against the hind knee	13 39 28	7 14 12 N	3
	15 28 32	3 56 17 S	6
In the toes of the hind foot	15 43 28	3 24 16 S	6
	15 55 15	3 20 08 S	6
35			
	16 12 46	3 29 39 S	6
In the back of the hind foot	16 06 17	1 08 53 S	6
Caput Herculis	11 48 47	37 18 55 N	3
In the tibia of the hind leg	16 34 53	2 04 47 N	4
	17 00 23	1 42 28 S	6
40			
Bright one in the foal of the foot	17 05 02	1 47 38 S	4
	17 34 53	4 54 52 S	4
	17 43 57	0 59 24 S	7
	18 31 16	6 34 12 S	6
	18 01 32	0 53 48 S	4
Preceding in heel of hind foot			
45			
In the middle of the back	16 15 52	27 20 39 N	5
	19 00 57	0 31 20 S	7
Posterior in the heel	19 09 46	0 38 18 S	6
	17 53 59	30 28 22 N	7
	20 46 26	1 28 55 N	6
50			
In ophiuchus's head	18 05 32	35 53 16 N	2
	18 06 51	30 27 27 N	7
In the cubitus of hind arm	20 02 33	15 15 23 N	4
Last of those that follow the foot	21 48 44	1 44 45 S	5
North of 2 in posterior shoulder	21 00 44	27 58 00 N	3
55			
	21 22 46	26 01 24 N	7
South in the hind shoulder	22 18 32	26 09 20 N	3
	24 31 30	1 24 08 S	5
South in the hind hand	25 25 16	13 42 45 N	5
	25 46 01	5 28 51 N	7
60			
Of three informis be- 7 North	25 44 33	27 51 03 N	4
hind the posterior 7 middle	25 51 19	26 24 31 N	4
shoulder 7 South	26 09 17	24 47 07 N	4
North in the posterior hand	26 27 33	15 18 06 N	5
That following middle informis	27 09 16	26 03 54 N	4
65			
North of those following the head	27 47 41	32 11 53 N	6
South and bright of those	27 49 43	33 01 25 N	4
After 4 informis fol- 7 preceding	28 21 39	27 26 14 N	6
lowing the shoulder. 7 Subsequent	29 29 49	26 44 36 N	6

SERPENTINE *verfes*, are such as begin and end with the same word.—As,

Ambo florescit etatibus, Arcades ambo.

SERPENTINE, in chymistry, a worm, or pipe of copper, or pewter, twisted into a spiral, and ascending from the bottom of the alembick to the capital, and serving in the distillation of rectified spirit of wine.

SERPENTINE *marble*, or *stone*, a kind of marble called by the ancients *ophites*, from the Greek *ophis*, *serpent*, as being speckled like a serpent's skin.

The ground of the *serpentine* is usually blackish; but it is beset with green and yellowish stains, streaks, &c. being withal exceeding hard.

The scarceness of the *serpentine* is such as only allows it to be used by way of incrustation.—The largest pieces we know of, are some tables in the compartments of the attic of the Pantheon; and two columns in the church of St Laurence in Lucina at Rome.

SER

There is also a soft kind of *serpentine* brought from Germany, used to make vessels of, but not in building.

SERPENTINE *column*. See the article COLUMN.

SERPI *gratta del*. See the article GROTTA.

SERPIGO, in medicine, a kind of herpes, popularly called a *tetter*, or *ring-worm*.

It consists of a number of very small pustules, rising close to each other, sometimes in a circular form, with great pain and itching. It never comes to digestion, and is not cured without difficulty. For after it appears to have been quite extinguished, it frequently breaks forth again at certain seasons of the year.—The common people use to cure it, by rubbing it with ink: but where the disease is fixed, some universals should be first applied.

SERRATUS, in anatomy, a name given to several muscles, from their resemblance in shape, to a saw. Such are the SERRATUS *anticus minor*, which arises thin and fleshy from the second, third, fourth, and fifth superior ribs, and ascending obliquely, is inserted fleshy into the processus coracoides of the scapula, which it draws forward. It also helps in respiration.—See *Tab. Anat. (Myol.) fig. 2. n. 10.*

SERRATUS *anticus major*, comes from the whole basis of the scapula, and is inserted into the seven true ribs, and first of the false ribs, by so many distinct portions, representing the teeth of a saw.—See *Tab. Anat. (Myol.) fig. 7. n. 15. 15. fig. 1. n. 42. fig. 2. n. 26.*

SERRATUS *posticus superior*, arises by a broad and thin tendon, from the two inferior spines of the vertebrae of the neck, and the three superior of the back, and growing fleshy, is inserted into the second, third and fourth ribs, by so many distinct indentations.—See *Tab. Anat. (Myol.) fig. 7. n. 31.*

These two help to draw the ribs upwards, and bring them to right angles with the vertebrae; and, consequently, they make the cavity of the thorax wider and shorter.

SERRATUS *posticus inferior*, arises by a broad thin tendon from the three inferior spines of the vertebrae of the back, and from the two superior of the loins: its fibres, ascending obliquely, grow fleshy, and are inserted by four indentations, into the four last ribs.

SERVAGE. See the article SERVICE.

SERVANT, SERVUS, a term of relation, signifying a person who owes and pays a limited obedience for a certain time, to another, in quality of master.

The Romans besides their slaves, whom they also called *servi*; had another kind of *servants*, whom they called *nexi* and *addicti*, who were such as being in debt, were delivered up to their creditors by the praetor, to work out their debt; after which they were again at liberty.

The pope, out of his wonderful humility, calls himself in his bulls, the *servant of the servants of God*, *servus servorum Dei*. The first who used the appellation, as Diaconus tells us, were pope Damasus and Gregory the great; which last is said to have used it to check, by his modesty, the arrogance of John, patriarch of Constantinople, who took the title of *oecumenical*.—Du Cange adds, that the title *servant* has been assumed by some bishops, some kings, and some monks.

SERVETISTS, a sect said to be the disciples or followers of Michael Servetus, the ring-leader of the antitrinitarians of these last ages.

In reality, however, Servetus had not any disciples; as being burnt together with his books, at Geneva, in 1553, before his dogma's had time to take root.—But the name *Servetists* is given to the modern antitrinitarians, because they follow the foot-steps he had marked out.

Sixtus Senensis calls the anabaptists, *Servetists*, and seems to use the two terms indifferently. The truth is, in many things, the ancient anabaptists of Switzerland, &c. chimed in with Servetus.

As the books that he wrote against the trinity are very rare, his real sentiments are but little known: M. Simon, who had a copy of the first edition, delivers them at large in his critical history.

Though Servetus uses many of the same arguments against the trinity, as the Arians, yet he professes himself very far from their sentiments. He also opposes the Socinians in some things; and declares his dissent from the opinions of Paulus Samosatenus; though Sandius mistakenly charges him with having the same sentiments. In effect, he does not seem to have had any fixed regular system of religion, at least not in the first edition of his book against the trinity, published in 1531, under the title, *de trinitatis erroribus, libri septem*, per Michaelum Servetum, alias Reves, ab Arragonia Hispanum.

The year following he published his dialogues on the mystery of the trinity. In the preface to which last work, he declares himself dissatisfied therewith.—It was on this account he undertook another on the same subject, of much greater extent; which did not appear till the year 1553, a little before his death. Those of Geneva having seized the copies of this edition, had it burnt; nor were there above two of three that escaped; one of which was kept at Basil, where the book was printed, but is now in the college library at Dublin.

It was lately put to the press, secretly, in England; but being discovered, the impression was seized and destroyed.

SERVICE, or **SERVAGE**, **SERVITIUM**, in law, a duty which the tenant, by reason of his fee, owes to the lord.

Ancient law-books make several divisions of *service*, viz. into *personal*, *real* and *mixt*; *military* and *habe*; *intrinsic* and *extrinsic*, &c. But since the statute 12 Car. II. whereby all tenures are turned into free and common socage; much of that learning is set aside.—Yet it may not be amiss to mention how the several kinds of *service* are described in our ancient law-books.

Personal SERVICE, is that to be performed by the person.—Such is that due from a slave to his master.

Real SERVICE, is either *urbane* or *ruric*; which two kinds differ, not in the place, but the thing.—The first is that due from a building or house, in whatever place situate, whether city or country; as the keeping a drain, a villa, or the like.

Ruric SERVICES, are those due for grounds where there is no building; such is the right of passage through ways, &c.

Mixt SERVICE, is that due from the person, by reason of the thing, as an usufruct, &c.

Our ancient law-books tell us of lands held of the king, by the tenant's letting a fart before the king on new year's-day; others, by furnishing the king with whores whenever he travelled that way; others, by bringing the king a mess of pottage at his coronation feast, &c.

There are also *natural SERVICES*.—For instance, if a man cannot gather the produce of his lands without passing through his neighbour's grounds, the neighbour is obliged to allow a passage, as a *natural service*.

Forensic, or extrinsic SERVICE, **SERVITIUM forenseum**, &c. was a *service* which did not belong to the chief lord, but to the king.

It was called *forensic* and *extrinsic*, because done *foris*, out of doors; and *extra servitium*.—We meet with several grants in the monasticon, of all liberties, with the apurtenances, *salvo forensi servitio*.

Intrinsic SERVICE, **SERVITIUM intrinsicum**, that due to the chief lord alone, from his vassals within his manor.

Frank SERVICE, **SERVITIUM liberum**, a *service* done by the feudatory tenants, who were called *liberi homines*, and distinct from vassals: as likewise was their *service*; for they were not bound to any base *services*, as to plough the lord's lands, &c. but only to find a man and horse to attend the lord into the army or court.

Base SERVICE,	} See the articles	VILLENAGE,
Base SERVICE,		BORD,
Foreign SERVICE,		FOREIGN,
Honorary SERVICE,		HONORARY,
Knights SERVICE,		KNIGHT,
Military SERVICE,		MILITARY,
Rent SERVICE,	} See the articles	RENT,
Ovelty of SERVICE,		OVELTY,
Suit of SERVICE,		SUIT,

SERVIENTES virgatores. See **VIRGATORES**.

SERVITES, an order of religious, so denominated from their vowing a peculiar attachment to the service of the virgin.

The order was founded by seven Florentine merchants, who, about the year 1233, began to live in community on mount Senar, two leagues from Florence. In 1239, they received from the bishop, the rule of St. Augustin; with a black habit, in lieu of a grey one which they had wore before.—In 1251, Bonifacio Monaldi, one of the seven, of simple prior of mount Senar, was named general.

This order was approved of by the council of Lateran, notwithstanding the decree it had passed to prevent the multiplication of religious orders. And it was again approved by cardinal Raynerius, legat of pope Innocent IV; who put it under the protection of the holy see. The succeeding popes have granted it a great many favours, particularly Alexander IV. and Innocent VIII.—It has also undergone some reforms.

At present it consists of twenty-seven provinces. It is become famous in Italy, by the history of the council of Trent, of Fra. Paolo, a Venetian, who was a religious *servite*. M. Hermant gives this order the name of the *annunciate*, doubtless from this mistake, that in some cities of Italy, they are called *religious of the annunciate*, because in those cities, their church is dedicated under that name. F. Archang. Giani derives the name *servites*, servant of the holy virgin, from hence; that when they appeared for the first time in the black habit given them by the bishop, the sucking children, as they say, cried out; Behold the servants of the virgin.—There are also nuns of this order.

SERVITIA.—Per qua SERVITIA. See the article PER.

SERVITIUS consuetudinibus. See **CONSUETUDINIBUS**.

SERVITOR, in the university of Oxford, a scholar or student, who attends or waits on another for his maintenance there.

SERVITORS of bills, denote such servants or messengers of the marshal of the king's-bench, as were sent abroad with bill or writs, to summons men to that court.—They are now commonly called *tip-staves*.

SERVITUDE, the condition of a servant, or rather slave.

Under the declension of the Roman empire, a new kind of *servitude* was introduced, different from that of the ancient Romans: it consisted in leaving the lands of subjugated nations to the first owners, upon condition of certain rents, and servile offices, to be paid in acknowledgment.—Hence the names of *servi censi*, *adscriptitii* and *adscripti glebe*: some whereof were taxable at the reasonable discretion of the lord; others at a certain rate agreed on; and others were mainmortal, who, having no legitimate children, could not make a will to above the value of five-pence, the lord being heir of all the rest: and others were prohibited marrying, or going to live out of the lordship. Most of which *services* still subsist in one province or other of France; though they are all abolished in England.—Such, however, was the original of our tenures, &c.

SERUM, a thin, transparent, watry liquor, somewhat falsh, which makes a considerable part in the mass of blood.

The blood consists of two kinds of parts; the *cruer*, or red part; and the *serum*, or wheyish, limpid part.

Mr. Boyle, and some others, have taken the *serum* to be more ponderous than the *cruer*; but Dr. Jurin, in the Philosophical Transactions, from repeated experiments, assures us of the contrary.

The *serum* is, in reality, the same with the lymph: it is carried by the arteries throughout the several parts of the body; whence it returns partly in the veins, and partly in the lymphatick vessels. See **LYMPHA**.

The use of the *serum* is to nourish the parts of the body; and to render the chyle and blood more fluid.

Urine and sweat, are nothing but *serum* drained of their nutritious parts, by repeated circulations, and secreted from the blood in the glands of the kidneys and skin.

The redundancy and other vices in the *serum* are the cause of various diseases.

SESAMOIDEA ossa, in anatomy, several very small bones, placed between the joints of the fingers and toes, to fortify them, and prevent dislocations.

They have their name from their resemblance in figure and size, to a grain of sesamum: from *sesamum*, and *ossa*, form.

SESQUI, a Latin particle, signifying a whole and a half; which, joined with *altera*, *tertia*, *quarta*, &c. is much used in the Italian music, to express a kind of ratio's; particularly several species of triples.

The ratio expressed by *sesqui*, is the second ratio of inequality, called also *super-particular ratio*; and is, when the greater term contains the less, once, and some certain part, over: as 3 : 2; where the first term contains the second once, and unity over; which is a quota part of two.

Now, if this part remaining, be just half the less term, the ratio is called *sesqui-altera*: if the remaining part be a third part of the lesser term, as 4 : 3, the ratio is called *sesqui-tertia*, or *sesqui-terza*: if a fourth part, as 5 : 4, the ratio is called *sesqui-quarta*; and thus to infinity, still adding to *sesqui* the ordinal number of the smaller term.

In English, we sometimes say, *sesqui-altera*, or *sesqui-alterate*, *sesqui-third*, *sesqui-fourth*, &c.—Though this is a little hybrid.

As to the kinds of triples expressed by the particle *sesqui*, they are these.—The *greater perfect SESQUI-ALTERATE*, which is a triple, where the breve is three measures, or semi-breves, and that without having any point or dot annexed to it.

Greater imperfect SESQUI-ALTERATE, which is where the breve, when pointed, contains three measures, and without any point two.

Lesser perfect SESQUI-ALTERATE, which is where the semi-breve contains three measures, and that without any point.

Lesser imperfect SESQUI-ALTERATE, a triple, where the semi-breve, with a point, contains three measures, and two without.

According to Buontempi, one may likewise call the triples $\frac{3}{2}$ and $\frac{4}{3}$, *sesqui-alterati*.

SESQUI-OCTAVE, is a kind of triple, marked C $\frac{3}{2}$, called by the Italians, *nonupla di croma*, where there are 9 quavers in every measure or bar, in lieu of 8.

Dupla SESQUI-QUARTA, is a kind of triple, marked C $\frac{3}{4}$, called by the Italians, *nonupla di semiminime*, where there are 9 crotchets in each measure, instead of 4; that is, three crotchets to each time.

SESQUI-ALTERATE, in geometry and arithmetic, is a ratio between two lines, two numbers, or the like, where one of them contains the other once, with the addition of an half. Thus 6 and 9 are in a *sesqui-alterate* ratio; since 9 contains 6 once, and 3, which is half of 6, over: and 20 and 30 are in the same; as 30 contains 20, and half 20 or 10.

SESQUIDITONE, in music, a concord resulting from the

sounds of two strings, whose vibrations, in equal times, are to each other in the ratio of 5 to 6.

SESQUI-DUPLICATE ratio, is, when of two terms, the greater contains the less twice, with half another over: as 15 and 6; 50 and 20.

SESQUIQUADRATE, an aspect, or position, of the planets, when at the distance of four signs and an half, or 135 degrees, from each other.

SESQUINTILE, an aspect of the planets, when 108 degrees distant from each other.

SESSION, SESSIO, denotes each sitting, or assembly, of a council.

In quoting councils, we say, in such a *session*, such a canon,

SESSION of Parliament is the season, or space, from its meeting to its prorogation, or dissolution.

SESSION, in law, denotes a sitting of justices in court, upon their commission.—As, the *session of eyer and terminer*, &c. *Quarter-sessions*, called *general-sessions*, or *open-sessions*, stand opposite to *special*, otherwise called *privy-sessions*, which are procured upon some special occasion, for the more speedy dispatch of justice.

Petit-sessions, or *statute-sessions*, are those kept by the high-constable of a hundred, for the placing of servants. See **STATUTE**.

Kirk Sessions. See the article **KIRK**.

SESTERCE, SESTERTIUS, a silver coin, in use among the ancient Romans, called also simply *nummus*, and sometimes *nummus sestertius*.

The *sesterce*, was the fourth part of the denarius, and originally contained two *as*'s and an half; estimated in English money, at somewhat above one penny half-penny farthing.

The *sesterce* was at first denoted by **LLS**; the two *L*'s signifying two librae, and the *S* half. But the librarii, afterwards, converting the two *L*'s into an *H*, expressed the *sesterce* by **HS**.

The word *sestertius* was first introduced by way of abbreviation for *sestertius*, which signifies two, and a half of a third, or literally, only half a third; for in expressing half a third, it was understood, that there were two before.

Some authors make two kinds of *sesterces*; the *less*, called *sestertius*, in the masculine gender; and the *great* one, called *sestertium* in the neuter: the first, that we have already described; the latter containing a thousand of the other, or **SL** *i. e.* *id. e.* of our money.—Others will have any such distinction of great and little *sesterces*, unknown to the Romans: *sestertius*, say they, was an adjective, and signified as *sestertius*, or two *as*'s and a half: and when used plurally, as in *quingentesima sestertium*, or *sestertia*, it was only by way of abbreviation, and there was always understood *millia* thousands: this last is the more probable opinion.

To be qualified for a Roman knight, an estate of four hundred thousand *sesterces* was required; and, for a senator, of eight hundred thousand.

Authors also mention a copper *sesterce*, worth about $\frac{1}{2}$ of a penny English.

SESTERCE, SESTERTIUS, was also used in antiquity, for a thing containing two wholes and a half of another: as *as* was taken for any whole, or integer.

SESTUPLO, in music. See the article **SEXTUPLE**.

SETHIANS, or SETHINIANS, SETHIANI, or SETHINIANI, a branch of the ancient gnosticks; thus called, because of their pretending to deduce their origin from Seth, son of Adam, whom they called Jesus and Christ; from an opinion, that Seth and Jesus were the same person, who came down from heaven at two several times.

As the *Sethians* had the same philosophy with the other gnosticks, they had numerous other fables in their system. See **GNOSTICKS**.

They pretended to have several books of the ancient patriarchs; particularly, seven of their great master Seth: besides one of Abraham, which was full of manifest fallacies, which yet they called *apocalypse*, or *revelation*. The book called the little *Genesis*, anciently very common in the churches of the east, was borrowed from them. From this book they learned the name of Seth's wife, who, they say, was called *Horeca*.—Some imagine, they borrowed a great many of their fictions from the Hellenist Jews.

SETIER. See the article **SEPTIER**.

SETON, SEACRUM, in chirurgery, &c. a kind of topical remedy, used like a cautery, or an issue, to divert defluxions from the eyes, &c. by making a wound in the skin of the hind part of the neck, which is kept suppurating, by means of a little skain of silk, or cotton, passed through it. *Sets* are also sometimes applied to such as are apt to fall into epileptic fits.—They are of more efficacy than a common issue, but are preferred with much the same intention. The like operation is frequently practised on horses, &c. and called, by the barbers, *rouching*.

Sets evacuate with a gentle pain; shake the nerves, discharge serum, and give vent to repetitions and coacervations of humours.

SETTER, among farmers.—To *set*, is to cut the dew-lap of an ox or cow, and into the wound to put the root of the hellebore, whereby an issue is made, for ill humours to vent themselves.

SETTING, in astronomy, the withdrawing of a star or planet; or its sinking below the horizon.

Astronomers and poets make three different kinds of *setting* of the stars: *cosmical*, *acronycal*, and *helical*.—The first, when the star *sets* with the sun. The second, when it *sets* at the time the sun rises. The third, when it is immersed, and hid, in the sun's rays. To find the times of the *setting* of the sun and stars, see **GLOBE**.

SETTING, in sea language.—To *set* the land or the sun by the compass, is to observe how the land bears on any point of the compass; or, on what point of the compass the sun is.

Also, when two ships sail in sight of one another, to mark on what point the chased bears, is termed, *setting the chase by the compass*.

SEVENTH, SEPTIMA, in music, an interval, called by the Greeks *heptachordon*; whereof there are four kinds.

The first, the *defective* or *diminished seventh*, consisting of three tones, and three greater semi-tones, as from *ut* sharp to *fi* flat.

The second, called by Zarlino and the Italians, *semi-ditono con diapente*, or *settimo minore*; is composed diatonically of seven degrees, and six intervals, four whereof are tones, and the rest greater semi-tones, as from *de* to *ut*; and chromatically of ten semi-tones, six whereof are greater, and four less: it takes its form from the ratio *quadrupartiens quintas*, 9 to 5.

The third called by the Italians, *il ditono con diapente*, or *settimo maggiore*, is composed diatonically, like the former, of seven degrees, and six intervals, six whereof are full tones, and a single one a greater semi-tone; so that only one greater semi-tone is wanting of the octave: as from *ut* to *fi*; and chromatically of eleven semi-tones, six whereof are greater, and five lesser. It takes its origin from the ratio of 15 to 8.

The fourth, is the *redundant seventh*, composed of five tones, a greater semi-tone, and a lesser, as from *fi* flat to *la* sharp: so that it only wants a comma of an octave; that is, so much as it wants to render its second semi-tone a greater. Hence many confound it with the octave itself; maintaining, with good reason, that only the three first *sevenths* can be of any use.

SEVENTH pair of Nerves. See the article **NERVE**.

SEVERAL tail, in law, is that whereby land is given, and entailed severally to two: *e. gr.* to two men and their wives, and the heirs of their bodies begotten.

The donees, here, have joint estate for their two lives, yet they have *several* inheritance; for the issue of the one shall have his moiety, and that of the other, the other.

SEVERANCE, in law, the *jingling*, or *severing* two or more that join, or are joined, in the same writ, or action.

As if two join in a writ, *de libertate probanda*, and the one be afterwards non-suited; here, *severance* is permitted, so, as notwithstanding the non-suit of the one, the other may severally proceed.

There is also *severance of the tenants* in an affize; when one, two, or more difficulties appear upon the writ, and not the other. And—*Severance in debt*, where two executors are named plaintiffs, and the one refuses to prosecute.—We also meet with *severance of summons*, *severance in attainrs*, &c.

SEVERIANS, SEVERIANI.—There were two sects of heretics thus called: the first, who are as old as the beginning of the third century, were an impure branch of gnosticks; thus called from their chief, *Severus*.

The second, by some called *Severites*, were a sect of acephali, or Eutyrians; their leader, Severus, was preferred to the see of Antioch in 513, where he did his utmost to set aside the council of Chalcedon.

SEWER*, in the household, an officer who comes in before the meat of a king, or nobleman, to place and range it on the table.

* The word is formed from the French, *esuyer*, esquire, gentleman or usher.

SEWERS, in building, are shores, conduits, or conveyances, for the fillage and filth of a house.

Sir Henry Wotton advises, that art imitate nature in these ignoble conveyances, and separate them from sight (where there wants a running water) into the most remote, lowest and thickest part of the foundation, with secret vents passing up through the walls, to the wide air, like tunnels; this all the Italian architects commend for the discharge of noisom vapours, though elsewhere it is little practised. Clerk of the SEWERS. See the article **CLERK**.

SEX, SEXUS, something in the body, which distinguishes male from female.

The number of persons, of the two *sexes*, are exceedingly well balanced; so that every man may have his wife, and every woman her husband.

Hermaphrodites have both the *sexes* in one.

It is expressly forbid by the law of Moses, to disguise the sex.

SEXAGENARY, SEXAGENARIUS, something relating to the number sixty: more particularly, a person arrived at the age of sixty years.

Some canonists dispense with *sexagenarians* for not fasting: the Papian law prohibits *sexagenarii* from marriage; because at that age, the blood and humours are frozen.

SEXAGENARY arithmetick. See **SEXAGESIMAL**.

SEXAGENARY tables, are tables of proportional parts, shewing the product of two *sexagenaries* that are to be multiplied; or the quotient of two to be divided.

SEXAGESIMA, the second Sunday before lent, or the next to shrove Sunday.—So called, as being about the sixtieth day before Easter.

Sexagesima, is that which follows septuagesima, and precedes quinquagesima.

SEXAGESIMAL, or SEXAGENARY arithmetic, a method of computation, proceeding by sixties.

Such is that used, in the division of a degree into 60 minutes; of the minute, into 60 seconds; or of the second into 60 thirds, &c.

SEXAGESIMALS, or SEXAGESIMAL fractions, are fractions, whose denominators proceed in a sexageuple ratio; that is, a prime, or the first minute = $\frac{1}{60}$, a second = $\frac{1}{3600}$, a third = $\frac{1}{216000}$.

Anciently there were no other than *sexagesimals* used in astronomical operations, and they are still retained in many cases; though decimal arithmetic begins to grow in use now in astronomical calculations.

In these fractions, which some also call *astronomical fractions*, the denominator being always 60 or a multiple thereof, is usually omitted, and the numerator only written down; thus $4^{\circ}, 59', 32'', 50'''$, is to be read, 4 degrees, 59 minutes, 32 seconds of a degree, or 60th parts of a minute, 50 thirds, 16 fourths, &c.

SEXTANS, SEXTANT, a sixth part of certain things.

The Romans divided their *as*, which was a pound of brass, into 12 ounces: the ounce was called *uncia*, from *unum*; and two ounces *sextans*, as being the sixth part of the pound. See the article *As*.

SEXTANS was also a measure, which contained two ounces of liquor, or two cyathi.—Hence, *Sextantes, Caliste, duos infunde Falerni*.

SEXTANT, in mathematics, denotes the sixth part of a circle; or an arch comprehending 60 degrees.

SEXTANT is more particularly used for an astronomical instrument, made like a quadrant; excepting that its limb only comprehends 60 degrees.

The use and application of the *sextant*, is the same with that of the quadrant.

In the observatories of Greenwich, and Pekin, there are very large and fine *sextants*.

SEXTARIUS, an ancient Roman measure, containing two *cocyles*, or two hemine. See **COTYLA**.

SEXTILE, SEXTILIS, the position or aspect of two planets, when at 60 degrees distance; or at the distance of two signs from one another.—It is marked thus (*). See **ASPECT**.

SEXTION, a church officer, thus called by corruption of the Latin *sacerdos*, or Saxon *segerflame*, which denotes the same. His office is to take care of the vessels, vestments, &c. belonging to the church; and to attend the minister, churchwardens, &c. at church.—He is usually chose by the parson only.

The office of *sextion* of the pope's chapel is appropriated to the order of the hermits of St. Augustin.—He is generally a bishop, though sometimes the pope only gives a bishoprick, *in partibus*, to him whom he confers the post on.—He takes the title of *prefect of the pope's sacristy*, and has the keeping the vessels of gold and silver, the relics, &c.

When the pope says mass, the *sextion* always tastes the bread and wine first. If it be in private he says mass, his holiness, of two wafers, gives him one to eat; and if in public, the cardinal, who assists the pope in quality of deacon, of three wafers, gives him two to eat. When the pope dies, he administers to him the sacraments of extreme unction, &c. and enters the conclave, in quality of first conclavist.

SEXTUPLE, SESTUPLO, in music, denotes a mixed sort of triple time, which is beaten in double time. See **TRIPLE**.

This, the Italians call *sestuplo*; the French sometimes call it *sixth time*, *mesure a sex temps*; though improperly: according to M. Brossard it ought rather to be denominated *triple binary time*.

Authors usually make mention of three species hereof; to which M. Brossard adds two more, *viz.*

SEXTUPLE of the semi-breve, by the French called *triple of 6 for 1*, as being denoted by those two numbers $\frac{3}{2}$; or because here are required six semi-breves to a measure, in lieu of one, *viz.* three rising and three falling.

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SEXTUPLE of the minim, called by the French *triple of 6 for 2*, as being denoted by $\frac{3}{1}$, which shew that six minims are here required to a measure, instead of 2.

SEXTUPLE of the crochet, called by the French *triple of 6 for 4*, because denoted by $\frac{3}{2}$, or $\frac{3}{4}$, which shew that there must be 6 crotchets to a measure, in lieu of 4.

SEXTUPLE of the chroma, by the French called *triple of 6 for 8*, as being denoted by $\frac{3}{4}$; which shew that 6 quavers here make the measure or semi-breve, instead of 8.

SEXTUPLE of the semichroma, or *triple of 6 for 16*; so called because denoted by $\frac{3}{8}$, which shews, that 6 quavers are here required to a measure, instead of 16.

SEXTUS, SIXTH, in the canon law, denotes a collection of decretals, made by pope Boniface VIII. usually thus called from the title, which is *liber sextus*; as if it were a sixth book added to the five books of decretals, collected by Gregory IX.

The *sextus* is a collection of papal constitutions, published after the collection of Gregory IX. containing those of the same Gregory, Innocent IV. Alexander IV. Urban IV. Clement IV. Gregory X. Nicholas III. and Boniface VIII. by whose order the compilation was made.—The persons employed in making of it were Will. de Mandegot, archbishop of Ambrun; and Berenger, bishop of Beziers, and Richard of Sienna. See **CANON LAW**.

SGRAFFIT, SGRAFFIATA, in painting, denotes *scratch-work*; a method of painting in black and white only, not in fresco, yet such as will bear the weather.

Sgraffiti performs both the design and the painting, all in one.

—It is chiefly used to embellish the fronts of palaces, and other magnificent buildings.

SHACK, in ancient customs, a liberty of winter-pasturage.

In the counties of Norfolk and Suffolk, the lord of the manor has *shack*, i. e. a liberty of feeding his sheep at pleasure upon his tenants lands, during the six winter months.

In Norfolk, *shack* also extends to the common for hogs, in all mens grounds, from the end of harvest, till feed-time.—Whence, to go *a-shack*, is to feed at large.

SHADOW, SHADU, a plane where the light is weakened by the interpolation of some opaque body before the luminary.

The *shadow* of yew, cyprus, and walnut-tree, are supposed dangerous to men: the *shadow* of ash is said to be deadly to serpents; for which reason they say serpents are never found under its *shade*, but this is idle.

The doctrine of *shadows* makes a considerable article in optics and geography, and is the general foundation of dialling.

SHADOW, in optics, is a privation of light, by the interpolation of an opaque body.

As nothing is seen but by light, a mere *shadow* is invisible: when therefore we say, we see a *shadow*, we mean partly, that we see bodies placed in the *shadow*, and illuminated by light, reflected from collateral bodies; and partly, that we see the confines of the light.

If the opaque body, that projects the *shadow*, be perpendicular to the horizon, and the place it is projected on, be horizontal; the *shadow* is called a *right shadow*.—Such are the *shadows* of men, trees, buildings, mountains, &c.

If the opaque body be placed parallel to the horizon, the *shadow* is called a *versed shadow*; as the arms of a man stretched out, &c.

Laws of the projection of SHADOWS from opaque bodies.—1^o.

Every opaque body projects a *shadow* in the same direction with its rays; that is, towards the part opposite to the light. Hence, as either the luminary, or the body changes place, the *shadow* likewise changes its place.

2^o. Every opaque body projects as many *shadows*, as there are luminaries to enlighten it.

3^o. As the light of the luminary is more intense, the *shadow* is the deeper. Hence the intensity of the *shadow* is measured by the degrees of light that face is illuminated.

4^o. If a luminous sphere be equal to an opaque one it illuminates, the *shadow* this latter projects, will be a cylinder; and, of consequence, will be propagated still equal to itself, to whatever distance the luminary is capable of acting: so that, if it be cut in any place, the plane of the section will be a circle equal to a great circle of the opaque sphere.

5^o. If the luminous sphere be greater than the opaque one, the *shadow* will be conical. If therefore the *shadow* be cut by a plane parallel to the base, the plane of the section will be a circle, and that so much the less, as it is at a greater distance from the base.

6^o. If the luminous sphere be less than the opaque one, the *shadow* will be a truncated cone: consequently it grows still wider and wider: and therefore, if cut by a plane parallel to the section, that plane will be a circle so much the greater, as it is further from the base.

7^o. To find the length of the *shadow*, or the axis of the shady cone, projected by a less opaque sphere, illumined by a larger; the semi-diameters of the two, as CG, and IM, Tab. Opticks, fig. 12. and the distances between their centers GM being given.

draw FM parallel to CH ; then will $IM \perp CF$; and therefore FG will be the difference of the semi-diameters GC and IM . Consequently, FG or FC , the difference of the semi-diameters is to GM , the distance of the centers; so is CH , the semi-diameter of the opaque sphere, to PH , the distance of the vertex of the shadow cone, from the center of the opaque sphere. If then, the ratio of PM to MH be very small; so that MH and PH do not differ very notably, MH may be taken for the axis of the shadow cone: otherwise the part PM must be subtracted from PH ; and then, with the arch LK ; for, this subtracted from a quadrant, leaves the arch LQ ; which is the measure of the angle IMP . Since then, in the triangle IMP , which is rectangular at P , between the angle IMP , we have the side IM ; the side MP is easily found by plain trigonometry.

E. gr. If the semi-diameter of the earth be $MI = 1$; the semi-diameter of the sun, according to Riccioli, will be 233 ; and therefore $GP = 323$; and of course $PMH = 228$; hence then, MP is found by calculation to bear a very small ratio to MH ; PH may be taken to be 229 semi-diameters of the earth.

Hence, as the ratio of the distance of the opaque body, from the luminous body GM , to the length of the shadow MH , is constant; if the distance be diminished, the length of the shadow will be diminished likewise. Consequently, the shadow continually decreases as the opaque body approaches the luminary.

8°. To find the length of the shadow projected by an opaque body, *T S*, fig. 13; the altitude of the luminary, *e. gr.* of the sun above the horizon, viz. the angle SVT , and that of the opaque body given.—Since, in the rectangular triangle STV , which is rectangular at T , we have given the angle V , and the side TS ; the length of the shadow TV is had by trigonometry.

Thus, suppose the altitude of the sun $37^\circ 45'$, and the altitude of the tower 18 feet; TV will be found $24\frac{1}{2}$ feet.

9°. The length of the shadow TV , and the height of the opaque body TS , being given; to find the altitude of the sun above the horizon.

Since, in the rectangular triangle STV , rectangular at T , the sides TV and TS , are given; the angle V is found thus: as the length of the shadow TV , is to the altitude of the opaque body TS , so is the whole sine to the tangent of the sun's altitude above the horizon. Thus, if TS be 30 feet, and TV 45 ; TV will be found $33^\circ 41'$.

10°. If the altitude of the luminary, *e. gr.* the sun above the horizon SVT , be 45° , the length of the shadow TV is equal to the height of the opaque body.

11°. The lengths of the shadows TZ and TV of the same opaque body TS , in different altitudes of the luminary, are as the co-tangents of those altitudes.

Hence, as the co-tangent of a greater angle is less than that of a less angle; as the luminary rises higher, the shadow decreases: whence it is, that the meridian shadows are longer in winter than in summer.

12°. To measure the altitude of any object, *e. gr.* a tower AB (fig. 14.) by means of its shadow projected on a horizontal plane.

At the extremity of the shadow of the tower C , fix a stake, and measure the length of the shadow AC ; fix another stake in the ground at a known distance DE , and measure the length of the shadow thereof EF . Then as EF is to AC , so is DE to AB . If therefore, AC be 45 yards, and ED 5 yards; AB will be 32 $\frac{1}{2}$ yards.

13°. The shadows of equal opaque bodies have their lengths proportionable to their distances from the same luminaries equally high. Hence, as the opaque approaches to the luminary, or the luminary to the opaque body, the length of the shadow is increased; and as either of them recedes, it is diminished.

Hence, from the different lengths of shadows of the same opaque bodies at the same height as the Sun, Moon, Jupiter, Venus, &c. we may gather their different distances from the earth; though not accurately enough for astronomical purposes.

14°. The right shadow is to the height of the opaque body, as the co-sine of the luminary, to the sine.

15°. The altitude of the luminary being the same in both cases, the opaque body AC (fig. 15.) will be to the veridical shadow AD , as the right shadow EB , to its opaque body DB .

Hence, 16°. The opaque body is to its veridical shadow, as the co-sine of the altitude of the luminary to its sine; consequently, the veridical shadow AD is to its opaque body AC , as the sine of the altitude of the luminary to its co-sine.—20. If DB be AC ; then will DB be a mean proportional between EB and AD ; that is, the length of the opaque body is a mean proportional between its right shadow and veridical shadow, under the same altitude of the luminary.—21. When the angle C is 45° , the sine and co-sine are equal; and therefore the veridical shadow is equal to the length of the opaque body.

22°. A right line is to veridical shadow of the same opaque body, under the same altitude of the luminary, in a duplicate ratio of the co-sine to the sine of the altitude of the luminary.

Right and veridical shadows, are of considerable use in measuring; as by their means we can commodiously enough

measure altitudes, both accessible and inaccessible, and yet too when the body does not project any shadow. The right shadows we use, when the shadow does not exceed the altitude; and the veridical shadows, when the shadow is greater than the altitude. On this footing, is made an instrument called the *quadrat*, or *line of shadows*, by means whereof the ratio's of the right and veridical shadow of any object, at any altitude, are determined. This instrument is usually added on the face of the quadrant. Its description and use, see under the article *QUADRAT*.

SHADOW, in geography.—The inhabitants of the globe are divided, with respect to their shadows, into *oriental*, *amphicet*, *borerget*, and *periset*. The first are such as at a certain season of the year have no shadows at all, while the sun is in the meridian. The second are such, whose meridian shadow at one season of the year looks to the north, and at another to the south. The third are such, whose shadows constantly tend either to the north or south. The last are those, whose shadows, in one and the same day, successively turn to all the points.

SHADOW, in painting, denotes an imitation of a real shadow, effected by gradually heightening, and darkening the colours of such figures as by their disposition cannot receive any direct rays from the luminary supposed to enlighten the piece. The management of the shadows and lights, makes what painters call the *clair obscure*: the laws whereof see under the article *CLAIR-OBSCURE*.

SHADOW, in perspective.—The appearance of an opaque body, and a luminous one, whose rays arrive (*e. gr.* a candle, lamp, &c.) being given; to find the appearance of the shadow according to the laws of perspective.—The method is this. From the luminous body, which is here considered as a point, let fall a perpendicular to the perspective plane or table; *i. e.* find the appearance of a point upon which a perpendicular drawn from the middle of the luminary, falls on the perspective plane; and from the several angles, or named points of the body let fall perpendiculars to the plane. These points whereon the perpendiculars fall, connect by straight lines, with the point upon which the perpendicular is let fall from the luminary, falls. And continue the lines to the side opposite to the luminary. Lastly, through the raised points, draw lines through the center of the luminary, intersecting the former; the points of intersection are the terms or bounds of the shadow.

E. gr. Suppose it required to project the appearance of the shadow of a pillar, *A B C D* (tab. the perspective, p. 2, N. 10.) scenographically delineated: since AD , BE , and CF , are perpendicular to the plane, and LM likewise perpendicular to the same; (for the luminary is given, and an altitude LM be given) draw the right lines AM and BM , through the points D and E . Through the raised points A and B , draw the right lines GL and HL , intersecting the former in G and H . Since the shadow of the right line AD terminates in G ; and the shadow of the right line BE in H ; and the shadows of all the other right lines conceived in the given point are comprehended within these terms; $G D E H$ will be the appearance of the shadow projected on the plain.

Go to of CURVED SHADOWS. See the article *CURVE*.

SHAFT, in building: the shaft of a column, is the body thereof; thus called from its straightness: but by architects more frequently the *shaft*.—See *Ant. Archit.* fig. 24, 25, 26, 30, 32.

SHAFT, is also used for the spire of a church-steeple.—And for the flank or tunnel of a chimney.

SHAFT of a mine, is the hollow entrance or passage into a mine, sunk or dug to come at the ore.

In the tin-mines, after this is sunk about a fathom, they leave a little, long, square place, which is called a *shamble*. See *Supplement*, article *MINE*.

SHAGREEN, or CHAGREEN, a kind of grained leather, chiefly used in the covers of cases, books, &c. It is very close and solid, and covered over with little round grains, or papillae. It is brought from Constantinople, Tunis, Tripoli, Algiers, and some parts of Poland.

There is a dispute among authors what the animal is whence the shagreen is prepared? Rauwolf assures us it is the onager, which according to Linnæus Bononiensis is a kind of wild ass. V. Ray Synops. An. Quad. p. 63. See *Supplement*, article *ONAGER*.

It is added, that it is only the hard part of the skin is used for this purpose. Borel says it is the skin of a sea-calf; others of a kind of fish called by the Turks *shagreen*, whose skin is covered with grains; and these remark that they wash and polish wood.

There is also a sort of shagreen made of the skin of the squatin, in which the mark of a ray is left. V. *Supplement*, article *SCUT*.

Manner of preparing SHAGREEN.—The skin being just dead off, is stretched out, covered over with a salt, and the feed bruised on it; and then it is exposed to the weather for some days; and thus it is.

The best is that brought from Constantinople, of a brownish colour; the white is the worst. It is extremely hard, yet when steeped in water, it becomes very soft and pliable; whence it becomes of great use among shoe-makers. It takes

S H E

There are, of opinion, that the Hebrews had two kinds of *Sanctuary*, the camp of the Lord, called *Tabernacle*; and the *Shel of the Sanctuary*, which last they will have to be of the same use.—By this expedient may it be we may get clear of some difficulties occurring in scripture, where the *Sanctuary* is called of incidents we will presently notice.—We will observe, that every time it is said of the *Sanctuary*, we are there referred to the *Tabernacle* and the *Shel* of the *Sanctuary*.

But Villalpandus will not hear of such a distinction; nor do bishop Cumberland, M. Morin, &c. take the opinion to have any foundation. The *proplane shekel*, or *shekel* of four drachmas, they agree, was the same with the *sacred shekel*; and it was only called by this last name in regard the standard thereof was kept in the sanctuary, by the priests. See **SANCTUARY**.

It is maintained by several, that the Jews had also a gold *shekel*, *fictus aureus*, of the same weight with the silver one, and valued at 1 l. 16 s. 6 d. sterling.

The *shekel* is supposed to have been first struck in the desert, on the footing of 100 to the Attick mina, weighing 160 grains of wheat, and current for 10 geratis or oboli. But that afterwards they were struck of double that weight.

Some will have the *shekel* to be the oldest piece of money in the world, as being in use in Abraham's time; but this was not coined, or stamped; nor had any other value besides its intrinsic worth.

Xenophon mentions *shekels*, as current in Arabia; and Du Cange speaks of others struck and current in England.

SHELF, is what the miners, especially in tin mines, call the *self-country*; by which they mean, an imaginary surface of the earth, which, at the concussion of the waters at the deluge, was never moved; and to the *shelf*, they think, all the loads or mineral veins at first lay even, and parallel; though after the flood, some were elevated, and others depressed.

By *shelf*, they now mean that hard surface, or coat of the earth which lies under the broken strata at different depths; for they suppose, that since the flood, the earth hath gotten a new coat of vegetable earth, or such as is made by the corruption of vegetables and animals. See *supplement*, article **FAST**.

SHELL, *Testa*, in natural history, a hard crust, serving to cover, and enclose a kind of animal, hence called *testaceous*. Naturalists have been sometimes mistaken as to the manner of the formation of *shells*. The animal and its *shell* have been always supposed to arise wholly from the egg. But M. Reaumur has shewn the supposition to be false. He has found, by certain experiments, that the *shells* of garden snails are formed of a matter which perspires from their bodies, and hardens and condenses in the air.

It is certain, that all animals perspire, and are encompassed with a kind of cloud or atmosphere, which exhales from them, and, in all probability, assumes pretty nearly their external figure. Snails have nothing peculiar in this respect; unless that the atmosphere of their perspiration, condenses and hardens about them, and forms a visible cover, whereof the body is the mould or medal; whereas that of other animals is evaporated and lost in the air. This difference arises from the different substance perspired; that coming from snails, being viscous and stony.—This is no supposition; but a matter of fact, which M. Reaumur has well proved by experiments.

On this principle, though the *shell* serve the animal as an universal bone, yet it does not grow like a bone, nor like any of the other parts, by nutrition; that is, by a juice circulating within itself; but by an external addition of parts laid one over another; as is commonly supposed the manner of growth of flowers.

But, to consider the thing more particularly; it is to be remembered, that the snail's head is always at the aperture of the *shell*, and its tail in the tip or point of the *shell*; and that its body is naturally turned into a spiral form, the different spires or circumsolutions whereof are in different planes.—This supposed; take the snail just hatched; as the matter it perspires petrifies around it, there must be first formed a little cover, proportioned to the bigness of its body; and as its body is yet too little to make a circumsolution of a spiral, at least a whole one; this cover will only be the centre, or, at most, the first beginning of a little circle of a spiral. But the animal grows: if, then, it ceased to perspire, it is evident, all that is added to its body, would remain naked; but as it continues to perspire, it makes itself a cover in proportion as it needs it.—Thus is an entire circumsolution of a spiral formed; and thus is a second and a third; and still every new spire is bigger than the last; in regard the animal grows in thickness, at the same time as it grows in length. When the animal ceases to grow, yet it does not cease to perspire; and accordingly, the *shell* continues to grow thicker, though not longer.

SHELLS, *Conchæ* and *Cochleæ*, make a considerable article in the cabinets of the curious: the finest and rarest are these that follow, *viz.*—The *papal crown*, *tiora pontificia*, which takes its name from its form, and which is variegated with red on a white ground.—The *feather*, *pluma*, whose whiteness, with its carnation stains, have an admirable effect.—The *Hebraica*, which, on a ground as white as snow, has spots as black as jet, much resembling Hebrew characters.—The *Chinese snail*, *limax sinicus*, which has a green and black embroidery, on a dark brown ground.—The *cloth of gold*, *textile aureum*, remarkable for an admirable variegation of yellow, brown and black.—The *cloth of silver*, *textile argenteum*, which does not come behind that of gold in beauty.—The *leopard*, *pardus*, which is all speckled.—The *tiger*, *ti-*

gris, *feu concha cinericea*, whose spots exceed those of the leopard.—The *hart's-horn*, *cornu cervinum*, which has black stains on a white ground.—The *purse*, *crumena*, thus called from its figure; it is embroidered with three or four colours.—The *sun-dial*, *solarium manarium*.—The *caterpillar*, *eruca*, both denominated from their forms.—Add the *white nautilus*, the *admiral shell*, &c.

In Aldrovand, Gessner and Fabius Columna, we have all that the ancients have said on the subject of *shells*.—In 1692, Dr. Lister, published a natural history of *shells*, in folio, full of cuts, representing the various kinds of *shells*.—Under the first class, he ranges the terrestrial or land *shells*: in the second, the fresh-water *shells*, both those called *turbinata*, and the *bivalvia*; in the third he disposes all the sea *shells*, the *bivalvia* and *multivalvia*; and in the fourth, he divides, into several classes, those sea *shells*, called *turbinata*. See *supplement*, article **SHELL**.

SHELLS, are frequently found under ground, in places far remote from the sea, in mines, and even on the tops of mountains: but how they should come there, is a thing the naturalists are greatly divided about.—The most usual and easy opinion is, that those parts have been formerly sea, or at least have been overflowed thereby; and many even go back as far as the grand deluge for this.

Others take these to be the natural places of their birth or formation; some of them being found little other than crude clay; others of the same texture with the rock whereto they grow; though others seem of as absolute a *shelly* substance, as any in the sea.—In effect, they say, these may be only to many different gradations of nature, which can as well produce *shells* in mines, as in the sea; there being no want of saline or earthy particles for the purpose; nor is there any great difference between some sorts of spars, and sea *shells*.

Dr. Lister judges, that the *shells* found in stone-quarries, were never any part of an animal; and gives this reason for it, that quarries of different stone, yield quite different species of *shells*; different not only from one another, but from any thing in nature besides, which either sea or land does yield. This opinion has been since proved erroneous, and all these bodies to have been really once parts of living animals. See *supplement*, article **FOSSILS**, **EXTRANEOUS**.

LITTORAL SHELLS. See the article **LITTORAL**.

SHELL gold. See the article **GOLD**.

SHELL silver. See the article **SILVER**.

TORTOISE SHELL. See the article **TORTOISE**.

SHELL-FISH, a collective name for all fishes naturally inclosed in *shells*.

SHELTERS horizontal. See the article **HORIZONTAL**.

SHERIFF*, or **SHIRE-REVE**, an officer in each county of England, whose business is to see the execution of the king's orders, particularly of all writs directed to him out of the king's courts; to impanel juries; bring causes and criminals to trial; take care of the dispatch of affairs both civil and criminal; collect the revenues, imposts, fines, confiscations, &c. arising in his county, for which he accounts to the exchequer; and to attend and assist the itinerant judges.

* The word is formed from the Saxon, *scire*, province, shire, and *gereaf*, grave, reve or prelat; or rather from *scire*, to divide; the *sheriff* being denominated from the first division of the kingdom into counties. See **GRAVE** and **REVE**.—In Latin he is called *his comes*.

The *sheriff* is, as it were, the soul of the policy of the county, and the preserver of the peace thereof. His office only lasts one year.

He was anciently chose by the people in the county-court, as knights now are for parliament; but he is now nominated by the king: in order to which the itinerant judges every year nominate six persons for each county; whereof the lord chancellor, treasurer, privy-council, &c. assembled in the exchequer-chamber, make choice of three; out of which number, the king chooses one.—Only the county of Middlesex has two *sheriffs*, chose, as anciently, by the citizens of London: and Durham, Westmoreland, and Cumberland, have none.

The *sheriff*, besides his ministerial office, of executing processes and precepts of the courts, and making returns of the same, has a judicial office, whereby he holds two several kinds of courts; the one called the *sheriff's turn*, held in divers places of the county, to enquire of all offences against common law not prohibited by any statute.—The other called the *county court*, wherein he hears and determines all civil causes of the county, under forty shillings. See **COURT** and **TURN**.

Appoal of SHERIFFS. See the article **APPOAL**.

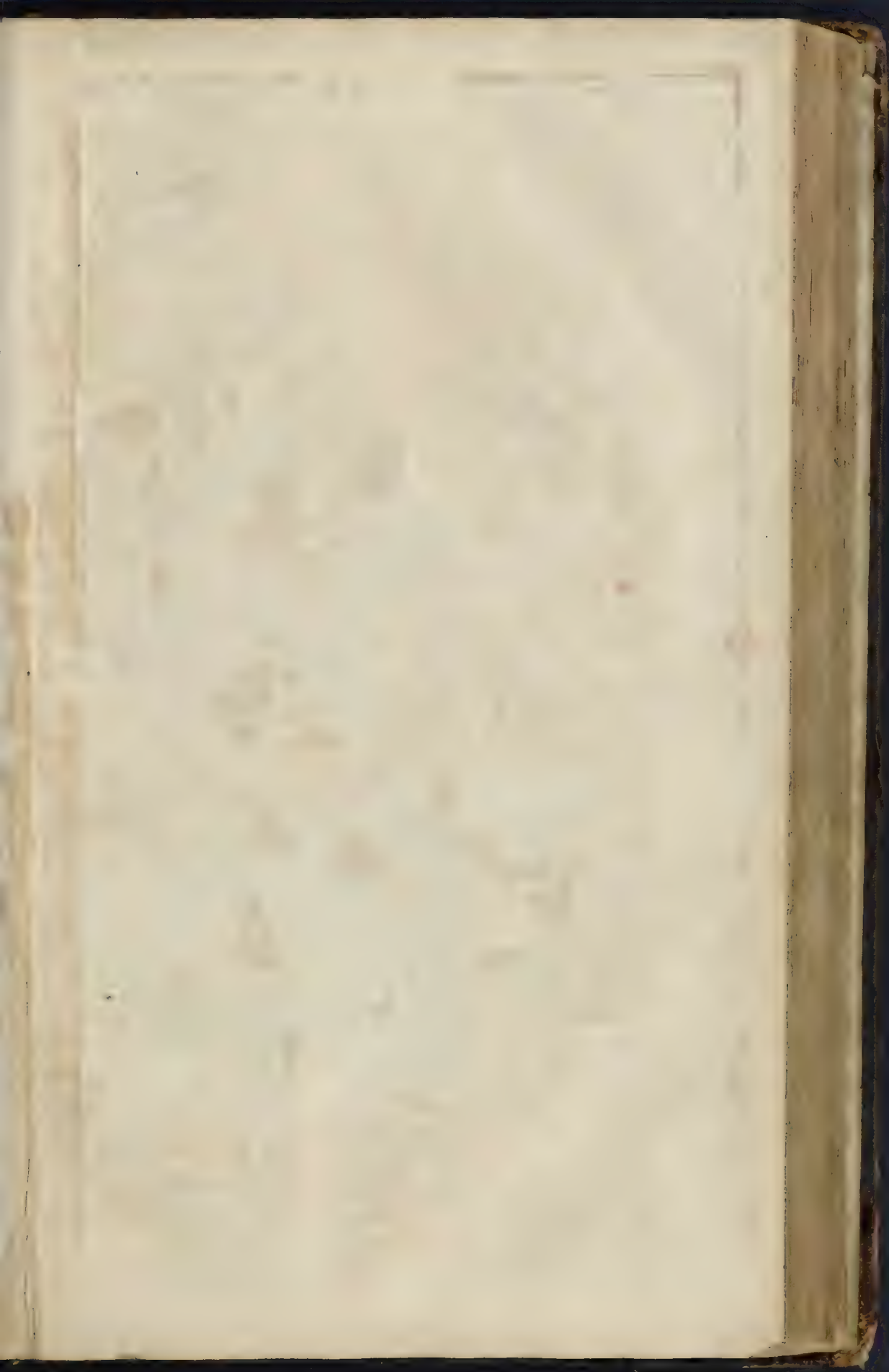
SHEWAGE. See the article **SCAVAGE**.

SHIDES. See the article **SHINGLES**.

SHILLD, an ancient weapon of defence, in form of a light buckler; born on the arm to send off lances, darts, &c.

The form of the *shield* is represented by the escutcheon in coats of arms.

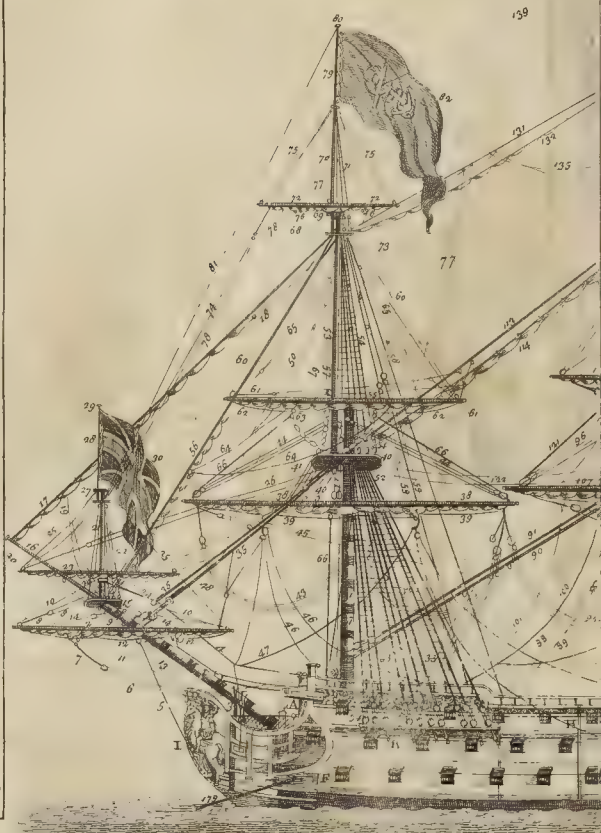
SHIELD, in heraldry, denotes the escutcheon or field whereon the bearings of an armory are placed.



REFERENCES.

1	Bonspirit	50	Fore Leechlines
2	Yard and Sail	51	Fore Topgripe
3	Gunwain	52	Fore Top Mast
4	Horse	53	Shrouds and Tanyards
5	Bobstay	54	Yard and Sail
6	Spritsail Sheets	55	Stay and Sail
7	Pendants	56	Runner
8	Braces and Pendants	57	Backstays
9	Hallyards	58	Hallyards
10	Liffls	59	Liffls
11	Clowlines	60	Braces and Pendants
12	Spritsail Horses	61	Horses
13	Buntlines	62	Clowlines
14	Standing Liffls	63	Bowlines & Briddles
15	Spritsail Top	64	Reefackles
16	Flying Jibboom	65	Shrouds
17	Flying Jib Stay & Sails	66	Buntlines
18	Hallyards	67	Crowbars
19	Shrouds	68	Cap
20	Horses	69	Cap
21	Spritsail Top Mast	70	Foretopgall Mast
22	Shrouds	71	Shrouds & Tanyards
23	Yard and Sail	72	Yard and Sail
24	Shrouds	73	Backstays
25	Liffls	74	Stay
26	Braces and Pendants	75	Liffls
27	Cap	76	Clowlines
28	Jack Staff	77	Braces and Pendants
29	Truck	78	Bowlines & Briddles
30	Jack Flag	79	Flag Staff
31	Fore Mast	80	Truck
32	Runner and Tackle	81	Flag Staff Stay
33	Shrouds	82	Flag Staff Headline
34	Tanyards	83	Main Mast
35	Stay and Tanyards	84	Shrouds
36	Preventer Stay & Tanyards	85	Tanyards
37	Wooding the mast	86	Runner & Tackle
38	Yard and Sail	87	Pendant of the Cornet
39	Horses	88	Guy of D ^s
40	Top	89	Hall of D ^s
41	Crowfoot	90	Stay
42	Jeers	91	Preventer Stay
43	Yard Tackles	92	Stay Tackle
44	Liffls	93	Wooding the mast
45	Braces and Pendants	94	Jeers
46	Shrouds	95	Yard Tackles
47	Fore Tacks	96	Braces and Pendants
48	Bowlines & Briddles	97	Braces and Pendants
49	Fore Buntline	98	Braces and Pendants

of a Ship of War of the First



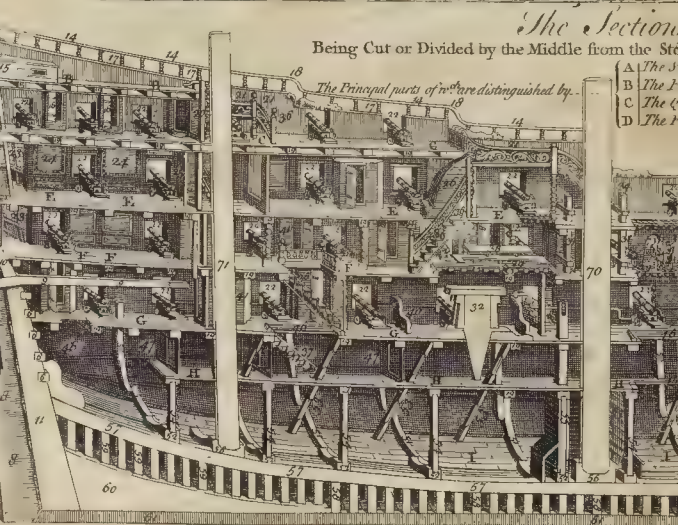
The Section

Being Cut or Divided by the Middle from the Stern to the Fore

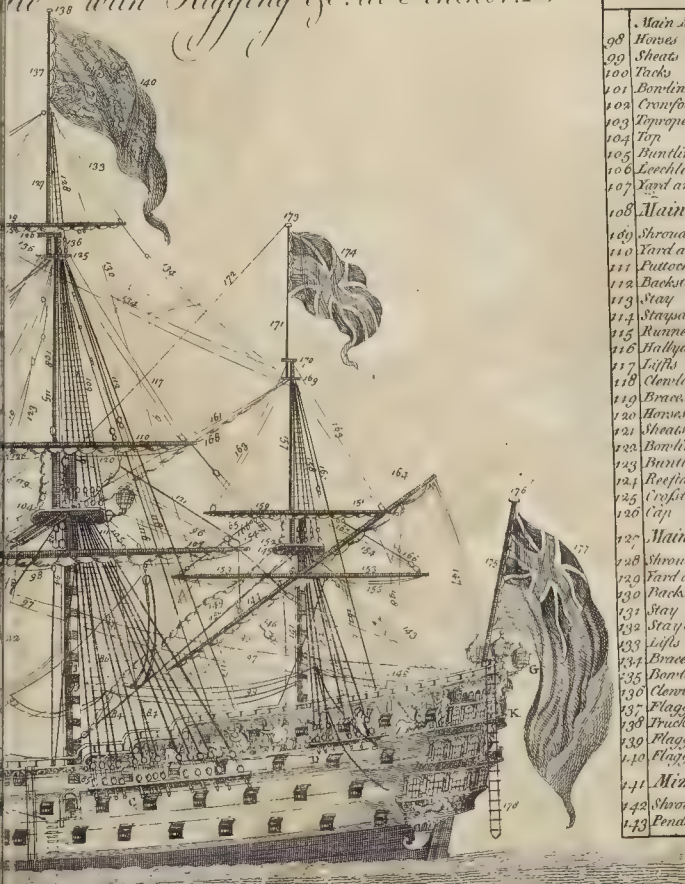
The Principal parts of it are distinguished by

A The Stern
B The Fore
C The Gun Deck
D The Main Deck

1	The Tafforell	26	Bulk head of the Coach
2	The upper lights & Ballot	27	Cabins for Boatmen & Carpenter & Mates
3	The lower lights & Ballot	28	Bulk head of the Fore Peak
4	The Wardroom lights	29	Gratings
5	The Counter	30	Part of the Calt
6	The Transoms	31	Cook Room Chimney
7	The fashion Pieces	32	Main Capstan
8	The Rudder	33	Jeer Capstan
9	The Tillar	34	Bits & Cross Pieces to the Mast
10	Timbers of Stern Head & A.K.	35	Standing Cabins for Midshipmen
11	The Stern Post	36	Flying & Winding Stairs
12	Rails	37	Ladders
13	Brackets	38	Common Table
14	The Five Rails on the Side	39	Cook Room and Furnaces
15	The Trumpeters Cabbin		
16	Cabins for Lieut. Masters & Mates		
17	Bannisters		
18	Hances or Falls		
19	Beams of the Decks		
20	Bulkheads of		
21	Gangway & Stairs unto		
22	Guns & Ports		
23	Entrance into the Gallery		
24	The State Room		
25	The Bulkhead of the State Room		



with Rigging &c. at Anchor.



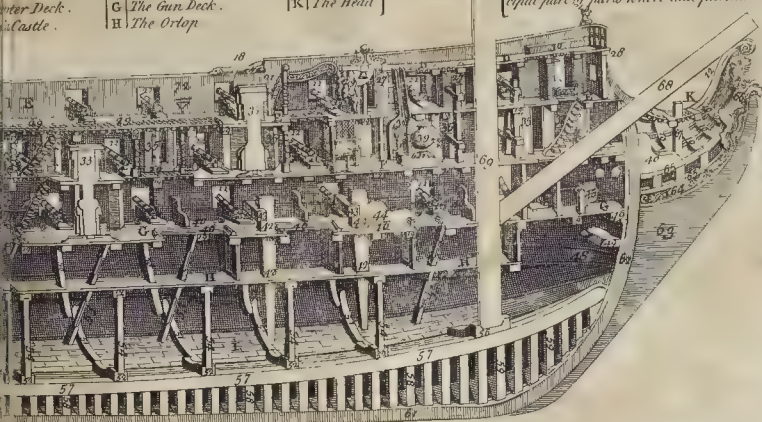
REFERENCES.

Main Mast continued	Mizon Mast continued
98 Hovees	144 Yard & Sail
99 Sheats	145 Crowsfoot
100 Hooks	146 Sheet
101 Bonelines & Bridles	147 Pendant Lines
102 Crowsfoot	148 Peckwaits
103 Tynne	149 Stay Sail
104 Top	150 Stay
105 Bonelines	151 Derrick & Spann
106 Leechlines	152 Top
107 Yard and Sail	153 Crofs Jacklard
108 Main Top Mast	154 Crofsjack Luffs
109 Shrouds & Lanyards	155 Crofsjack Brees
110 Yard and Sail	156 Crofsjack Slings
111 Futtock Shrouds	157 Mizon Top Mast
112 Backstays	158 Shrouds & Lanyards
113 Stay	159 Yard & Sail
114 Stayail & Stay & Hall'd	160 Backstays
115 Runners	161 Stay
116 Hallyards	162 Hallyards
117 Luffs	163 Tuffs
118 Clewlines	164 Breees & Pendants
119 Breees & Pendants	165 Bonelines & Bridles
120 Hovees	166 Sheats
121 Sheats	167 Clewlines
122 Bonelines & Bridles	168 Stay Sail
123 Bonelines	169 Crofsjacks
124 Reefstackles	170 Cap
125 Crofsjacks	171 Flag Staff
126 Cap	172 Flag Staff Stay
127 Maintopgull Mast	173 Truck
128 Shrouds & Lanyards	174 Flag Union
129 Yard and Sail	175 Ensigne Staff
130 Backstays	176 Truck
131 Stay	177 Ensign
132 Stay Sail & Hallyards	178 Prop ladder
133 Luffs	179 Bower cable
134 Breees & Pendants	
135 Bonelines & Bridles	
136 Clewlines	
137 Flag Staff	
138 Truck	
139 Flag Staff Stay	
140 Flag Standard	
141 Mizon Mast	
142 Shrouds & Lanyards	
143 Pendants & Breees	

A First Rate Ship.

to the Stern, at one View discovering the Decks, Guns, Cabbins &c. &c.

about.
F The Upper Deck.
G The Middle Deck.
H The Gun Deck.
I The Orlop.



(All particulars on either of these parts are to be understood by Numbers 1. 2. 3. &c. against which there is placed the Letter of the Alphabet which refers to the Principal part or parts where that particular is to be found. Viz.)

40 Standarts to the Side & Head	G	47 Partitions for Steward & Store Rooms	G H
41 Cabbins for Gunner & Mates	G. H	48 Broad Room abaft Powder Room afore	I H
42 Butt Pins		49 Breast Hooks	I H
43 Crofs Peices for the Cables	G. H	50 Upper Futtock Ridders	H. I
44 Standarts		51 Lower Futtocks	I
45 Manger	G	52 Floor Riders	I
46 Hatch Ways	G. H	53 Crofs Pillars	I
		54 Through Pillars	I
		55 Well Pump & Shot Lockers	G H
		56 Steps for the Masts	
		57 The Kelson	
		58 The appearance of the Floor	
		59 Timbers Cut	I
		60 Lower ends of the Eutocks	
		61 The rising or Dead Wood	
		62 The Keel	
		63 The Stem	
		64 Knee of the Head	K
		65 The Trill boards	
		66 Cheeks	
		67 Figure	K
		68 Funnell for Ease	
		69 Boreprit	
		70 Fore Mast	
		71 Main Mast	
		72 Mizon Mast	
		73 Riddell	
		74 Entring Port	

SHILLING*, an English silver coin, equal to twelve pence, or the 20th part of a pound.

* *Fræherus* derives the Saxon *scilling*, whence our *shilling*, from a corruption of *scilica*; proving the derivation by several texts of law, and among others by the XXI. law, *de annuis legatis*. Skinner with more probability deduces it from the Saxon *scild*, shield; by reason of the clutcheon of arms thereon.

It is observed, there were no *shillings* or twelve-penny-pieces coined in England till the year 1504; and these, Stow calls *groats*, though *Fabian* mentions them under the name of *shillings*, 34 Hen. VIII.

The Dutch, Flemish, and Germans have likewise their *shilling*; called *schelin*, *schilling*, *schelling*, *scalin*, &c. But these not being of the same weight or fineness with the English *shilling*, are not current on the same foot.—The English *shilling* is worth about 23 French sols; those of Holland and Germany about eleven sols and a half. Those of Flanders about nine. The Dutch *shillings* are also called *sols de gros*, because equal to 12 gros. The Danes have copper *shillings*, worth about $\frac{1}{2}$ of a farthing sterling.

SHINGLES, or **SHIDES**, in building, small pieces of wood, or quartered oaken boards, sawed to a certain scantling, or more usually cleft to about an inch thick at one end, and made like wedges, four or five inches broad, and eight or nine inches long. They are used in covering, especially for churches and steeples, instead of tiles, or slates.

This covering is dear; yet where tiles, &c. are very scarce, and a light cover is required, it is preferable to that. If made of good oak, and cleft, not sawed, and well seasoned, *shingles* make a fire, light, and durable covering.

The building is first to be covered all over with boards, and the *shingles* then nailed thereon.

SHINGLES, in medicine, a kind of herpes, called also the *milary herpes*.

It consists of innumerable little pustules breaking out in various parts of the body, viz. the neck, breast, loins, thighs, &c.—The place affected is somewhat inflamed, and the patient is a little feverish.—White pustules finally arise and suppurate, and are succeeded by little round scars resembling millet seeds.

It is to be attacked with discutients; and the higher pustules are to be cut off with scissars, and a cerate of oil and wax, is then to be applied.

Wierow observes, that the *shingles* come near the nature of a palsy, and are therefore to be cured with mercurial cathartics.

SHIP, a general name for all great vessels with sails, fit for navigation on the sea; excepting galleys, which go with oars and bank sails.—See *1^o SHIP*, fig. 1 and 2.

The *Clear Arabis*, denotes a *ship*, a timber-building, consisting of various parts and pieces, nailed and pinned together with iron and wood, in such form as to be fit to float, and to be conducted by wind and sails, from sea to sea.

The invention of *ships* is very ancient, and, at the same time very uncertain: mythologists attribute it to *Dædalus*; and pretend, that the wings he invented to save himself from the labyrinth of Crete, were nothing but sails, which he first gave to vessels, and wherewith he eluded the vigilance and pursuit of Minos. Others give the honour to Janus, on the credit of some ancient Greek and Latin coins, on one side whereof is represented his double face, and on the reverse a *ship*. Lastly, others, and those who go on the surest grounds, look on Noah to have been the first *ship-builder*.

SHIPS are usually divided into three classes: *ships of war*, *merchant ships*, and an intermediate kind, half war, half merchant; being such, as though built for merchandize, yet take commissions for war.

Ships of war are again divided into several orders, called *rates*.

Merchant ships are estimated by their burden, that is, by the number of tons they bear; each ton reckoned at two thousand pounds weight.—The estimate is made by gauging the hold, which is the proper place of loading.

The most celebrated *ships* of antiquity are, that of Ptolemy Philopater, which was 280 cubits long, 38 broad, and 48 high; it carried 400 rowers, 400 sailors, and 3000 soldiers. That which the same prince made to sail on the Nile, we are told, was half a stadium long.—Yet these were nothing in comparison with Hiero's *ship*, built under the direction of Archimedes; on the structure whereof, Mofchion, as we are told by Snellius, wrote a whole volume. There was wood enough employed in it to make fifty galleys. It had all the variety of apartments of a palace; banqueting-rooms, galleries, gardens, fish-ponds, stables, mills, baths, a temple of Venus, &c. It was incomparable with an iron rampart, and eight towers, with walls and bulwarks, furnished with machines of war; particularly one, which threw a stone of 300 pounds, or a dart 12 cubits long, the space of half a mile; with many other particulars related by Athenæus.

Among modern *ships*, the most considerable is the English first-rate man of war; the dimensions whereof, whence

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those of other rates may be deduced, are as follow: the length 210 foot; number of guns 110: number of men 1250: number of tons 2300: draught of water 22 foot; the main-mast in length 54 yards, depth 10: main-mast in length 39 foot; in diameter 38 inches: weight of the anchor 82 hundred, 1 quarter, 14 pound: cable in length 200 yards: diameter of the cable 22 inches.—The expence of building a common first rate *ship*, with guns, tackling and rigging, is computed at 60,000 l. sterling.

To give the reader an idea of the several parts and members of a *ship*, both internal and external, with their respective denominations in the sea language (the principal whereof are explained in the respective places of this dictionary) we here give him two draughts: the one, a section of the body of a first rate; to shew its construction, the disposition of its inside, &c.—The other, the same *ship* entire, with the sails, rigging, &c.

For the most convenient form of **SHIPS**; or that wherein they shall meet with the least resistance from the water; see **VESSEL** and **RESISTANCE**.

<i>Bulk of a SHIP,</i>	} See the articles	BULK.
<i>Burden of a SHIP,</i>		BURDEN.
<i>Captain of a SHIP,</i>		CAPTAIN.
<i>Clerk of a SHIP,</i>		CLERK.
<i>Corporal of a SHIP,</i>		CORPORAL.
<i>Company of a SHIP,</i>		COMPANY.
<i>Grounding a SHIP,</i>		GROUNDING.
<i>Master of a SHIP,</i>		MASTER.
<i>Rigging of a SHIP,</i>		RIGGING.
<i>Run of a SHIP,</i>		RUN.
<i>Sheathing of a SHIP,</i>		SHEATHING.
<i>Squadron of SHIPS,</i>		SQUADRON.
<i>Stay a SHIP,</i>		STAY.
<i>Steward of a SHIP,</i>		STEWARD.
<i>Warp a SHIP,</i>		WARP.
<i>Washing of a SHIP,</i>		WASHING.
<i>Way of a SHIP,</i>		WAY.
<i>Flag SHIP,</i>	} See the articles	FLAG.
<i>Mine SHIPS,</i>		MINE.
<i>Register SHIPS,</i>		REGISTR.
<i>Transport SHIP,</i>	}	TRANSPORT.

SHIP-MONEY, an imposition which was anciently charged upon the ports, towns, cities, boroughs, and counties of the realm; by writs commonly called *ship-writs*, under the great seal of England, for the providing and furnishing certain ships for the king's service.

This imposition was revived by king Charles I. in the years 1635 and 1636; but by stat. 17. Car. I. it was declared to be contrary to the laws and statutes of the realm, claim of right, liberty of the subject, &c.

SHIPPER, **SKIPPER**, or **SCHIPPER**, a Dutch term, signifying the master of a ship.

We also use the word popularly for any common seamen.

SHIPWRACK. See the article **WRECK**.

SHIRE*, **SCYRA**, a part or portion of the land, called also a county.

* The word is originally Saxon, *fir* or *firt*, formed from *fyran*, to divide.

King Alfred first divided the land into *satrapias*, which we now call *shires*, and those into *centurias*, which we now call *hundreds*. And those again into *decennias*, which we call *tithings*.

The assizes of the *shire*, or assembly of the people of a county, was called by the Saxons, *fyregemot*. See **COUNTY**.

SHIRE reeve, } See the articles } **SHERIFF.**

Knights of the SHIRE, } **KNIGHT.**

SHOAL-STONE. See the article **SHOAL-STONES**.

SHOAL, in the sea phrase, is the same as *shallow*, and is applied to flats in the water.

They say, it is *good shoaling*, when a ship sailing towards shore, they find by her founding, it grows shallower and shallower by degrees, and not too suddenly; for then the ship goes in safety.

SHOAL-STONES, or **SHOAL-STONES**, the miners term in the tin mines, for those fragments of ore, which by rains, currents of water, &c. have been torn off from the load, or veins of ore.—These are washed down from the hills, and by finding them, they guess where to look for a load of ore. Sometimes these are called *squad*, and *squad*. See **SUPPLEMENT**, article **SHOAL-STONE**.

SHOAR, or **SHORE**, a prop or counterfort, set up to support any thing of weight, which leans on one side. See **BUTTRESS**.

SHOE, a covering for the foot, usually of leather.

Its structure, though the object of a particular art, is too popular to need explaining.

Its history is more obscure: Bened. Baudoin, a *shoe-maker* by profession, has a learned treatise of the ancient *shoes*, *de solæ veterum*; where the origin, matter, form, &c. thereof, are particularly enquired into.

Baudoin maintains, that God, in giving Adam skins of

beasts to cloath him, did not leave him to go bare-footed; but gave him *shoes* of the same matter. That after raw skins, men came to make their *shoes* of rushes, broom, paper, flax, silk, wood, iron, silver and gold: so different has their matter been.—Nor was their form more stable, with regard either to the shape, colour or ornaments: they have been square, high, low, long, and quite even, cut, carved, &c. Pliny, lib. 7. c. 56. tells us, that one Tychius of Bœotia was the first who used *shoes*.—M. Nilant, in his remarks on Baudoin, observes, that he quotes Xenophon wrongly, to shew, that even in his time they still wore *shoes* of raw skins. Xenophon relates, that the ten thousand Greeks, who had followed the young Cyrus, wanting *shoes*, in their retreat, were forced to cover their feet with raw skins, which occasioned them great inconveniences. Nilant will not even allow, that the *shoes* of the country people, called *carbatines*, and *peronees*, were of crude skin, without any preparation.

The patricians among the Romans, wore an ivory crescent on their *shoes*: Heliogabalus had his *shoes* covered over with a very white linen; in conformity to the priests of the sun, for whom he professed a very high veneration: this kind of *shoe* was called *adæ, udo, or ado*. Caligula wore *shoes* enriched with precious stones. The Indians, like the Egyptians, wore *shoes* made of the bark of the papyrus. The Turks always put off their *shoes*, and leave them at the doors of the mosques.

Horse SHOE. } See the articles } **HORSE.**
Horse SHOE head. } **HORSE-SHOE head.**
SHOE housing. See the article **HOUSING.**
SHOOTING. See **GUNNERY** and **PROJECTILE.**
SHOOTING of bombs. } See the articles } **BOMB.**
SHOOTING with air. } **WIND-GUN.**
SHOTS.—Hot SHOTS. } See the articles } **WATER.**

SHOP-LIFTER, a person, who on pretence of buying goods, or otherwise, takes an opportunity to steal them.

SHORE, or common SHORE, a corruption of *sewer*. See **SEWERS.**

SHORN velvet. See the article **VELVET.**
SHORT accent, in grammar, a mark which shews, that the time of pronouncing a syllable is to be *short*.—It is wrote thus (').

SHORT sails, in a man of war, are the same with *fighting-sails*; being the fore-sail, main-sail, and fore-top-sail, which are all that are used in fight, lest the rest should be fired, and spoiled; besides the trouble of managing them when a ship gives chase to another.

If a chase have a mind to fight, they say, the chase *strips into her short sails*, i. e. puts out her colours in the poop, her flag at the main-top, and her streamers, or pendants, at the yard's arms; furls her spit-sail, peeks her mizzen, and lines her main-yard.

SHORT-SIGHTEDNESS, myopia, a defect in the conformation of the eye, wherein the crystallin, &c. being too convex, the rays reflected from different objects are refracted too much, and made to converge too fast, so as to unite before they reach the retina; by which means the vision is rendered dim, and confused.

The ordinary remedy, for *short-sightedness*, is a concave lens, held before the eye; which making the rays diverge, or at least, diminishing much of their convergency, makes amends for the too great convexity of the crystallin.

Dr. Hook suggests another remedy: finding, that many *short-sighted* persons are but little helped by concaves; he recommends a convex glass, placed between the object and the eye; by means whereof the object may be made to appear at any distance from the eye, and consequently, all objects may be thereby made to appear at any required distance from the eye; so that the *short-sighted* eye shall contemplate the picture of the object, in the same manner, as if the object itself were in the place.—It is true, the image will appear inverted; but we have expedients to remedy this too: for, in reading, there needs nothing but to hold the book upside down.—To write, the best way in this case, will be for the person to learn to do it upside down. For distant objects, the doctor asserts, from his own experience, that, with a little practice in contemplating inverted objects, one gets as good an idea of them, as if seen in their natural posture.

SHOT, in the military art, includes all sorts of ball or bullets for fire-arms, from the cannon to the pistol. See **BULLET, FIRE-ARM, CANNON, &c.**

Those for cannon are of iron; those for musquets, carbines and pistols, are of lead.

SHOT, for ordnance, especially in the sea service, are of several sorts; as—*Round SHOT*, bullets fitted to the bore of the piece.

Bar SHOT, is two bullets, or rather half bullets, joined together by an iron bar; serving to cut down masts, sails, &c.

Cafe SHOT, } **CASE SHOT.**
Chain SHOT, } **CHAIN SHOT.**
Langrel SHOT, } **LANGREL SHOT.**
Random SHOT, } **RANDOM SHOT.**
Trundle SHOT, } **TRUNDLE SHOT.**

SHOT, for fowling, is otherwise called *ball*, by reason of its figure and size.

The method of casting it is as follows. The lead being melted, stirred, and skimmed, a quantity of powdered yellow orpiment is strewn upon it; as much as will lie on a shilling, to 12 or 15 pounds of lead. The whole being well stirred, the orpiment will flame. To judge whether there be orpiment enough in, a little of the lead is dropped into a glass of water, and if the drops prove round, and without tails, there is orpiment enough, and the degree of heat is as it should be.

This done, a copper-plate, hollow in the middle, and three inches in diameter, bored through with 30 or 40 small holes, according to the size of the *shot*, is placed on an iron frame, over a tub of water, four inches above the water: the hollow part is to be very thin. On this plate are laid burning coals, to keep the melted lead in fusion. The lead is now poured gently, with a ladle, on the middle of the plate, and it will make its way through the holes in the bottom of the plate into the water, in round drops.—Great care is taken to keep the lead on the plate in its proper degree of heat: if too cold it will stop the holes; and if too hot, the drops will crack and fly.

The *shot*, thus made, are dried over a gentle fire, always stirring them that they do not melt: this done, the greater are separated from the smaller, by putting them through sieves for that purpose.

Fresh SHOT, } **FRESH SHOT.**
Hot SHOT, } **HOT SHOT.**
Water SHOT, } **WATER SHOT.**

SHOT-FLAGON, a sort of *flagon* somewhat bigger than ordinary; which in some countries, particularly in *Italy*, it is the custom for the host to save his guests, after they have drank above a shilling.

SHOTTEN herrings, } See the articles } **HERRING.**
Blood SHOTTEN, } **BLOOD SHOTTEN.**

SHOULDER-BLADE, a bone of the shoulder, of a triangular figure, covering the hind part of the ribs; called by anatomists, the *scapula* and *omoplasta*. See **SCAPULA.**

SHOULDER-PONE. See the article **HUMERUS.**

SHOULDERING, in fertilisation. See **ÉPAULEMENT.**

SHOULDERING-PIECE, in building. See **BRACKET.**

SHOULDER-PITCH, is a disease in a horse, when the pitch or point of the shoulder is displaced, which makes the horse halt downright.

SHOULDER-SPLAIT, or SHOULDER-TORN, is a hurt which befalls a horse by some dangerous slip, whereby the shoulder is parted from the breast.

SHOULDER-WRENCH, is a strain in the shoulder.

SHOWER, a cloud resolved into rain, and distinguished on a certain tract of ground.

In natural history we meet with abundance of instances of extraordinary and preternatural powers, as, for example, mentioned by Gallienus, and others; a *virgine*, mentioned by Wormius; *showers of fire*, mentioned by Pliny, and even by Dr. Plot; a *river of milk*, mentioned in the *Apocryphal* *Book of Enoch*; a *river of oil*, mentioned in the *Apocryphal* *Book of Enoch*; a *river of honey*, mentioned in the *Apocryphal* *Book of Enoch*; a *river of wine*, mentioned in the *Apocryphal* *Book of Enoch*; a *river of milk*, mentioned in the *Apocryphal* *Book of Enoch*; a *river of oil*, mentioned in the *Apocryphal* *Book of Enoch*; a *river of honey*, mentioned in the *Apocryphal* *Book of Enoch*; a *river of wine*, mentioned in the *Apocryphal* *Book of Enoch*; a *river of milk*, mentioned in the *Apocryphal* *Book of Enoch*; a *river of oil*, mentioned in the *Apocryphal* *Book of Enoch*; a *river of honey*, mentioned in the *Apocryphal* *Book of Enoch*; a *river of wine*, mentioned in the *Apocryphal* *Book of Enoch*; 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shrouds are fastened to the puttocks, by plates of iron, and by what they call dead-men's eyes, and lanners also, as the others are.—See *Tab. Ship*, fig. 1. n. 4, 12, 23, 41, 52, 62, 84, 104 and 135.

The terms are, *Ease the shrouds*; that is, slacken them. Set taught the shrouds; that is, set them faster.

SHRUB, *frutex*, a little, low, dwarf tree; or a woody vegetable, of a size less than a tree; and which, instead of one single stem, frequently, from the same root, puts forth several sets, or stems. See *TREE* and *PLANT*.

Such are privet, phyllirea, holley, box, honey-suckle, &c. Shrubs and trees put forth in autumn a kind of buttons, or gems, in the axis of the leaves: these buttons are as so many little ova, which coming to expand by the warmth of the following spring, open into leaves, and flowers.—By this, together with the height, some distinguish shrubs from suffrutescent, or under-shrubs; which are low bushes, that do not put forth any of these buttons; as sage, thyme, &c.

SHUTTLING the mouth. See the article *MOUTH*.

SHUTTLE, in the manufactures, an instrument used by the weavers, which, with a thread it contains either of woolen, silk, flax, or other matter, serves to form the woofs of stuffs, cloths, linens, ribbards, &c. by throwing the shuttle alternately from left to right, and from right to left, a-crofs between the threads of the warp, which are stretched out lengthwise on the loom.

In the middle of the shuttle is a kind of cavity, called the *eye* or *chamber of the shuttle*; wherein is inclosed the spool, which is a part of the thread destined for the woof; and this is wound on a little tube of paper, rush, or other matter.

The ribband-weaver's shuttle is very different from that of most other weavers, though it serve for the same purpose: it is of box, six or seven inches long, one broad, and as much deep: shod with iron at both ends, which terminate in points, and are a little crooked, the one towards the right, and the other towards the left, representing the figure of an S horizontally placed.

SI, in music, a seventh note, added within this sixty years, by one le Maire, to the six ancient notes invented by Guido Arctin, *ut, re, mi, fa, sol, la, si*: by means whereof, the embarrass of the ancient gamut is avoided.

So busy a thing is jealousy, that, for a matter of thirty years, that le Maire kept preaching to the musicians of his time, in behalf of the new note; not a man would allow it: but he was no sooner dead, than all the world came into it.

SIBYLS, *SIBYLLÆ*, in antiquity, virgin-prophetesses, or maids supposed to be divinely inspired; and who, in the height of their enthusiasm, gave oracles, and foretold things to come.

* The word is supposed formed of an assemblage of the two Greek words, *sis*, for *sis*, *sis*, and *sis*, council.

Authors do not agree about the number of the *sibyls*: Capella reckons but two, viz. Erophyle of Troy, called *sibylla Phrygia*; and Sinuachia of Erythraea, called *sibylla Erythraea*. Solinus mentions three, viz. Cumæa, Delphica, and Erythraea. Ælian makes their number four: and Varro increases it to ten, denominating them from the places of their birth: the Persian, Lybian, Delphic, Cumæan, Erythraean, Samian, Cumæan, Hellepontic or Trojan, Phrygian, and Tiburtin.—Of these, the most celebrated are, the Erythraean, Delphic, and Cumæan *sibyls*.

The *sibylline* oracles were held in great veneration by the more credulous among the ancients; but they were much suspected by many of the more knowing. The books wherein they were written, were kept by the Romans with infinite care, and nothing of moment was undertaken without consulting them. Tarquin first committed them to the custody of two patrician priests, instituted for that purpose. See *ORACLE*.

SICILIAN measures, } See the articles { **MEASURE.**
SICILIAN money, } **MONEY.**
SICILIAN silk, } **SILK.**
SICILIAN vespers, } **VESPERS.**

SICILIAN, in music, denotes a kind of gay sprightly air, or dance; somewhat of the nature of an English jig: usually

marked with the characters — or —
6 12
8

SICK herrings, } See the articles { **HERRING.**
Iron SICK, } **IRON sick.**

SICKNESS, } See the articles { **DISEASE.**
Green SICKNESS, } **CHLOROSIS.**
Sweating SICKNESS, } **SUDOR Anglicanur.**
Falling SICKNESS, } **EPILEPSY.**

SICIL *aliat*, a writ sent out in the second place, where the first writ was not executed.

It is thus called from its beginning, which is in this form: *Georgius D. G. &c. Vice-comiti Hæref. salutem. Præcipimus tibi (scut alias) præcepim*, &c.

SIDE, *latus*, in geometry. The *SIDE* of a figure, is a line

making part of the periphery of any superficial figure. See *FIGURE*.

In triangles, the *sides* are also called *legi*. In a rectangle triangle, the two *sides*, including the right angle, are called *catheti*; and the third the *hypotenuse*.

SIDE of a polygonal number, is the number of the terms of the arithmetrical progression, that are summed up. See *POLYGONAL number*.

SIDE of power, is what we otherwise call the *root*, or *radix*. See *ROOT*.

SIDES of horn-works, crown-works, double tenailles, and the like out-works, are the ramparts and parapets which inclose them on the right and left, from the gorge to the head.

Right SIDE, } in conicks. See { **LATUS rectum.**
Transverse SIDE, } **LATUS transversum.**

SIDE grafting. See the article *ENGRAFTING*.

SIDE lay, is a term made use of by huntsmen, when dogs are placed in the way, to be let slip at a deer, as he passes by.

SIDERATION, *SIDERATIO*, in chirurgery, a mortification of some part of the body; called also *apoplexia*, and *ne-crosis*. See *MORTIFICATION*.

SIDERATION is also used for a being suddenly benumbed, and deprived of the use of one's limbs, senses, &c. which the common people call being *stupid*, or *stunned*.

SIDERATION also denotes the blain, or blighting of trees, plants, &c. by eastern winds, excessive heat, drought, or the like causes. See *BLIGHT*.

SIDIERIAL year. See the articles *YEAR* and *SOLAR*.

SIDERITES, a name which some authors give the load-stone. See *MAGNET*. It is also the name of a genus of plants, supposed to have great virtue as vulneraries. See *Supplement*, article *SIDERITES*.

SIDES-MEN, properly called *synods-men* or *quest-men*, persons, who in larger parishes are appointed to assist the churchwardens, in enquiring into the manners of incontinent livers, and in presenting offenders at visitations.

SIEGE*, in war, the encampment of an army around a place, with design to take it, either in the way of distress and famine, by making lines all around it, to prevent any relief from without; or by main force, as by digging trenches, and making fortal attacks.

* The word is French, and, signifies, literally, *seat*: alluding to the army's taking its seat here till the reduction of the place.

The most celebrated sieges of antiquity, are those of Troy, Tyre, Alexandria, and Numantium. And among the moderns, those of Ostend, Candia, Grave, &c. See *LINES*.

SIEVE, or *SEARCE*, an instrument serving to separate the fine from the coarse parts of powders, liquors, and the like; or to cleanse pulse from dust, hair, &c.

It is made of a rim of wood: two sides, or space whereof is filled with a plexus of silk, tiffany, hair, linen, wire, or even thing slices of wood.

The *sieves* which have large holes, are sometimes also called *riddles*; such is the coal or lime *sieve*, the garden *sieve*, &c.

When drugs, apt to evaporate, are to be passed through the *sieve*, it is usual to have it covered with a lid.

SIEUR, a title of honour, or quality among the French; chiefly used among the lawyers, and in public acts, and other writings of that kind.

They say, I plead for the *sieur* such an one, the *sieur* abbot, the *sieur* marquis, &c.

The title *sieur* is also given by a superior to an inferior; in his letters and other private writings.—As, Tell the *sieur* Hubert, that he proceed, &c.

In this sense, authors sometimes use it, by way of modesty, in speaking of themselves: thus, at the heads of books, we see, *Traduction du sieur d'Ablandcourt*; *OEvres du sieur d'Espreaux*, &c.

SIEUR, is also a term expressing *seignury*, or lordship: as *ecuyer* or *sieur* of such a place.

SIGHT, the exercise, or act of the sense of seeing.

Our *sight*, the noblest and most useful of all our senses, farther Malebranche shews, deceives us in abundance of instances; nay, almost in all: particularly with regard to the magnitude, and extent of things; their figures, motions, &c. Our eyes do not shew us any thing less than a mite: half a mite is nothing, if we believe their report. A mite is only a mathematical point, with regard thereto; and we cannot divide it without annihilating it. In effect, our *sight* does not represent extension, such as it is in itself; but only the relation and proportion it has to our body. Hence, as half a mite has no relation to our bodies, and that it cannot either preserve or destroy us, our *sight* hides it entirely. Were our eyes made like microscopes, or were we ourselves as small as mites, we should judge very differently of the magnitude of bodies.

It may be added, that our own eyes are really no other than a kind of natural spectacles; that the humors of the eye perform the office as the lens in spectacles; and that, according to the figure

figure of the crystallin, and its distance from the retina, objects are seen very differently by us; inasmuch, as we are not sure, that there are any two persons in the world, who see them equally big.—It is even very rare, that the same person sees the same object equally big with both eyes; as both eyes are very seldom perfectly alike: on the contrary, we generally see things bigger with the left than the right eye; of which we have some very good observations in the journal of the learned at Rome, for the year 1669. See VISION.

Short SIGHT, } See the articles { MYOPIA.
Second SIGHT, } SECOND sight.
Point of SIGHT, } VIEW and POINT.

SIGHTS, in mathematics, denote two thin pieces of brass raised perpendicularly on the two extremes of an alidade or index of a theodolite, circumferentor, or other like instrument: each whereof has an aperture or slit up the middle, through which the visual rays pass to the eye, and distant objects are seen.—Their use is for the just direction of the index to the line of the object.

Sometimes the slits or apertures have glasses, or lenses fitted into them; in which case they are called *telescopic sights*: by way of distinction from the former, which in respect hereof are denominated *plain sights*.

Mr. Flamsteed and Dr. Hook, absolutely explode the use of *plain sights* in astronomical observations. The errors in Tycho's latitudes of the stars, Mr. Flamsteed ascribes wholly to his using *plain sights*; and suspects, that Hevelius using the same kind of *sights*, must fall into the like errors.—Hevelius, on the contrary, in a paper in the Philosophical Transactions, vindicates the use of *plain sights*, and prefers them to *telescopic* ones: the main objection he makes to the latter, is, that no observation can be safely taken with them, without first examining and rectifying them: in which examination, many and gross mistakes are liable to be committed.—To which he adds, that in sextants, octants, azimuth quadrants, &c. he does not see how such examination can be made, at all times, without much loss of time.

SIGILLARIA, a solemn feast held among the ancient Romans; thus called from a custom which obtained therein, of sending little presents from one to another, consisting of seals, little figures, and sculptures, made of gold, silver, brass, or even earthen ware, and of devoting them to Saturn as an atonement for themselves and their friends.

The *sigillaria* followed immediately after the saturnalia, and held two days; which, with the five days of the saturnalia, made a solemnity of seven days.

Some derive the origin of *sigilli* and figures in this solemnity from the argei or ruffen figures of men thrown annually into the Tiber, from the Pons Sublicius, by the vestals, on the ides of March. Vid. Macrobius Saturn. l. i. c. 7, 10 and 11. See also ARGEA.

SIGILLATA terra, a name given to several kinds of medicinal earths marked with seals, to express their being genuine. The principal is the Lemnian earth: this is a kind of earth, or bole, dug in the isle of Lemnos; and thence also called Lemnian earth; of considerable use in medicine. See LEMNIAN earth.

It is of different colours, but the most common is red; heavy, soft, and friable; it is held very astringent, and, as such, used in hæmorrhages; as also against the plague and poisons.—Pliny attributes several other virtues to it, which experience does not justify; nor is it now in that esteem it anciently was; yet it is still an ingredient in Venice-treacle, &c.

It was anciently found in a mountain, in the neighbourhood of the city Hephæstia; where Diana's priests went at certain times, with great ceremony, to dig it up. After a little preparation, they made it up into troches, and sealed them with Diana's seal; whence the appellation of *sigillata*, sealed. See Supplement, article LEMNIA TERRA.

SIGILLUM, a seal or signet. See SEAL and SIGNET.

SIGN, SIGNUM, a sensible mark or character, denoting something absent, or invisible. See CHARACTER and MARK.

Anciently the monks, in all religious houses, were not allowed to speak; nor to express their minds otherwise than by signs, which they learned in their novitiate. C. Rhodiginus and Porta have wrote of the ancient signs, and ciphers, used in speaking, and writing.

SIGN, in algebra, denotes a symbol, or character. See CHARACTER.

Like SIGNS, } See the articles { LIKE.
Radical SIGNS, } RADICAL.

SIGN, in medicine, denotes some appearances in the body, discernible by the senses; whence, by just reasoning, is inferred the presence, nature, state, event of health, a disease, or death.

Those which denote the present condition of a body, whether sick or well, dying or the like, are called *diagnostic signs*.

Those which foretell the future state thereof, are called *prognostic signs*.

That sign which is peculiar to the disease, and inseparable from it, as arising from the nature thereof, is called a *pathognomonic sign*.

As all signs are effects produced by the cause of the disease, the disease itself, and its symptoms; they usually note the present condition of the matter which first produced the disease, and even of that produced by the disease: on which footing, the signs are all reducible to these three classes, viz. signs of the acuity, and coction of the disease; of its event, whether in health, sickness, or death; and of its secretion and excretion: which last signs are called *critical* ones.

Antecedent SIGN. See the article ANTECEDENT.

SIGN, in astronomy, a twelfth part of the ecliptic, or zodiac; or a portion containing thirty degrees thereof.

The zodiac was divided by the ancients into twelve segments, called signs; commencing from the point of intersection of the ecliptic and equinoctial: which signs they denominated from the twelve constellations which, in Hipparchus's time possessed those segments.—But, the constellations have since so changed their places, by the precession of the equinox, that aries is now got out of the sign called aries, into taurus, taurus into gemini, &c.

The names of the twelve signs, and their order, are as follow; aries, taurus, gemini, cancer, leo, virgo, libra, scorpio, sagittarius, capricornus, aquarius, pisces: each of which, with the stars thereof, see under its proper article, ARIES, TAURUS, &c.

The signs are distinguished with regard to the season of the year, when the sun is in them, into vernal, æstival, autumnal, and brumal. See AUTUMNAL and VERNAL.

The vernal, or spring SIGNS, are aries, taurus, gemini.

The æstival, or summer SIGNS, are cancer, leo, and virgo.

The autumnal SIGNS, are libra, scorpio, and sagittarius.

The brumal, or winter SIGNS, are capricornus, aquarius, and pisces.

The vernal and summer signs, are also called northern signs. —And the autumnal and brumal signs, southern signs.

Ascending SIGNS, } ASCENDING.

First SIGNS, } See the articles { FIXT.

Masculine SIGNS, } MASCULINE.

SIGN manual, the setting one's hand and seal to a writing.

See SIGNATURE.

Among the Saxons, before the invention of seals, a† was a common sign or signum, prefixed to the names of most subscribing witnesses in charters and other deeds; as† signum Roberti Episcop. Lond. &c.

SIGNAL, a certain sign agreed upon for the conveying of intelligence to places to which the voice cannot reach.

Signals are given for the beginning of a battle, or an attack; usually with drums, and trumpets: at sea, they are given by cannon or musket-shot, by lights, flags, &c.

Signals have been in use in all ages. The ancients who had no regular couriers or posts, made use thereof to convey intelligence of what passed at a great distance. For which purpose they placed centinels on the eminences, from space to space; some mention whereof, we find made by Homer himself. Iliad. O. v. 553, &c. Odyss. z. v. 261. Those people thus disposed, lighted fires, or flambeaux in the night-time. In the Agamemnon of Æschylus, that prince at his departure for Troy, promises Clytemnestra, that the very day the city should be taken, he would apprise her of his victory by fires lighted express. He keeps his word, and tidings are brought the prince, that Troy is taken, and that Agamemnon's signals are seen. Frontinus observes, they were in use among the Arabs; and Bonaventura Vulcanius, in his Scholia on Aristotle's book de mundo, adds, that while the Moors were masters of the greatest part of Spain, they built on the tops of the mountains, an infinity of turrets, or watch-houses, called in the Arabic, *atalayas*, a word the Spaniards still retain; whence, by fires, they could immediately alarm the whole kingdom. Indeed the custom was much more ancient than the Moors in Spain. Q. Curtius observes, it was very frequent among the Asiatics, in the time of Alexander. Livy and Cæsar also both mention it as used among the Romans. Polydore Virgil shews it of great antiquity in England; and Boethius adds, that in several places in England, there are the remains of huge poles that have served for this purpose.

SIGNALS at sea, are signs made by the admiral or commander in chief of a squadron of ships, either in the day or by night, whether for sailing, for fighting, or for the better security of the merchant ships, under their convoy.

These signals are very numerous and important; being all appointed and determined by order of the lord high admiral, or lords of the admiralty; and communicated in the instructions

structions sent to the commander of every ship of the fleet or squadron before their putting out to sea.

SIGNALS by day.—When the commander in chief would have them prepare for fighting, he first hoists his fore-top-mast, and then the whole fleet are to do the same. When he would have them unmoor, he hoists his main-top-mast, and fires a gun, which in the royal navy is to be answered by every flag-ship. When he would have them weigh, he hoists his fore-top-mast, and fires a gun, and sometimes haws home his sheats: the gun is to be answered by every flag-ship, and every ship is to get to sail as soon as it can. If with the leeward-side, the stern-moist ship is to weigh first. When he would have the weather-moist, and head-moist ships to tack first, he hoists the union flag at the fore-top-mast-head, and fires a gun, which each flag-ship answers; but if he would have the stern-moist and leeward-moist ships to tack first, he hoists the union-flag at the mizen-top-mast-head, and fires a gun; and when he would have all the whole fleet tack, he hoists an union, both on the fore, and mizen-top-mast-heads, and fires a gun. When in bad weather, he would have them wear, and bring to the other tack, he hoists a pendant on the ensign-staff, and fires a gun: and then the leeward-moist and stern-moist ships are to wear first, and bring on the other tack, and lie by, or go on with an easy sail, till he comes a-head: every flag is to answer with the same signal. If they are lying by, or failing by a wind, and the admiral would have them bear up and fail before the wind, he hoists his ensign, and fires a gun, which the flags are to answer: and then the leeward-moist ships are to bear up first, and to give room for the weather-moist to wear, and fail before the wind with an easy sail, till the admiral comes a-head. But if it should happen when the admiral hath occasion to wear and fail before the wind, that both jack and ensign be abroad, he will hawl down the jack, before he fires the gun to wear, and keep it down till the fleet is before the wind. When they are failing before the wind, and he would have them bring to, with the star-board tacks aboard, he hoists a red flag at the flag-staff, on the mizen-top-mast-head, and fires a gun. But if they are to bring to, with the lar-board tack, he hoists a blue flag at the same place, and fires a gun, and every ship is to answer the gun. When any ship discovers land, he is to hoist his jack and ensign, and keep it abroad, till the admiral or commander in chief answer him, by hoisting his; on sight of which, he is to hawl down his ensign. If any discovers danger, he is to tack and bear up from it, and to hang his jack abroad from the main-top-mast cross-trees, and to fire two guns: but if he should strike or stick fast, then, besides the same signal with his jack, he is to keep firing, till he sees all the fleet observe him, and endeavour to avoid the danger. When any sees a ship or ships more than the fleet, he is to put abroad his ensign, and then keep it, till the admiral's is out, and then to lower it, as often as he sees ships, and stand in with them, that so the admiral may know which way they are, and how many; but if he be at such a distance, that the ensign cannot well be discovered, he is then to lay his head towards the ship or ships so discovered, and to brail up his low sails, and continue hoisting and lowering his top-sails, and making a waft with his top-gallant sails, till he is perceived by the admiral. When the admiral would have the vice-admiral, or he that commands in the second post of the fleet, to fend out ships to chase, he hoists a flag, striped white and red on the flag-staff, at the fore-top-mast-head, and fires a gun. But if he would have the rear-admiral do so, he then hoists the same signal on the flag-staff, at the mizen-top-mast-head, and fires a gun. When the admiral would have any ship to chase to windward, he makes a signal for speaking with the captain, and he hoists a red flag in the mizen shrouds, and fires a gun: but if to chase to leeward, a blue flag; and the same signal is made by the flag, in whose division that ship is. When he would have them give over chase, he hoists a white flag on his flag-staff at the fore-top-mast-head, and fires a gun: which signal is to be made also by that flag-ship which is nearest the ship that gives chase, till the chasing ship sees the signal. In case of springing a leak, or any other disaster, that disables their ship from keeping company, they are to hawl up their courses, and fire two guns. When any ship would speak with the admiral, he must spread an English ensign, from the head of his main, or fore-top-mast, downwards on the shrouds, lowering his main, or fore-top-mast, and continue firing guns, till the admiral observe him; and if any ship perceive this, and judgeth the admiral doth not, that ship must make the same signal, and make the best of his way to acquaint the admiral therewith, who will answer by firing one gun. When the admiral would have the fleet to prepare to anchor, he hoists an ensign, striped red, blue, and white on the ensign staff, and fires a gun, and every flag-ship makes the same signal. If he would have the fleet moor, he hoists his mizen-top-mast, with the clew-lines hawled up, and fires a gun. If he would have the fleet cut or slip, he looses both his top-sails, and fires two guns; and then the leeward ships are to cut or slip first, to give room to the weathermost to come to sail. So he would have any particular ship to cut or slip, and

to chase to windward, he makes the signal for speaking with that ship, hoists a red flag in the mizen shroud, and fires a gun: but if the ship is to chase to leeward, he hoists a blue flag as before. If he would have the fleet exchange their small arms, he hoists a red flag on the ensign-staff, and fires a gun; but if the great guns, then he puts up a pendant over the red flag.

SIGNALS by night.—To be observed at an anchor, weighing anchor, and sailing, are as follow. When the admiral would have the fleet to unmoor, and lie short, he hangs out three lights, one over another, to signify small shrouds, over the constant light in the mizen-top, and fires two guns, which are to be answered by the flag-ships; and each private ship hangs out a light in the mizen-shrouds. Note, That all guns, fired for signals in the night, must be fired on the same side, that they may make no alteration in the found. When he would have them weigh, he hangs a light in the main-top-mast shrouds, and fires a gun, which is to be answered by all the flags, and every private ship must tack as fast as they can, and the stern-moist flag-ship, after he is about on the other tack, is to lead the fleet, and him they are to follow, to avoid running through one another in the dark. When he is upon a wind, and would have the fleet veer, and bring to on the other tack, he hoists up one light at the mizen-peak, and fires three guns, which is to be answered by all the flag-ships, and every private ship must answer, with one light at the mizen-peak, and the stern-moist ships, are to bear up as soon as the signal is made. When he would have them, in blowing weather, to lie a try, short, or a hull, or with the head-sails braced to the masts, he will form lights of equal height, and fire five guns, which are to be answered by the flag-ships, and then every private ship must shew four lights: and after this, if he would have them to make sail, he then fires ten guns, which are to be answered by all the flags, and then the head-moist and weather-moist ships, are to make sail first. When the fleet is sailing large, or before the wind, and the admiral would have them bring to, and lie by with their star-board tacks aboard, he puts out four lights in the fore-shrouds, and fires six guns; but if with the lar-board tacks aboard, he fires eight guns, which are to be answered by the flag-ships; and every private ship must shew four lights. The wind-moist ships must bring to first. Whenever the admiral alters his course, he fires one gun, (without altering his lights) which is to be answered by all the flag-ships. If any ship hath occasion to lie short, or by, after the fleet hath made sail, he is to fire one gun, and shew three lights in his mizen-shrouds. When any one first discovers land, or danger, he is to shew as many lights as he can, to fire one gun, and to tack, or bear away, from it: and, if any one happen to spring a leak, or any be disabled from keeping company with the fleet, he hangs out two lights of equal height, and fires guns till he is relieved by some ship of the fleet. If any one discovers a fleet, he is to fire guns, make false fires, put one light out on the main-top, three on the poop, to steer after them, and to continue firing of guns, unless the admiral call him off, by firing another course, and fire two or three guns; for then he must follow the admiral. When the admiral anchors, he fires two guns, a small space of time one from the other, which are to be answered by the flag-ships, and every private ship must shew two lights. When the admiral would have the fleet to moor, he puts a light on each top-mast head, and fires a gun, which is to be answered by the flag-ships, and every private ship is to shew one light. If he would have them lower their yards and top-masts, he hoists one light upon his ensign staff, and fires one gun; which is to be answered by the flag-ships; and every private ship must shew one light. And when he would have them hoist their yards and top-masts, he puts out two lights, one under the other, in the mizen-top-mast shrouds, and fires one gun: which is to be answered by the flag-ships; and each private ship must shew one light in the mizen-shrouds. If any strange ship be discovered coming into the fleet, the next ship is to endeavour to speak with her, and bring her to an anchor, and not suffer her to pass through the fleet. And if any one discovers a fleet, and it blow so hard that he cannot come to give the admiral notice timely, he is to hang out a great number of lights, and to continue firing gun after gun, till the admiral answers him with one. When the admiral would have the fleet to cut or slip, he hangs out four lights, one at each main-yard-arm, and at each fore-yard-arm, and fires two guns, which are to be answered by the flag-ships, and every private ship is to shew one light.

SIGNALS used, when a fleet sails in a fog.—If the admiral would have them weigh, he fires ten guns; which every flag-ship is to answer. To make them tack, he fires four

guns,

guns, which are to be answered by the flag-ships; and then the leeward-moist, and stern-moist ships must tack first, and after they are about, to go with the same fall they tacked with, and not to lie by, expecting the admiral to come a-head: and this is to avoid the danger of running through one another in thick weather.

When the admiral brings to, and lies with his head-fails to the mast; if with the star-board tack aboard, he fires six guns; but if with the lar-board tack, he fires eight-guns, which the flag-ships are to answer. And after this, if he makes sail, he fires ten guns, which the flag-ships must answer, and then the head-moist and weather-moist ships are to make sail first. If it grow thick and foggy weather, the admiral will continue sailing, with the same sail set, that he had before it grew foggy, and will fire a gun every hour, which the flag-ships must answer, and the private ships must answer, by firing of muskets, beating of drums, and ringing of bells. But if he be forced to make either more or less sail than he had, when the fog began, he will fire a gun every half hour, that the fleet may discern, whether they come up with the admiral, or fall a-stern of him; and the flags and private ships are to answer as before. If any one discovers danger, which he can avoid, by tacking and standing from it, he is to make the signal for tacking in a fog; but if he should chance to strike and stick fast, he is to fire gun after gun, till he thinks the reef have avoided the danger. When the admiral would have the fleet to anchor, he fires two guns, which the flags are to answer; and after he hath been half an hour at an anchor, he will fire two guns more, to be answered by the flags, as before; that all the fleet may know it.

SIGNALS for calling officers on board the admiral.—When the admiral puts aboard an union-flag in the mizen-throwds, and fires a gun, all the captains are to come aboard him: and if with the same signal, there be also a waft made with the ensign, then the lieutenant of each ship is to come on board. If an ensign be put aboard in the same place, all the masters of the ships of war are to come on board the admiral. If a standard on the flag-staff be hoisted at the mizen-top-mast-head, and a gun fired, then all the flag-officers are to come aboard the admiral. If the English flags only; then a standard in the mizen-throwds; and fire a gun: if the flags, and land general officers; then the admiral puts aboard a standard at mizen-top-mast-head, and a pendant at mizen-peek, and fires a gun. If a red flag be hoisted in the mizen-throwds, and a gun fired; then the captains of his own squadron are to come aboard the admiral; and if, with the same signal, there be also a waft with the ensign, the lieutenant of each ship must come aboard. If he hoists a white flag, as before, then the vice-admiral, or he that commands in the second post, and all the captains of his squadron, are to go on board the admiral: if a blue flag, &c. then the rear-admiral, and the captains of his squadron, must come on board; and if a waft, as before, the lieutenants. When a standard is hoisted on the ensign-staff, and a gun fired, the vice and rear-admirals must come on board the admiral's ship. When the admiral would speak with the captains of his own division, he will hoist a pendant on the mizen-peek, and fire a gun; and if with the lieutenants, a waft is made with the ensign, and the same signal: for whenever he would speak with the lieutenants of any particular ship, he makes the signal for the captain, and a waft also with the ensign. When the admiral would have all the tenders in the fleet come under his stern, and speak with him; he hoists a flag, yellow and white, at the mizen-peek, and fires a gun. But if he would speak with any particular ship's tender, he makes a signal for speaking with the captain the tends upon, and a waft with the jack. If all the pinnaces and barges are to come on board, manned and armed, the signal is a pendant on the flag-staff, hoisted on the fore-top-mast-head, and a gun fired; and if he would have them chase any ship, vessel, or boat, in view, he hoists the pendant, and fires two guns. The signal for the long-boats to come on board him, manned and armed, is the pendant hoisted on the flag-staff, and the mizen-top-mast-head, and a gun fired; and if he would have them chase any ship, vessel, or boat, in open view, without coming on board him, he hoists the pendant, as aforesaid, and fires two guns. When the admiral would have all the boats in the fleet come on board him, manned and armed, he hoists a pendant on the flag staff, both on the fore-top-mast, and mizen-top-mast-head, and fires one gun; but if he would have them chase, he hoists his pendants, as before, and fires two guns. When the admiral would speak with the victualler, or his agent, he puts an English ensign in the mizen-top-mast throwds; and when with him that hath the charge of the gunner's stores, he will spread an ensign at his main-top-fall-yard-arm.

SIGNALS for managing a sea-fight.—When the admiral would have the fleet form a line of battle, one ship a-head of another, he hoists an union-flag at the mizen-peek, and fires a gun; and every flag-ship does the like. But when they are to form a line of battle, one a-breast of another, he hoists a pendant with the union-flag, &c. When he would have the admiral of the white, or he that commands in the second

post, to tack, and endeavour to gain the wind of the enemy, he spreads a white flag under the flag at the main-top-mast-head, and fires a gun; and when he would have the vice-admiral of the blue do so, he doth the same with the blue flag. If he would have the vice-admiral of the red do so, he spreads a red flag from the cap, on the fore-top-mast-head, downward on the back-stay: if the vice-admiral of the blue, he spreads a blue-flag, &c. and fires a gun. If he would have the rear-admiral of the red do so, he hoists a red flag at the flag-staff, at the mizen-top-mast-head; if the rear-admiral of the white, a white flag, if the rear-admiral of the blue, a blue flag, and under it a pendant of the same colour, with a gun. If he be to leeward of the fleet, or any part of it, and he would have them bear down into his wake or grain, he hoists a blue flag at the mizen peek, and fires a gun. If he would be to leeward of the enemy and his fleet, or any part of it be to leeward of him; in order to bring these ships into the line, he bears down with a blue flag at the mizen peek, under the union flag (which is the signal for battle) and fires a gun; and then those ships, that are to leeward of him, must endeavour to get into his wake or grain, according to their station in the line of battle. When the fleet is sailing before the wind, and he would have him, who commands in the second post, and the ship of the star-board quarter, to clap by the wind, and come to the star-board tack, he hoists a red flag at the mizen-top-mast-head: but a blue one, if he would have ships of the lar-board quarter, come to the lar-board tack, with a gun. If the van are to tack first, he spreads the union-flag at the flag-staff, on the fore-top-mast-head, and fires a gun, if the red-flag be not abroad; but if it be, then he lowers the fore-top-falls a little; and the union-flag is spread from the cap of the fore-top-mast downwards; and every flag-ship doth the same. If the rear be to tack first, he hoists the union-flag on the flag-staff, at the mizen-top-mast-head, and fires a gun; which all the flag ships are to answer. If all the flag-ships are to come into his wake or grain, he hoists a red flag at his mizen-peek, and fires a gun; and all the flag-ships must do the same. If he would have him that commands in the second post of his squadron to make more sail (though he himself shorten sail) he hoists a white flag on the ensign-staff. But if he that commands in the third post be to do so, he hoists a blue flag, and fires a gun, and all the flag-ships must make the same signal. Whenever he hoists a red flag on the flag-staff at the fore-top-mast-head, and fires a gun; every ship in the fleet must use their utmost endeavour to engage the enemy, in the order prescribed them. When he hoists a white flag at his mizen-peek, and fires a gun; then all the small frigates of his squadron, that are not of the line of battle, are to come under the stern. If the fleet be sailing by a wind in the line of battle, and the admiral would have them brace their head-fails to the mast, he hoists up a yellow flag, on the flag-staff, at the mizen-top-mast-head, and fires a gun; which the flag-ships are to answer: and then the ships in the rear must brace first. After this, if he would have them fall their head-fails, and stand on, he hoists a yellow flag on the flag-staff of the fore-top-mast-head, and fires a gun, which the flag-ships must answer, and then the ships in the van, must fall first, and stand on. If when this signal is made, the red flag at the fore-top-mast-head be abroad, he spreads the yellow flag under the red. If the fleets being near one another, the admiral would have all the ships to tack together, the sooner to lie in a posture to engage the enemy; he hoists an union-flag on the flag-staves at the fore and mizen-top-mast-heads, and fires a gun; and all the flag-ships are to do the same. The fleet being in a line of battle, if he would have the ship that leads the van, hoist, lower, set, or hawl up any of his sails, he spreads a yellow flag, under that at his main-top-mast-head, and fires a gun, which signal the flag-ships are to answer; and the admiral will hoist, lower, set, or hawl up the sail, which he would have the ship that leads the van, do; which is to be answered by the flag-ships of the fleet. When the enemies run, and he would have the whole fleet follow them, he makes all the fall he can after them himself, takes down the signal for the line of battle, and fires two guns out of his fore-chafe, which the flag-ships answer; and then every ship is to endeavour to come up with, and board the enemy. When he would have the chafe given over, he hoists a white flag at the fore-top-mast-head, and fires a gun. If he would have the red squadron draw into a line of battle, one a-breast of another, he puts abroad a flag, striped red and white, on the flag-staff at the main-top-mast-head, with a pendant under it, and fires a gun: if the white or second squadron is to do so, the flag is striped red, white and blue: if the blue or third squadron is to do so, the flag is a Genoese ensign and pendant: but if they are to draw into a line of battle, one a-head of another, the same signals are made without a pendant. If they are to draw into the line of battle one a-stern of another, with a large wind, and he would have the leaders go with the star-board tacks, a-board by the wind; he hoists a red and white flag at the mizen-peek, and fires a gun: but if they should go with the lar-board tacks aboard, by the wind, he hoists a Genoese

flag at the same place; which *signali*, like others, must be answer'd by the flag-ships.

SIGNATURE, *SIGNATURA*, *signing*, a subscription or putting of one's name at the bottom of an act, or deed, in one's own hand-writing.

Anciently, when very few people could write, they dispensed with the use of *signatures*; and contented themselves with the party's seal.

SIGNATURE of the court of Rome, is a supplication answered by the pope, whereby he grants a favour, dispensation, or collation to a benefice, by putting the *fiat* at the bottom thereof, in his own hand; or the *concessum est* wrote in his presence.—This *signature*, at the bottom of the supplication, gives the name to the whole instrument.

The *signature* contains the clauses, derogations, and dispensations wherewith the pope grants the favour, or the benefice; with a commission for the execution thereof, either in *forma dignum*, or in gracious form.

A *signature* of the pope's own hand, whereby he answers, *fiat ut petitur*, is preferred to another answered by the prelate, in his presence, in these words, *concessum ut petitur in presentia D. N. papae*. Sometimes in *signatures* with the *fiat*, the pope adds, *proprio motu*; which clause gives them still further force.

There are three kinds of *signatures*; one in *forma gratiosa*, dispatched on an attestation of the ordinary; another in *forma dignum antiqua*, dispatched for canonicates; the third in *forma dignum novissima*, which is a kind of second *signature*, or executorial letter granted where, upon the ordinary's failing to execute the writ within thirty days, the nearest other ordinary is enjoined to execute it.

SIGNATURE, in printing, denotes a mark at the bottom of each sheet, to facilitate the gathering and binding of the book; and to shew the order and number of the quires and sheets.

The *signatures* consist of the capital letters of the alphabet; and change in every sheet. If there be more sheets than letters in the alphabet; to the capital letter, they add a small one of the same sort, i. e. a little a after a great A, &c. which they repeat, as often as is necessary.

SIGNATURE, *SIGNATURA*, is also used by some naturalists for the resemblance a vegetable or mineral bears to any part of the human body; this is by some fantastical people, supposed to afford an indication of its virtues and use.

SIGNET, one of the king's seals, used for sealing his private letters, and signing all grants which pass his majesty's hand by bill.

The *signet* is always in the custody of the king's secretaries: on whom attend four clerks of the *signet-office*. See *SECRETARY* and *CLERK*.

SIGNIFICATION, the sense or meaning of a sign, word, phrase, emblem, device or the like; that is, the thing denoted by such sign, word, figure, &c.

We are almost perfectly at a loss as to the *signification* of the hieroglyphic characters of the ancients.

SIGNIFICATION, in law, is the notification of an act, &c. made to the opposite party, by a copy, &c. thereof, given and attested by a proper officer.

Some *significations* are to be made to the person himself; or, at least, at his house: for others, it is enough that they be made to the party's attorney, or agent.

SIGNIFICAVIT, a writ which issues out of chancery, upon a certificate given by the ordinary, of a man that stands obstinately excommunicate for the space of forty days; for the laying him up in prison, without bail or mainprize, till he submit himself to the authority of the church.

SIGNING. See *SIGNATURE* and *COUNTER-SIGNING*.

SILENCIARY, *SILENTIARIUS*, an officer among the ancient Roman slaves; being, according to some authors, a slave placed over the rest, to prevent any noise and uproar, and to keep them silent.

Seneca, in his epistles, mentioning the great care taken to keep the slaves mute, has given occasion to Liplius, Popma, and some others, to suppose, that the *silenciary* was established in his time: but others, as Pignorius, think no such conclusion can be drawn from Seneca's words; nor any thing, but that they were, even then, very severe in preventing any noise among the slaves.—As to the name and office of the *silenciary*, it was not established till about the time of Salvan; who is the first author that mentions it.

There were also *silenciarii* established in the emperor's court, called *quæstus ministri*, and *silenciarii palatii*; and honoured with the higher titles of *clarissimi*, *speciabiliter*, *devotissimi*, and in Greek *εὐσεβιστάτοις*, q. d. most admirable.

There were a great number of these; but only thirty ordinarily officiated; who were divided into three bands, each whereof had its *decurio*.—The council of Chalcedon, call the body of *silenciaries*, *schola devotissimarum silentiariorum*.

SILENI, in antiquity, a sort of heathen demi-gods, the same with *satyrs*, which were called *sileni* when they came to be advanced in age.

Yet was there one principal *Silenus* elder than any of the

rest.—Diod. Siculus says, he was the master, or tutor of Bacchus, whom he disciplined nobly, and followed him to the wars. He quotes an ancient poet named *Lycomachus*, who relates, that the *sileni* assisted Bacchus in the war he waged against the Titans; adding, that the first *Silenus* reigned in an island made by the river Triton in Libya.—He is represented, as having a long tail hanging behind; which is likewise an attribute of all his posterity.—The poets always mount him on an ass.

Nonnus makes *Silenus* a son of Teiulus; and gives him three sons, *Astræus*, *Maron* and *Lenæus*. Servius, on Virgil's eclogue, makes *Silenus* * the son of Mercury; others, the son of Pan, and a nymph: others will have him born of the drops of the blood of Cœlus, the father of Saturn.

* Bochart, in his *Canaan*, will have *Silenus* to take his name from שילן; or שילן, *Silo*; whence שילן, *Silan*, the name of the Messiah. He very rashly adds, that all that is attributed to this imaginary deity, is taken from what the prophets have foretold of Jesus Christ.—Thus, whereas it is said, the Messiah shall be the instructor of the people; *Silenus* is made the preceptor of Bacchus. Because it is said, that our Saviour shall bind his ass to the vine, and his colt to the young vine. *Silenus* is made to ride on an ass. Because our Saviour walked his garments in blood, as those that trod the wine-press: *Silenus* was made to preface over those who pressed the vintage. Because it is added, his eyes were red by reason of wine; *Silenus* was made always fuddled. Bochart, however, advances all this with a great deal of distrust, as he has reason; it having no warrant: he adds, that the devil invented the fable of *Silenus*, to turn the mysteries of our religion into ridicule. But it must be a very ignorant devil, to take *שילן* with *שילן*, & *שילן* with *שילן* for *שילן* in the sense he has done, as if the words signified any thing more, in the propriety of the Hebrew tongue, than his eyes were redder than wine; his teeth whiter than milk. We may add, that no body, before Bochart, neither Christian nor Jew, ever saw any thing of Jesus Christ in the fable of *Silenus*.

SILIQUEA, in botany, the seed-vessel, husk, pod, or shell of a plant of the leguminous kind.—W hence

SILICOUS plants, those which produce *siliques*, or seed-pods.

SILK, *SERICUM*, a very soft, fine, bright, delicate thread; the work of an insect, called *bombyx*, or the *silk-worm*.

The ancients were but little acquainted with the use and manufacture of *silk*: they took it for the work of a sort of spider, or beetle, who spun it out of its entrails, and wound it with its feet about the little branches of trees.—This insect they called *ser*, from *Seres*, a people in Scythia, who they thought bred it; whence the *silk* itself they called *sericum*.—But this *ser* of theirs has very little affinity with our *silk-worm*, *bombyx*: the former living five years; but the latter dying annually, enveloped in a yellowish bag, or ball, which wound out into little threads, makes what we call *silk*.

It was in the isle of Cos, that the art of manufacturing *silk* was first invented; and Pamphila, daughter of Platis, is honoured as the inventress.—The discovery was not long unknown to the Romans. *Silk* was brought them from Serica, where the worm was a native. But so far were they from profiting by the discovery, that they could not be induced to believe so fine a thread should be the work of a worm; and thereupon formed a thousand chimerical conjectures of their own.

Silk was a very scarce commodity among them for many ages: it was even sold weight for weight with gold; inasmuch, that Vopiscus tells us, the emperor Aurelian, refused the empress, his spouse, a suit of *silk*, which she solicited of him with much earnestness; merely on account of its dearth.—At length, two monks, coming from the Indies to Constantinople in 555, brought with them great quantities of *silk-worms*, with instructions for the hatching of their eggs, rearing and feeding the worms, and drawing out the *silk*, and spinning and working it. Upon this, manufactures were set up at Athens, Thebes and Corinth.

About the year 1130, Roger king of Sicily, established a *silk* manufactory at Palermo, and another in Calabria; managed by workmen, who were a part of the plunder brought from Athens, Corinth, &c. whereof that prince made a conquest in his expedition to the holy land.—By degrees, Mezeray adds, the rest of Italy and Spain learned from the Sicilians and Calabrians, the management of the *silk-worms*, and the working of *silk*: and at length the French, got it by right of neighbourhood, a little before the reign of Francis I. and began to imitate them.

The great advantage the new manufactory turned to, made our Kings James I. very earnest for its being introduced into England: accordingly, it was recommended several times from the throne, and in the most earnest terms, to plant mulberry-trees, &c. for the propagation of *silk-worms*; but, unhappily, without effect: though from the various experiments we meet withal in the Philosophical Transactions, and other places, it appears, that the *silk-worm* thrives and works as well, in all respects, in England, as in any other part of Europe.

The *silk-worm* is an insect, not more remarkable for the precious

precious matter it furnishes for divers stuffs, than for the many forms it assumes, before and after its being enveloped in the rich cocoon ball it weaves itself. From a small egg about the size of a pin's head, which is its first state, it becomes a pretty big worm, or caterpillar, of a whitish colour, inclining to yellow. In this state it feeds on mulberry-leaves, till being come to maturity, it winds itself up into a *silken* bag, or case, about the size and shape of a pigeon's egg; and becomes metamorphosed into an aurelia: in this state it remains without any signs of life, or motion: till at length it awakes, to become a butter-fly; after making itself a passage out of its *silken* sepulchre. And, at last, dying indeed, it prepares itself, by an egg, which it casts, for a new life; when the warmth of the summer weather assists it in re-fuming.

As soon as the *silk* worm or caterpillar is arrived at the size and strength necessary for beginning his cocoon; he makes his web: for it is thus they call that slight tissue, which is the beginning, and ground of this admirable work. This is his first day's employment. On the second, he forms his folliculus or ball, and covers himself almost over with *silk*. The third day, he is quite hid; and the following days he employs himself in thickening and strengthening his ball: always working from one single end, which he never breaks by his own fault; and which is so fine, and so long, that those who have examined it attentively, think they speak without comparison, when they affirm, that each ball contains *silk* enough to reach the length of six English miles.

In ten days time, the ball is in its perfection; and it is now to be taken down from the branches of the mulberry-tree, where the worms have hung it.—But this point requires a great deal of attention; for there are some worms more lazy than others; and it is very dangerous waiting till they make themselves a passage, which usually happens about the nineteenth day.

The first, finest and strongest balls, are kept for the breed; the rest are carefully wound: if there be more than can be well wound at once; they lay them for some time in an oven moderately hot, or else expose them, for several days successively, to the greatest heats of the sun, in order to kill the insect; which, without this precaution, would not fail to open itself a way to go and use those new wings abroad, which it has acquired within.

Ordinarily, they only wind the more perfect balls. Those that are double, or too weak, or too coarse, are laid aside; not as altogether useless, but that, being improper for winding, they are reserved to be drawn out into threads.

The balls are of different colours; the most common are yellow, orange-colour, isabella, and flesh-colour.—There are some also of a sea-green; others of a sulphur-colour, and others white: but there is no necessity for separating the colours and shades to wind them apart; as all these colours are to be lost in the future scouring and preparing of the *silk*.

To wind the SILK from off the balls. Two machines are necessary; the one a furnace, with its copper; the other a reel, or frame, to draw the *silk*.—The winder seated near the furnace, throws into the copper of water over the furnace (well heated to a certain degree, which custom alone can teach) a handful or two of balls, which have been first well purged of all their loose furry substance. He then stirs the whole very busily about with birchen rods, bound and cut like brushes; and when the heat and agitation have detached the ends of the *silk* of the pods, which are very apt to catch on the rods, he draws them forth; and joining ten or twelve, or even fourteen of them together, he forms them into threads, according to the bigness required to the workmen are destined for: eight ends sufficing for ribbands; and velvets, &c. requiring no less than fourteen. The ends thus joined into two or three threads, are first passed into the hole of three iron rods, in the fore-part of the reel, then upon the bobbins, or pulleys, and at last they are drawn out of the reel itself, and there fastened; each to an end of an arm or branch of the reel. Thus disposed, the workman, giving motion to the reel, by turning the handle, guides his threads; substitutes new ones, when any of them break, or any of the balls are wound out; strengthens them where necessary, by adding others; and finally he takes away the balls wound out, or that having been pierced, and are full of water. In this manner, two workmen will spin and reel three pounds of *silk* in a day; which is an otherwise dispatch than is made by the spinning-wheel, or distaff.—Indeed, all *silks* cannot be spun and reeled after this manner: either by reason the balls have been perforated by the *silk*-worms themselves, or because they are double, or too weak to bear the water; or because they are coarse, &c. Of all these together, they make a particular kind of *silk* called *floretta*: which being carded, or even spun on the distaff, or the wheel, in the common way it comes from the ball, makes a tolerable *silk*. As to the ball, after opening them with knives, and taking out the insects (which are of some use for the feeding of poultry) they are steeped three or four days in troughs, the water whereof is changed every day to prevent their stinking.

When they are well softened by this soaking, and cleared of that gummy matter, the worm had lined the inside withal, and which renders it impenetrable to the water, they boil them half an hour in a lye of ashes, very clear and well strained: and after washing them out in the river, and drying them in the sun, they card and spin them on the wheel, &c. and thus make another kind of *floretta*, somewhat interior to the former.

The several preparations which *silks* undergo, to fit them to be used in the manufacture of *silk* stuffs, are the spinning, reeling, milling, bleaching and dying.—The two first we have already spoke of, as they are concerned in drawing the *silk* from off the balls.—As to the spinning and reeling of raw *silk* off the balls, such as they are brought hither from Italy, the Levant, &c. the first is chiefly performed on the spinning-wheel; and the latter, either on hand-reels, or on reels mounted on machines, which serve to reel several strains at the same time.—As to the milling, they use a mill composed of several pieces, which may mill two or three hundred bobbins at once, and make them into as many strains. See MILLING. For the bleaching and dying, see BLEACHING and DYING.

Silk is distinguished by different names according to its different states.—Thus,

Raw SILK, is that taken from the ball, without fire, and wound without any coction: such as is most, if not all, that is brought into England from the Levant.

In the French *silk*-works, the greatest part of this raw *silk*, passes for little better than a kind of fine *floretta*; yet, when spun, it makes a bright thread, and serves for the manufacture of stuffs of moderate value and lustre. But the raw *silks* of the Levant, whence most of ours come, are exceeding fine and beautiful.—This difference arises hence, that in France the best balls are spun and wound in boiling water, and only the refuse made into raw *silk*: whereas, in the Levant, there is no such thing as spinning or winding on the fire; but the *silks* are all sent in bales or packs, as they are drawn from off the balls: so that they are only distinguished by their quality of fine, middling, and coarse.

Boiled SILK, is that which has been boiled in water, to facilitate the spinning and winding.—This is the finest of all the sorts of *silk* manufactured in France, and is seldom used, but in the richest stuffs; as velvets, taffeties, damasks, brocades, &c.

There is also another kind of *boiled silk*, which is prepared by boiling, to be milled; and which cannot receive that preparation, without being first passed through hot water.

By the laws of France, it is prohibited to mix raw with *boiled silk*; both as such a practice spoils the dying, and as the raw *silk* corrupts and cuts the boiled.

Thrown or twisted SILKS are such as, beside their spinning and winding, have received their milling or throwing.

This they receive in a different degree, as they are passed oftener, or seldom, over the mill: properly, however, *thrown SILKS*, are those wherein the threads are pretty thick thrown, and are twisted several times.

Slack SILKS are such as are not twisted, but are prepared, and dyed, for tapestry, and other works, with the needle.

Eastern, or East-Indian SILK.—That popularly thus called, is not the work of the *silk* worms, but comes from a plant that produces it, in pods, much like those of the cotton-tree. The matter this pod contains is extremely white, fine, and moderately glossy: it spins easily, and is made into a kind of *silk*, that enters the manufacture of several Indian and Chinese stuffs.

French SILKS.—It is only in the most southern provinces of France, that *silk* is cultivated, mulberry-trees planted, and worms bred. The principal places are Languedoc, Dauphine, Provence, Avignon, Savoy and Lyons.—This last place, indeed, furnishes very few *silks* of its own growth; but is the great staple whence the merchants of Paris and the other cities are to fetch them: at least, they are obliged to have them pass through Lyons, if they bring them from elsewhere, either by land or sea.

There are computed to enter Lyons, *communibus annis*, 6000 bales; the bale valued at 160 pound weight: of which 6000 bales, there are 1400 from the Levant, 1600 from Sicily, 1500 from Italy, 300 from Spain, and 1200 from Languedoc, Provence and Dauphine.

At the time when the manufactures of Lyons were in their prosperity, there were reckoned 18000 to be looms employed in the *silk* manufacture; but they are now so fallen, that even in 1698, there were not reckoned 4000.—The decay is not less notable at Tours: they had formerly there 700 mills for winding and preparing the *silks*; 8000 looms to weave them, and 40,000 persons employed in the preparation and manufacturing thereof; but these are now reduced to 70 mills, 1000 looms, and about 4000 persons.

Sicilian SILK.—The commerce of the *silks* of Sicily is very considerable; and the Ilorentines, Genoeve and Luccefe, are the people who chiefly make it. Great quantities are yearly brought thence, especially from Messina; part whereof they use in their own manufactures, and sell the rest to their neighbours, the French, &c. with profit.—The Italians have this

this advantage, especially the Genoese, over other people, that having large establishments in the island, they are reputed as natives, and pay no duty for the export.

Part of the *Sicilian silks* are raw; the rest are spun and milled; of which last kind, those of St. Lucia and Messina, are the most valued.—The raw, unwrought silks are always sold for ready money; the others, sometimes, in exchange for other goods.

Italian SILKS.—The silks brought from Italy are partly wrought, and partly raw, and unwrought. Milan, Parma, Lucca and Modena, furnish none but the latter kind; Genoa most of the former; Boulogna affords both kinds.

Spanish SILKS, are all raw; and are spun, milled, &c. in England, according to the several works they are to be used in.

Turky SILKS, are all raw.—One advantage we have in the commerce of the Levant, in silks, wanting in those of Sicily, is, that the latter are confined to a particular season of the year; whereas the former are bought at all times. They are brought from Aleppo, Tripoli, Sayda, and from the ile of Cyprus, Candia, &c.—But the principal place of commerce, especially for the silks of Persia, is Smyrna. The silks are brought thither in caravans, from the month of January to September. The caravans in January, are laden with the finest silks; those of February and March bring indifferent ones; the rest, the coarsest.

They all come from the several Provinces of Persia, chiefly those of Quilan and Schiravan, and the city of Schamachia, situate near the edge of the Caspian sea; from which three places, a Dutch author assures us, there do not come less than 30,000 bales of silk in a year.—Ardeuil or Ardebil, another city of Persia, not far distant from these silk countries, is the place where the silks are laid up, and whence the caravans set out for Smyrna, Aleppo and Constantinople; and it is this city, with Schamachia, that have always been esteemed the centre of the silk trade; which has been several times attempted to be removed from Smyrna and the Mediterranean, in favour of Atchangel and the White sea, by carrying them across Muskoy, by the Volga and Dwina, two rivers that traverse the principal provinces of that vast empire.

This new course of the Persian silks into Europe, was first proposed by Paolo Centurio, a Genoese, to the czar Basil, under the pontificate of Leo X. The French had the same design in 1626. The duke of Holstein, in 1633, sent ambassadors to the court of Persia purely with the same view; and in 1668, the czar Alexis Michael attempted the thing himself; but he was disappointed by the rebellion of the Cossacks, and the surprize of Astracan.

In 1688, the commerce of Persian silks had like to have been removed from Smyrna, by an earthquake, which almost overturned that whole city: and, doubtless, the removal had been effected, but for the vigorous means used by the Turks to prevent it.—Smyrna, however, still remains in her ancient possession; and the several nations of Europe continue every year to send their fleets, to fetch away the silks; and matters are like to remain so, unless the conquests made by the late czar, along the Caspian sea, enable his successors, as it is certain he himself had such a thing in view, to put this trade into another channel.

China, Japan and Indian SILKS.—Several provinces of China are so fertile in mulberry-trees, and their climate is so agreeable to the nature of silk-worms, that the quantity of silk there produced is incredible: the single province of Tschekiam might supply all China, and even a great part of Europe, with this commodity. The silks of this province are the most esteemed, though those of Nanquin and Canton be excellent.

The silk trade is the principal in China, and that which employs the most hands: but the European merchants, who deal in it, especially in wrought silks, are to be careful of the spinning, &c. the waste being usually very great, as the French East-India company lately found to their cost.

Japan does not afford fewer silks than China; but that the Japanese, a barbarous and distrustful people, have interdicted all commerce with strangers, especially with Europeans; excepting with the Dutch; who are said to be admitted on certain impious terms, related by Tavernier, but which we must own we cannot credit. The Dutch have endeavoured to vindicate themselves from these by the pens of several famous writers.

The silks of the states of the great mogul, are brought almost wholly from Kafem-bazar, a midland place, whence they are conveyed by a canal of fifteen leagues into the Ganges, by which, they are forwarded fifteen leagues further, to the mouth of the famous river of Indostan.—The silk of Kafem-bazar is yellowish; as are also those of Persia and Sicily; there being none, that we know of, naturally white, but that of Palestine. The Indians, however, whiten this with a lye, made of the ashes of a tree, called *Adam's fig-tree*; but as this tree is pretty scarce, and they have not yet found any other that will serve in its place, the Europeans are forced to take the greatest part of their silk in the native yellow. Kafem-bazar alone, is computed to furnish every year two

ty-two thousand bales of silk, each bale weighing 100 pounds. The Dutch buy it almost all up; not to bring it into Europe, no more than they do that of Japan; but to exchange it for other rich merchandizes; particularly teas of silver, &c.

Spider SILK.—Within a few years the secret has been found in France, of procuring and preparing silk from the webs of spiders; and the using it in several manufactures has been attempted. This discovery is owing to M. Bon, in 1710, who published a dissertation on the subject; whence what follows is extracted.

Spiders are usually distinguished, either with regard to their colour; as, into black, brown, yellow, white, &c. or with regard to the number, or arrangement, of their eyes; some having 6, others 8, others 10.—But with regard to the silk-spider, M. Bon reduces them all to two kinds, those with long legs, and those with short: which last, are those which furnish the finest raw silk.

The silk-spider makes a silk, every whit as beautiful, glossy, and strong as the silk-worm: it spins it from the anus, around which are five papillæ, or small nipples, and behind these, two others; all muscular, and furnished with spinners.—These nipples serve, as to many wire drawing-irons, to form and mould a viscous liquor, which, when dried in the air, after being drawn through them, makes the silk.

Each of these nipples, M. Reaumur observes, consists of a number of lesser and insensible ones; which one may be convinced of, by pressing a spider's belly between the fingers, to oblige the liquor to flow into the nipples; for by this means, applying the finger against the anus, several distinct threads will be drawn out through the several perforations of each nipple.—The threads are too fine to be counted with any certainty; but M. Reaumur reckons, each larger nipple may send forth a great many.

Hence we see, how the spiders make their threads bigger, or smaller: for as, before they begin to spin, they always apply more or fewer of these nipples, upon the body, whence the web is begun; or as they apply each more or less strongly, so as more or fewer of the minute nipples come to take; the thread thus spun, will be a compound of more or fewer, of the single threads. Indeed, as the threads come from the anus, all joined together, they appear to be single; but M. Bon has distinguished one of the single ones to consist of 15 or 20 distinct threads.

The threads are of two kinds: the first is weak, and only serves for that kind of web wherewith they catch flies.—The second is much stronger, and serves to wrap up their eggs in; which, by this means, are sheltered from the cold, as well as from insects, when might otherwise gnaw and destroy them. These threads they wind very loosely round the eggs, resembling the balls or bags of silk-worms, that have been prepared and looked for the distaff.

The spider-bags are of a grey colour when new; but they turn blackish when long exposed to the air: indeed, one might find other spider-bags of other colours, and which would afford a better silk, but their scarcity would render the experiment difficult; for which reason we confine ourselves to the bags of the commonest spiders, which are the fault-leaved kind.—These always find out some place secure from the wind and rain, to make their bags; as hollow trees, the corners of windows, or vaults, or under the eaves of houses.

By collecting a quantity of these bags, a new silk is made, inferior in nothing to the common silk. It takes all kinds of dyes, and may be made into all kinds of stuffs.—M. Bon had stockings and gloves made of it, which he presented to the academy; and others to our royal society.

For the manner of preparing the bags to get the silk, thus: after having gathered 12 or 13 ounces of spider-bags, M. Bon had them well beaten for some time, with the hands, and a stick, to get out all the dust: he then washed them, in luke-warm water, till they left the water very clean: after this, he laid them to steep, in a large vessel, with soap, and salt-petre, and gum-arabic. The whole was set to boil over a gentle fire, for three hours. The bags were next washed, in warm water, to get out the soap; and, after all, laid to dry some days, to fit them for carding; which was performed by the common silk-carders, but with cards much finer than ordinary.—By this means, he had a silk, of a very particular ash-colour, which was easily spun, and the thread spun from it, was both stronger and finer than that of common silk; which shews, that all sorts of works may be made of it: nor is there any reason to fear, but it will stand any trials of the loom, after having passed that of the basket-weavers.

The only difficulty, now, is in procuring a sufficient quantity of spiders bags to make any considerable work of it, which M. Bon observes, would be no difficult matter at all, had we at the art of breeding them, as we do silkworms. For they multiply much more; every spider laying 6 or 700 eggs, whereas the silk-worm does not lay above 100; yet are these last so tender, &c. that one had the trouble making

any bags, or are hindered by some little accident, from making them : whereas the spiders hatch of themselves, without any care, in the months of August and September, in fifteen or sixteen days after they are laid ; the old spiders that lay them, dying soon after. The young ones thus bred live ten or twelve months without eating, and continue in their bags without growing, till the hot weather putting their viscid juices in motion, induces them to come forth, spin, and run about to seek food.—Were a way, therefore, found of breeding young spiders in rooms, they would, doubtless, furnish a much greater quantity of bags than *silk-worms* do. For of seven or eight hundred young spiders, which M. Bon kept, scarce one died in a year ; whereas of one hundred *silk-worms*, not forty lived to make their bags. M. Bon having ordered all the short-legged spiders that could be found in the months of August and September, to be brought to him, shut them up in paper coffins, and pots ; covering the pots with papers, which he pricked full of pin-holes, as well as the coffins, to give them air. He fed them with flies, and found sometime afterwards, that the greatest part of them had made their bags.—The same ingenious person found that spiders bags, with regard to their weight, afford much more *silk* than those of the *silk-worms* : as a proof hereof, he observes, that thirteen ounces yield near four ounces of clear *silk*, two ounces whereof will make a pair of stockings ; whereas stockings of common *silk* weigh seven or eight ounces.

Nor is there any venom in the *silk*, or even in the spider, as many have imagined. M. Bon has been bit by them several times, without any manner of harm ; and as for the *silk* it is used with very good success, to stop bleeding and cure wounds, the natural gluten thereof acting as a kind of balsam.—It likewise yields, by distillation, several specific medicines, particularly great quantities of spirit, and volatile salt, which being prepared after the same manner as that drawn from the bags of *silk-worms*, in making the guttae Anglicanae, or English drops, at one time, so famous over all Europe ; may serve to make other drops of greater efficacy, which M. Bon calls drops of *Montpellier*, and advises to be used in all sleepy diseases.

M. Reaumur being appointed by the royal academy, to make a further enquiry into this new *silk-work*, has raised several objections and difficulties against it ; which are found in the memoirs of the academy for the year 1710. The sum of what he has urged, amounts to this.—The natural fierceness of the spiders, renders them unfit to be bred and be kept together : four or five thousand being distributed into cells, 50 in some, 100 or 200 in others ; the big ones soon killed and eat the less, so that in short time, there were scarce left one or two in each cell : and to this inclination of mutually eating one another, M. Reaumur ascribes the scarcity of spiders, considering the vast number of eggs they lay. But this is not all : he even affirms, that the spider's bag is inferior to that of the *silk-worm*, both in lustre and strength ; and that it produces less matter to be manufactured. The thread of the spider's web, he says, only bears a weight of two grains without breaking ; that of the bag bears 36. The latter, therefore, in all probability, is eighteen times thicker than the former ; yet is it weaker than that of the *silk-worm* which bears a weight of two drams and a half. So that five threads of the spider's bag must be put together to equal one thread of the *silk-worm's* bag.

Now, it is impossible these should be applied so justly over one another, as not to leave little vacant spaces between them, whence the light will not be reflected ; and of consequence, a thread thus compounded, must fall short of the lustre of a solid thread. Add to this, that the spider's thread cannot be wound off, as that of the *silk-worm* may ; but must, of necessity, be carded ; by which means being torn in pieces, its evenness, which contributes much to its lustre, is destroyed. In effect, this want of lustre was taken notice of by M. de la Hire, when the stockings were presented to the academy.

Again, spiders furnish much less *silk* than the worms : the largest bags of these latter, weigh four grains ; the smaller three grains ; so that 2304 worms, produce a pound of *silk*. The spiders bags do not weigh above one grain : yet, when cleared of their dust and filth, they lose two thirds of their weight. The work of 12 spiders, therefore, only equals that of one *silk-worm* ; and a pound of *silk* will require at least 27648 spiders. But as the bags are wholly the work of the females, who spin them to deposit their eggs in ; there must be kept 55296 spiders, to yield a pound of *silk*. Yet will this only hold of the best spiders ; those large ones ordinarily seen in gardens, &c. scarce yielding a twelfth part of the *silk* of the others. 280 of these, he shews, would not do more than one *silk-worm* ; 60352 of them would scarce yield a pound.

SILLON, in fortification, an elevation of earth made in the middle of the moat, to fortify it, when too broad.

The *sillon* is more usually denominated an *entlope*. See **ENTLOPE**.

SILVER, a white, rich sort of metal ; being the finest, pur-

est, most ductile, and most precious of all metals, except gold. There are *silver mines* in all the four quarters of the world. Europe has its share ; nor is our own island quite destitute thereof, though it has none yet discovered of much value.

The mines of Peru, and some other parts of America are much the richest, and most abundant ; they appear almost inexhaustible ; particularly those of Potosi, which continue to be dug with equal advantage as when first discovered ; with this only difference, that the veins which were then almost in the surface of that famous mountain, are now sunk to prodigious depths, the workmen going into them by a painful descent of four or five hundred steps.—Many millions of Indians have perished in them ; and prodigious numbers continue to be destroyed there, yearly.

The ores, or mineral stones they dig, are not all of the same quality, consistence, or colour : some are white, or ash-coloured, spotted with red, or blue : and called *plata blanca* ; others are black, and called *plata-vence* : these last are the richest, and the easiest wrought ; no mercury being here needed ; nor any thing, but to put them in the fire : where the lead burning away, leaves the *silver* pure. The Indians, who, till the arrival of the Spaniards, knew nothing of the use of mercury, melted none but of this kind of mineral.—The *reflector*, is another black mineral distinguished by whetting and rubbing it against iron, which turns it red. It is very rich, and the metal it yields, is of the best sort. The *zorache* is like talc, and looks as if *silvered* ; though it does not yield much metal. The *paco* is of a yellow red, very soft, and found almost broke in pieces ; it is not rich. The *cobriso* is green, and somewhat friable.

Though the *silver* of this be visible, yet it is exceedingly difficultly drawn from it, by reason of the copper wherewith it is intermixed. Lastly, the *arames*, which is only found in Potosi, and that only in the mine of Cotamito, consists of threads of pure *silver*, interwove like a *silver* lace that has been burnt together out the *silk*. The *silver veins*, of what quality soever, are usually richer in the middle, than towards the extremes : but the richest places are those where the veins intersect.—It is reckoned a great addition to the richness of a mine to be near a river, for the advantage of mills to grind the ore. At Lipes and Potosi, for instance, the caxon of ore must yield ten marks to depay expenses ; whereas, at Tanava, there need not above five.

The most usual way of separating the *silver* from the ore, is by what they call *puaca*. See **Puaca**.—Sometimes, however, they use nothing but fire frequently repeated : or aqua fortis.

What renders the working of these mines exceedingly dangerous, is the exhalations arising from them ; which are even felt on the outside ; and make an impression on animals grazing in the neighbourhood ; but in the inside, they stupify the miners, none of whom can bear so poisonous an air above a day together. Sometimes it is so fatal, that it kills on the spot ; and obliges them to stop up the veins again, whence it exhales.—The mines of Potosi, are much the least subject to them ; and yet, without the herb *puaguay*, the infusion whereof is taken by the miners, as we do that of tea, those mines must be soon abandoned.

Though the mines of Potosi and Lipes, still keep up their reputation, yet there are several discovered within these few years, that exceed them much in richness : such are the mines of Oruro, eight leagues from Arica, and those of Ollachea, near Culco, opened in 1712.—It is remarkable, that most of the mines in America, are found in cold and barren places.

The method of separating *silver* from the ore, in Europe, is the same as that of separating gold : that is, by means of quick-silver ; with this difference, that for *silver*, to every fifty hundred weight of ore, is added one hundred weight of rock-salt, or some other natural salt.—This curious operation may be seen at length under the article **GOLD**.

To separate the *silver* from the mercury, wherewith it is amalgamated ; they have a furnace open at the top ; and the aperture covered with a kind of capital made of earth, of a cylindrical form ; that may be clapped on, or taken off at pleasure.—The mass of *silver*, and mercury, being laid in the furnace, and the capital applied, and the fire lighted underneath, the quick-silver raised by the action of the fire, in form of vapour, is caught in the capital, and taken thence, to be used in a second operation.

The standard of fine *silver* is 12 penny weights, each consisting of 24 grains. When it is below this, it must be raised to it by refining ; which is usually performed by means of lead.—In order to this, a coppel is filled, made with a mixture of brick-earth, and ashes of a bullock's or other bones. It is set on the fire, and heated red hot ; in which state the lead is put in, and when this is melted, the *silver* is added, in the proportion of a pound of lead to four or five ounces of *silver*, and even somewhat more lead, if the *silver* be very coarse. As these two metals melt together, the copper, before mixed with the *silver*, diffuses in smoke, or goes away with the scum and litharge ; and so does the lead itself ; leaving the *silver* alone in the coppel, in its proper degree of fineness.

In this method of refining, wherein 6 or 7000 pounds may be refined at once; the metal is drawn out of the coppel two ways; the one by plunging in it, while still liquid, a thick bar of iron, round which, the *silver* sticks in form of a shell, or crust; repeating this again and again: the other, is by letting the coppel stand till it be cold; in the bottom whereof, the *silver* fixes in form of a cake.

Besides the refining of *silver* with lead, there is another manner of doing it with salt-petre; which see under the article **REFINING**.

But both the one and the other are tedious and troublesome; when performed on large quantities. This occasioned M. Homberg to endeavour to shorten the operation; which he effected with good success.—His method is; to calcine the *silver* with half its weight of common sulphur; and after melting the whole together, to cast a quantity of steel filings upon it at several times: upon this, the sulphur quits the *silver*, and joins itself to the iron, and both with the other impurities are converted into scoria, which swim on the *silver*; and the metal itself is found pure at the bottom of the crucible.

The assay of *silver* is also made by the coppel, in the same manner as the refining by lead. If the *silver*, after this assay, preserve its weight, it is standard; if it lose, the grains, or penny-weights of its diminution, are accounted.

SILVER wire, is *silver* drawn through the holes of a wire-drawing-iron, and by this means reduced to the fineness of a thread or hair.—The manner of drawing it, see under the article **GOLD-WIRE**. See also **WIRE** and **DRAWING**.

SILVER leaf, is that which the gold-beaters have reduced into fine, thin leaves, to be used by gilders, &c. See **GOLD-LEAF**.

Shell SILVER, is made of the threads of *silver* leaves, or of the leaves themselves: and used in painting, and silvering certain works.—It is prepared after the same manner as shell-gold. See **GOLD**.

SILVER, in chymistry, is called *luna*, the moon; and several preparations are made from it: particularly, a

Tincture of SILVER, made by dissolving thin *silver* plates, or *silver* shot in spirit of nitre; and pouring the dissolution into another vessel full of salt-water. By this means, the *silver* is immediately precipitated in a very white powder, which they wash several times in spring-water. This powder they put in a matras; and pour rectified spirit of wine, and volatile salt of urine upon it. The whole is left to digest in a moderate heat for fifteen days; during which, the spirit of wine assumes a beautiful sky-blue colour, and becomes an ingredient in several medicines.—This is also called *potable silver*, *argentum potable*.

Silver is likewise converted into crystals, by means of the fume spirit of nitre; and it is this is called *vitriol of silver*.

The *lapis infernalis argenteus* is nothing but the crystals of *silver* melted with a gentle heat in a crucible; and then poured into iron moulds.

<p>Alc SILVER, Herring SILVER, King's SILVER, Rep SILVER, White hart SILVER,</p>	<p>See { ALC SILVER. HERRING. KING'S SILVER. REP SILVER. WHITE HART SILVER.</p>
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Quick SILVER. See the article **MERCURY**.

SILVERING, the covering of any work with silver-leaf.

It is usual to silver metals, wood, paper, &c. which is performed either with fire, oil, or size. Metal-gilders silver by the fire: painter-gilders, all the other ways. See **GILDING**.

SYLVESTRE GRANUM, or **COCCUS SYLVESTRIS**, a term used by some authors to express the *coccus polonicus*; and by others, for a coarse or bad kind of cochineal, produc'd in the Province of Guatimala, in New-Spain: it is by some, supposed to be the seed of a plant; but is, in reality, an insect, as the true cochineal is; only that the scarlet colour it yields is greatly inferior to the other. See **COCHINEAL**.

SIMA, or **CYMA**, in architecture, a term used by Wolfius, and some other writers, for what we otherwise call *cymatium* or *simatium*.

SIMATIUM, or **SIMATSE**, in architecture. See **CYMATIUM**.

Simatium and *cymatium*, are generally confounded together; yet they ought to be distinguished: the latter being the genus and the former the species.—*Simatium of sima*, camous, according to Felibien, is the last and uppermost member of grand corniches, called particularly the *great doucine*, or *gula recta*; and by the Greeks, *epititheta*.

In the antique buildings, the *simatium*, at the top of the Doric cornice, is generally in form of a cavetto, or semi-

scotia; as we see particularly in the theatre of Marcellus.—This, some modern architects have imitated; but in the Ionic order, the *simatium* is always a doucine.

The *simatium*, or doucine, then, is distinguished from the other kinds of *cymatia*, by its being camous, or flattened.

SIMELIUM *, a Latin term, used by some to signify a table, with ranges of little cavities therein, for the disposing of medals in chronological order.

* The word is but ill wrote: it should rather be *crimelium*; a being formed of the Greek *κρυσταλλος*, curiosities, or a cabinet of precious things.

We more usually say, a cabinet of medals, than a *simelium*.

SIMILAR, in arithmetic and geometry, the same with *like*.

Those things are said to be *similar*, or *like*, which cannot be distinguished but by their com-prefence; that is, either by immediately applying the one to the other, or some other third to them both. So that there is nothing found in one of the *similar* things, but is equally found in the other.

Thus, if you note all the things in A, which may be discerned and conceived, without assuming any other; and, in like manner, note all the things in B, which may be thus conceived: and A be *similar* to B; all things in A will be the same with those in B.

Since a quantity cannot be understood, otherwise, than by assuming some other quantity to refer it to; *similar* things, notwithstanding their similitude, may differ in quantity: and since, in *similar* things, there is nothing wherein they differ, beside the quantity; quantity itself is the internal difference of *similar* things.

In mathematicks, *similar* parts, as A a, have the same ratio to their wholes B b; and if the wholes have the same ratio to the parts, the parts are *similar*.—*Similar parts* A a, are to each other as their wholes B b. See **PART**.

SIMILAR angles, are also equal angles.—In solid angles, when the planes, under which they are contained, are equal both in number, and magnitude, and are disposed in the same order; they are *similar*, and consequently equal.

SIMILAR rectangles, are those which have their sides about the equal angles, proportional.

Hence 1°. All squares must be *similar rectangles*.—2°. All *similar rectangles* are, to each other, as the squares of their homologous sides.

SIMILAR triangles, are such as have all their three angles respectively equal to each other. See **TRIANGLE**.

Hence 1°. All *similar rectangles* have their sides about the equal angles, proportional.—2°. All *similar triangles* are, to each other, as the squares of their homologous sides.

In *similar triangles*, and parallelograms, the altitudes are proportional to the homologous sides; and the bases are proportionably by those sides.

SIMILAR polygons are those, whose angles are severally equal, and the sides about those angles proportional.

And the like of other *similar* rectilinear figures.

Hence, all *similar polygons* are, to each other, as the squares of the homologous sides.

In all *similar figures*, the homologous angles are equal; and the homologous sides proportional. All regular figures, and *similar* irregular ones, are in a duplicate ratio of their homologous sides. Circles, and *similar* figures, inscribed in them, are, to each other, as the squares of the diameters.

SIMILAR arches, are such as contain like, or equal parts of their respective circumferences. See **ARCH**.

SIMILAR segments of circle, are such as contain equal angles. See **SEGMENT**.

SIMILAR conic-sections, are those where the ordinates to a diameter in one are proportional to the correspondent ordinates to the *similar* diameter in the other; and where the parts of *similar* diameters between the vertices and ordinates in each section are *similar*.

The same definition also agrees to *similar* segments of conic sections.

SIMILAR plain numbers, are those which may be ranged into *similar rectangles*; i. e. into rectangles, whose sides are proportional: as 6 multiplied by 2, and 12 by 4; the product of one whereof is 12, and the other 48, are *similar numbers*.

SIMILAR solid numbers, are those whose little cubes may be so ranged, as to make *similar* and rectangular parallelepipeds.

SIMILAR distase, in medicine, denotes a distase of some simple, solid part of the body.—As of a fibre, with regard to its tension, or flaccidity; of a membrane; a nervous canal, or the like.

SIMILAR parts, in anatomy, are those parts of the body which, at first sight, appear to consist of like parts, or parts of the same nature, texture, and formation.

Of these we usually reckon ten, viz. the bones, cartilages, ligaments,

ligaments, membranes, fibres, nerves, arteries, veins, flesh, and skin: each of which see under its proper article.
Dr. Grew, in his anatomy of plants, observes, that these have likewise, their *similar*, and organical parts.

SIMILE, or **SIMILITUDE**, in rhetoric, a comparison of two things, which, though different in other respects, yet agree in some one.—As, He shall be like a tree planted by the water-side, &c.

The difference between a *simile* and a *comparifon*, consists in this; that the *simile* properly belongs to what we call the quality of the thing, and the comparison to the quantity.

SIMILITUDE, in arithmetick, geometry, &c. denotes the relation of two things similar to each other; or which are only distinguishable by com-prefence.

The notion of *similitude*, which now makes some figure in geometry, &c. is owing to M. Leibnitz: it will be rendered easy by the following instance.—Suppose two watches perfectly alike; the one belonging to Caius, the other to Gracchus. If, now, Caius pull out his watch in presence of Gracchus; the latter will be surprized, and fancy it his own; but he will perceive it different from his own, upon pulling out his own: that is, Gracchus distinguishes Caius's watch from his own, by their com-prefence; or, by applying the one immediately to the other.

Euclid, and after him most other authors, demonstrate every thing in geometry from the sole principle of congruity.—Wolffius, in lieu hereof, substitutes that of *similitude*; which, he tells us, was communicated to him by M. Leibnitz, and which he finds of very considerable use in geometry, as serving to demonstrate many things directly, which are only demonstrable from the principle of congruity, by an ambages.

SIMONIAICAL, is applied to a person guilty of simony; that is, of purchasing a benefice, or other sacred matter, with money.

A *simoniacal* person convict, is infamous, and incapable of holding any benefice.

SIMONIAN, a sect of ancient hereticks, the first that ever disturbed christianity; if they might be said to do so, who were little more than mere philosophers, and chiefly made profession of magic.

Simon Magus, so often mentioned in the Acts, was their leader, and died under the emperor Nero; St. Peter still surviving: so that Clemens Alexandrinus is mistaken, when he makes Simon postulator to Marcion.

St. Epiphanius says expressly, that the first heresy was set on foot by Simon the magician, born in a little city of Samaria, who pretended to be the great virtue and power of God, sent from heaven to earth. Among the Samaritans he made himself pass for God the Father; and among the Jews, for the Son.—He patched up a kind of mealy system, out of the philosophy of Plato, the religious fables of the heathens, and christianity. particularly, from the Platonists he borrowed abundance of things relating to the worship of angels, which he perverted to magical uses; pretending, there was no salvation, but by the invocation of angels, who were, as it were, the mediators between God and man: to which superstitious worship of angels it is that St. Paul seems to allude in his epistle to the Colossians.

The gnosticks, whereof the same Simon was the father, adopted the same practice of worshipping angels, and even improved on it.

SIMONY*, **SIMONIA**, the crime of trafficking with sacred things; particularly of purchasing a benefice with money.

* The word is borrowed from Simon Magus, who is mentioned in the Acts of the apostles, as offering to buy the power of working miracles with money.

By the English canons, Anno 1220, *simony* is not only committed by an agreement for money in hand, or to be paid yearly; but by any other profit or emolument; any reward, gift, or benefit, directly or indirectly; or by reason of any promise, grant, bond, &c. and this, either in the acceptance of a living, or in an exchange or resignation.

The penalty, by our laws, is, that the corrupt patron shall forfeit the next presentation to the king, and two years value of the living; and the corrupt incumbent, shall be for ever disabled to hold a living.

SIMONY is also committed by buying, or selling the sacrament, baptism, ordination, or abolition; as well as by the nomination and collation to a benefice, a place in a monastery, or the like.

Some have pretended it to be sufficient to avoid the charge of *simony*, if only the ordination were gratuitous, though the revenues were bought and sold as a temporal thing.—But the canons of several councils have condemned this subtle distinction; since the revenues are attached to an ecclesiastical office purely spiritual.

Cato distinguishes three kinds of *simony*, viz.

Mental **SIMONY**, is that which sticks in the mere will, and inclination, without ever breaking forth into act.—As when

a present is made to a collator, without taking any notice that we expect a benefice from him.—This kind of *simony* is only punishable in *foro conscientie*.

Conventional **SIMONY** is where there is an express act and a formal bargain, though it never come to an execution. **Real** **SIMONY**, is where the convention is executed on both sides; which last is the most criminal of all.—The canonical penalty of *simony* is deposition in a clerk, and excommunication in a layman.

It is a maxim among the Romish canonists, that there is no *simony* in the court of Rome; in regard, the pope acts there as an absolute sovereign: they also say, that resignations in *favorem*, are not to be admitted but by the pope, as favouring a little of *simony*. On these occasions, however, the parties always swear, that there had been no deceit, collusion, *simony*, or other illegal covenant.

Peter Damian distinguishes three kinds of *simony*: that of *money*, that of the *tongue*, and that of *services*.

SIMONY of money, or *per manus a manu*, is where money is really paid down for a benefice: he adds, that the same is likewise committed, by expending money to live at court to obtain a benefice.

SIMONY of the tongue, or *per manus a lingua*, consists in flattering the collator, or making one's self agreeable by complaisance and commendation.

SIMONY of services, or *per manus ab obsequio*, consists in the doing them good offices to obtain a benefice.

It was agreed, by all the Justices, *Trin. ad. Jac. p. n. i.*, that if the patron presented any person to a benefice with cure, for money; such presentation, &c. is void, though the presentee were not privy to it: and the statute gave the presentation to the king; but this is now repealed.

SIMPLARY, **SIMPLARIS**, in antiquity, a Roman soldier, who had only single pay.—Thus called, in opposition to the *duplares*, or such as had double pay.

SIMPLE, **SIMPLEX**, something not mixed, or compounded: in which sense it stands opposed to *compound*. See **COMPOUND**.

The elements are *simple* bodies, from the composition whereof all mixed bodies result.—Hence also

SIMPLE affection,	} See the articles	AFFECTION.
SIMPLE form,		FORM.
SIMPLE modes,		MODE.
SIMPLE necessity,		NECESSITY.
SIMPLE opposition,		OPPOSITION.
SIMPLE taste,		TASTE.
SIMPLE vision,		VISION.

In geometry we say, the most *simple* demonstrations are the best: the *simplest* machines are always the most esteemed.

In pharmacy there are *simple* remedies, and compounds: the former of which are usually preferable to the latter.

SIMPLE diaclyster,	} See the articles	DIACLYSTER.
SIMPLE diacodium,		DIACODIUM.
SIMPLE diamorue,		DIAMORUE.
SIMPLE diaprunum,		DIAPRUNUM.
SIMPLE dropax,		DROPIX.
SIMPLE fomentations,		FOMENTATION.
SIMPLE hydromel,		HYDROMEL.
SIMPLE oxymel,		OXYMEL.
SIMPLE waters,		WATER.

In grammar, we have *simple* words, or primitives; and compounds, which have some particle added to them.

In juris-prudence, they say, a *simple* donation, in opposition to a mutual or reciprocal one: a *simple* sale, in opposition to that made with a reservation of the faculty of redemption: and *simple* homage, in opposition to liege homage.

SIMPLE average,	} See the articles	AVERAGE.
SIMPLE benefice,		BENEFICE.
SIMPLE charter,		CHARTA.
SIMPLE church,		CHURCH.
SIMPLE deposit,		DEPOSIT.
SIMPLE estate,		ESTATE.
SIMPLE fee,		FEE.
SIMPLE force,		FORCE.
SIMPLE resignation,		RESIGNATION.
SIMPLE vassalage,		VASSALAGE.

SIMPLE, in botany, is a general name given to all herbs and plants; as having each its particular virtue, whereby it becomes a *simple* remedy.

The *simples* brought from the Levant, and the East-Indies, were not known among us till about the year 1200.

SIMPLE flowers,	} See the articles	FLOWER.
SIMPLE anomaly,		ANOMALY.
SIMPLE fistula,		FISTULA.
SIMPLE glands,		GLAND.
SIMPLE ulcer,		ULCER.

SIMPLE equation, in algebra, is an equation where the unknown quantity is only of one dimension.—*Ex. C.* $x = (a + b) : 2$.

SIMPLE flank, } See the articles **FLANK.**
SIMPLE fraction, } **FRACTION.**
SIMPLE motion, } **MOTION.**
SIMPLE pendulum, } **PENDULUM.**
SIMPLE quadratics. See the article **QUADRATIC.**
SIMPLE quantities, in algebra, are such as have but one sign: as $2a$, or $-2b$.

By which they stand opposed to compound quantities, which have several signs: as $a+b$; or $a-b$.

SIMPLE surd, } See the articles **SURD.**
SIMPLE tenaille, } **TENAILE.**
SIMPLE wheel, } **WHEEL.**

SIMPLE, in music, is chiefly used in opposition to *double*; sometimes to a compound of several parts, or figures of different values, &c.

SIMPLE cadence, is that where the notes are all equal through all the parts.

SIMPLE concords, are those, wherein we hear at least two notes in consonance; as a third and a fifth; and of consequence, at least three parts.—This is either done immediately, and is called the *harmonical triad*; or in a more remote manner; that is, when the sounds, that are not bass, are one or two octaves higher.—This distance has no ill effect in the third; but in the fifth it has; and, generally speaking, the nearer or more immediate the concords are, the better.

They also say, *C simple* or plain, in opposition to *c accented*.

SIMPLE counter-point, is a harmonical composition, wherein note is set against note; in opposition to figurative counter-point.

SIMPLE diessi. See the article **DIESIS.**

SIMPLE fugue, or **SIMPLE imitation,** is, when one part imitates the singing of another for some measures.

SIMPLE harmony, } **HARMONY.**
SIMPLE interval, } **INTERVAL.**
SIMPLE sounds, } **SOUND.**
SIMPLE triple, } **TRIPLE.**
SIMPLE fencing, } **FENCING.**
SIMPLE history, } **HISTORY.**
SIMPLE style, } **STYLE.**

SIMPLIFYING, in ecclesiastical matters, is the taking away of a cure of souls from a benefice, and dispensing the beneficiary from residence.

Several benefices, which have been *simplified*, now require residence; and an infinity of others, which required residence, have been *simplified*.

Some use the word in a more extensive signification, viz. for the shortening a relation, &c. or retrenching every thing not precisely necessary. When the matter or fact shall be *simplified*, and stripped of its vain circumstances, the court will see, &c.

SIMPLUDIARIA*, in antiquity, a kind of funeral honours paid to the deceased at their obsequies.

* The word is formed from the Latin *simplex* and *ludus*, whence *simpliciaria* or *simpliciaria*, q. d. simple games.

Some will have *simpliciaria* to be the funerals at which games were exhibited: such is the sentiment of Paulus Diaconus. Festus says, they were those, in the games whereof nothing was seen but dancers, and leapers, called *corvitores*; who, according to M. Dacier, were persons who run along the masts and yards of vessels or boats, called *corbes*.

In other respects, those two authors agree as to the kind of funerals, called *simpliciaria*, viz. that they were opposite to those called *indivisa*; wherein, besides the dancers and leapers, observed in the *simpliciaria*, there were defunctores, or people who vaulted on horses; or, perhaps, horse-races, wherein the cavaliers, leaped from horse to horse at full speed.

SIN, a breach, or transgression of some divine law, or command.

Plato defines *sin* to be something void, both of number and measure: by way of contradiction to *virtue*, which he makes to consist in musical numbers, &c. See **VIRTUE**, and **RHYTHMUS**.

Agreeably hereto, Suarez observes, that an action becomes sinful, by its wanting a due commensuration; for as every thing measured refers to some rule, from which if it deviate it becomes incommensurate; and as the rule of man's will is the law of God: so, &c.—Suarez adds, that all evil actions are prohibited by some divine law; and that this is required to the perfection of the divine providence.

Simplicius, and, after him, the schoolmen assert, that evil is not any positive thing, contrary to good; but a mere defect and accident.

Sins are distinguished into *original* and *actual*.

The Romish casuists again distinguish *actual sins* into *mortal*, which are such as make us lose the grace of God; and *venial*, which alone are pardoned, as being only *sins* of infirmity, not of malice.

Divines are not yet agreed what the *sin* against the Holy Ghost is.

SINAI, knights of. See **CATHARINE**.

SINAPISM*, **SINAPIEMOZ**, in pharmacy, an external medicine, in form of a cataplasm; composed chiefly of mustard-seed pulverized, and mixed up with the pulp of figs; or with briony, garlic, onion, nasturtium, euphorbium, ranunculus roots, or the like.

* The word is formed from the Latin, *sinapi*, or Greek *σινάπις*, mustard seed.

Sinapisms excite a redness, heat, itching tumour, and sometimes a blister on the place they are applied to. They were anciently in great request; and still continue in use for inveterate diseases of the head; long continued *defluxions*, &c.

SINCIPUT, or **SYNCIPUT**, is the fore-part of the head, reaching from the fore-head to the coronal suture. See *Tub. Anat. (Osteol.) fig. 2. lit. a. fig. 7. n. 1.*

SINDON, in chirurgery, a little round piece of linen or silk, or lint, used in dressing the wound after trepanning. See **TREPANNING**.

The first thing usually done after the operation of trepanning, is to pour a few drops of white balsam on the dura mater: then a spoonful of mel-rostatum, being warmed with a little balsam, a *sinon* is dipt in it, of fine linen cloth; this is immediately applied upon the dura mater; and being greater than the hole in the skull, its circumference is thrust all round between the cranium and the membrane: then pledges of lint are applied, and the hole is quite stopped therewith. The next morning, when the dressing is taken off, the brain is never left bare a moment; but as soon as the former *sinon* and lint are removed, new ones are clapped on in their room.

SINE, or **Right SINE**, in trigonometry, a right line drawn from one extremity of an arch, perpendicular upon the radius drawn from the other extremity; or the *sine* is half the chord of twice the arch.

Thus the line AD (*Tab. Trigonim. fig. 1.*) which is half the chord AB, of the double arch AEB, is the right *sine*; or, simply, the *sine* of the arch AE.

Whole SINE, *sinus totus*, is the *sine* of the quadrant HE, or of 90 degrees; that is, the whole *sine* is the same with the radius HC. See **RADIUS**.

Verfed SINE, is a part ED of the whole *sine* or radius, intercepted between the right *sine* AD, and the arch AE.

It is demonstrated, 1^o. That the right *sine* AD, being perpendicular to the radius EC; all *sines* drawn to the same radius, are parallel to each other.

2^o. Since the arch AE is the measure of the angle ACE, and AI the measure of the contiguous angle ACI; and the quadrant HE the measure of the right angle; AD is also the right *sine*, and ED the *versed sine* of the angles ACE and ACI; and the whole *sine* is the *sine* of the right angle.

3^o. Two angles contiguous, as ACE and ACI, have the same *sine*.

4^o. The *sines* of obtuse angles are the same with those of their complements to two right angles.

5^o. All *sines* of similar arches have the same ratio to their radii.

SINE complement, or **Co SINE**, is the *sine* of an arch AEB, which is the complement of another arch AH, to a quadrant. See **Co-SINE**.

Thus also the *sine* of the arch AH, is called the *sine-complement* of the arch AE.

In estimating the quantity of *sines*, &c. we assume radius for unity; and determine the quantity of the *sines*, tangents, and secants in fractions thereof.—From Ptolemy's Almagest, we learn, that the ancients divided the radius into 60 parts, which they called degrees, and thence determined the chords, in minutes, seconds, and thirds; that is, in sexagesimal fractions of the radius, which they likewise used in the resolution of triangles.

—The *sines*, or half chords, for ought that appears, were first used by the Saracens.

Regiomontanus, at first, with the ancients, divided the radius into 60 degrees; and determined the *sines* of the several degrees in decimal fractions thereof. But he afterwards found it would be more commodious to assume radius for 1; and thus introduced the present method into trigonometry. In the common tables of *sines* and tangents, the radius is conceived, divided into 1000000 parts; beyond which we never go in determining the quantity of the *sines* and tangents.—Hence, as the side of a hexagon subtends the sixth part of a circle, and is equal to radius; the *sine* of 30° is 500000.

1^o. The *SINE* AD being given; to find the *sine-complement*.—From the square of the radius AC subtract the square of the *sine* AD: the remainder will be the square of the *sine-complement* AG: whence, the square root being extracted, gives the *sine-complement*. E. gr. Supposing AC, 1000000, and AD 500000, AG will be found 8660254, the *sine* of 60°.

2^o. The *SINE* AD of the arch AE being given; to find the *sine* of the half arch, or half of AE.—Find the chord of the arch AE (see **CHORD**;) for half of this is its *sine*. Thus supposing

supposing D C and A D, as in the preceding problem: we shall find the *fine* of the half-arch A E, or the *fine* of 15° = 2588190.

3°. The SINE D G, of the arch D F being given; to find the *fine* D E, of the double arch D B (fig. 7.)—Since the angles at E and G are right angles; and the angle B is common to each triangle B C G and D E B; we shall have B C : C G :: B D : D E: wherefore C G being found by the second problem, and B D being double of D G; D E is found by the rule of proportion.

4°. The SINES F G and D E (fig. 8.) of the arches F A and D A, whose difference D F is greater than 45 minutes, being given; to find any intermediate *fine*, as I L.—To the difference F D of the arches, whose *sines* are given; the difference of the arch I F, whose *fine* is required, and the difference of the given *sines* D H; find a fourth proportional: this added to the less given *fine* F G; the aggregate will be the *fine* required.

5°. To find the SINE of 45 degrees.—Let H I (fig. 1.) be a quadrant of a circle; then will H C I be a right angle: consequently the triangle, rectangular; therefore $H I^2 = H C^2 + C I^2$; wherefore, since H C the whole *fine*, is 10000000; if from 2 H C squared, 20000000000000, be extracted the square root 14142136; we shall have the chord H I, whose half 7071068 is the *fine* of 45° required.

6°. The SINE of a minute or 60" F G (fig. 8.) being given; to find the *fine* of one or more seconds A M F.—Since the arches A M and A F are very small; A M F may be taken for a right line, without any sensible error in the decimal fractions of the radius wherein the *fine* is expressed; that is, the arches A M and A F may be taken proportional to their chords. Wherefore, since M N is parallel to F G; we shall have A F : F G :: A M : M N. Therefore A F, F G and A M being given, M N is easily had.

To construct a canon of SINES.—The *sines* of 30° 15° 45° and 36° (which we have already shown how to find) being had; we can thence construct a canon of all the *sines* to every minute, or every second. For from the *fine* of 36° we find those of 18° 9° 4° $30'$ and $2^{\circ} 15'$, by the second problem: the *sines* of 54° 27° 81° 83° $30'$ and $87^{\circ} 45'$, &c. by the first problem. Again, from the *fine* of 45° , find the *fine* of $22^{\circ} 30'$ $11^{\circ} 15'$, &c. From the *sines* of 30° , and the *sines* of 54° , find the *fine* of 12° . From the *fine* of 12° , find the *sines* of 6° $3'$ 1° $30'$ $35'$ $78'$, &c. From the *fine* of 15° , find the *fine* of 7° $30'$ $45'$, &c. till you have 120 *sines* succeeding each other orderly, at an interval of 45 minutes. Between these, find the intermediate *sines* by the fifth problem: thus will the canon be complete.

From the SINE of an arch given; to find the tangent and secant.

To find the logarithm of a given SINE, see LOGARITHM.

In every triangle, the sides are as the *sines* of the opposite angles.

The SINE B C (fig. 9.) and the versed *fine* A B, being given in common measure, not in parts of the radius; to find the arch F C in degrees.—Find the semi-diameter A D. Then in the triangle D B C, besides the right angle B, by the sides A C and D C, we find the angle A D C, which shews the number of degrees in the arch; the double whereof is the arch F C.—This problem is of use in finding the segment of a circle. See SEGMENT.

Artificial SINE, denotes the logarithm of a *fine*.

Line of SINES, a line on the sector, Gunter's scale, &c. the description and use whereof see under the articles SECTOR and GUNTER'S SCALE.

SINE-CURES, are ecclesiastical benefices without cure of souls.

No church, where there is but one incumbent, can properly be a *sine-cure*; and though the church being down, or the parish being become destitute of parishioners, the incumbent may be thereby necessarily acquitted from the actual performance of public duty, yet he is still under an obligation to do it, whenever a church shall be built, and there are a competent number of inhabitants: and in the mean while, if the church be presentative, as most such churches are, the incumbent is instituted into the cure of souls.—Such benefices are rather depopulations than *sine-cures*, and it will be proper for the new incumbent to read the 39 articles, and the liturgy in the church-yard, &c. and to do whatever other incumbents usually do.

But a rectory, or portion of it, may properly be a *sine-cure*, if there be a vicar under the rector endowed and charged with the cure: in which case it does not come within the statute of pluralities, 21 Hen. VIII. c. 13.

Here therefore no dispensation is necessary to hold the *sine-cure*, with a former living: nor need the incumbent read the articles or divine service, as required by 13 Eliz. c. 12, which extends only to a benefice with cure.

A *sine-cure* donative wants no institution and induction; but the presentative must have both; especially if it consist in glebe and tithes, and not in a portion of money; but the

institution must not run in *curam animarum*, but in *recliam*, five persons vicariorum de A.D. 1300. By the above mentioned statute 21 Hen. VIII. not only benefices, and rectories with vicarages endowed, but also archdeaconries, are declared to be benefices without cure.

SINE-DIE, in law.—When judgment is given against the plaintiff, he is said to be *sine die*, i. e. *without day*; and for the defendant, it is said, *eat inde sine die*, i. e. he is dismissed the court.

The phrase is also used in parliament, for the adjournment of any debate, without fixing the day when it shall come on again; which is looked upon as a genteeler diminution of the thing in question.

SINEW, properly denotes what we call a *nerve*; though in common speech it is rather used for a *tendon*.

SINGING, the act of making divers inflexions of the voice, agreeable to the ear, and correspondent to the notes of a song or piece of melody.

The first thing done in learning to sing, is to raise a scale of notes by tones and semi-tones, to an octave; and descend again by the same notes; and then to rise and fall by greater intervals, as a 3d, 4th, and 5th; and to do all this by notes of different pitch.

Then these notes are represented by lines and spaces, to which the syllables *fa, sol, la, mi*, are applied, and the pupil is taught to name each line and space thereby; whence this practice is usually called *sol-fa-ing*. The nature, reason, defects, &c. whereof, see under the article SOL-FADING.

SINGLE echo,	} See the articles	ECHO.
SINGLE fine,		FINE.
SINGLE position,		POSITION.
SINGLE proposition,		PROPOSITION.
SINGLE rafters,		RAFTER.
SINGLE tenaille,		TENAILE.

SINGLES. See the article PETTY SINGLES.

SINGULAR number, in grammar, the first manner of declining nouns, and conjugating verbs; used when we only speak of a single person, or thing.

The Latins, French, English, &c. have no numbers but the singular, and plural; the Greeks and Hebrews have likewise a dual, peculiar to two persons.

SINGULAR history. See the article HISTORY.

SINGULTUS, in medicine, a convulsive motion of the midriff, commonly called the hiccup. See HICUP.

SINICAL quadrant, a kind of quadrant furnished with an index, and two sights to take altitudes, &c. by; and having besides, its side, or face, covered over with lines, drawn from each side, intersecting each other; whereby the sines can be found, by inspection, any problem in plain sailing. Its construction and use, see under the article QUADRANT.

SINISTER*, something on, or towards, the left-hand.

* Hence some derive the word *sinister*, a *sinist*; because the gods, by such auguries, permit us to proceed in our designs. See AUGURY.

SINISTER is ordinarily used among us for unlucky.—Though in the sacred rites of divination, the Romans used it in an opposite sense.—Thus *ovis sinist*, or a bird on the left-hand, was esteemed a happy omen: whence in the law of the twelve tables, *ovis sinist*ra populi magister esse.

SINISTER, in heraldry. The *sinister* side of an escutcheon is the left hand side.

SINISTER chief, is the left angle of the chief.

SINISTER base, is the left hand part of the base.

SINISTER bend. See the article BEND.

SINISTER aspect, among astrologers, is an appearance of two planets, happening according to the succession of the signs: as, Saturn in Aries, and Mars in the same degree of Gemini.

SINISTRI, a sect of ancient heretics; thus called, because they held the left hand in abhorrence, and made it a point of religion, not to receive any thing therewith.

What in us, is a piece of civility; in them was a superstition.—Balamon observes, that they were likewise called *sabbathians* and *novatians*.

SI NON OMNES, a writ of association, whereby, if all in commission cannot meet at the day assigned; it is permitted that two, or more of them may finish the business.

SINOPER, or SINOPIS, in natural history, a native red earth, or kind of ruddle. See Supplement, article SINOPICA TERRA.

SINOPLÉ*, or SENOPLE, in heraldry, denotes vert, or the green colour in armories.—Thus called by the ancient heralds; though Pliny and Idore, by *color sinopiceus*, or *sinople*, mean a brownish red, such as that of our ruddle.

* F. Menestrier derives the word from the Greek, *trafina hylla*, green armories; by corruptly retrenching the first syllable, *tra*; which is no new thing among oriental words, witness Salonica for Thessalonica.

Sinople is supposed to signify love, youth, beauty, rejoicing and liberty; whence it is, that letters of grace, abolition, legitimation,

timation, &c. are always used to be sealed with green wax.

SINOVIA. See the article **SYNOVIA**.

SINUOSITY, a series of bends, and turns in arches or other irregular figures; sometimes jetting out, and sometimes falling in.—Such is described by the motion of a serpent, &c. It is the *sinuosity* of the *fla* coasts that forms bays, ports, capes, &c. Du Loir observes, that the course of the river Meander, creeping in a thousand agreeable *sinuosities*, served Dædalus as a model to form his labyrinth by.

SINUOUS ulcers. See the article **ULCER**.

SINUS, in chirurgery, a little cavity or sacculus, frequently formed by a wound, or ulcer; wherein pus is collected.

A *sinus* is properly a cavity in the middle of a fleshy part, formed by the stagnation and putrefaction of the blood or humours, and which has wrought itself some vent or exit.

Deep *sinus's* that slope downwards, Scultetus observes, are difficult to heal: yet that surgeon undertakes to cure *sinus's* in a week, by the medicaments he describes, page 238, not by an agglutimative bandage. He adds, that he never comes to the incision, till he finds that the pharmaceutical applications are ineffectual; and that for the dilatation of *sinus's*, he does not use the deceitful scalpel; as being more apt to deceive the operator than the patient.

SINUS, in anatomy, denotes a cavity in certain bones and other parts, the entrance whereof is very narrow, and the bottom wider and more spacious.

Of these *sinus's*, we find several in the divers parts of the body; particularly in the basis of the skull, on the *osseopetrosa*; where the ancients imagined their use was to render the bones more light.—In several of the joints of the body, they serve to receive the epiphyses of the other bones.

SINUS is also an appellation given to the duplicatures of the dura mater.

These *sinus's*, Dr. Drake observes, are venous channels, formed for the re-conveyance of the blood. There are four of them chiefly considerable, *viz.* the *sinus longitudinalis*, which running along the middle of the convex part of the brain, sends out a branch on each side, between the brain and cerebellum, called the *lateral sinus's*, and the torcular herophili, formed out of a confluence of the *lateral sinus's*, and pineal gland.—They are all formed of the several venous branches, which return the blood from the brain and cerebellum, and deliver their contents into the jugular veins; whereof they are, as it were, the roots. Their coats are furnished with strong fibres, by means whereof, they are dilated by the influx of the venal blood, and again contracted with a reciprocal motion, like the puls of an artery.—See *Tab. Anat. (Osteol.) fig. 4. lit. b. b. c. c.*

SINON COLLEGE. See the article **COLLEGE**.

SIPHON, or **SYPHON**, in hydraulics, a crooked tube, one leg or branch whereof is longer than the other; used in the raising of fluids, emptying of vessels, and in various hydrostatical experiments.

The word in the original Greek, *σῖφων*, signifies, simply, *tube*; whence some apply it to common tubes or pipes.—Wolffius, particularly describes two vessels under the name of *siphon's*; the one cylindrical in the middle, and conical at the two extremes; the other globular in the middle, with two narrow tubes fitted to it, axis-wise; both serving to take up a quantity of water, &c. and to retain it when up.

But the most useful and celebrated *siphon* is that which follows.—A crooked tube A B C (*Tab. Hydraulicks, fig. 2.*) is provided, of such a length, and with such an angle, as that when the orifice A, is placed on an horizontal plane, the height of A B, may not exceed 30 foot. For common uses, a foot, or half a foot high, suffices.—If, now, the less arm A B, be immersed in water, or any other liquid, and the air be sucked out of it by the aperture C, till the liquor follow; the liquor will continue to flow out of the vessel, through the tube B C; as long as the aperture A is under the surface of the liquor.

Note, instead of sucking out the air, the event will be the same, if the *siphon* be at first filled with the fluid, and the aperture C stopped with the finger, till the aperture A be immersed.

The truth of the phenomenon is known by abundance of experiments: nor is the reason of part of it far to seek. In sucking, the air in the tube is rarified, and the equilibrium destroyed; consequently the water must be raised into the lesser leg A B, by the preponderating pressure of the atmosphere.

The *siphon* being thus filled, the atmosphere presses equally on each extremity thereof; so as to sustain an equal quantity of water in each leg; but the air not being able to sustain all the water in the longer leg, unless it exceed 32 feet in height; it will be more than able to sustain that in the shorter leg; with the excess of force, therefore, it will raise new water into the shorter leg; and this new water cannot make its way, but by protruding the first before it. By this means is the water continually driven out at the longer leg, as it is continually raised by the shorter.

But Wolffius, and some other authors assert, that the air continues to flow through the *siphon*, even when there is no receiver, and the air exhausted from it. The reason of this, if there were any, is not difficult to account for.

Some will have it, that there is still enough left in the evacuated receiver, to raise the water to an inch or two. But as both mercury and water are found to fall entirely out of the Torricellian tubes *vacuo*; to prevent the loss remaining in them, can be in the curve of the *siphon*, both of mercury and water, in the shorter leg of the *siphon*. Hence, as the height of the *siphon* is known, it is a fact; and this only reason, that air cannot raise water higher; it does not appear, whether or no we are in the right in rejecting Hero's method of carrying water, by means of a *siphon* over the tops of mountains, into an opposite valley.—For Hero only orders the apertures of the *siphon* to be stopped, and water to be poured through a funnel into the angle or neck of the legs, till the *siphon* be full; when, shutting the aperture in the angle, and opening the other two, the water, he says, will continue to flow.—Now, if there only need air for the first rise of the water into the less leg, not for the continuation of the motion; it were possible to raise the water much higher than the height of the atmosphere would carry it.

The real cause, therefore, of this extraordinary, though well-known phenomenon, needs some further disquisition: this is certain, that a *siphon* once set a running, will persist in its motion, though removed into the most perfect vacuum our air-pumps will make: or, if the lower orifice of a full *siphon* be shut, and the whole be thus placed in a receiver; with a contrivance for opening the orifice when the air is exhausted; the water will be all emptied out of the vessel, as if it had been in open air.

This, too, is remarkable enough, that the figure of the *siphon* may be varied at pleasure (*see fig. 3. &c.*) provided only the orifice C be below the level of the surface of the water to be drawn up; but, still, the farther it is distant from it, the faster will the fluid be carried off.—And if, in the course of the flux, the orifice A be drawn out of the fluid; all the liquor in the *siphon* will go out at the lower orifice C: that in the leg C B, dragging as it were, that in the shorter leg A B after it.

If a filled *siphon* be so disposed, as that both orifices A and C be in the same horizontal line: the fluid will remain pendant in each leg; how unequal never the length of the legs may be.—Fluids, therefore, in *siphons*, seem, as it were, to form one continued body; so that the heavier part descending, like a chain, pulls the lighter after it.

Lastly, it must be observed, that the water will flow out, even through a *siphon* that is interrupted, by having the legs A D and F C joined (*fig. 4.*) together, by a much bigger tube full of air.

The **SIPHON Württembergicus**, is a very extraordinary machine of this kind, performing divers things which the common *siphon* will not reach.—*E. gr.* In this, though the legs be in the same level, yet the water rises up the one, and descends through the other: the water rises, even though the aperture of the less leg be only half immersed in water: the *siphon* has its effect after continuing dry a long time: either of the apertures being opened, the other remaining shut for a whole day, and then opened, the water flows out as usually. Lastly, the water rises and falls indifferently through either leg.

The project of this *siphon*, was laid by Jordanus Pelletier, and executed at the expence of prince Frederick Charles, administrator of Württemberg, by his mathematician, Schachard, who made each branch 20 feet long, and set them 18 feet apart: the description thereof was published by Reifelius, the duke's physician.

This gave occasion to M. Papin to invent another, that did the same things, described in the Philosophical Transactions; and which Reifelius, in another paper in the Transactions, ingeniously owns to be the very same with that of Württemberg.—Its structure will appear from its figure; which is represented, *Tab. Hydraulicks, fig. 5.*

SIRE, a title of honour in France, now given to the king only, as a mark of sovereignty.—In all placets and petitions, epistles, discourses, &c. to the king, he is addressed under the title of *sire*.

* Some derive the word from the Latin, *senior*, master: of which opinion seems Bodinus, who, in speaking to king Francis I. always called him *senior*, q. d. master, or *senior*: others derive it from the Greek, *κύριος*, and: or when opinion is Paquier, who adds, that the ancient Franks gave the same title to God, calling him *senior* *fire* *deus*: others fetch the word from the Syriac, and maintain, it was first given to the merchants who traded to Syria. Menage will have it come from *senior*, elder; whence *senior*, *senior*, *senior*, and *senior*.

SIRE was likewise anciently used in the same sense with *senior*, and *senior*; and applied to bishops, gentlemen and citizens.

The *sire* de Joinville has wrote the history of St. Louis.

SIREN, **SIRIEN**, in antiquity, *mermaids*; a name given to a kind of fabulous beings represented by Ovid, &c. as sea-monsters, with women's faces and fishes tails; and by others

decked with a plumage of various colours. The three *sirens* are supposed to have been the three daughters of the river Achelous; and are called *Parthenope, Ligea, and Leucisfia.* Homer only makes mention of two *sirens* ; and some others reckon five. Virgil places them on rocks, where vessels are in danger of splitting. Pliny makes them inhabit the promontory of Minerva, near the island Capreae. Others fix them in Sicily, near Cape Pelorus. Claudian says, they inhabited harmonious rocks; that they were charming monsters; and that sailors were wrecked on their rocks without regret, and even expired in raptures: *dulce malum pelago siren.*

This description is doubtless, founded on a literal explication of the fable, that the *sirens* were women who inhabited the shores of Sicily, and who, by all the allurements of pleasure, stopped passengers, and made them forget their course. Some interpreters of the ancient fables, will have the number and the names of the three *sirens* to have been taken from the triple pleasure of the senses; wine, love and music; which are the three most powerful means of seducing men; and hence for many exhortations to avoid the *sirens* fatal song. Probably it was hence, that the Greeks fetched their etymology of *sirens* , viz. from *sira* , a chain, as if there was no getting free of their incitement.

Others, who do not look for so much mystery in the fable, maintain, that the *sirens* were nothing but certain streights in the sea, where the waves whirling furiously around, tossed and swallowed up vessels that approached them too near.

Others hold the *sirens* to have been certain shores and promontories, where the winds, by the various reverberations of the waves, cause a kind of harmony that surprises and transports the ear. This, probably, might be the origin of the *sirens* song; and the occasion of giving the name of *sirens* to these rocks.

Sculptors and painters usually follow Ovid's description of the *sirens* ; but on some medals, we find them represented with the upper parts of women, and the lower parts of fish.

Sirius, in astronomy, the *dog-star* ; a very bright star, the first magnitude in the mouth of the constellation *canis major,* or the great dog.

The Arabs call it *aschere, aschecere, sera* ; the Greeks, *syra* ; and the Latins, *canicula,* or *canis canem.* See *CANICULA.*

Its longitude, according to Mr. Flamsteed, is $9^{\circ} 49' 1''$; its latitude $22^{\circ} 32' 8''$ south.

SURNAM. See the article *SURNAME.*

SYSTROID angle. See the article *ANGLE.*

SYSTRUM, or *CISTRUM,* an ancient kind of musical instrument used by the priests of Isis, and Osiris.

Spon describes it as of an oval form, made in manner of a racket, with three sticks traversing it breadth-wise, which playing freely, by the agitation or beating of the instrument, yielded a kind of sound, which to the ancients seemed melodious.

Mr. Malcolm takes the *systrum* to have been no better than a kind of rattle.—Jer. Bofius has an express treatise on the *systrum,* intitled, *Ispicius de systro.*

Osilius observes, that the *systrum* is found represented on several medals; and also on Talismans.—Osiris on some medals, is painted with the head of a dog, and with a *systrum* in his hand.

SITE, or *SCITE, SITUS,* denotes the situation of a house, messuage, &c.—And sometimes the ground-plot, or spot of earth it stands on.

SITE, SITUS, in logic, one of the predicaments, declaring a subject to be so and so placed.

SITOPHYLAX, ΣΙΤΟΦΥΛΑΞ, in antiquity, an Athenian magistrate, who had the superintendence of the corn, and was to take care that no body bought more than was necessary for the provision of his family.

* The word is formed from the Greek σίτος, corn, and φύλαξ, keeper.

By the Attic laws, particular persons were prohibited buying more than fifty measures of wheat a man; of those measures, we mean, called *modii* ; and the *strophylax* was to look to the observation of this law.—It was a capital crime to prevaricate in it.

There were fifteen of these *strophylax* 's; ten for the city, and five for the Pyreus.

SITUS, in geometry and algebra, denotes the situation of lines, surfaces, &c.

Wolffius gives us some things in geometry, which are not deduced from the common analysis; particularly matter depending on the *situs* of lines and figures.—M. Leibnitz has even invented a particular kind of analysis, called *analysis situs,* and built a peculiar kind of analysis thereon, called *calculus situs.*

SIXAIN, SIXTH, SEXAGENA, in war, an ancient order of battle, wherein six battalions being ranged in one line, the second and fifth were made to advance, to form the vanguard; the first and sixth to retire, to form the rear-guard;

the third and the fourth remaining on the spot, to form the corps, or body of the battle.

* The word is French, where it signifies the same thing.

SIX-CLERKS, officers in chancery of great account, next in degree below the twelve masters; whose business is to enrol commissions, pardons, patents, warrants, &c. which pass the great seal.

They were anciently *clerici,* and forfeited their places if they married: they are also attorneys for parties in suits depending in the court of chancery.

Under them were formerly 60 clerks, who with the under-clerks, did the business of the office; which number was afterwards increased to 90.—At present the number is indefinite; an order having been made, for reducing them to their ancient number of 60; by not filling up the vacancies that may happen by death, &c. till they are fallen to that standard.

SIXHINDEMIEN. See the article *SYXHINDEMIEN.*

SIXTH, SIXTH, in music, one of the simple original concords, or harmonical intervals.

The *sixth* is of two kinds; *greater* and *lesser* ; and hence it is esteemed one of the imperfect concords; though each of the two species arises from a division of the octave.

The *greater SIXTH,* called by the Greeks *hexachordon majus,* is the concord resulting from a mixture of the sounds of two strings that are to each other as 8 to 5.

The *lesser SIXTH,* *hexachordon minus,* results from two strings, which are to each other as 8 to 5.

The *lesser sixth* is composed diatonically of six degrees, whence its name; and of five intervals, three whereof are tones, and two semi-tones; chromatically of eight semi-tones; five whereof are greater, and three less.—It has its form or origin from the ratio *super-tri partium quintas* ; as of 8 to 5.

The *greater sixth* is composed diatonically, like the *less,* of five degrees and five intervals; among which are four tones, and a semi-tone; and chromatically of nine semi-tones; five whereof are greater, and four less; of consequence it has a lesser semi-tone more than the former.—It has its origin from the ratio *super-tri partium tertias* ; as 5 to 3.

Anciently the *sixth* had only one repetition, which was the 12th; but in the modern system, it has several, as the 26th, 27th, &c. all marked indifferently in the thorough bass, by the figure 6. And even the *sixth* itself, both greater and lesser, when natural, is not expressed any otherwise than by a simple 6. But when it is greater or less by accident; to the 6 is added the mark of a sharp, or a flat: as may be seen in M. Broffard.

Besides the two kinds of *sixths* here described, which are both good concords; there are two others that are vicious and dissonant.

The first is the *defective SIXTH,* composed of two tones and three semi-tones, or of seven semi-tones, five whereof are greater and two less.

The second is the *redundant SIXTH,* composed of four tones, a greater semi-tone, and a less. Whence some call it *pentatenon,* as comprehending five tones.

These two being both discords, should never be used in melody, and very rarely in harmony.

As to the two consonant *sixths,* they were anciently used very sparingly; at present they are allowed to be used as often as one pleases; as is the case with thirds; the *sixths* being in reality, no other than inverted thirds: but care is usually taken, that the first *sixth* that occurs be a lesser, and the last a greater; and that from the greater, we rise to the octave, and from the less, fall to the fifth.

SIXTH, in the military art. See the article *SIXAIN.*

SIXTH pair of nerves, } See the articles *NERVE.*

SIXTH rates, } See the articles *RATE.*

SIZE, the name of an instrument used to find the bigness of fine round pearls withal.

It consists of thin pieces or leaves, about two inches long, and half an inch broad; fastened together at one end by a rivet. In each of these, are several round holes drilled, of different diameters. Those in the first leaf serve for measuring pearls from 1 grain to seven grains. Those of the second, for pearls from eight grains or two carats, to five carats, &c. and those of the third, for pearls from 6 to 8 carats.

SKELETON, ΣΚΕΛΕΤΟΝ, in anatomy, an assemblage or arrangement of all the bones of a dead animal, dried, cleaned, and disposed in their natural situation; and kept in that disposition by means of wires, &c.—See *Tab. Anat. (Osteol.) fig. 3, 7.*

* The word is formed from the Greek, σκελεω, I dry.

Skeletons serve to good purpose, in learning the osteology. For the several bones a *skeleton* consists of, see *BONE.*

SKIFF, or *SQUIFF,* the less of two ship-boats; serving chiefly to go ashore in, when the ship is in harbour.

SKIN, in anatomy, a large thick membrane, spread over the whole body, serving as the external organ of feeling, and as a cover and ornament of the parts underneath.

The *skin* consists of three parts; the external one, called the *cuticle,* *epidermis,* or *scarf-skin.* The middle-moist is called the *corpus cuticulare,* because pierced through with a great number of holes, like a net or sieve.—The innermost, called the *cutis* is a fibrous

fibrous substance, vove out of the extremities of arteries, veins, nerves, tendons, &c. Whence also arise abundance of little eminences, called *papillæ pyramidales*.—See *Tab. Anat.* (Myol.) fig. 8.

It is likewise set with an infinity of glands, called *miliary glands*, each whereof has its excretory duct passing along with the pyramidal papillæ, through the holes of the corpus reticulæ, and terminating at the cuticle.

The papillæ are held by the moderns to be the organ of feeling; and the excretory vessels serve to carry off the matter of perspiration, which is separated from the blood in the miliary glands. See *MILIARY glands*, *PERSPIRATION* and *FEELING*.

Nutrition, M. Perrault observes, is sometimes taken in throughout the whole body of animals, at the pores of the *skin*. The subtle substances of nutritious matters applied externally to those bodies, are found to penetrate them, to mix with the blood and juices, and they are there assimilated. On this account, heads, it is, that butchers dogs, turnspit-dogs, &c. are generally very fat, and even butchers, cooks, &c. themselves. M. Dodart takes it, that plants thus receive a great part of their food by the external bark, not all of it by the root. See *Root*.

SKIN, in commerce, is particularly used for this membrane stripped off the animal, to be prepared by the tanner, skinner, currier, parchment-maker, &c. and converted into leather, &c.

The use of *skins* is very ancient; the first garments in the world having been made thereof. The Danes and other northern nations, have a long time dressed in *skins*.—Morocco's are made of the *skins* of a kind of goats.

Parchment is usually made of sheep *skins*; sometimes of goat *skins*. Velum is a kind of parchment made of the *skin* of an abortive calf, or at least of a sucking calf.

The true shammy, is made of the *skin* of an animal of the same name; though frequently it is counterfeited with common goats and sheep *skins*. See *SHAMMY*.

Shagreen is prepared at Constantinople, of the hind-part of the *skin* of a kind of ass of that country, prepared and tanned, and when soft and manageable, stretched on a frame, and exposed to the sun.—This done, they sprinkle mustard-seed on the *skin*; taking care to rub it several times over with the hand. By means hereof, and by the heat of the sun, the grain of the leather is raised up, and there hardened.

SKINKER, a cup-bearer or butler. See *ARCH-butler*.

SKIPPER. See the article *SHIPPER*.

*SKIRMISH**, in war, a disorderly kind of combat, or encounter, in preference of two armies between small parties, or persons who advance from the body for that purpose, and introduce to a general, regular fight.

* The word seems formed from the French, *escarmouche*, which signifies the same, and which Nicod derives from the Greek *zappos*, which signifies at the same time, both light, combat and joy: Menage derives it from the German, *schirmen* or *schermen*, to fence or defend: De Cange, from *caracumcia*, a light engagement, of *scara* and *mucia*, a body of soldiers hid in ambush; in regard many *skirmishes* are performed by persons in ambuscade.

SKULL, in anatomy. See the article *CRANIUM*.

SKY, the blue expanse of air or atmosphere. See *AIR*, and *ATMOSPHERE*.

The azure colour of the *sky*, Sir Isaac Newton attributes to vapours beginning to condense therein, which have got consistence enough to reflect the most reflexible rays, *viz.* the violet ones; but not enough to reflect any of the less reflexible ones.

M. de la Hire attributes it to our viewing a black object, *viz.* the dark space beyond the regions of the atmosphere, through a white or lucid one, *viz.* the air illuminated by the sun; a mixture of black and white always appearing blue. But this account is not originally his; it is as old as Leonardo da Vinci.

SKY rocket. See the article *ROCKET*.

SLAB, an outside sappy plank or board sawed off from the sides of a timber-tree: the word is also used for a flat piece of marble.

SLATE, a blueish fissile stone, very soft when dug out of the quarry, and on that account easily cut and split into thin long squares or ekealops, to serve in lieu of tiles for the covering of houses: sometimes also to make tables of, and to pave withal.

The ancients were unacquainted with the use of *slate*, and instead thereof covered their houses with shingle, as we read in Pliny. Besides the blue *slate*, we have in England a greyish *slate*, called also *Horsham stone*, from a town in Sussex of that name, where the greatest quantities of it are found.

The blue *slate* is a very light, lasting, and beautiful covering, but it is chargeable withal, in regard the roof must be first boarded over, and the *slates* hung on tacks, and laid with finer mortar than tiles. The grey *slate* is chiefly used in the covering of churches, chapels, chancels, &c. It is dearer than tiles, but far more durable. The timber of the roof needs to be very strong for these grey *slate*, it being

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almost double the weight of tiles.

To judge of the goodness of *slate*, Mr. Chappuis, in the Philosophical Transactions, orders it to be knocked against any hard body, to make it yield a sound; if the sound be good and clear, the stone is firm and good; otherwise, it is friable and soft.

Another method of proving its goodness, is, by weighing it exactly, then letting it lie six or eight hours under water, and wiping it very clean; if it weighs now much more than it did before, it is of that kind that soaks in water, and therefore will not long endure, without rotting the lath or timber. Another method of trial is, by placing a *slate* half a day perpendicularly in a vessel of water, so as to reach a considerable height above the level thereof: if the *slate* be firm and close, then it will not draw water; that is, the water will not have ascended above half an inch above the level of that in the vessel, nor that perhaps any where but at the edges, the texture whereof might be loosened by heaving; but a bad stone will have drawn the water to the very top, be it as high as it will.

There are *slates* in several places, which the most experienced *slaters*, or coverers, conjecture to have continued on houses several hundreds of years, and which are yet as firm as when first put up.

M. Leibnitz informs us, in the history of the French academy, that in several parts of the dutchy of Brunswick, particularly about Osteroda, &c. there are horizontal veins of *slate*, wherein are found very exact and finished representations of various kinds of fishes and plants, appearing in their natural breadth and length, but without any thickness.—The same impressions are also frequently found on other substances, as on the black *slate* that lies over veins of coals.

M. Leibnitz accounts for this appearance, by supposing the lakes and meadows of these places to have been covered over with a kind of earth, which has buried the fishes and plants; or that some very muddy water much impregnated with earth, has covered them up, or carried them away.—This earth he takes to have since hardened into *slate*; and by length of time, or some other cause, to have consumed the delicate matter of the fish, &c. much as the bodies of flies or ants, which are found enclosed in amber, are quite dissipated, and nothing left, but, as it were a mere delineation.

The matter of the fish, or plant, thus consumed, has left its form impressed in the *slate*, by means of the cavity remaining therein; which cavity has sometimes been afterwards filled up with a metallic matter: whether by reason that the subterranean fire, in baking the earth into *slate*, has separated a metal therefrom; or that a metallic vapour penetrating the *slate*, has become fixed in these cavities. See *Supplement*, article *EXTRANEOUS FOSSIL*.

*SLAVE**, a person in the absolute power of a master, either by war or conquest. See *SERVANT*.

* Menage, and Vossius derive the word from *Sclavus*, the name of a Scythian people, whom Charlemagne condemned to perpetual imprisonment; whence the Italians made their *schiavi*, the Germans their *schlawen*, the French their *esclaves*, and we *slaves*: the Italians and other nations used to buy these *Sclavi* or *Sclavonians* to make drudges of; whence the proper name of a nation, in time, became the name of a state or condition. See *SLAVONIC*.

The Romans called their *slaves*, *servi*, from *servare*, to keep, or save; as being such as were not killed, but saved, to yield money either by sale, or by their work. Though other authors are of opinion, that the Roman name *servi* might come from that of *Serbi*; as that of *slaves* from *Sclavi*, a people.

We find no mention of *slaves* before the deluge; but immediately after, *viz.* in the curse of Canaan, Gen. ix. 25. whence it is easily inferred, that servitude commenced soon after that time: for in Abraham's days we find it generally established.—Some will have it to have commenced under Nimrod, because it was he who first began to make war, and of consequence to make captives; and to bring such as he took either in his battles, or irruptions, into slavery.

Among the Romans, when a *slave* was set at liberty, he changed his name into a surname; he took the nomen or praenomen of his master; to which he added the cognomen or nick name he had been called by when a *slave*. See *NAME*.

By the civil law, the power of making *slaves* is esteemed a right of nations, and follows as a natural consequence of captivity in war. The Lacedaemonians, say some, or as others say, the Assyrians, first introduced the practice; which the Romans not only approved of, but they even invented new manners of making *slaves*; for instance, a man born free among them, might sell his freedom, and become a *slave*.—This voluntary slavery was first introduced by a decree of the senate, in the time of the emperor Claudius, and at length was abrogated by Leo.

The Romans had power of life and death over their *slaves*, which no other nations had: but this severity was afterwards moderated by the laws of the emperors; and by one of Adrian, it was made capital to kill a *slave* without a cause.—The *slaves* were esteemed the proper goods of their masters, and all they got belonged to them: but, if the master were too cruel in his domestic corrections, he was obliged to sell his *slave* at a moderate price.

As *slavery* was not abolished by the gospel, the custom of keeping *slaves* lasted a long time in Christendom.—In the times of the Greeks they were so numerous in Egypt, that it was found a difficult matter to quell a body of them who had made head against their masters: yet Bartolus, who lived in 1300, observes, there were none left in his days.

Slavery is absolutely abolished in England, and France, as to personal servitude: our *slaves* are not *slaves*, but only are subject to certain determinate services. It is said, that the moment a *slave* steps on English ground, he becomes free.

Slaves make a very considerable article of the traffick in America. The English South-Sea company have the sole privilege of furnishing the Spanish West-Indies with *slaves*, by treaty.

SLAUGHTER. See MANSLAUGHTER, HOMICIDE, MURDER, BUTCHER, &c.

SLAVERY *botan.* a kind of holland thus called, because made in *sluys* in Germany; and which, from its lightness, occasions at thin, slight, ill-wrought hollands to be called *slawly*. See HOLLAND.

SLEDGE, a kind of carriage, without wheels, for the conveyance of very weighty things, as huge stones, bells, &c. The Dutch have a kind of *sledge*, whereon they can carry a vessel of any burthen by land. It consists of a plank of the length of the keel of a moderate ship, raised a little behind, and hollow in the middle; so that the sides go a little aloope, and are furnished with holes to receive pins, &c. The rest is quite even.

SLEEP, that state wherein the body appearing perfectly at rest, external objects move the organs of sense as usually, without exciting the usual sensations.

Sleep, according to Rohault, consists in a scarcity of spirits; which occasions that the orifices or pores of the nerves in the brain, whereby the spirits used to flow into the nerves, being no longer kept open by the frequency of the spirits, shut of themselves. For this being supposed, as soon as the spirits, now in the nerves, shall be dissipated, the capillaments of those nerves, having no supplement of new spirits, will become lax, and cohere as if cemented together; and so be unfit to convey any impression to the brain: besides, the muscles being now void of spirits, will be unable to move, or even to sustain the members: thus will sensation, and motion be both for the time destroyed.

Sleep is broke off unnaturally, when any of the organs of sense are so briskly acted on, that the action is propagated to the brain: for upon this, the few spirits remaining in the brain, are all called together, and unite their forces to unlock the pores of the nerves, &c. But if no object should thus affect the organ, yet *sleep* would in some time be broke off naturally; for the quantity of spirits generated in *sleep*, would at length be so great, that, stretching out the orifices of the nerves, they would open themselves a passage.

With regard to medicine, *sleep* is defined, by Boerhaave, to be that state of the medulla of the brain, wherein the nerves, do not receive so copious, nor so forcible an influx of spirits, from the brain as is required to enable the organs of sense, and voluntary motion, to perform their offices.

The immediate cause hereof appears to be the scarcity of animal spirits, which being spent, and requiring some time to be recruited, the minute vessels, before inflated, become flaccid and collapse: or else, it is owing to such a pressure of the thicker blood against the cortex of the brain, as that the medulla, becoming likewise compressed by its contiguity with the cortex, the passage of the spirits is obstructed.

The natural cause of *sleep*, then, is any thing that may contribute to these two.—And hence its effects may be understood: for in *sleep* several functions are suspended, their organs and muscles are at rest, and the spirits scarce flow through them, therefore there is a less consumption of them; but the solid villi and fibres of the nerves are but little changed, and an equilibrium obtains throughout; there is no difference of pressure on the vessels, nor of velocity in the humours: the motion of the heart, lungs, arteries, viscera, &c. is increased. The effects of which are, that the vital humours circulate more strongly and equally through the canals, which are now freer, laxer, and opener, as not being compressed by the muscles. Hence the blood is driven less forcibly, indeed, into the lateral vessels, but more equally; and through the greater vessels, both more strongly, and more equally. Thus are the lateral fibres sensibly filled, as being less traversed, and at length they remain at rest, with the juices they have collected: and hence the lateral adipose cells become filled and distended with an oily matter.

By this means the circulation, being almost wholly performed in the larger blood-vessels, becomes gradually slower, and at length scarce sensible, if the *sleep* be too long continued: thus, in moderate *sleep*, is the matter of the chyle best converted into serum; that into thinner humours; and those, into nourishment. The attrition of the solid parts is less considerable; the cutaneous secretion is increased, and all the rest diminished. The parts wore off are now best supplied, as an equable, continual repletion, restores the humours,

and repairs the solids, the preventing and disturbing cause being then at rest. In the mean time, while the nutritious matter is best prepared; there is an aptitude in the vessels to receive, and in the humours to enter, and the means of application, and consolation, are at liberty: hence, a new production, and accumulation of animal spirits, in all the humours, as to matter, and in the minutest vessels as to repletion: the consequence of which is, an aptitude for waking, and an in-aptitude for *sleep*; so that upon the first occasion the man awakes.

Some of the more extraordinary phenomena of *sleep*, yet to be accounted for, are: that when the head is hot, and the feet cold, *sleep* is impracticable: that spirituous liquors first bring on drunkenness, then *sleep*: that perspiration, during the time of *sleep*, is twice as great as at other times: that upon *sleeping* too long, the head grows heavy, the senses dull, the memory weak, with coldness, pittingness, an indisposition of the muscles for motion, and a want of perspiration. That much *sleeping* will sustain life a long time, without either meat or drink: that upon a laudable *sleep*, there always follows an expansion of all the muscles, frequently a repeated yawning, and the muscles and nerves acquire a new agility; that *fetus*'s always *sleep*; children often; youth more than grown persons, and they more than old men; and that people, recovering from violent distempers, *sleep* much more than when perfectly at health.

SLEEVE *Hippocrates*'s. See the article HIPPOCRATES.

SLIDING, in mechanicks, *superficies radens*, is, when the same point of a body, moving along a surface, describes a line on that surface.

Such is the motion of a parallelepiped, protruded along a plane.

SLIDING rule, a mathematical instrument, serving to work questions in gauging, measuring, &c. without the use of compasses; merely by the *sliding* of the parts of the instrument one by another, the lines and divisions whereof give the answer, by inspection.

This instrument is variously contrived, and applied by various authors; particularly Everard, Coggehal, Gunter, Hunt, and Partridge; but the most usual and useful ones, are those of Everard and Coggehal; the description, and uses whereof, are as follow.

Everard's Sliding rule is principally used in gauging; being ordinarily made of box, a foot long, an inch broad, and $\frac{1}{2}$ of an inch thick.—It consists of three parts: a rule, on each side whereof, *a b*, and *c d* (*Tab. Surveying*, fig. 17.) is a groove; and two small scales, or *sliding pieces*, *m n*, *slide* in the grooves.—When both these pieces are drawn put to their full extent, the instrument is three foot long.

On the first broad face of the instrument *a b*, are four lines of numbers; for the properties, &c. whereof, see GUNTER'S line. The first marked *A*, consisting of two radius's numbered 1, 2, 3, 4, 5, 6, 7, 8, 9, 10; and then 2, 3, 4, 5, &c. to 10. On this line are four brass centre-pins, two in each radius; one in each whereof is marked MB, to signify that the number it is set against, 2150.42 is the cubic inches in a malt-bushel; the other two are marked with *A*, to signify that the numbers they are set against, viz. 282, are the cubic inches in an ale-gallon.—The second and third lines of numbers, are on the *sliding pieces*, and are exactly the same with the first. Close to the figure 7, in the first radius, is a dot marked *S*, set exactly over .707, denoting .707 to be the side of a square inscribed in a circle, whose diameter is unity. Close to *g* is another dot, marked *S*, set over .886, which is the side of a square, equal to the area of a circle, whose diameter is unity. Another dot, nigh *W*, is set over 231, the number of cubic inches in a wine-gallon; and another near *C*, is set over 3.14 the circumference of a circle, whose diameter is unity.—The fourth line of numbers, marked MD, to signify malt depth, is a broken line of two radius's numbered 2, 10, 9, 8, 7, 6, 5, 4, 3, 2, 1, 9, 8, 7, &c. the number 1 being set directly against MB on the first radius.

On the second broad face, marked *c d*, are 10°. A line of numbers of one radius, numbered 1, 2, 3, &c. to 10, noted by the letter D. On this are four centre pins; the first, marked WG, is the gauge-point for a wine-gallon, *i. e.* the diameter of a cylinder, whose height is an inch, and content 231 cubic inches, or a wine-gallon, which is 17.15 inches: the second centre-pin AG stands at the gauge-point for an ale-gallon, which is 18.95 inches. The third MS stands at 46.3 the side of a square, whose content is equal to the inches in a solid bushel. The fourth MR is the gauge-point for a malt bushel, which is 52.32 inches.—2°. Two lines of numbers on the *sliding piece*, which are exactly the same as those on the *sliding piece* on the other side. Close to the division 8 is a dot marked *c*, which is set to .795, the area of a circle whose diameter is unity; and another marked *d*, stands at .785, the area of a circle, whose diameter is unity.—3°. Two lines of segments, each numbered 1, 2, 3, to 100; the first, for finding the ullage of a cask, taken as the middle frustum of a spheroid, lying with its axis parallel to

the horizon; and the other, for, finding the ullage of a cask standing.

Again, on one of the narrow sides, noted e , are 1° . A line of inches, numbered 1, 2, 3, &c. to 12, each sub-divided into ten equal parts. 2° . A line, by which, with that of inches, we find a mean diameter for a cask, in the figure of a middle frustum of a spheroid: it is numbered 1, 2, 3, &c. to 7, and marked *spheroid*. 3° . A line for finding the mean diameter of a cask, in the figure of the middle frustum of a parabolic spindle, which gaugers call the *second variety of casks*; it is numbered 1, 2, 3, &c. and noted *second variety*. 4° . A line, by which we find the mean diameter of a cask of the third variety, i. e. of a cask in the figure of two parabolic conoids, abutting on a common base; it is numbered 1, 2, 3, &c. and noted *third variety*.

On the other narrow face, marked f , are 1° . A foot divided into 100 equal parts, marked F M. 2° . A line of inches, like that before-mentioned, noted I M. 3° . A line for finding the mean diameter of the fourth variety of casks, which is the middle frustum of two cones, abutting on a common base. It is numbered 1, 2, 3, &c. and noted F C, signifying frustum of a cone.

On the backside of the two *sliding* pieces are a line of inches, from 13 to 36, when the two pieces are put endwise; and against that, the correspondent gallons, or hundred parts, that any small tub, or the like open vessel (from 13 to 36 inches diameter) will contain at one inch deep.

Use of Boverard's SLIDING rule.— 1° . To multiply one number by another. Suppose 4 required to be multiplied by 6: set 1 on the line of numbers B, to 4 on the line A; then, against 6 upon B is 24, the product sought upon A. Again, to multiply 26 by 68, set 1 on B to 26 on A; then, against 68 on B is 1768 on A, the product sought.

2° . To divide one number by another. Suppose 24 to be divided by 4: set 4 on B to 1 on A; then against 24 on B is 6 on A, which is the quotient. Again, to divide 952 by 14: set 14 on A to 1 on B, and against 952 on A you have on B, 68, which is the quotient.

3° . To work the rule of three. If 8 give 20, what will 22 give? set 8 on B to 20 on A, then against 22 on B stands 55 on A; the number sought.

4° . To find a mean proportional between two numbers, suppose between 50 and 72: set 50 on C to 72 on D; then against 72 on C you have 60 on D, which is the mean required.

5° . To extract the square root of a number. Apply the lines C and D to one another, so as to at the end of D be even with 10 at the end of C; then are these two lines a table, shewing the square root of any number less than 1000000 by inspection: for against any number on C, the number answering to it on D, is the square root thereof. Note, if the given number consist of 1, 3, 5, or 7 places, seek it on the first radius, on the line C, and against it is the root required at D.

6° . Either the diameter, or circumference of a circle, being given; to find the other. Set 1 on the line A against 3, 141 (to which is writ C) on the line B; and against any diameter on the line A, you have the circumference on B; and contrariwise: thus, the diameter being 20 inches, the circumference will be 62.831 inches; and the circumference being 94, the diameter will be 30.

7° . The diameter of a circle given, to find the area in inches, or in ale or wine-gallons. Suppose the diameter 20 inches, what is the area? set 1 upon D, to .785 (noted d) on C; then against 20 on D is 314.159 the area required. Now to find that circle's area in ale-gallons, set 18.95 (marked A G) upon D, to 1 on C; then against the diameter 20 upon D, is the number of ale-gallons on C, viz. 1.11. The same may serve for wine-gallons, regard being only had to the proper gauge-point.

8° . The two diameters of an ellipsis being given, to find the area in ale-gallons. Suppose the transverse diameter 72 inches, and the conjugate 50; set 359.05 the square of the gauge-point on B, to one of the diameters (suppose 50) on A; then against the other diameter 72 on B, you will have the area on A, viz. 10.02 gallons, the content of this ellipsis at one inch deep. The like may be done for wine-gallons, if instead of 359.05 you use 249.11 the square of the gauge-point for wine-gallons.

9° . To find the area of a triangular surface in ale-gallons. Suppose the base of the triangle 260 inches, and the perpendicular let fall from the opposite angle 110 inches: set 282 (marked A) upon B to 130, half the base on A; then against 110 on B is 50.7 gallons on A.

10° . To find the content of an oblong in ale-gallons. Suppose one side 130 inches, and the other 180; set 282 on B to 180 on A; then against 130 upon B is 82.97 ale-gallons, the area required.

11° . To find the content of a regular polygon in ale-gallons, one of the sides being given. Find the length of the perpendicular let fall from the centre to one of the sides: this multiplied by half the sum of the sides, gives the area. For an instance: suppose a pentagon, whose side is 1 inch; here, the perpendicular will be found .837, by saying, as the sine

of half the angle at the centre, which in this polygon is 36° , is to half the given side .5, so is the sine of the complement of 36° , viz. 54° to the perpendicular aforesaid. Whence the area of a pentagon, whose side is unity, will be found 1.72 inches, which divided by 282, give .0061, the ale-gallons in that polygon.

12° . To find the content of a cylinder in ale-gallons. Suppose the diameter of the base of the cylinder 120 inches, the perpendicular height 36 inches: set therefore the gauge-point (A G) to the height, 36 on C; then against 120, the diameter on D, is found 1443.6, the content in ale-gallons.

13° . The bung and head-diameter, of any cask, together with its length, being given; to find its content in ale, or wine-gallons.— 1° . Suppose the length of a cask taken (as the middle frustum of a spheroid, which is the first cask or variety) be 40 inches, its head-diameter 24 inches, and bung-diameter 32 inches: subtract the head diameter from that of the bung; the difference is 8. Look, then, for 8 inches on the line of inches, on the first narrow face of the rule; and against it, on the line *spheroid* stands 5.6 inches, which added to the head-diameter 24, gives 29.6 inches for that cask's mean diameter: set therefore the gauge-point for ale (marked A G) on D, to 40 on C; and against 29.6 on D, is 97.45, the content of the cask in ale-gallons. If the gauge-point for wine (marked W G) be used instead of that for ale; you will have the vessel's content in wine-gallons.— 2° . If a cask, of the same dimensions as the former be taken (as the middle frustum of a parabolic spindle, which is the second variety) see what inches, and parts, on the line marked second variety, stand against the difference of the bung and head-diameters, which in this example is 8; and you will find 5.1 inches, which added to 24, the head-diameter makes 29.1 inches, the mean-diameter of the cask: set therefore the rule, as before, and against 29.1 inches, you will have 94.12 ale-gallons, for the content of the cask.— 3° . If the cask taken be the middle frustum of two parabolic conoids, which is the third variety; against 8 inches, the difference of the head and bung-diameters, on the line of inches, you will find 4.57 inches on the line called *third variety*; this added as before to 24, gives 28.57 for the cask's mean-diameter: proceeding as before, you will find the content 90.8 gallons.— 4° . If the cask taken be the frustums of two cones, which is the fourth variety, against 8 inches on the line of inches, you will find on the line marked F C, 4.1 inches to be added to 24 inches: the rest, carried on as before, gives the content of the cask 87.93 ale-gallons.

14° . A cask partly empty, lying with its axis parallel to the horizon; to find the quantity of liquor therein. Find its whole content, as above; which suppose 97.455 gallons, and suppose the inches left dry, 8, and the bung-diameter 32: then, as the bung-diameter on C is to 100 on the line of segments L, so are the dry inches on C to a fourth number on the line of segments: and as 100 upon B is to the cask's whole content on A, so is that fourth number to the liquor wanting to fill up the cask; which, subtracted from the whole contents of the cask, gives the liquor remaining therein. *E. gr.* Set 32, the bung-diameter on C, to 100 on the segment line L; then against 8, the dry inches on C, stands 17.6 on the segment line: set therefore 100 on B, to the cask's whole content on A; and against 17.6 on B, you have 16.5 gallons on A; subtracting therefore the said gallons from 97.45, the vessel's whole content; the liquor in the cask will be 80.95 gallons.

15° . A cask standing upright, or with its axis perpendicular to the horizon, to find the liquor therein. Suppose the length of the cask 40 inches, and ten of them dry; set 40 inches, on the line C, to 100 on the segment line S; and against 10, the dry inches on the line C, stands 24.2 on S the segment line. Set, then, 100 on B, to 97.455, the cask's whole content on A; and against 24.2 on B, you will have 23.5 gallons, which is what is wanting to fill up the cask: this, therefore, subtracted from the whole content 97.455, give 73.955 gallons, for the quantity of liquor remaining in the cask.

16° . To find the content of any right-angled parallelepiped (*e. gr.* a cistern, uting-fat, or the like) in malt bushels. Suppose the length of the base 80 inches, the breadth 50, and depth 9 inches: set the breadth 50 on B, to the depth 9 on C; then against the length 80 on A, stand 16.8 bushels on B, the number required.

Coggehal's SLIDING rule is principally used in measuring of the superficies, and solidity of timber, &c. It consists of two rulers, each a foot long, which are framed, or put together, various ways; sometimes, they are made to slide by one another, like glazier's rules: sometimes a groove is made in the side of a common two-foot joint-rule, and a thin sliding piece put in, and Coggehal's lines added on that side: but the most usual and commodious way, is to have one of the rulers slide in a groove made along the middle of the other, as it is represented in *Table Surveying*, fig. 18.

On the sliding side of the rule are four lines of numbers, three

three whereof are double, that is, are lines to two radius's, and are a single broken line of numbers: the three first, marked *A, B, C*, are 1, 2, 3, &c. to 9; then 1, 2, 3, &c. to 10. Their construction, &c. &c. are the same as those on *Wentworth's sliding rule*. The single line, called the *girt-line*, is marked *D*, whose radius is equal to the two radius's of any of the other lines, is broke for the easier measuring of timber, and figured 4, 5, 6, 7, 8, 9, 10, 20, 30, &c. from 4 to 5. It is divided into ten parts, and each 10th subdivided into 2, and so on from 5 to 10, &c.

On the back-side of the rule, are, 1^o. A line of inch-measure, from 1 to 12; each inch being divided and subdivided. 2^o. A line of foot-measure; consisting of one foot, divided into 100 equal parts, and figured 10, 20, 30, &c. The back-side of the sliding piece is divided into inches, halves, &c. and figured from 12 to 24; so that when slid out, there may be a measure of two foot.

Use of Coggeshal's SLIDING rule, in measuring plain superficies.

1^o. To measure a square. Suppose, *e. gr.* the sides be each 5 feet: set 1 on the line *B*, to 5 on the line *A*; then against 5 on the line *B*, is 25 feet; the content of the square on the line *A*.

2^o. To measure a long square. Suppose the longest side 18 feet, and the shortest 10: set 1 on the line *B*, to 10 on the line *A*; then against 18 foot, on the line *B*, is 180 feet, the contents on the line *A*.

3^o. To measure a rhombus. Suppose the side 12 feet, and the length of a perpendicular let fall from one of the obtuse angles, to the opposite side, 9 feet: set 1, on the line *B*, to 12, the length of the side, on the line *A*; then against 9, the length of the perpendicular on the line *B*, is 108 feet, the content.

4^o. To measure a triangle. Suppose the base seven feet, and the length of the perpendicular let fall from the opposite angle to the base, 4 feet: set 1 on the line *B*, to 7 on the line *A*; then against half the perpendicular, which is 2, on the line *B*, is 14 on the line *A*, for the content of the triangle.

5^o. To find the content of a circle, its diameter being given. Suppose the diameter 3.5 feet: set 11 on the girt-line *D*, to 95 on the line *C*; then against 3.5 feet on *D* is 9.6 on *C*, which is the content of the circle in feet.

6^o. To find the content of an oval or ellipsis. Suppose the longest diameter 9 feet, and the shortest 4. Find a mean proportional between the two, by setting the greater 9 on the girt-line, to 9 on the line *C*; then, against the less number 4, on the line *C*, is 6; the mean proportional sought. This done, find the content of a circle, whose diameter is 6 feet; this, when found, by the last article, will be equal to the content of the ellipsis sought.

Use of Coggeshal's SLIDING rule, in measuring timber.—1^o. To measure timber the usual way. Take the length in feet, half feet, and, if required, quarters; then measure half way back again; there girt the tree with a small cord or line; double this line twice, very evenly, and measure this fourth part of the girt or perimeter, in inches, halves, and quarters.

The dimensions thus taken, the timber is to be measured as if square, and the fourth of the girt taken for the side of the square, thus; set 12 on the girt-line *D*, to the length in feet on the line *C*, then against the side of the square, on the girt-line *D*, taken in inches, you have, on the line *C*, the content of the tree in feet.

For an instance: suppose the girt of a tree, in the middle, be 60 inches, and the length 30 feet, to find the content: set 12 on the girt-line *D*, to 30 feet on the line *C*; then against 15, one fourth of 60, on the girt-line *D*, is 46.8 feet; the content on the line *C*. If the length should be 9 inches, and the quarter of the girt 35 inches; here, as the length is beneath a foot, measure it on the line of foot-measure, and see what decimal part of a foot it makes, which you will find .75. Set 12, therefore, on the girt-line to 75 on the first radius of the line *C*, and against 35 on the girt-line is 6.4 feet on *C*, for the content.

2^o. To measure round timber the true way. The former method, though that generally in use, is not quite just. To measure timber accurately, instead of the point 12 on the girt-line, use another, *viz.* 10.635; at which there should be placed a centre-pin. This 10.635 is the side of a square equal to a circle, whose diameter is 12 inches. For an instance: suppose the length 15 feet, and $\frac{1}{4}$ of the girt 42 inches: set the point 10.635 to 15 the length; then against 42 on the girt-line is 233 feet for the content sought; whereas by the common way, there arises only 184 feet. In effect, the common measure is only to the true measure, as 11 to 14. See **TIMBER**.

3^o. To measure a cube. Suppose the sides to be 6 feet each; set 12 on the girt-line *D*, to 6 on *C*; then against 72 inches (the inches in 6 feet) on the girt-line, is 216 feet on *C*, which is the content required.

4^o. To measure unequally-squared timber; that is, where the breadth and depth are not equal. Measure the length of the piece, and the breadth and depth (at the end) in inches: then find a mean proportional between the breadth and depth of the piece. This mean proportional is the side

of a square, equal to the end of the piece; which found, the piece may be measured as square timber. For an instance: let the length of the piece of timber be 13 feet; the breadth 22 inches, and the depth 13 inches: set 23 on the girt-line *D*, to 23 on *C*; then against 13 on *C* is 17.35 on the girt-line *D*, for the mean proportional. Again setting 12 on the girt-line *D*, to 13 feet, the length on the line *C*; against 17.35 on the girt-line, is 27 feet, the content.

5^o. To measure taper-timber. The length being measured in feet, note one third of it; which is found thus: set 3 on the line *A*, to the length on the line *B*; then against 1 on *A*, is the third part on *B*: then if the solid be round, measure the diameter at each end in inches, and subtract the less diameter from the greater; add half the difference to the less diameter; the sum is the diameter in the middle of the piece. Then set 13.54 on the girt to the length of the line *C*, and against the diameter in the middle, on the girt-line, is fourth number on the line *C*. Again, set 13.54 on the girt-line to the third part of the length on the line *C*; then against half the difference on the girt-line, is another fourth number on the line *C*, these two fourth numbers added together, give the content. For an instance: let the length be 27 feet (one third whereof is 9) the greater diameter 22 inches, and the lesser 18; the sum of the two will be 40, their difference 4, and half the difference two, which added to the less diameter, gives 20 inches for the diameter in the middle of the piece. Now set 13.54 on the girt-line, to 27 on the line *C*, and against 20 on *D*, is 58.9 feet. Again, set 13.54 of the girt-line to 9 on the line *C*; and against 2 on the girt-line (represented by 20) is .196 parts; therefore, by adding 58.9 feet to .196 feet, the sum is 59.096 feet the content.

If the timber be square, and have the same dimensions; that is, the length 27 feet, the side of the greater end 22 inches, and that of the lesser 18 inches, to find the content: set 12 on the girt-line to 27, the length on the line *C*, and against 20 inches, the side of the mean square on the girt-line, is 75.4 feet. Again, set 12 on the girt-line to 9 feet, one third of the length, on the line *C*, and against 2 inches, half the difference of the sides of the squares of the ends on the girt-line, is .25 parts of a foot, both together make 75.65 feet, the content of the solid.

The girt or circumference of a tree, or round piece of timber given; to find the side of the square within, or the number of inches of a side, when the round timber is squared. Set 10 on *A* to 9 on *B*, then against the girt on *A*, are the inches for the side of the square on the line *B*.

SLING, *funda*, a firing-instrument, serving for the casting stones with the greater violence.

Pliny, *l.* 76. *c.* 5. attributes the invention of the sling to the Phœnicians: but Vegetius ascribes it to the inhabitants of the Balearic islands, who were famous in antiquity, for the dextrous management thereof. Florus and Strabo say those people bore three kinds of slings; some longer, others shorter, which they used according as their enemies were nearer or more remote. Diodorus adds, that the first served them for a head-band, the second for a girdle, and that the third they constantly carried with them in the hand.

SLINGING, is used variously at sea; but chiefly for the hoisting up casks, or other heavy things, with slings, *i. e.* contrivances of ropes spliced into themselves at either end, with one eye big enough to receive the cask, or other thing to be slung.

SLIPPING, among gardeners, the tearing off a sprig from a branch, or a branch from an arm of the tree.—These sort of slips take root more readily than cuttings.

SLIT grafting. See the article **ENGRAFTING**.

SLOOP, a sort of floating vessel, otherwise called *shallop*.

In our navy, *sloops* are tenders on the men of war; and are usually of about 60 ton, and carry about 30 men.

SLOPING alley. See the article **ALLEY**.

SLOT.—Drawing on the slot. See **DRAWING**.

SLOUGH, a deep muddy place.—The cast skin of a snake, the damp of a coal-pit, and the scar of a wound, are also called by the same appellation.

SLOUGH of a wild boar, is the bed, foil, or mire, wherein he wallows, or in which he lies in the day-time.

SLOUTH, or **SLOUGHT**, in hunting, is used for a company of some sort of wild-beasts.—As, a *slout* of bears.

SLOW fevers, } See the articles **FEVER**.

SLOW pulse, } **PULSE**.

SLUICE, a frame of timber, stone, or other matter, serving to retain and raise the water of a river, &c. and, on occasion, to let it pass.

Such is the *sluice* of a mill, which stops and collects the water of a rivulet, &c. to let it fall, at length, in the greater plenty upon the mill-wheel: such also are those used as vents or drains to discharge water off land.—And such are the *sluices* of Flanders, &c. which serve to prevent the waters of the sea overflowing the lower lands, except when there is occasion to drown them.

Sometimes there is a kind of canal inclosed between two gates

gates or *suices*, in artificial navigations, to save the water, and render the passage of boats equally easy, and safe, upwards and downwards; as in the *suices* of Briare in France, which are a kind of massive walls built parallel to each other, at the distance of 20 or 24 feet, clothed with strong gates, at each end, between which is a kind of canal or chamber, considerably longer than broad, wherein a vessel being inclosed, the water is let out at the first gate, by which the vessel is raised 15 or 16 foot, and passed out of this canal into another much higher. By such means a boat is conveyed out of the Loire into the Seyne, though the ground between them rise above 150 feet higher than either of those rivers.

The word *suice* is formed of the French, *eschuse*, which Menage derives from the Latin, *exclusa*, found in the Salic law in the same sense.—But this is to be refrained to the *suices* of mills, &c. for as to those serving to raise vessels, they were wholly unknown to the ancients.

SMACK, is a small vessel with but one mast.

Sometimes they are employed as tenders on a man of war; and are also used for fishing upon the coasts, &c.

SMALL apparatus, } See the articles } APPARATUS.
SMALL intestine, } {

SMALL-POX, *variole*. See POX and VARIOLAE.

SMALL repeat. See the article REPEAT.

SMALT, the last produce of cobalt, a kind of mineral matter, prepared and purified abroad, and brought hither, sometimes in form of a blue powder, and sometimes in lumps; chiefly used along with starch, to give linens the finer and clearer cast; and best known by the name of *powder-blue*.

The preparation of *smalt*, as practised in Hermanduria, we find described in the Philosophical Transactions by Dr. Krieg; who tells us, that the matter it is made of, is the mineral stone, called cobalt, or cadmia mineralis, which being pulverized, and the lighter stuff washed away, the remainder is laid on a furnace, and by a fire, underneath and aside it, the flames whereof are reverberated over it, a matter is separated from it in form of a smoke, which sticking to the walls makes what we call *arsenic*.

When the cobalt has done smoking, it is cooled, mixed with pot-ashes and powder of white flint-stones; the mixture is put in pots, and melted for five or six hours in a furnace. By this means, the matter is formed into a blue glass, which being put in cold water, cracks and grows tender, and is at length powdered by an engine, the finest part separated by a sieve, put into a mill, and ground in water, into a very fine powder, which by washing is still further separated from the coarser, then dried in warm chambers, barrelled up, and sent away.

SMARAGD, ΣΜΑΡΓΑΔΟΣ, a precious stone of a green colour, very beautiful, and brilliant, called also the *emerald*.

The oriental *smaragds* are the most in esteem, as being the hardest, and their splendor the most vigorous; so as even to tinge the ambient air with their greenness; but these are very rare.

Great virtues are ascribed to the *smaragd*, or emerald: Cardan and others say, it resists plagues, poisons, and dyenteries; that it refreshes the spirits, &c. See Supplement, article EMERALD.

SMECTYMNIUS, a term that made some figure in the time of the civil wars, and during the inter-regnum.—It was formed of the initial letters of the names of five eminent presbyterian ministers of that time, viz. Stephen Marshall, Edmund Calamy, Thomas Young, Matthew Newcomen, and William Spurlow, who, together, wrote a book against episcopacy, in the year 1641; whence they and their retainers, were called *smectymnians*.

SMELL, odor, with regard to the organ, is an impression made on the nose, by little particles continually exhaling from odorous bodies.

SMELL, with regard to the object, is the figure and disposition of odorous effluvia, which sticking on the organ, excite the sense of *smelling*.

SMELL, with regard to the soul, is the perception of the impression of the object on the organ; or the affection in the soul resulting therefrom.

The chymists teach, that sulphur is the principle of all *smells*, and that these are more or less strong, as the sulphur in the odorous body, is more or less dried and exalted. Sulphur, they say, is the foundation of odours, as salt is of flavours, and mercury of colours.

Smell, like taste, consists altogether in the arrangement, composition and figure of the parts; as appears from the following experiments of Mr. Boyle:

1°. From a mixture of two bodies, each whereof is, of itself, void of all *smell*; a very urinous *smell* may be drawn: this is done by the grinding of quick-lime with sal-ammoniac.

2°. By the admixture of common water, which of itself is void of *smell*, or inodorous; an other inodorous body may be made to emit a very rank *smell*.—Thus camphor dissolved in oil of vitriol, is inodorous, yet mixed with water, it immediately exhales a very strong *smell*.

3°. Compound bodies may emit *smells*, which have no sim-

ilitude to the *smells* of the simples they consist of.—Thus oil of turpentine, mixt with a double quantity of oil of vitriol, and distilled; after distillation, there is no *smell* but of sulphur; and what is left behind in the retort, being agitated by a more violent fire, yields a *smell* like oil of wax.

4°. Several *smells* are only to be drawn forth by motion, and agitation.—Thus glass, stones, &c. which even when heated, yield no *smell*, yet when rubbed and agitated in a peculiar manner, emit a strong *smell*; particularly beech-wood in turning, yields a kind of *smell*.

5°. A body that has a strong *smell*, by being mixed with an inodorous one, may cease to have any *smell* at all.—Thus if aqua-fortis, not well dephlegmated, be poured on salt of tartar, till it cease to ferment; the liquor, when evaporated, will yield inodorous crystals, much resembling nitre: yet these, when burnt, will yield a most noisome *smell*.

6°. From a mixture of two bodies, one whereof *smells* extremely ill, and the other not well; a very pleasant aromatic odor may be gained, viz. by a mixture of aqua-fortis, or spirit of nitre, with an inflammable spirit of wine.

7°. Spirits of wine, by mixing with an almost inodorous body, may gain a very pleasant, aromatic *smell*.—Thus inflammable spirits of wine, and oil of Dantzic vitriol, mixed in equal portions, then digested, and at last distilled, yield a spirit of a very fragrant *smell*.

8°. A most fragrant body may degenerate into a foetid one, without the admixture of any other body.—Thus, if the spirit, mentioned in the former experiment, be kept in a well-closed receiver, it will soon acquire the rankness of garlic.

9°. From two bodies, one whereof is inodorous, and the other foetid; a very pleasant *smell* may arise, much resembling musk, viz. by putting pearls into spirit of vitriol: for when dissolved, they yield a very agreeable *smell*.

SMELLING, the act whereby we perceive *smells*, or whereby we become sensible of odorous bodies, by means of certain effluvia thereof, which striking on the olfactory organ, briskly enough to have their impulse propagated to the brain, excite a sensation in the soul.

The principal organs of *smelling*, are the nostrils, and the olfactory nerves; the minute ramifications of which latter are distributed throughout the whole concave of the former: their descriptions, see under their proper heads.

Smelling is performed by the odorous effluvia floating in the air, being drawn into the nostrils, in inspiration, and struck with such force against the fibrillae of the olfactory nerves, which the figure of the nose, and the situation of the little bones, render opposite thereto, as to shake them, and give them a vibratory motion; which action being communicated thence to the common sensory, occasions an idea of a sweet, or foetid, or sour, or an aromatic, or a putrid object, &c. The matter in animals, vegetables, fossils, &c. which chiefly affects the sense of *smelling*, Boerhaave observes, is that subtle substance inherent in the oily parts thereof, called *spirit*; for that when this is taken away from the most fragrant bodies, what remains, has scarce any *smell* at all; but this poured on the most inodorous bodies, gives them a fragrance. *Instit. cap. de Olfac.*

Willis observes, that brutes have, generally, the sense of *smelling* in much greater perfection than man; as by this alone, they distinguish the virtues and qualities of bodies unknown before; hunt out their food at a great distance, as hounds, and birds of prey; or hid among other substances, as ducks, &c.

Man having other means of judging of his food, &c. did not need so much sagacity in his nose: yet have we instances of a great deal, even in man.—In the *Histoire des Antilles*, we are assured, there are negroes who, by the *smelling* alone, can distinguish between the foot-steps of a Frenchman and a negro.

It is found that the laminae, wherewith the upper-part of the nostrils is fenced, and which serve to receive the divarications of the olfactory nerves, are always longer, and folded up together in greater number, as the animal has this sense more accurate: the various windings and turnings of these laminae, detain and fester the more of the odoriferous particles.

SMELTING, among metallists, the melting of a metal from the ore, in a *smelting* furnace; in order to separate the metallic from the earthy and other parts.

Smelting, in propriety, is refrained to large works, wherein ores from the mines are melted down and separated.—In speaking of works in a lesser way, we do not say *smelting*, but melting.

SMINTHEAN, SMINTHEUS, ΣΜΙΝΘΕΙΟΣ, in antiquity, an epithet given to Apollo, from the Greek, σμινθος, a rat. There are two different accounts of the origin of this appellation: the first is, that in the city of Chrysi in Mylia, was a priest of Apollo, called *Crinis*, with whom that god being offended, sent a herd of rats to spoil all his lands. But *Crinis* appealing the deity, he came in person to his assistance, took up his bow with *Crinis's* shepherd, told him who he was, and destroyed all the rats with his arrows: in memory whereof, *Crinis* built a temple to his deliverer, under the name of *Apollo Smintheus*.

Clemens Alexandrinus, in his exhortation to the Greeks, gives us a different story: the Cretans, says he, intending to send out a colony, consulted the oracle of Apollo as to the place: the answer was, that they should fix their colony where those born of the earth should oppose them.—Upon their arrival in the Hellespont, the rats, in the night-time, gnawed asunder all the strings of their bows: this they deemed an accomplishment of the oracle, and there built a city called *Smintha*.

SMOKE, or **SMOAK**, *fumus*, a humid matter, exhaled in form of vapour, by the action of heat, either external or internal.

Smoke, Sir Isaac Newton observes, ascends in the chimney by the impulse of the air it floats in: for that air being rarified by the fire underneath, has its specific gravity diminished; and thus, being determined to ascend itself, it carries up the *smoke* along with it.—The tail of a comet, that great author takes also to ascend from the nucleus after the same manner.

See **COMET**.

Smoke of fat unctuous woods, as fir, beech, &c. makes what we call *lamp-black*.

There are various inventions for preventing, and curing *smoking* chimneys; as the æolipiles of Vitruvius, the ventiducts of Cardan, the wind-mills of Bernard, the capitals of Serlio, the little drums of Paduanus, and several artifices of de Lorme, &c.

In the Philosophical Transactions, we have the description of an engine invented by Monsieur Daleme, which consumes the *smoke* of all sorts of wood, and that so totally as the most curious eye cannot discover it in the room, nor the nicest nose smell it, though the fire be made in the middle of the room.—It consists of several iron hoops, four or five inches in diameter, which shut into one another; and is placed on a trevet.—A brand taken out of the fire *smokes* instantly; but ceases as soon as returned. The most fœtid things, as a coal steeped in cat's piss, which stinks abominably when taken out of the fire, yet in it makes not the least ill scent; no more than red herrings broiled, &c.

Smoke *farthings*, were the pentecostal or customary oblations offered by the inhabitants within any diocese, when they made their processions to the cathedral church; which came by degrees into an annual standing rent, called *smoke-farthings*. See **PENTECOSTAL**, &c.

SMOOTHING plane. See the article **PLANE**.

SMUGGLING, a cant term for the running of goods; or the clandestine landing them without paying custom. See **CUSTOM**.

SMUT, a disease in corn, whereby the pulp or meal thereof is damaged, and its natural taste, colour, &c. altered.

The *smut* is usually ascribed by the husbandmen to the excessive fatness and rankness of the soil; to the manuring the land with rotten vegetables, as straw, hawm and fern; and to the sowing *smutty* seed.

Mr. Bradley makes no doubt to call the *smut* a blight, and to account for it on the same principle as the blights befalling other plants, particularly fruit-trees, viz. from innumerable insects, brought, or at least hatched by the eastern winds, which prey on and devour the native juices of the corn, and poison them with a mixture of their own.

An approved method to prevent the *smut*, the same Mr. Bradley gives us, as follows: the wheat, for seed, is to be washed in three or four waters, stirring it well round, and with great force, each time, and skimming off all the light wheat swimming at top. This done, it is to be steeped in a liquor thus prepared: into a sufficient quantity of water, put as much salt, as, when stirred about, will make an egg swim; and to this add as much more salt; stir the whole well, and to the brine, put two or three pound of alum beaten fine. In this mixture, lay the wheat to steep, at least, thirty or forty hours. Take it out the night before it is to be sown, and sift some slacked lime on it; this dries and fits it for sowing.

Note, many steep their wheat in brine, yet have plenty of *smutty* corn: the reason is, that they do not either make their brine strong enough, or do not let the wheat stay long enough therein. It is a common notion among them, that steeping it so long, rots the grain; but experience shews the contrary.

SNAKE root. See **SERPENTARIA**.

SNEEZING, *sternutation*, a convulsive motion of the muscles of the breast used in expiration; wherein, after suspending the inspiration begun, the air is repelled from the mouth and nose with a momentary violence and noise.

The cause, is an irritation of the upper membrane of the nose, which communicates with the interocular nerve by means of the twigs that it detaches to it.

This irritation is performed either externally, by strong smells, as marjoram, roses, &c. or by dust floating in the air, and taken in by inspiration; or by sharp, pungent medicines, as cresses and other sternutatories, which vellicate the membrane of the nose; or internally, by the acrimony of the lymph

or mucus, which naturally moistens that membrane.

The matters cast forth in *sneezing*, come primarily from the nose and throat; the pituitary membrane continually exuding a mucus thicker; and, secondarily, from the breast, the trachea, and the bronchia of the lungs.

F. Strada, in an express treatise on *sneezing*, has discovered the original of the custom of saluting those who *sneeze*. He shews it to be a relic of paganism; though he owns it was in use among the Jews as well as among the Romans.—From an epigram in the anthology, it appears, that among the ancients, a person after *sneezing*, made a short prayer to the gods; as *ἄν εὖ εἴη, ἵππερ σέσω με*.

SNOW, *nix*, a meteor formed in the middle region of the air, of a vapour raised by the action of the sun or subterraneous fire; there congealed, its parts confipated, its specific gravity increased, and thus returned to the earth in form of little white villi, or flakes.

The *snow* we receive, may properly enough be ascribed to the coldness of the atmosphere, through which it falls. When the atmosphere is warm enough to dissolve the *snow* before it arrives at us, we call it *rain*: if it preserve itself undissolved, it makes what we call *snow*.

Dr. Grew, in a discourse of the nature of *snow*, observes, that many parts thereof are of a regular figure, for the most part so many little rowels or stars of six points, and are perfect and transparent ice, as any we see on a pond, &c. Upon each of these points are other collateral points, set at the same angles, as the main points themselves: among which there are divers other irregular ones, which are chiefly broken points, and fragments of the regular ones. Others also, by various winds, seem to have been thawed, and froze again into irregular clusters; so that it seems as if the whole body of *snow* were an infinite mass of icicles irregularly figured.—A cloud of vapours being gathered into drops, the said drops forthwith descend; upon which descent, meeting with a freezing air as they pass through a colder region, each drop is immediately froze into an icicle, shooting itself forth into several points; but these still continuing their descent, and meeting with some intermitting gales of warmer air, or in their continual waftage to and fro, touching upon each other, some of them are a little thawed, blunted, and again froze into clusters, or intangled so as to fall down in what we call flakes.

The lightness of *snow*, although it is firm ice, is owing to the excess of its surface, in comparison to the matter contained under it; as gold itself may be extended in surface, till it will ride upon the least breath of air.

The uses of *snow* must be very great, if all be true that Bartholin has said in its behalf, in an express treatise, *de nivis usu medico*: he there shews, that it fructifies the earth, (which, indeed, is a very old and general opinion) and that it preserves from the plague, cures fevers, cholicks, tooth-aches, sore eyes, and pleurifies (for which last use, his countrymen of Denmark usually keep *snow-water* gathered in March.) He adds, that it contributes to the prolongation of life; giving instances of people in the Alpine mountains that live to great ages: and to the preserving of dead bodies; instances whereof, he gives in persons buried under the *snow* in passing the Alps, which have been found uncorrupted in the summer when the *snow* is melted.

He observes that in Norway, *snow-water* is not only their sole drink in the winter: but *snow* even serves for food; people having been known to live several days, without any other sustenance.

Indeed the generality of the medicinal effects of *snow*, are not to be ascribed to any specific virtue in *snow*; but to other causes. It fructifies the ground, for instance, by guarding the corn or other vegetables, from the intemper cold of the air, especially from the cold, piercing winds. And it preserves dead bodies, by confipating and binding up the parts, and thus preventing all such fermentations or internal conflicts of their particles, as would produce putrefaction.

It is a popular error, that the first *snow* that falls in the year, has particular virtues. In Italy, they cool their wines all the summer with *snow-water*.

Signior Sarotti, in the Philosophical Transactions, mentions a red or bloody *snow*, which fell on the mountains la Langhe, near Genoa, on St. Joseph's day.—This *snow* when squeezed, yielded a liquor of the same red colour.

SNUFF, a preparation of tobacco, made by reducing it into a powder, fit to be taken in at the nose; in order to purge or clear the head of pituita.

Ordinarily, tobacco is the basis of *snuff*; other matters being only added to give it a more agreeable scent, &c. The kinds of *snuff*, and their several names, are infinite; and new ones are daily invented; so that it would be difficult, not to say impossible, to give a detail of them. We shall only say, that there are three principal sorts; the first granulated; the second an impalpable powder; and the third the bran or coarse part remaining after sifting the second sort.

SOAP, or *SOPH*, a kind of paste, sometimes hard and dry, and sometimes soft and liquid; much used in washing, and whitening linens, and for various other purposes, by the dyers, perfumers, hatters, fullers, &c.

The principal *soaps* of our manufacture, are the *soft*, the *hard*, and the *ball soap*.—The *soft soap*, again, is either *white* or *green*: the process of making each kind, is as follows.

Green soft SOAP.—The chief ingredients used in making this, are lyes drawn from pot-ash and lime, boiled up with tallow and oil.—First, the lye and tallow are put into the copper together, and when melted, the oil is put to it, and the copper is made to boil; then the fire is dampt or stoppt up, while the ingredients lie in the copper to knit or incorporate; which done, the copper is again set on boiling, being fed or filled with lyes as it boils, till there be a sufficient quantity put therein: then it is boiled off with all convenient speed, and put into casks.

White soft SOAP.—One sort of white *soap* is made after the same manner as *green soft soap* is, oil alone excepted, which is not used in white.—The other sort of *white soft soap*, is made from lyes of ashes of lime boiled up at twice with tallow. First, a quantity of lyes and tallow are put into the copper together, and kept boiling; being fed with lyes as they boil, until the whole grains, or is boiled enough; then the lyes are separated or discharged from the tallowish part, which part is removed into a tub, and the lyes thrown away: this is called the first *half boil*.—Then the copper is charged again with fresh tallow and lyes, and the first half boil is put out of the tub into the copper a second time; where it is kept boiling with fresh lyes and tallow, till it comes to perfection.—It is then put out of the copper into the same sort of casks as are used in green soft *soap*.

Hard SOAP is made with lyes from ashes and tallow, and is most commonly boiled at twice: the first, called the *half-boil*, hath the same operation as the first half-boil of soft white *soap*.—Then the copper is charged with fresh lyes again, and the first half-boil put into it, where it is kept boiling, and fed with lyes as it boils, till it grains, or is boiled enough; then the lye is discharged from it, and the *soap* put into a frame to cool and harden.

Note, there is no certain time for bringing 'off' a boiling of any of these sorts of *soap*: it frequently takes up part of two days.

Ball SOAP, commonly used in the north, is made with lyes from ashes and tallow.—The lyes are put into the copper, and boiled till the watery part is quite gone, and there remains nothing in the copper but a sort of saline matter (the very strength or essence of the lye) to this the tallow is put, and the copper is kept boiling and stirring for above half an hour, in which time the *soap* is made; and then it is put out of the copper into tubs or baskets with sheets in them, and immediately (whilst soft) made into balls.—Note, it requires near twenty-four hours in this process to boil away the watery part of the lye.

Soaps, both *dry* and *soft*, are of use in medicine: the *soft* against fevers; to be applied by rubbing the soles of the patient's feet therewith: and the *dry*, dissolved with spirit of wine, in the cure of cold humours.—Besides its being used in suppositories, and in the composition of a kind of plaster, commonly called *emplast. de sapone*.

SOAP-EARTH, *stætitæ*, a smooth unctuous kind of earth, also a saline matter found in the Levant, and used as a *soap*.

The Levant *soap-earth*, Dr. Smith tells us, is only had in two places near Duraclea, six leagues to the east of Smyrna. It is, in effect, of itself, a fine alkaline salt, boiling and shooting up out of the earth.

It is gathered always before sun-rise, and in mornings when there falls no dew; so that a stock must be laid up in the summer months, to serve all the year.

In some places, it comes up an inch or two above the surface of the ground: but the sun rising on it, makes it fall again. Every morning there returns a fresh crop.

For the *soap earth* called *stætitæ*, see *Supplement, article STÆTITÆ*. For the *soap-earth* of the Levant, see *Supplement, article NATRUM*.

SOC, or *SOK*, *SOKA*, in law, denotes jurisdiction; or a power or privilege to administer justice, and execute laws.

The word is also used for the shire, circuit, or territory wherein such power is exercised by him endued with such jurisdiction.

Hence also the law Latin *soca*, used for a feignory or lordship, franchised by the king, with liberty of holding a court of his *soc-men* or *socagers*, that is, his tenants whose tenure is hence called *socage*.

This kind of liberty still subsists in several parts of England, under the name of *sok*, or *soken*.—Skene defines *sok* to be *señal de hominibus suis in curia secundum consuetudinem regni*.—Brady makes mention of these liberties: *soc, soc, tol, team, infangthef* and *utfangthef*.

In the laws of Henry I. *soca* is also used as synonymous with franchise, for a privileged place, refuge, asylum or sanctuary, &c. From the Saxon, *socn* or *socne*.

SOCAGE*, or *SOCAGE*, a tenure, by which men held their lands on condition of ploughing those of their respective lords, with their own ploughs, and doing other inferior offices of husbandry at their own charges.

* Bracton thus describes it: *dicti poterit socagium a socca & inde tenentes* (Sckmanni, eo quod deputati sunt, ut ostendat, tantummodo ad culturam, & quorum custodia & maritima ad propinquiores parentes jure sanguinis pertinebant, &c.

This flavish tenure was afterwards, by the mutual agreement of lord and tenant, turned into the payment of a certain sum of money, which is hence called *liberum socagium*, free or common *socage*. Whereas the other was *villanum socagium*, or *basse socage*: inasmuch as those who held lands by this tenure, were not only bound to plough their lords' lands, but took the oath of fealty to them, *sicut villani*.

Socage was a tenure of that extent, that Littleton tells us; all the lands in England, which were not held by knight's-service, were held in *socage*: so that it seems the land was divided between the two tenures, which, as they were of different natures, so the descent of the land was in a different manner. For the lands held in knight's-service, descended to the eldest son; but those held in *villanum socagio*, came equally among all the sons. Yet if there was but one messuage, the eldest son was to have it; but so, as that he was to pay the rest the value of their shares of it.

Skene defines *socage*, a tenure of lands; whereby a man is infeoffed freely, without wardship and marriage, paying to his lord some small rents, &c. which is called *free socage*, &c. Several divisions of *socage* we meet withal in law-writers, as *socage in capite*, &c.—But by stat. 12. Car. II. it is ordained, that all tenures from and after the 24th of February, 1645, shall be adjudged and taken for ever, to be turned into *free* and *common socage*.

SOCUS, *Sock*, in antiquity, a kind of high shoe, reaching above the ankle, worn by the actors in the ancient drama, in representing of comic characters.

The *soccus* was much lower than the cothurnus; and was the distinguishing wear of the comedians; as the cothurnus was of the tragedians: hence *soccus* is frequently used for comedy itself. Comedy, says M. Fenelon, must talk in an humbler stile than tragedy; the *sock* is lower than the buskin.

SOCIETY, *SOCIETAS*, an assemblage, or union of several persons in the same place, for their mutual assistance, security, interest, or entertainment.

Of *societies* we have a great many kinds, distinguished by the different ends proposed by them: *civil societies*, *trading societies*, *religious societies*, *literary societies*, &c.

SOCIETY, in trade, is a contract or agreement between two or more persons, whereby they bind themselves together for a certain time, and agree to share equally in the profits or losses which shall accrue in the affairs for which the *society* or co-partnership is contracted.

We have several very considerable *societies* of this kind; as the Merchant Adventurers, the Turkey, East-India, Muscovy, Eastland, Greenland, Spanish, African, South-Sea and Hudson's Bay companies. The institutions, policies, &c. whereof, see under the article *COMPANY*.

By the Roman law, the social contract needs no other solemnity, but the sole consent of parties, without any writing at all: but among us, articles of co-partnership are required.—There is no contract wherein probity is more required than in *society*; inasmuch as the laws pronounce those null, that are made contrary to equity, and with design to deceive.

The French distinguish three kinds of mercantile *society*: *ordinary society*, called also *collective* and *general*: *society in commendam* or *commandity*: and *anonymous society*, called also *momentary* and *incommute*.

The first is, where several merchants act alike in the affairs of the *society*, and do all under their collective names, which are publick and known to every body.

SOCIETY in commendam, &c. is that between two persons, one of whom only puts his money into stock, without doing any other office of a co-partner; the other, who is called the *complementary* of the *society*, dispatching all the business under his own name.—This *society* is very useful to the state; inasmuch as all kinds of persons, even nobles and men of the robe, may contract it; and thus make their money of service to the public: and those who have no fortune of their own to trade withal, hereby find means of establishing themselves in the world, and of making their industry and address serviceable.

Anonymous SOCIETY, is that, where all the members are employed, each particularly, in the common interest, and each is accountable for profits, &c. to the rest; but without the publick's being informed thereof; so that the teller has only an action against the particular buyer, no other name appearing.

It is also called *momentary*, because frequently made on particular occasions, and ceasing with them; as in the making a purchase, the selling any commodity, &c.

Of this they distinguish four kinds: *society by participation*,

which is usually formed by letters from one city to another, where a merchandise is to be bought or sold.—The second is, when two or three persons go together to fairs to buy goods.—The third, when two or three persons agree to buy up the whole of some commodity, in any country; to sell it again at their own price.—And the fourth is, when three or four persons make a journey together, to buy and sell the same commodity. Beside merchants, people of quality, &c. are admitted into these anonymous societies.

Religious SOCIETIES, are parties of persons formed, either to live regularly together; or to promote the interest of religion; or to cultivate it in themselves.

Of the first kind, are all congregations of religious; particularly the Jesuits, who are called the *society* of Jesus; though they more usually call themselves the *company* of Jesus. The *society* of the Sorbonne.—The *society* of St. Thomas de Villeneuve, instituted in 1660, by F. Ange le Proust.—The *society* of St. Joseph, instituted in 1638.—The *society* of Bretagne, a reform of Benedictines in 1606.—And the *society* of Jesus, a religious military order, instituted by Pius II.

Of the second kind are, the

SOCIETY for reformation of manners, and putting in execution the laws against immorality and prophaneness.—This was set on foot above forty years ago, by five or six private persons in London; but is since exceedingly increased, by numbers of members of all denominations: a particular body of the most considerable hereof, bear the expences of prosecutions, &c. without any contribution from the rest: these chiefly apply themselves to the prosecuting persons for swearing, drunkenness, and prophaning the sabbath.—Another body of about 50 persons, apply themselves to the suppressing lewdness; and by them many hundred lewd houses have been actually suppressed.—A third body consists of constables.—A fourth, of informers.

Besides these, are eight other regular, mixed bodies of house-keepers, and officers, who inspect the behaviour of constables and other officers, assist in searching disorderly houses, &c. and in seizing offenders, and giving information. There are several other societies of this kind at Bristol, Canterbury, Nottingham, &c.

SOCIETY for propagating the gospel in foreign parts, was instituted by king William, in 1701, for securing a maintenance for an orthodox clergy, and making other provisions for the propagation of the gospel in the plantations, colonies, factories, &c.—To that end, he incorporated the archbishops, several bishops, and other of the nobility, gentry and clergy, to the number of 90, into a body, with privilege to purchase two thousand pounds a year inheritance, and estates for lives or years, with other goods, to any value.

They meet yearly on the third Friday in February, to chuse a president, vice-president and other officers; and the third Friday in every month to transact business, depute fit persons to take subscriptions for the said uses; and of all monies so received, to give account to the lord chancellor, &c.—They have a standing committee at the Chapter-house, to prepare matters for the monthly meeting, which is held at St. Martin's library.

SOCIETY for propagating christian knowledge, was begun in 1699 by some persons of worth, &c. Its original design was to propagate religion in the plantations, to secure the pious education of the poor at home, and to reclaim those that err in the fundamentals of christianity.

In the year 1701, they had procured considerable charities, and had transmitted the same to the plantations, in libraries, bibles, catechisms, &c. with a voluntary maintenance for several ministers, to be employed in the plantations.—But the *society* for propagating the gospel in foreign parts, being then instituted, they were incorporated, by charter, into the same; and thus discharged, as a particular *society*, from the further pursuit of that branch of their original design: whereupon they wholly turned themselves to the other; and are now very considerable, by great accessions from among the clergy and laity.

They meet weekly, to concert measures for raising charity for the education of poor children, and setting up schools for that purpose; as also for the more regular disposal of pious books and catechisms; for instruction of the ignorant, erroneous, &c.—By the assistance of members of other religious societies, they have procured subscriptions for the education of above three thousand children, who are placed out in schools about London, and taught reading, writing, psalmody, &c.—They have dispersed great numbers of books among the poor, in the fleet, army, &c. and have procured several to be translated into Welch and other foreign languages, and dispersed accordingly.

Of the third kind, are divers religious societies, very properly so called; these were first set on foot in London about the year 1678, by a few young men, who agreed to meet weekly, for prayer, psalmody and spiritual conference.—They are now increased to forty distinct bodies, who have set up publick prayers in many churches where they were not before frequent, procured frequent administrations of the sacrament; and maintain lectures on that subject,

in one church or another almost on every Sunday-evening.

SOCIETY of the cord. See the article CORD.

Royal SOCIETY. See the article ROYAL society.

SOCINIANS, a modern sect of antitrinitarians, who, in these ages, have revived some of the errors of Paulus Samosatenus, Photinus and Arius; whence they are also occasionally called *Arians*, *Photinians*, &c. though in many respects they are different from them all.

Faustus Socinus, a gentleman of Sienna, from whom they take their name, was not the first author of the sect: he himself affirms, in his letter to Martin Vodau, wrote in 1548, that he advances no dogma but what had been published by others before him, even in Poland, before he came to settle there. The truth is, he may be rather said to have refined, by his subtilties, on the notions that already prevailed there in his time, than to have invented a new system.

In his life, wrote by a Polish knight, we read, that he had not applied himself to the study of philosophy and divinity, nor had studied any thing but logic, till 35 years of age: but had spent the greatest part of his life at the court of the great duke of Tuscany. Upon his retiring thence, he began to think of religion; and, prepossessed as he was with the writings of his uncle Lælius Socinus, he formed a system thereon.—Lælius had explained the first words in the gospel of St. John, *in principio erat sermo*; by these, *in principio evangelii erat sermo*; as if the beginning, there spoke of, were only the beginning of the gospel.

This interpretation, never heard of in all antiquity, is followed by Faustus, in his comment on the fourteen first verses of that gospel.—He adds, that he who is called *Word*, had not been from all eternity, nor even before the creation of the world; but that by *Word*, must be meant the man Jesus Christ, God born of the virgin, under the emperor Augustus. But this is a paradox, which all his followers do not equally come into.—However, they all deny, not only the divinity of Jesus Christ, but the existence of the Holy Ghost, the mystery of the incarnation, original sin, and grace.

Their sentiments are explained at large, in their catechism, printed several times, under the title of *Catechesis ecclesiarum Polonicarum, unum Deum patrem illiusque filium unigenitum, unum cum sancto spiritu ex sacra scriptura confitentium*.

The Socinians are divided into several parties: some of them leave Socinus, as to what regards the worship offered to Jesus Christ; not being able to conceive how divine worship should be given a mere man; and some in other points.

The heresy of the Socinians spread exceedingly in Poland, Lithuania, Transylvania, and the neighbouring places. Racow was their chief school; and there all their first books were published.—But they were exterminated out of Poland in 1655: since which time they have chiefly sheltered in Holland; where, however, their publick meetings have been prohibited: but they find means to conceal themselves there under the names of Arminians, and Anabaptists.

SOCK. See the article SOCCUS.

SOCKET.—Ball and socket. See the article BALL.

SOULE *, or **SOULE**, in architecture, a flat, square member under the bases of pedestals, of statues, vases, &c. which it serves as a foot, or stand.

* The word is French, formed from the Italian *soccolo*, or the Latin *foceus*, the shoe of the ancient comic actors.—Vitruvius calls it *quadra*; we frequently, *plinth*.

Continued SOULE, is a kind of continued stand, or pedestal, without either base, or cornice, ranging round the whole building; called by Vitruvius, *stereobata*, and by the French, *soubassement*. See STEREOBATA.

SOCOME, in our law-books, &c. a custom of grinding corn at the lord's mill.

There is *bond socome*, where the tenants are bound to it; and *love socome*, where they do it freely, out of affection to the lord. See MOLTA.

SOCRATIC philosophy, the doctrines and opinions, with regard to morality and religion, maintained, and taught by Socrates.

By the character of Socrates, left us by the ancients, particularly by his scholar Plato, Laertius, &c. he appears to have been one of the best, and the wisest persons in all the heathen world.—To him is ascribed the first introducing of moral philosophy; which is what is meant by that popular saying, *Socrates first called philosophy down from heaven to earth*; that is, from the contemplation of the heavens and heavenly bodies, he led men to consider themselves, their own passions, opinions, faculties, duties, actions, &c.

While young, he was exceedingly fond of natural knowledge, as he witnesses of himself in Plato: but in his older age, he cast aside this part of philosophy as obscure, uncertain, impracticable, and even useless and impertinent; and applied himself wholly to moral or active philosophy.

It was he, first, who when all the other philosophers boasted they knew all things, owned, ingenuously, he knew nothing, but this, that he knew nothing. Which Pyrrho, the father

of the sceptic philosophy, improved on, when he said he knew nothing; not even this, that he knew nothing. Yet in an answer of the oracle, it was pronounced; *Ανδρας ακαταλυστος Σωκράτης, ακεφαλος*. That Socrates was the wisest of all men. He was accused by Anytus, Melitus and Lycon, three persons, whose hatred he had incurred, by his severe declamations against the poets, of which number the two first were, and the third an actor. His accusation was, that he corrupted the Athenian youth, and broached new superstitions. He was condemned to drink cicuta by 281 votes, as we are told by Quintilian.

After his death, his fellow-citizens repented to that degree, that the gymnasia, courts of justice, &c. were all shut up: Melitus was put to death, Anytus was banished, and a statue was erected to Socrates.

He wrote nothing himself; yet almost all the Grecian sects of philosophers refer their origin to his discipline; particularly the Platonists, Peripatetics, Academicks, Cyrenaicks, Stoicks, &c.—But the greatest part of his philosophy, we have in the works of Plato.

SODALES *Augustales*. See the article AUGUSTALES.

SODDER, or SODER, } See the articles } SOLDER.

SODDERING, } SOLDERING.

SODOMY, the unnatural crime of buggery; thus called from the city of *Sodom*, which was destroyed by fire for the same.

The Levitical laws adjudged those guilty of this execrable evil to death, Lev. xvii. 22, 23. xx. 15, 16; and the civil law assigns the same punishment to it. Our laws also make it felony.

SOFA, in the east, a kind of alcove, raised half a foot above the floor of a chamber, or other apartment; and used as the place of state, where visitors of distinction are received.

Among the Turks, the whole floor of their state-rooms is covered with a kind of tapestry, and on the window-side is raised a *sefa* or *sepha*, laid with a kind of matras, covered with a carpet much richer than the other.—On this carpet the Turks are seated, both men and women, like the taylors in England, cross-legged, leaning against the wall which is bolstered with velvet, satin or other stuff, suitable to the season. Here they eat their meals; only laying a skin over the carpet, to serve as a table-cloth, and a round wooden board over all, covered with plates, &c.

The ambassadors of France stood out a long while, and refused to visit the grand vizier, unless he would receive them on the *sefa*: at length he granted them the *sefa*.

SOFFEE. See the article SOPHI.

SOFFITA*, SOFFIT, or SOFIT, in architecture, any timber ceiling, formed of cross beams, or flying cornices; the square compartments, or pannels whereof are enriched with sculpture, painting or gilding.

* The word is Italian, and signifies the same with the Latin. *lacunar* and *laquear*; with this difference, that *lacunar* is used for any ceiling with square, hollow pannels, called *lacus*; and *laquear* for compartments interlaced with plat-bands, after the manner of knots or *laquei*.

Such are those we see in the basilics and palaces of Italy, in the apartments at Luxembourg, at Paris, &c.—See *Tab. Archit. fig. 10*.

SOFFITA*, or SOFFIT, is also used for the under side or face of an architrave; and more particularly for that of the corona or larmier, which the ancients called *lacunar*, the French *plafond*, and we usually the *drip*.

It is enriched with compartments of roses; and in the Doric order has 18 drops, disposed in three ranks, six in each, placed to the right of the guttae, at the bottom of the tryglyphs.

SOFI, or SOPHI. See the article SOPHI.

SOFIT. See the article SOFFIT.

SOFT *pulse*, } See the articles } PULSE.

SOFT *roc*, } ROE.

SOFT *soap*, } SOAP.

SOFTENING, in painting, the mixing and diluting of colours with the brush or pencil.

To *soften* designs in black and white, made with the pen, &c. signifies to weaken the tint.

To *soften* a portrait, according to Felibien, is to change some of the froaks, and give a greater degree of sweetness and *softness* to the air thereof, which before had something rough and harsh in it.

SOIL, SOLUM, in agriculture and gardening, denotes earth, or ground, considered with regard to the quality of its mould for the production and growth of vegetables.

Mr. Bradley reduces all soils to three heads or kinds, viz. sand, loam, or mother-earth and clay.

Gravels and all the open soils, till we come at loam, are of the sandy race; and the binding earths, from loam down to the stiffness of chalk, may be ranged under the clay kind.

Loam or mother-earth, is the medium between the two,

and includes all the intermediate kinds.

Each of these soils tends alike to vegetation; and each has its salts proper thereto; but in different proportions: a peck of clay having twice as much salts in it as the same quantity of loam; and four times as much as so much sand.

Now, it is found to be the salts or juices of the soil, not the earth itself, that plants are fed and subsisted by. For in many experiments of vegetation, where plants of fifteen or twenty pound weight have been produced, there has been no sensible diminution of the earth.

Hence, at first sight, it might seem, that clay were the most proper, and sand the least proper soil to promote the growth of plants; but this is contrary to experience. The reason is, that the parts of clay being close wrought together, do not so easily give out their salts; nor can the tender fibres of many plants make their way through it, in search of their food. But if its parts be well opened, by digging and breaking it into very small pieces, and those parts be kept open by a mixture of some sharp sand, or other like matter, that author adds, we shall see the effects of its vigour. Sand, on the other hand, giving its salts readily, puts forth its plants very early, and will make them germinate a full month sooner than clay; but as it is hasty, it is soon spent. The sun's warmth calls up all its salts early in the spring, and there is but little left for them to subsist long on, if the heat continue.

Each of these kinds has its peculiar plants, which will not grow in the other; but the peculiar plants of both the other two will grow in loam, as partaking equally of the qualities of both. Loam, then, must be allowed the best and most beneficial soil, where it can be had: and where it cannot, if, by a mixture of other earths, we can make a compost to resemble it; we have more to expect from it, especially in plantations of durable trees, than from a composition of dung or other forcing ingredients, which, like excess of high temperate foods and liquors, though they give a hasty growth, yet make the thing short-lived. The composition or soil here meant, is equal quantities of sand and clay well mixed. Generally, a mixture of two or three soils, is better than any simple soil, especially where the hot and dry are mixed with the cold and moist. Clay laid on sand or gravel, or sand on clay, is the best manure.

But it is not the nature of the soil alone; but its depth is also to be regarded, and what soil is underneath. For the best soil, if it be not above a foot deep, and lie on a stiff clay, or hard cold stone, is not so fertile as a leaner soil of greater depth, or lying on a warm lime-stone, sand, or gravel, through which the superfluous moisture may descend, and not stagnate, as it will do on the clay or stone, to chill the roots of plants. Indeed, regard is to be also in this had to the climate; for even in England, cold, moist clays are more fruitful in the south than the north.

Some general rules with respect to soils, are as follow.

1^o. All land that moulders to dust with frost, with all sorts of warm lands, black mould, and yellow clay, (if not too wet) and such as turns black after rain, are good for corn.

2^o. Lands bringing forth large trees and weeds, black-thorn, thistles, rank grass, &c. generally prove fruitful.

3^o. Straw-berries, betony, thyme, &c. give indication to wood, and camomile to a mould disposed for corn.

4^o. All land that binds after frost and rain, and turns white and full of worms, that is extremely moist, bears holly, yew, box, broom, heath, moss, &c. is of a cold temperature.

5^o. Black, dun and yellow sand, and hot, stony gravel, are generally unfruitful.

SOIT *fait comme il est desiré*, be it done as it is desired: a form used when the king gives the royal assent to a private bill preferred in parliament.

SOK, SOKE, SOC, in ancient customs. See SOC.

The word is sometimes also used for the privilege of tenants excused from customary impositions.

Also, for a quit rent, or payment made to the lord by his tenant, for acting in quality of *soe-man* or freeholder. See SOCAGE.

The rent-gatherer in the *sok*, or *soken*, was called *sokereve*.

SOL, in music, the fifth note of the gammut: ut, re, mi, fa, sol, la.

SOL*, or SOU, *shilling*, a French coin, of billon, i. e. of copper with a little silver mixed; equal to twelve deniers, or French pence; and the 20th part of the livre, or pound. See SHILLING.

* The word is formed from the Latin, *solidus*, shilling. Bodin, is mistaken, when he derives it à *sol*, by reason of the sun struck on it.

The French *sol* is now worth upwards of an English half-penny, or the 23d part of an English shilling.

The *sol* was first struck on the foot of 12 deniers tournois, whence it was also called *douzain*, a name it still retains, though its ancient value be changed; the *sol* having been

france augmented by three deniers, and struck with a punch of a flower de lys, to make it current for 15 deniers.—Soon after, the old *sols*, were coined over again, and both old and new were indifferently made current for 15 deniers.—In 1703, the value of the same *sols* was raised to 18 deniers.—Towards the latter end of the reign of Louis XIV. the *sols* of 18 deniers were again lowered to 15, where they now stand.

The Dutch have also two kinds of *sols*: the one of silver, called *sols de gros*, and likewise *schelling*; the other of copper, called also the *stuiver*.

In old authors we read of gold *sols*, which were different at different times. In the time of the Salic law, the gold *sol* was forty deniers; and thus it continued till the time of King Pepin, when it was reduced to twelve.—Some have also imagined, that the French had anciently silver *sols*.

SOL, in astrology, &c. signifies the sun.—*Sol* in aries, &c. See **SUN**.

SOL, *sun*, in chymistry, is gold; thus called from an opinion, that this metal is, in a particular manner, under the influence of that luminary.

What should have been the principal inducement of torturing this metal, with so much violence, to obtain from it some medicinal virtues, Dr. Quincy observes, is not easy to be guessed; unless it was to keep up the authority of an ill-dressed regard, and a jealousy, that they could not be well in the common opinion as physicians, who could not do extraordinary things in their possession with a metal, which had such a prodigious influence on other accounts. Many, indeed, there have been, who have honestly opposed this artifice; but the contrary side has a long time prevailed, and that to such a degree, that this metal itself has not only been transformed into all the shapes imaginable for medicinal purposes, but even its name has been transferred to do honour to, and enhance the price of many other worthless preparations, that bore any resemblance to its sensible qualities.

Hence many tinctures of a yellow colour, are presently the golden tincture of something or other.

Most, indeed, acknowledge, that gold in substance, or reduced into the smallest particles by the hammer, as in the leaf gold, is not digestible in the stomach, so as to be transformed into the blood, and be of any efficacy there. But there are nevertheless, many, who are confident of its doing extraordinary matters, if reduced into a powder, by amalgamation with mercury, and by evaporating the mercury afterwards.

Zacutus Lusitanus, is one of the smartest pleaders on this side the controversy, against Musæ, Picus Mirandola and Plateus; who, besides many instances of its efficacy, urges the authority of Avicen, Serapion, Geber and many of the Arabian physicians, with those of other countries, and of later date. Quercetius, Schroderus, Zwelfer and Etmuller, with many other more modern, practised physicians, have fallen into the same opinion. But which side soever is in the right, the present practice rejects all pretensions to medicines from it.

SOL, in the hermetical philosophy signifies *fulgur*. See **SULPHUR**.

SOL, in heraldry, denotes *or*; the golden colour in the arms of sovereign princes.

SOLAR, something belonging to the sun. See **SUN**.

Thus we say **SOLAR** fire, in contradistinction to *culinary* fire.

SOLAR civil month, } See the articles } **MONTH**.

SOLAR year, } See the articles } **CYCLE**.

SOLAR eclipse, is a privation of the light of the sun, by the interposition of the opaque body of the moon. See **ECLIPSE**.

SOLAR month, } See the articles } **MONTH**.

SOLAR rising, } See the articles } **RISE**.

SOLAR spots, } See the articles } **SPOTS**.

SOLAR system, the order and disposition of the several heavenly bodies, which revolve round the sun as the centre of their motion, viz. the planets, primary and secondary, and the comets.—For a scheme of the *solar* system, see **SYSTEM**.

The **SOLAR** year, consists of 365 days, 5 hours, 49 minutes; in opposition to the *lunar* year, which only consists of 354 days.

The *solar* year, is either *tropical*, or *sidereal*.

SOLAR tropical year, is the space of time, wherein the sun returns again to the same equinoctial or solstitial point; which is always equal to 365 days, 5 hours, and about 49 minutes.

SOLAR sidereal year, is the space wherein the sun comes back to any particular, fixed star; which is about 365 days, 5 hours and 9 minutes.

SOLDAN. See the article **SULTAN**.

SOLDER*, **SODDER**, or **SODER**, a metallic or mineral composition, used in *soldering* or joining together other metals.

* The word is formed from the French, *souder*, of the Latin *soluere*, to strengthen.

The different *solders* are made of gold, silver, copper, tin,

bismuth, and lead; usually observing, that in the composition, there be some of the metal to be *soldered*, mixed with some higher and finer metals.

Goldsmiths usually make four kinds of *solder*, viz. *solder* of eight; where, to seven parts of silver there is one of brass or copper. *Solder* of six, where only a sixth part is copper. *Solder* of four; and *solder* of three.—It is the mixture of copper in the *solder* that makes raised plate always come cheaper than flat.

The *solder* used by plumbers, is made of two pounds of lead to one of block-tin. Its goodness is tried by melting it, and pouring the bigness of a crown-piece on a table; for, if good, there will arise little, bright, shining flars therein.

The *solder* for copper is made like that of the plumbers; only, with copper and tin: and for very nice works, instead of tin, they sometimes use a quantity of silver.

Solder for tin, is made of two thirds of tin, and one of lead; but where the work is any thing delicate, as in organ-pipes, where the juncture is scarce discernible, it is made of one part of bismuth, and three parts of pewter.

The duke of Florence's nail, anciently so much admired, as being half iron and half gold, whereas those two metals were deemed irreconcilable; was joined by a kind of *solder* made by Turneffler, an ingenious chymist of Venice: the secret whereof, was never discovered till published by Tachenius. This *solder* is nothing but a little copper or cyprus vitriol put between the gold and the iron. For, naturally the great acidity of the gold, reduces the iron into a scoria or rust, when the two are applied immediately over one another; but this inconvenience is removed, by the interposition of a little copper, be it in the smallest quantity imaginable.

SOLDERING, or **SODDERING**, among mechanicks, the joining and fastening together of two pieces of the same metal, or of two different metals, by the fusion and application of some metallic composition on the extremities of the metals to be joined.

Goldsmiths *solder* with gold, silver and brass or copper mixed together: plumbers with lead and tin.

Copper is usually *soldered* with tin; sometimes, according to the work, with a mixture of copper and silver.—In the *soldering* of all these metals, they generally use borax in powder, and sometimes rosin.

As to iron, it is sufficient that it be heated red-hot; and the two extremities, in this state, be hammered together.—By this means they become incorporated one with the other.

SOLDIER*, a military man, fitted to serve a prince or state, in consideration of a certain daily pay.

* The word is formed from the Italian, *solcare*, and that from the Latin, *solus*, or *solitarius*, of *solus*, the sole, or pay: though Plautus chuses to derive it from the old Gallic *sol-darius*, *sol*, a soldier; and *Nico* from *nicere*.

The *soldier* is he who takes pay, the *vassal* he who is obliged to serve at his own expences; the *volunteer* he who serves at his own expence, and of his own accord.

Du Cange observes, that the ancient *soldani* were not to be short of five foot and a half; and that this measure was called *incomia* or *incommia*.

Band of **SOLDIERS**. See the article **BAND**.

SOLDURI, in antiquity, a kind of military clients, or retainers to the great men in Gaul, particularly in Aquitania; mentioned by Cæsar.

The *solduri* were people, who shared all the good and ill fortune of their patrons; to whom, if any disaster happened, they either underwent the very same, or killed themselves; and Cæsar assures us, that no one had ever been known to refuse the alternative, *Lib. III. de Bel. Gal.*

Vegenere takes them to have been more than common soldiers; and even Gentlemen in pension, or appointment.—Athenæus calls them *συνεσθοντορες*, q. d. dying together, or with their masters.

SOLECISM*, **SOLECISMUS**, in grammar, a gross impropriety in speech, contrary to the use of language, and the rules of grammar, either in respect of declension, conjugation, or syntax.

* The word is Greek, *σολεσμοσ*, derived from the *Soli*, a people of Attica, who being transplanted to Cilicia, lost the purity of their ancient tongue, and became ridiculous to the Athenians for their improprieties therein.

An actor on the Roman theatre having made a wrong gesture, the audience immediately cried out, he had committed a *solecism* with his hand. Ablance.

Solecisms, on some occasions, are pardonable: *impetratum est a ratione ut peccare suavitatis causa liceret*: Vaugelas is frequently repeating that of Quintilian; *aliud est Latine, aliud grammaticè loqui*.—Balthasar Stolberg has a Latin treatise of the *solecisms* and barbarisms falsely attributed to the New Testament.

SOLEIL.—*Ombre de SOLEIL*. See the article **OMBRE**.

SOLEMN, **SOLENNIS**, something performed with much pomp, ceremony and expence.—Thus we say, *solemn feasts, solemn funerals, solemn games*, &c.

SOLENN, in law, signifies something authentic, or that is clothed in all its formalities.

SOLENN testament, in the civil law, is to be attested by seven persons, and sealed with their seals.

SOLENN marriage, is that performed in one's own parish-church, after publication of the bans, and in presence of witnesses.

SOLENN acceptance. See the article ACCEPTANCE.

SOLE-TENANT, in law, he or she, who holds lands only in his or her own right, without any other person joined.

E. gr. If a man and his wife hold lands for their lives, the remainder to their son; here, the man dying, the lord shall not have heir, because he dies not *sole-tenant*.

SOLEUS, in anatomy, a muscle called also *gastrocnemius internus*.—See *Tab. Anat. (Myol.) fig. 1. n. 67. fig. 2. n. 49. fig. 6. n. 42.* See also **GASTROCNEMIUS**.

SOL-FADING, in music, the naming and pronouncing of the several notes of a song, by the syllables *sol, fa, la*, &c. in learning to sing it.

Of the seven notes in the scale, *ut, re, mi, fa, sol, la, si*; only four are in use among us, *viz. fa, sol, la, mi*. Their office is principally in fingering: that by applying them to every note of the scale, it may not only be pronounced more easily; but chiefly, that by them, the tones and semitones of the natural scale, may be better marked out and distinguished.

This design is obtained by the four syllables, *fa, sol, la, mi*; thus, from *fa* to *sol* is a tone; as also from *sol* to *la*, and from *la* to *mi*, without distinguishing the greater or lesser tone; but from *la* to *fa*, also from *mi* to *fa*, is a semi-tone. If, then, these be applied in this order, *fa, sol, la, fa, sol, la, mi, fa*, &c. they express the natural tones from *c*; and if that be to be repeated to a second or third octave, we see by them how to express all the different orders of tones and semi-tones in the diatonic scale; and still above *mi*, will stand *fa, sol, la*; and below it, the same reversed, *la, sol, fa*; and one *mi* is always distant from another by an octave; which cannot be said of any of the rest, because after *mi* ascending, comes always *fa, sol, la, fa*, which are repeated invertedly, descending.

To conceive the use of this: it is to be remembered, that the first thing in teaching to sing, is to make one raise a scale of notes by tones and semi-tones to an octave, and descend again by the same notes, and then to rise and fall by greater intervals, at a leap, as a third, fourth, fifth, &c. And to do all this, by beginning at notes of different pitch.—Then, these notes are represented by lines and spaces, to which those syllables are applied, and the learner is taught to name each line and space, by its respective syllable; which makes what we call *sol-fading*; the use whereof is, that while they are learning to tune the degrees and intervals of sound, expressed by notes for on lines and spaces; or learning a song, to which no words are applied; they may do it the better, by means of an articulate sound: but, chiefly, that by knowing the degrees and intervals expressed by these syllables, they may more readily know the true distance of notes.

Mr. Malcolm observes, that the practice of *sol-fading*, common as it is, is very useless and insignificant, either as to the understanding or practising of music; yet exceedingly perplexing: the various applications of the several names, according to the various situations of the clef, are enough to perplex any learner: there being no less than 72 different ways of applying the names *sol, fa*, &c. to the lines and spaces of a particular fidein.

SOLID, in physics, a body whose minute parts are connected together, so, as not to give way, or slip from each other upon the smallest impression.

The word is used in *metaphysics*, in contradistinction to *fluid*. *Atmosphere of SOLID Bodies*. See **AIR** and **SPHERE**.

For the laws of gravitation of **SOLIDS** immersed in fluids specifically either lighter or heavier than the *solids*; see **GRAVITY** and **FLUIDS**.

To find the specific gravity of **SOLIDS**, and its ratio to that of fluids: see **SPECIFIC GRAVITY**.

For the laws of the resistance of **SOLIDS** moving in fluids; see **RESISTANCE**.

SOLID, in geometry, is a figure bounded with three dimensions; or extended in length, breadth and depth.

Hence, as all bodies have these three dimensions, and nothing but bodies, or corporeities, are frequently used indifferently.

A *solid* is terminated, or bounded under one or more planes or surfaces; or a figure bounded one or more lines. See **FIGURE** and **LINE**.

From the boundaries or terminating lines, *solids* become divided into *prisms* and *pyramids*.

Regular SOLIDS, are those terminated by regular and equal planes.

Under this class come the tetrahedron, hexahedron or cube,

octahedron, dodecahedron and icosaedron. See **TETRAEDRON**, **CUBE**, &c.

Irregular SOLIDS, are all such as do not come under the definition of regular ones.—Such are the sphere, cylinder, cone, parallelogram, prism, pyramid, parallel-piped, &c.

The genera, properties, ratios, constructions, dimensions, &c. of the several *solids*, regular and irregular, spherical, elliptical, conical, &c. see under each respective article.

Measure of a SOLID. See the article **MEASURE**.

Curvature, or area of a SOLID, is the measuring of the space comprehended under a *solid*, i. e. the solidity or *solid* content thereof.

SOLID of the least resistance. See **RESISTANCE**.

SOLID angle, is that formed by three or more plain angles meeting in a point. See **ANGLE**.—Or more strictly, a *solid angle*, as *B*, (*Tab. Geometry, fig. 30.*) is the inclination of more than two lines, *A B, B C, B F*, which concur in the same point *B*, and are in different planes.

Hence, for *solid angles* to be equal, it is necessary they be contained under an equal number of equal planes, disposed in the same manner.

And as *solid angles* are only distinguishable by the planes under which they are contained; and as planes thus equal, are only distinguishable by comprecence, they are similar; and consequently similar *solid angles* are equal, and *viz. versa*.

The sum of all the plain angles constituting a *solid angle*, is always less than 360° ; otherwise they would constitute the plane of a circle, and not a *solid*.

Like SOLID figures. See the article **LIKE**.

SOLID bastion, } See the articles **BASTION**.

SOLID place, } See the articles **LOCUS**.

SOLID foot. See the article **FOOT**.

SOLID numbers, are those which arise from the multiplication of a plain number, by any other whatsoever.

Thus 18 is a *solid number* made of 6 (which is plain) multiplied by 3 ; or of 9 multiplied by 2 .

SOLID problem, in mathematics, is one which cannot be geometrically solved, but by the intersection of a circle, and a conic section; or by the intersection of two other conic sections, besides the circle.

Thus, to describe an isosceles triangle on a given right line; whose angle at the base, shall be triple to that at the vertex; is a *solid problem*, resolved by the intersection of a parabola and a circle.

SOLID theorem. See the article **THEOREM**.

SOLID phosphorus, } See the articles **PHOSPHORUS**.

SOLID sulphur, } See the articles **SULPHUR**.

SOLIDITY, in physics, a property of matter or body, whereby it excludes every other body from that place which it fills.

Solidity, in this sense, is a property common to all bodies, whether solid or fluid.—It is usually called *impenetrability*; but *solidity* expresses it best; as carrying in it somewhat more of positive with it than the other, which is a negative idea.

The idea of *solidity*, Mr. Locke observes, arises from the resistance we find one body make to the entrance of another into its own place.—*Solidity*, he adds, seems the most extensive property of body; as being that whereby we conceive it to fill space: it is distinguishable from *figure*, by this latter not being capable of resistance or motion.

It is distinguished from *hardness*, which is only a firm cohesion of the solid parts, so as they may not easily change their situation.

The difficulty of changing situation, gives no more *solidity* to the hardest body than to the softest; nor is a denied property a yet more solid than water.—By this we distinguish the idea of the extension of body, from that of the extension of space: that of body, is the continuity or cohesion of solid, separable, moveable parts; that of space, the continuity of unsolid, inseparable, immovable parts.

The Cartesians, however, will, by all means, deduce *solidity*, or, as they call it, *impenetrability*, from the nature of extension; they contend, that the idea of the former, is contained in that of the latter; and hence they argue against a vacuum.—Thus, say they, one cubic foot of extension cannot be added to another, without having two cubic feet of extension; for each has in itself, all that is required to constitute that magnitude. And hence they conclude, that every part of space is solid, or impenetrable; inasmuch as of its own nature it excludes all others. But the conclusion is false, and the instance they give follows from this, that the parts of space are immovable; not from their being impenetrable or solid.

SOLIDITY, in geometry, the quantity of space contained in a solid body; called also the *solid content*, and the cube thereof.

The *solidity* of a cube, prism, cylinder, or parallelepiped, is had by multiplying its base into its height.

The *solidity* of a pyramid or cone, is had by multiplying either the whole base into a third part of the height; or the

whole height into a third part of the base. To find the SOLIDITY of any irregular body.—Put the body in a hollow parallelepiped, and pour water or sand upon it, and note the height of the water or sand A B (*Tab. Geometry, fig. 32.*) then, taking out the body, observe at what height the water (or sand when levelled) stands, as A C. Subtract A C from A B; the remainder will be B C. Thus the irregular body reduced to a parallelepiped, whose base is F C G E; and its altitude B C. To find the solidity whereof, see PARALLELEPIPED.

Suppose, *e. gr.* A B to be 8, and A C, 5; then will B C be 3; suppose again, D B, 12, D E, 4; then will the solidity of the irregular body be found 144.

If the body be such, as that it cannot be well laid in such a kind of channel; *e. gr.* if it be required to measure the solidity of a statue, as it stands; a quadrangular prism or parallelepiped is to be framed over it: the rest as before.

To find the SOLIDITY of a hollow body.—If the body be not comprized in the number of regular bodies; its solidity is found as in the preceding problem. If it be a parallelepiped, prism, cylinder, sphere, pyramid or cone; the solidity, first of the whole body, including the cavity, then that of the cavity, which is supposed to have the same figure with the body itself, is to be found, according to the respective methods delivered under the PARALLELEPIPED, PRISM, &c. —For the latter being subtracted out of the former, the remainder is the solidity of the hollow body required.

SOLIDITY, in architecture, is applied both to the confidence of the ground whereon the foundation of a building is laid; and to a mass of masonry, of extraordinary thickness, without any cavity within.—The solidity of the Egyptian pyramids is much to be admired.

SOLIDS, in anatomy, &c. denote all the continuous, and continent parts of the body; thus called, in opposition to the fluids or perspirantia therein.

Of the solid kind, are the bones, cartilages, ligaments, membranes, fibres, muscles, tendons, arteries, veins, nerves, glands, lymphaducts, &c.

Notwithstanding the great number and appearance of the solids of the body; we find from the microscope, injections, vesicatories, atrophies, &c. that the solid parts are exceedingly small and inconsiderable, in comparison of the fluids. Nay, it is almost demonstrable, from a consideration of the life and generation of the vessels, and the resolution of the greatest vessels into their smallest confluent ones, that the whole mass of solids in the body, consists merely of fibres, as their common elements.

In effect, the whole mass of solids as well as fluids, a minute stamen or animalcule only excepted, has arisen from a very subtle fluid colligament, not unlike the nervous juice; as is shewn by Malpighi, in his treatise de Ovo Incubato.

The white of the egg never nourishes, till, from its natural thickness, it have been brought, by incubation, through innumerable degrees of fluidity, to become subtle enough to enter the minute vessels of the stamen or feed. The first, soft, tender solids arising from this subtle humour pass through infinite, intermediate degrees, before they arrive at their utmost solidity.

All the solids, therefore, in our bodies (unless any one will be so nice as to except the first stamen) only differ from the fluids, out of which they arise, by their rest, cohesion and figure; and a fluid particle will become fit to form a part of a solid, as soon as there is a force sufficient to effect its cohesion with the other solid parts.

SOLIDUS. See the article AUREUS.

SOLILOQUY, SOLILOQUIUM, a reasoning or discourse, which a man holds with himself.

Papias says, that soliloquy is properly a discourse by way of answer to a question that a man has proposed to himself. Soliloquies are become very common things on the modern stage; yet can nothing be more artificial or more unnatural, than an actor's making long speeches to himself, to convey his intentions, &c. to the audience.

Where such discoveries are necessary to be made, the poet should rather take care to give the dramatic persons such confidants, as may necessarily share their inmost thoughts; by which means, they will be more naturally conveyed to the audience.—Yet is even this a shift, an accurate poet would not be found to have occasion for.

The use and abuse of soliloquies, is well delivered by the duke of Buckingham, in the following lines:

Soliloquies had need be very few,
Extremely short, and spoke in passion too.
Our levers talking to themselves, for want
Of others, make the pit their confidant:
Nor is the matter mended yet, if thus
They trust a friend, only to tell it us.—

SOLIS via. See the article VIA.

SOLITARY, SOLITARIUS, something retired, or in private; remote from the company, or commerce of others of the same species. See HERMIT.

SOLITARY column, is a column that stands alone in any public place; as the Trajan column.

SOLITARY worm, SOLIUM, *tania*, or *Lumbricus latus*, is a worm sometimes found in the intestines, and which is always the only one of the kind there; as commencing from the pylorus, and extending thence, the whole length of the intestines; so that there is no room for another. See Supplement, article TANIA.

SOLITARIES, a denomination of the nuns of St. Peter of Alcantara, instituted in 1676, by cardinal Barberini, when abbot of Notre dam de Farfa, in that city.

The design of their institute is to imitate the severe, penitential life of St. Peter of Alcantara; to keep a continual silence, never open their mouths to any body but themselves; employ their time wholly in spiritual exercises, and leave the temporal concerns to a number of maids, who have a particular superior in a separate part of the monastery.—They always go bare-footed, without sandals, gird themselves with a thick cord, and wear no linen.

SOLITATORILIA, in antiquity. See SUOVETAVURILIA.

SOLICITOR, or SOLICITATOR, SOLICITATOR, a person employed to follow, and take care of other persons suits depending in courts of law, or equity; formerly allowed only to nobility, whose menial servants they were; but now frequently used to others, to the great increase of champarty, and maintenance.

The king has a SOLICITOR general, who holds his office by patent, during the king's pleasure.—The attorney general, and he, had anciently a right to their writs of summons, to fit in the lords house on special occasions, till the 13 Car. II. since which time, they have almost constantly been chosen members of the house of commons.

The solicitor general has the care and concern of managing the king's affairs, and hath fees for pleading, besides other fees arising by patents, &c. He hath his attendance on the privy council; and the attorney general, and he, were anciently reckoned among the officers of the exchequer: they have audience, and come within the bar in all other courts.

SOLICITATION of gravity, } See { PARACENTRIC.

SOLICITATION of levity,

SOLSTICE, SOLSTITIUM, in astronomy, the time when the sun is in one of the solstitial points; that is, when he is at his greatest distance from the equator, which is 23 degrees and a half: thus called, because he then appears to stand still, and not to change his place in the degrees of the zodiac, any way: an appearance owing to the obliquity of our sphere, and which those who live under the equator are strangers to.

The solstices are two, in each year; the *æstival* or *summer solstice*, and the *hyemal* or *winter solstice*.

The *summer solstice*, is when the sun is in the tropic of cancer; which is on the 11th of June; when he makes the longest day.

The *winter solstice*, is when he enters the first degree of capricorn; which is on the 11th of December; when he begins to return towards us, and makes the shortest day.

This is to be understood, as in our northern hemisphere; for in the southern, the sun's entrance into capricorn, makes the *summer solstice*, and that into cancer, the *winter solstice*.

SOLSTITIAL points, are those points of the ecliptic, whereby the sun's ascent above the equator, and his descent below it, are terminated.

The first point, which is in the beginning of the first degree of cancer, is called the *æstival* or *summer point*; and the latter, which is in the beginning of the first point of capricorn, the *winter point*. See SOLSTICE.—The solstitial points are diametrically opposite to each other. See POINT.

SOLSTITIAL colure, is that which passes through the solstitial points. See COLURE.

SOLUBLE, in medicine, *loose*, or apt to go to stool.

In chymistry it signifies easily dissolvable.

SOLUBLE tartar, is a kind of salt chymically prepared, by boiling eight ounces of cream of tartar, with four of fixed salt of tartar.

SOLVENT, the same with *dissolvent*. See DISSOLVENT.

SOLUTIO *continui*, or SOLUTION of continuity, a term used by physicians, &c. to express a disorder common to the solid parts of the body, wherein their natural cohesion is separated: as by a wound or other cause.

If this happen to a simple, similar part of the body; it is called, simply, *solutio continui*.—If to a compound, or organized part, it acquires a particular denomination, from the nature of the part, the difference of the cause, or the manner of application; as, a wound, rupture, fracture, puncture, fissure, contusion, ulcer, corrosion, dislocation, exfoliation, caries, &c.

SOLUTION, SOLUTIO, in algebra and geometry, is the answering of a question; or resolving any problem proposed.

The solution of the problem of the quadrature of the circle, and that of the duplicature of the cube, by right lines, are held impossible.

SOLUTION of continuity, in chirurgery. See **SOLUTIO** *continui*.

SOLUTION, in physics, the reduction of a solid, or firm body, into a fluid state, by means of some menstruum. See **MENSTRUUM**.

SOLUTION is frequently confounded with what we otherwise call *dissolution*; but there is a difference. See **DISSOLUTION**.

SOLUTION, in chymistry, is sometimes used for the analysis, or reduction of a natural body into its chymical principles. In this sense, *solution* is the same with what we otherwise call *resolution*.

SOLUTIVE, *loosening*, or *laxative*. See **LAXATIVE**.

SOLUTIVE *diaprunum*. See the article **DIAPRUNUM**.

SOMNAMBULI*, or **SOMNAMBULONES**, an appellation given to people, who walk in their sleep; more usually called *noctambuli*.

* The word is formed from the Latin, *somnus*, sleep, and *ambulo*, I walk.

SOMNIFEROUS. See the article **SOPORIFEROUS**.

SOMNOLENTUM *coma*. See the article **COMA**.

SON, a relative term, applied to a male child, considered in the relation he bears to his parents.

The children of the king of England, are called *sons* and *daughters* of England. The eldest son is born duke of Cornwall, and created prince of Wales. The younger sons are called *cadets*.

The king of France's children were anciently called *filz*, and *filles de France*, sons and daughters of France; and the grand-children, *petits filz*, and *petites filles de France*. At present, the daughters are called *mes-dames*, and the grand-daughters, *mes-demoiselles de France*.

Natural SON, { See the articles **BASTARD**.

Adoptive SON, { **ADOPTIVE**.

SON of God, is a term used in various senses, in the holy scripture, as, 1^o. For the Word, or second person in the blessed trinity; who is thus called, with respect to the manner of his generation: as being begotten of the Father.

Him, the orthodox believe to be co-eternal, and co-equal with the Father; and to have been with him, the eternal principle and fource of the Holy Spirit.

The appellation *Son*, is applied to him, both before and after his incarnation.—Thus we say, The *Son* of God created the world; the *Son* of God was incarnate, and lived 33 years on earth, &c.

2^o. Several creatures are also called *Sons of God*; not as being of the same nature and generation, but on divers other accounts.—Thus the angels are called *sons of God* by Job; in respect of their creation, adoption, &c. And great men are called the *Sons of God*; as being his lieutenants; or, the *Sons of his authority*. Good men, and particularly the just, are called *sons of God*, in various places of the scripture.

SON is frequently used in scripture, to signify man; as *Son of man*, &c. not only the nature of man, but his frailty.

The expression is very usual among the Hebrews and Chaldeans: Daniel, Ezekiel, and Jesus Christ, are particularly thus called; the first once, and the two latter frequently. Sometimes, the phrase *son of man*, is also used for the wicked and reprobate: in contradistinction to those called *sons of God*.

SONATA, **SUONATA**, in music, a piece or composition of music, wholly executed by instruments; and which is with regard to the several kinds of instruments, what the *cantata* is in respect of voices.

The *sonata*, then, is properly a grand, free, humorous composition, diversified with a great variety of motions, and expressions, extraordinary and bold strokes, figures, &c. And all this purely according to the fancy of the composer; who, without confining himself to any general rules of counter-point, or to any fixed number or measure, gives a loose to his genius, and runs from one mode, measure, &c. to another, as he thinks fit.

We have *sonata's* of 1, 2, 3, 4, 5, 6, 7, and even 8 parts; but usually they are performed by a single violin, or with two violins and a thorough bass for the harpsicord, and frequently a more figured bass for the bass-viol, &c.

There are a thousand different species of *sonata's*: but the Italians usually reduce them to three kinds.

Sonate de chiesa, that is, *sonata's* proper for church-music, which usually begin with a grave, solemn motion, suitable to the dignity and sanctity of the place and the service; after which they strike into a brisker, gayer and richer manner.—These are what they more peculiarly call *sonata's*.

Sonate da camera, or *sonata's* for the chamber, are properly series's of several little pieces, for dancing; only composed to the same tune.—They usually begin with a prelude, or little *sonata*, serving as an introduction to all the rest: afterwards come the allemand, pavane, courant, and other serious dances; then jigs, gavots, minuets, chacons, pascallees and other gayer airs: the whole composed in the same tone or mode.

SONG, in poetry, a little composition, consisting of simple,

easy, natural verses, set to a tune, in order to be sung.

Each stanza of a *song*, is called a *couplet*.

The *song* bears a great deal of resemblance to the madrigal; and more to the ode, which is indeed nothing but a *song* according to the ancient rules.

Its object is usually either wine or love; whence M. le Brun defines a modern *song*, to be either a soft and amorous, or a brisk and bacchic thought, expressed in a few words. Indeed, this is to restrain it to too narrow bounds; for we have devout *songs*, satyrical *songs*, and panegyric *songs*.

But, be the *song* what it will, the verse is to be easy, natural, and flowing, and are to contain a certain harmony, which neither shocks the reason nor the ear; and which unites poetry and music agreeably together.

Anciently, the only way of preserving the memory of great and noble actions, was, by recording them in *songs*; and in America there are still people, who keep their whole history in *songs*.

SONG, in music, is applied in the general, to any single piece of music, whether contrived for a voice or instrument.

A *song*, Mr. Malcolm observes, may be compared to an oration: for, as in this latter, there is a subject, viz. some person or thing the discourse is referred to, and which is always to be kept in view throughout the whole; so, in every truly regular and melodious *song*, there is one note which regulates all the rest; wherein the *song* begins, and at last ends, and which is, as it were, the principal matter, or musical subject, to be regarded in the whole course of the *song*.—And, as in the oration, there may be several distinct parts, which refer to particular subjects, yet must they have an evident connection with the principal subject, which regulates the whole; so in melody, there may be several sub-principal subjects, to which the different parts of the *song* may belong: but these are themselves, under the influence of the principal subject, and must have a sensible connexion with it.—This principal or fundamental note, is called the *key* of the *song*.

Responsive SONG. See the article **RESPONSARY**.

SONNA*, a book of Mahometan traditions, wherein all the orthodox muslimen are required to believe. See **MAHOMETANISM**.

* The word signifies, in Arabic, the same with *misna* in the Hebrew, that is, *second law*, or, as the Jews call it, *oral law*.

The adherents to the *sonna* are called *sonnites*: and as among the Jews, there is a sect of Caraites, who reject the traditions as fables invented by the rabbins; there are also sectaries among the Mahometans, called *Shiites*, who reject the traditions of the *Sonnites*, as being only founded on the authority of an apocryphal book, and not derived to them from their legislator.

There is the same enmity between the *Sonnites* and *Shiites*, as between the rabbinist Jews and the Caraites. The *Shiites* reproach the *Sonnites* with obtruding the dreams of their doctors, for the word of God: and the *Sonnites*, in their turn, treat the *Shiites* as hereticks, who refuse to admit the divine precepts, and who have corrupted the Alcoran, &c.

SONNET, **SONETTO**, in poetry, a kind of composition, properly contained in fourteen verses, viz. two stanza's or measures of four verses each, and two of three; the eight first verses being all in two rhymes.

The *sonnet* is of Italian origin, and Petrarch is allowed to be the father of it: it is held the most difficult and artful of all poetical compositions; as requiring the utmost accuracy, and exactness. It is to end with some pretty, ingenious thought: the close must be particularly beautiful, or the *sonnet* is naught.

In Malherb, and some other French poets, we meet with *sonnets*, where the two first stanza's are not in the same rhyme; but they are held irregular; and, in effect, great part of the merit of these pieces, consists in a scrupulous observation of the rules.

Ronsard, Malherb, Maynard and Gombaut, have composed abundance of *sonnets*; but among two or three thousand, there are scarce two or three worth much.

Pasquier observes, that du Bellai was the first who introduced *sonnets* into France. But du Bellai himself says, that Melin de S. Gelais, first converted the Italian *sonnets* into French.

SOOP. See the article **SOUP**.

SOOT, an earthy, volatile matter, arising from wood, coals, and other fuel, along with the smoak, by the action of fire; or, rather, it is the smoak itself, fixed and detained on the sides of the chimney.

Soot is found an excellent manure for corn lands, especially where the soil is cold.

The dyers make considerable use of *soot*, for a kind of dun colour; which it is true, has no agreeable smell; but in return it has the property of saving cloaths and other stuffs from moths.

SOOT of frankincense, is the smallest and finest part of the incense, called *olibanum*, or *male incense*; burnt after the manner of rosin to make lamp-black.

Diocteorides shows how to make a *foot* of butter, which has several uses in medicine.—The *just* found in the furnaces of gas-houses, is used by painters.

SOPE. See the article SOAP.

SOPHI*, or SOFI, a title or quality given to the emperor of Persia; importing as much as *wise*, *sage* or *philosopher*.

* The title is by some said to have taken its rise from a young shepherd thus named, who attained to the crown of Persia in 1370: others derive it from the *sophoi* or *sages*, anciently called *magi*. Vossius gives a different account of the word: *sophi*, in Arabic, he observes, signifies *wise*, and he adds, that it was applied by the Turks out of derision to the kings of Persia, ever since Ismael's time, because according to their scheme of religion, he is to wear no other covering on his head, but an ordinary, red, woollen stuff; whence the Persians are also called *sezel fesi*, q. d. *red heads*.—But Eochart assures us, that *sophi*, in the original Persian language, signifies one that is pure in his religion, and who prefers the service of God in all things; and derives it from an order of religious, called by the same name.

The *sophi's* value themselves, and with some reason, on their illustrious extraction; the race being second to none in the east. They are descended in a right line from Houssein, second son of Ali, Mahomet's cousin, and Fathima Mahomet's daughter.

There is no prince in the world, whose authority is more absolute than that of the *sophi* of Persia: his power is not even limited by any laws he himself can make; but he suspends, changes, and annuls them at pleasure.

SOPHIS*, or SOPEES, a kind of order of religious among the Mahometans in Persia, answering to what are otherwise called *derwises*, and among the Arabs and Indians, *saquirs*.

* Some will have them called *safi's*, from a kind of coarse camble which they wear, called *soufi*, from the city *Souf* in Syria, where it is principally manufactured.

The more eminent of those *sophi's* are complimented with the title *sheik*, that is *reverend*; much as in Romish countries, religious are called *reverend fathers*.

Scheich *Sophi*, who laid the first foundation of the grandeur of the royal house of Persia, was the founder, or rather the restorer of this order: Ismael, who conquered Persia, was, himself, a *sophi*, and greatly valued himself on his being so. He chose all the guards of his person from among the religious of this order; and would have all the great lords of his court *sophi's*. The king of Persia is still grand master of the order; and the lords continue to enter into it, though it be now fallen under some contempt.

The vulgar *sophi's* are now chiefly employed as ushers, and attendants of the court; and some even as executioners of justice; the emperor last reigning, would not allow them, according to custom, to gird the sword on him.

This neglect, into which the *sophi's* are sunk, has occasioned the late emperors to dispute the title of *sophi*, or *safi*: however, M. de la Croix is mistaken, when he says, that they never bore it.

SOPHISM, SOPHISMA, in logic, a captious, and fallacious reasoning; or an argument, which with some subtilty, carries much appearance of truth, but little solidity. See FALLACY.

A *sophism* is, properly, an argument false at bottom, and only invented to amuse and embarrass the person to whom it is used.

SOPHISMS, or SOPHISTICAL arguments, among logicians, are more particularly such as are not in form, or are founded on equivocal.

As: *You have every thing you have not lost; but you have not lost horns: therefore you have horns.*

SOPHIST*, SOPHISTE, a person who frames sophisms; that is, uses subtle arguments, with design to deceive those he would persuade or convince.

* The word is formed from the Greek, *sophos*, *wise*; or rather from *sophiste*, *impollutor*, *deceiver*.

The term *sophist*, which is now reproachful, was anciently honourable; and carried a very innocent idea. St. Augustin observes, it signified a rhetor, or professor of eloquence: such as were Lucian, Athenæus, Libanius, &c. Suidas, and after him Olar. Celsus, in an express dissertation on the Greek *sophists*, tells us, that the appellation was applied indifferently to all who excelled in any art, or science; whether divines, lawyers, physicians, poets, orators, or musicians.—But this seems to be stretching the sense of the word without all measure: it is possible a rhetor might have made verses, &c. but that it was on account of his poetical talent, that he was denominated *sophist*, is what we see no reason to apprehend.—However, Solon is the first who appears to have ever bore the appellation; which is given him by Hecataeus: afterwards, it was scarce ever given, except to philosophers, and declaimers.

The title *sophista* was in great credit among the Latins in the XIIIth century, and in the time of St. Bernard; but it began to lose ground in Greece, as early as Plato's time; on account

of Protagoras and Gorgias, who made a sordid traffic thereof by selling eloquence for money.—Hence Seneca calls the *sophists*, *quacks* or *empirics*.

Cicero says, that the title *sophista* was in his time given to such as professed philosophy with too much ostentation, in order to make a trade of it, by running from town to town, to retail their deceitful science.—A *sophist*, therefore, was then, as now, a rhetor, or logician, who makes it his business to ensnare and perplex people, by frivolous distinctions, vain reasonings and captious discourses.

Nothing has conducted more to the increasing of the number of *sophists*, than the contentious school philosophy: people are there taught to puzzle and obscure the truth, by barbarous, unintelligible terms; as antipredicaments, great and little logicals, quiddities, &c.

The title *sophists* was given to Rabanus Maurus, by way of eminence.—John Hinton, a modern English scholastic writer, endeavoured also to procure the splendid title of *sophist*.

SOPHISTICATION, in chymistry, alchymy, &c. a term particularly applied to the counterfeit works of fraudulent alchymists, who use indirect means of whitening copper, gilding silver, and giving other superficial tinctures to metals; as also of making augmentations, by divers mixtures, and other illegal operations, to delude those, at whose expence they are employed.

Hence the term is also applied to merchandizes, and other goods adulterated, mixed or altered by the deceit of the seller. Mufe, at present, is almost all *sophisticated*, as well as Bezoar: balm of Gilead, is also usually so, and other valuable drugs.—Canary wines are *sophisticated* on the place, before ever they come near our ports.

SOPORIFIC*, or SOPORIFEROUS, a medicine that has the faculty of procuring sleep. Such are opium, laudanum, &c.

* The word is formed from the Latin, *sopor*, *sleep*.—The Greeks in lieu hereof, use the word *hypnotic*.

SOPOROUS, *sleepy*, or *drowsy diseases*, are the coma or cataphora, lethargy and carus, which rather appear to differ in respect of more or less, than as to their essence.—In this they all agree, that they induce a moribund sleep.—See COMA, CARUS, and LETHARGY.

SORBON, or SORBONNE, the house or college of the faculty of theology, established in the university of Paris.

It was founded in 1252, by St. Louis, or rather by Robert de Sorbon his confessor and almoner; first, canon of Cambray, and afterwards of the church of Paris; who gave his own name to it; which he himself took from the village of Sorbon, or Sorbon, near Sens, where he was born.

The foundation was laid in 1250; queen Blanche, in the absence of her husband, furnishing him with a house which had formerly been the palace of Julian the apostate, whereof some remains are still seen.—Afterwards, the king gave him all the houses he had in the same place, in exchange for some others in another.

The college has been, since, magnificently rebuilt by the cardinal de Richelieu. The design of its institution, was for the use of poor students in divinity.

There are lodgings in it for 26 doctors, who are said to be of the *society of the Sorbonne*. Those admitted into it without being doctors, are said to be of the *hospitality of the Sorbonne*.—Six regent doctors hold lectures every day, for an hour and half each: three in the morning, and three in the afternoon.

SORBON is also used in the general, for the whole faculty of theology at Paris; in regard the assemblies of the whole body are held in the house of the Sorbon: and that the bachelors of the other houses of the faculty, as the house of Navarre, &c. come there to hold their *sorbonnique*, or act, for being admitted doctor in divinity.

SORCERY, the crime of witchcraft, or divination by the assistance of evil spirits.

Some hold *sorcery* to be properly what the ancients call *fortilegium*, or divination by means of *sortes* or *lots*. See SORTES.

My lord Coke, 3d Inst. fol. 44, describes a *forcerer*, *qui utitur fortibus & incantationibus demonum*. Sorcery is felony, by stat. 1^o Jac. In the mirror, *sorcery* is said to be a branch of heresy; and by stat. 12. Car. II. it is excepted out of the general pardons.

Sorcery is pretended to have been a thing formerly very common; at least the credulity of those ages made it pass for such; and people suffered frequently for it. In a more knowing and less believing age, it is out of doors.

In effect, the most probable opinion is, that the several glaring instances of *sorcery* we meet withal, in our old law-books and historians, if well enquired into, would be found, at bottom, no other than artful poisonings, and other villainous tricks.

SORDID ulcers. See the article ULCER.

SORITES*, SORITEIS, in rhetoric, &c. a kind of argument, wherein a number of propositions are gradually, and minutely laid

laid together; and something inferred from the whole.—Whence, Cicero calls it *sylogismus accretus*, an accumulative syllogism.

* The word is formed from the Greek *καμπος*, *camulus*, heap.

Such was that merry argument of Themistocles, to prove, that his little son, under ten years old, governed the whole world.—Thus: my son governs his mother; his mother me; I the Athenians; the Athenians the Greeks; Greece commands Europe; Europe the whole world: therefore my son commands the whole world.

This method of disputing, prevailed much among the stoicks; especially with Zeno, and Chrysippus. But it is very captious, and sophistical.

SORRANCES, among farriers, signify two things, *viz.* either an ill state or habit of a horse's body, arising from some part diseased: or, a loosening and solution of the continuity of the parts, which according to the various circumstances thereof, acquires various names, as *fracture, wound, ulcer, rupture, convulsion, cramp, excoriation, &c.*

SORTES, in antiquity, *lots*; a method of deciding dubious cases, where there appears no ground for a preference, by referring the decision to chance: as in casting of dice, drawing of tickets, &c.

The ancient *sortes* or *lots*, were instituted by God himself; and in the books of the Old Testament, we meet with divers standing and perpetual laws, and divers particular commands, prescribing and regulating the use thereof. Thus the scripture informs us, that the *lot* fell on St. Matthias, when a successor to Judas in the apostolate was to be chosen. Our Saviour's garment itself, was cast *lots* for. *Sortiti sunt Christi vestem.*

The **SORTES PRÆFATAE**, were famous among the Greeks.

The method of these was to put a great number of letters, or even whole words into an urn; to shake them together, and throw them out; and whatever should chance to be made out in the arrangement of the letters, &c. composed the answer of this oracle.

In what repute soever, this method of divination might, anciently, have been, M. Dacier observes, that in Cicero's time its credit was but low; inasmuch that none but the credulous populace had recourse to it.

In lieu of this, another kind of *sortes* was introduced into Greece and Italy, which was to take some celebrated poet, as Homer, or Euripides, or Virgil, to open the book, and whatever first presented itself to the eye upon opening, was taken for the ordinance of heaven. This made what they called the *sortes Homericae*, and *sortes Virgilianae*; which succeeded to the use of the *sortes Præfatae*.

This superstition passed hence into christianity; and the Christians took their *sortes* out of the books of the Old and New Testament. The first passage that presented itself, upon opening a book of scripture, was esteemed the answer of God himself.

If the first passage did not happen to be any thing to the purpose for which the *sortes* were consulted, another book was opened; till a passage was met withal, that might be taken for an answer. This was called *sortes sanctorum*.

St. Augustin does not disapprove of this method of learning futurity, provided it be not used for worldly purposes; and owns he has practised it himself.

Gregory of Tours adds, that the custom was, first to lay the Bible on the altar, and to pray the Lord, that he would discover by it what was to come to pass.

Instances of the use of the *sortes sanctorum* are very frequent in history. Heraclius, Mr. Fleury tells us, in his war against Cosroes, to learn where he should take up his winter-quarters, purified his army for three days, and then opened the gospels, and found the place appointed for his winter-quarters, was in Albania.

Gilbert of Nogent, informs us, that in his time, that is, about the beginning of the XIIth century, the custom was at the consecration of bishops, to consult the *sortes sanctorum*, to learn the success, fate, &c. of their episcopate.

The practice is founded on a supposition, that God presides over the *sortes*, and on Prov. xvi. 33. *The lot is cast into the lap; but the disposing thereof is of the Lord.*

In effect, many divines hold, that the *lot* is conducted in a particular manner by providence; that it is an extraordinary manner wherein God declares his will by a kind of immediate revelation.—The *sortes sanctorum*, however, were condemned by the council of Agda in 506, at the time they were beginning to take footing in France, &c.

SORTILEGE, **SORTILEGIUM**, a kind of divination by *sortes*, or *lots*.

SOTERIA*, in antiquity, sacrifices offered to the gods, in gratitude for their having delivered a person from danger. See **SACRIFICE**.

* The word is formed from the Greek, *σωτηρ*, saviour.

The term is also applied to poetical pieces composed for the same end. Orpheus is the first, who appears to have composed *seria*.

Our last poets use the same name to poems in Latin verse,

wrote to give thanks to God or the saints, for having preserved them on any occasion: F. Petavius being delivered from a dangerous disease, by the intercession, as he supposed, of St. Genevieve, composed that fine piece in honour of that saint, still extant under the title of *seria*.

SOU. See the article **SOL**.

SOVERAIGN, *supreme*; the chief and highest Being; or the Almighty: a term, in strictness, only applicable to God. The word is French *soverein*, which Pasquier derives further from the Latin, *superior*, the first in any thing, or he who is superior to the rest.—Hence,

In the ancient French customs, we meet with *sovereign* master of the household; *sovereign* master of the forests; *sovereign* master of the treasury.—Under Charles VI. the title *sovereign* was given to bailiffs and seneschals, with regard to their superiority over prevots, and chateilains.

SOVERAIGN, with regard to subjects, is applied to kings, and princes who are supreme and independent, and hold of none but God, and their sword.

The authority of a *sovereign* is only bounded by the laws of God, of Nature, and the fundamental laws of the state.

SOVERAIGN is also a title given to such as are invested with certain rights and prerogatives, which belong only to *soveraigns*: as the power of coining money, sending agents to diets, to treat of war and peace, &c.

In which sense, the feudatories of the empire, and the tributaries of the grand signor, are called *soveraigns*.

SOVERAIGN is also applied to courts and judges, who have a power from a prince, to decide the processes of his subjects without appeal, or in the last resort.

At Paris there are five *sovereign* companies; the parliament; the chamber of accounts, the court of aids, the grand council, and the court of monies.

In England, we have but one *sovereign* court; which is the house of lords.

SOUL, *anima*, a spirit adapted to an organized body. See **SPIRIT** and **BODY**.

Many of the ancient philosophers asserted an *anima mundi*, a *soul* which moved and animated the machine of the universe, and gave action to all natural causes. This doctrine, Plato handles very fully in his *Timæus*. See **ANIMA MUNDI**.

Others have given particular *souls* to all the heavenly bodies, the sun, stars, earth, &c. to regulate their motions.

The philosophers, many of them, allow of two, and others of three kinds of *souls*, *viz.* a

Rational Soul, which they hold to be divine, and infused by the breath of God.

Irrational or sensitive Soul, which man has in common with brutes, and which is formed out of the elements.

Vegetative Soul, which we have in common with plants; and which, as the first is the principle of reason and understanding, or that in us which thinks and understands; and the second, the principle of life; so this third is the principle of growth, nutrition and vegetation.

The Epicureans took the substance of the *soul*, we mean of the rational *soul*, to be a subtle air, composed of their atoms, or primitive corpuscles. See **ATOM**.

The stoicks held it to be a flame or portion of heavenly light. Spinosa and his followers, allowing only of one kind of substance, *viz.* matter, maintain the *soul* to be of the same substance with the body, *viz.* material.

The Cartesians make thinking the essence of the *soul*; and from this principle, deduce its immateriality and immortality.—But the principle is false; nor is there any need to define the *soul* a substance that thinks, to prove it immortal. It is enough, that the *soul* be capable of thinking; and that it produce its own thoughts, without making thinking its essence. It is no more essential to the *soul* to think than to will: for a thing I can conceive the *soul* without, cannot be its essence.

Again, if thought be the essence of the *soul*; as a thing cannot produce itself, its own being, or essence; the *soul* does not produce its own thoughts, nor its own will: and thus is it brought to the condition of brutes, or even of inanimate bodies, without any action, any liberty, &c.

If the Cartesians only mean this of the faculty of thinking; they do wrong even to call this the essence of the *soul*. It is no more its essence, than the faculty of willing is. And we conceive something in the *soul*, prior to both those faculties.

The *soul* is a spiritual substance, proper to inform, or animate a human body, and by its union with this body, to constitute a reasonable animal, or man. This is its essence; and this its definition.

It must be owned, the Cartesians prove the spirituality and immortality of the *soul*, from its thinking, exceedingly well: but they are not to have the honour of this proof, as their own invention. All the great philosophers used it before them, and use it still.

The philosophers are not at all agreed, as to the manner wherein the *soul* resides in the body. Some hold it equally diffused

throughout

throughout every part thereof. And others say it influences, and acts on every part of the body, though it has its principal residence in some particular part, called the *pineal gland*.

This principal part, Des Cartes maintains, is the pineal gland of the brain, where all the nerves terminate. See *PINEAL GLAND*.

Borri, a Milanese physician, in a letter to Bartholine, *de ortu cerebri & usu mederi*, asserts, that in the brain is found a certain, very subtle, fragrant juice, which is the principal seat or residence of the reasonable soul; and adds, that the subtilty and fineness of the soul, depends on the temperature of this liquor, rather than on the structure of the brain, to which it is usually ascribed. This liquor, we conceive, must be the same with what is usually called the *nervous juice*, or *animal spirits*. The constitution whereof, is, doubtless, of great importance, with regard to the faculties of the soul.

Mr. Locke distinguishes two principal faculties or powers of the rational or human soul, *viz.* perception and willing. See *POWER* and *FACULTY*.

To these, other philosophers add others; as *sensation*, *liberty*, *memory*, *imagination*, and *habit*.

The mystic divines distinguish two principal parts in the soul: the *superior part*, which comprehends the understanding and the will; and the *inferior part*, which comprehends imagination and sensation. Thus, say they, Jesus Christ was happy on the cross in his *upper part*, and suffered in his *lower part*. The lower part did not communicate to the upper, either its troubles, or its failings; nor the upper to the lower, its peace or beatitude. From this distinction, the quietists take in hand to maintain, that whatever passes contrary to good morals, in the lower part of the soul, is not contrary to the part of the upper part, inasmuch as the will has no share therein.

As to the soul of brutes, the Cartesian, and some others, deny its existence, in the common use of the word soul; that is, they strip it of all the properties or faculties of the human soul: and the Peripateticks, on the contrary, invest it with the greatest part, if not all of them.

In man, a particular disposition of the fibres of the brain is accompanied with a sensation of heat: and a certain flux of animal spirits towards the heart, and viscera, is followed by love or hatred.

Now the Peripateticks maintain, that brutes feel the same heat, and the same passions, on the same occasions: that they have the same reason for what incommodes them, and, in the general, are capable of all the passions, and all the sensations we feel.

The Cartesians deny, they have any perceptions or notices at all; that they feel any pain or pleasure; or love or hate any thing. The ground of their opinion is, that they allow of nothing in brutes, but what is material, and that they deny sensations, and passions to be any properties of matter. Some of the Peripateticks, on the other hand, maintain matter, when subtilized, framed, ranged and moved in a certain manner, to be capable of sensation and passion; that beasts may feel and perceive, by means of the animal spirits, which are a matter thus modified; and that even the human soul itself, only becomes capable of sensation and passion, by means thereof.

But we must own it very difficult, to reconcile the idea we have of matter, with that we have of thought; to conceive that matter figured in any manner, whether in a square, a sphere, or an oval, should be pleasure, pain, heat, colour or smell; or to conceive that matter, however agitated, whether in a circle, a spiral, parabola or ellipsis, should be love, hatred or joy, — surpasses our comprehension.

The maintainers of the contrary opinion, urge that appearance of sense, of fear, caution, love for their young, admirable sagacity, both for their own preservation and that of their species, visible through the whole brute creation. And, it is true, that all the actions of beasts plainly express an understanding; for every thing that is regular, expresses it; even a machine or watch expresses it: and a plant much more; the radicle of the seed turning downwards, and the stem upwards, whatever situation the seed is found in: the young plant, knitting from space to space, to strengthen it; its putting forth prickles, &c. to defend it, &c. mark a great understanding. All the motions of plants and brutes plainly discover an intelligence; but the intelligence does not reside in the matter thereof: it is as distinct from the beast or plant, as that which ranged the wheels of the watch, is distinct from the watch itself.

For, in effect, this intelligence appears infinitely great, infinitely wise, infinitely powerful; and the same which formed us in our mother's womb, which gave us our growth, &c. Thus, in brutes, there is not either understanding or soul, in the sense we generally use the word: they eat without pleasure, cry without pain, grow without knowing it. They fear nothing; know nothing; and yet they act in such manner, as shows understanding; whence we God having made them, to preserve them, has formed their bodies so as to avoid what might hurt them, mechanically.

Now, it might be said, that there is more understand-

ing in the vilest insect, nay, in the smallest grain, than in the most knowing of men; for it is evident, either of them contains more parts, and produces more regular motions and actions, than we are capable of understanding. Thus does the great F. Malebranche argue against the souls of brutes *Recherche de la verité, liv. 6.*

Cure of SOULS. } See the articles } *CURE*
Migration of SOULS. } *MIGRATION.*

Soul's cheat, a legacy anciently bequeathed at their death, by our scrupulously pious ancestors, to the parish priest, to compensate for any tithes that might have been forgot in their lives.

SOUND, SONUS, a perception of the soul, communicated by means of the ear; or, the effect of a collision of bodies, and a tremulous motion consequent thereon, communicated thence to the circumambient fluid, and propagated through it to the organs of hearing.

To illustrate the cause of sound; we observe, first, that a motion is necessary in the sonorous body, for the production of sound. Secondly, that this motion exists, first, in the small and insensible parts of the sonorous bodies, and is excited in them by their mutual collision, and percussion against each other, which produces that tremulous motion so observable in bodies that have a clear sound, as bells, musical chords, &c. Thirdly, that this motion is communicated to, or produces a like motion in the air, or such parts of it, as are fit to receive and propagate it; inasmuch as no motion of bodies at a distance, can affect our senses, without the mediation of other bodies which receive those motions from the sonorous body, and communicate them immediately to the organ. Lastly, that this motion must be communicated to those parts that are the proper and immediate instruments of hearing.

Further, that motion of a sonorous body, which is the immediate cause of sound, may be owing to two different causes; either the percussion between it and other hard bodies: as in drums, bells, chords, &c. or the beating and dashing of the sonorous body and the air, immediately against each other: as in wind instruments, as in flutes, trumpets, &c.

But in both cases, the motion, which is the consequence of the mutual action, and the immediate cause of the sonorous motion which the air conveys to the ear, is an invisible, tremulous or undulating motion in the small and insensible parts of the body.

To explain this; all sensible bodies are supposed to consist of a number of small and insensible parts or corpuscles, which are of the same nature in all bodies, and are perfectly hard and incompressible.

Of these, are composed others, somewhat greater, but still insensible; and these different, according to the different figures and union of their component parts. These, again, constitute other masses bigger and more different than the former; and of the various combinations of these last, are those gross bodies composed, that are visible, tangible, &c. The first and smallest parts, we have observed, are absolutely hard; the others are compressible, and are united in such manner, that being compressed by an external impulse, they have an elastic or resistive power, whereby they restore themselves to their natural state.

A shock, then, being made by one body upon another, the small particles, by their elastic principle, move to and again with a very great velocity, in a tremulous, undulating manner, somewhat like the visible motions of grosser springs; as we easily observe in the chords of musical instruments. And this is what we may call the *sonorous motion*, which is propagated to the ear: but observe, that it is the insensible motion of those particles next the smallest, which is supposed to be the immediate cause of sound; and of these, only those next the surface, communicate with the air: the motion of the whole, or of the greater parts, being no further concerned, than as they contribute to the other.

To apply this theory; strike a bell with any hard body, and you easily perceive a sensible tremor in the surface, spreading itself over the whole; and that more sensibly, as the shock is greater. Upon touching it in any other part, the motion and the sound too, are stopped. Now this is apparently a motion of the small and insensible parts, changing their situations, with respect to one another, which being so many, and so closely united, we cannot perceive their motions separately and distinctly; but only a trembling, which we reckon to be the effect of the confusion of an infinite number of little particles, closely joined, and only moving in infinitely little lines.

Mr. Perrault adds, that the visible motion of the parts, contributes no otherwise to sound, than as it causes the invisible motion of the smaller parts, which he calls *particles*, to distinguish them from the sensible ones, which he calls *parts*, and from the smallest of all, which we call *corpuscles*.

His he supports from the instance of a chord, which being struck, and the sound, and sensible undulations at rest again, if you approach the chord softly with the finger, you will find a small tremulous motion, which is the remains of the vibrations

vibrations of the whole chord, and the parts. Now the parts vibrate without any *sound*; but no sooner is the vibration felt by the finger, than the *sound* is heard again; which he ascribes to this, that the motion of the parts being insufficient to move the particles, whose motion is the first that ceases, requires some assistance from the finger against the finger, whereby to become enabled to give the particles the motion necessary for the producing of *sound*. He finishes his proof, by the instance of flutes; which when made of different matters, as wood, metal, &c. whose parts are very different, but their particles nearly the same, if their lengths and bores be the same; there is very little sensible difference in their *sounds*.

The sonorous body having made its impression on the contiguous air, that impression is propagated from one particle to another, according to the laws of pneumatics.

A few particles, for instance, driven from the surface of the body, drive their neighbouring particles into a less space; and the medium, as it is thus rarified in one place, becomes condensed in the other: but the air thus compressed in the second place, is, by its elasticity, returned back again, both to its former place, and its former state; and the air, contiguous to that, is compressed: and the like obtains, when the air less compressed expanding itself, a new compression is generated. From each agitation of the air, therefore, there arises a motion of the air, analogous to the motion of a wave on the surface of the water; which we call a *wave* or *undulation* of air.

In each wave, the particles go and return back again, though very short, but equal spaces; the motion of each particle is analogous to the motion of a vibrating pendulum, while it performs two oscillations; and most of the laws of the pendulum, with very little alteration, are applicable thereto. *Sounds* are as various, as are the means that concur to their production.—The principal varieties result from the figure, constitution, quantity, &c. of the sonorous body, the manner of percussion, with the velocity, &c. of the vibrations consequent thereon; the state and constitution of the medium; the disposition, distance, &c. of the organ; the obstacles between the organ and the sonorous object, and the adjacent bodies.—The most notable distinctions of *sounds*, arising from the various degrees and combinations of the conditions mentioned, are into *loud* and *low* (or strong and weak) into *grave* and *acute* (or sharp and flat, or high and low) and into *long* and *short*. The management whereof, makes the office of music.

The velocity of *sound* is the same, with that of the aerial waves; and does not differ much, whether it go with the wind or against it. By the wind, indeed, a certain quantity of air is carried from one place to another; and the *sound* is accelerated, while its waves move through that part of the air, if their direction be the same as that of the wind. But as *sound* moves vastly swifter than wind, the acceleration it will hereby receive, is inconsiderable. In effect, the most violent winds we know of, have their celerity to that of *sound*, only as 1 to 33; and all the effect we can perceive from the wind, is, that it increases and diminishes the space of the wave; so that by help hereof the *sound* may be heard to a greater distance than otherwise it would.

That the air is the ordinary medium of *sound*, appears from various experiments, in rarified and condensed air.—In an exhausted receiver, a small bell may be heard some distance; but when exhausted, it can scarce be heard at the smallest distance. If the air be condensed, the *sound* will be louder proportionably to the condensation, or quantity of air crowded in: of which we have many instances in Mr. Haukbee's experiments; and this does not only succeed in forced rarefactions, &c. but in such also, as are natural; as is evident from Fredricus's story of his journey to the top of mount Carpat in Hungary.

But it is not the air alone, that is capable of the impressions of *sound*; but water also; as is manifest, by striking a bell under water, the *sound* of which may plainly enough be heard, only not so loud, and also a fourth deeper, according to good judges in musical notes. And Meissenie say, a *sound* made under water, is of the same tone or note, as if made in air, and heard under water.

The velocity of *sound* is variously reported by various authors.—Sir Isaac Newton makes its progress, in a second of time, to be 955 feet; the honourable Mr. Francis Roberts 1200 feet; Mr. Boyle 1200 feet; Dr. Walker 1375 feet; Mersenne 1474 feet; Mr. Flamsted and Dr. Halley 1142 feet; the Florentine academy 1148 feet; the royal academy of Paris, 1172. The reason of which variety, Mr. Derham ascribes partly to some of those gentlemen using strings and plummets instead of regular pendulums; and partly to there not being distance enough between the sonorous body and the place of observation; and partly, to there being no regard had to the winds.

Some of the most considerable queries, relating to the laws of *sound*, the same author proposes; and answers several of them accurately, from experiments made for that purpose by himself, as follows:

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How far does a *sound* move in a second of time?—*Sound* moves 1142 seconds in a second, which is just an English mile in 9 $\frac{1}{2}$; or 9.25 half seconds; two miles in 18 $\frac{1}{2}$; three miles in 27 $\frac{1}{2}$, &c.

Does the report of a gun, discharged with its mouth towards us, come sooner than when the muzzle is from the observer?—By repeated experiments, it appears, there is no difference in the *sound*, from this different direction.

Do *sounds* move in the same time, the same spaces, in all states of the atmosphere, and heights of the barometer, by day and by night, in summer and in winter, in snowy and in clear weather, in this or that climate?—By repeated experiments, it does not appear there arises any difference from any of these different circumstances.

Do the winds affect the motion of *sounds*?—By repeated experiments, it appears, there is some, though a very small difference in the velocity of *sounds*, with or against the wind; which is also augmented, or diminished, by the strength or weakness of the wind.

Do a great and a ten's *sound*, and a small or languid one, move with the same velocity?—It appears that they do.

Does the *sound* of a gun move equally swift at all elevations of the gun?—It does.

Do different quantities or strengths of gun-powder, occasion any difference, as to the velocity of the *sound*?—None.

Does *sound* move in a right line, the nearest way; or does it sweep along the earth's surface? And is there an interference in the time, if the piece be discharged in an elevated position?—*Sound* moves the nearest; and the velocity appears to be the same in acclivities as in declivities.

Have all kinds of *sounds*, as those of guns, bells, &c. the same velocity? And are *sounds* equally swift in the beginning of their motion, and in the end?—There appears no inequality in either of these respects.

For the reflection, refraction, &c. of *sound*: see ECHO and PHONICS.

Articulate SOUNDS. See the article ARTICULATE.

SOUND, in music, denotes a quality in the several agitations of the air, considered as their dissimilar, measure, &c. may make music or harmony. See MUSIC and HARMONY.

Sound is the object of music; which is nothing but the art of applying *sounds*, under such circumstances of tone and time, as to raise agreeable sensations.

The principal affection of *sound*, whereby it becomes fitted to have this end, is that, whereby it is distinguished into *acute*, and *grave*.

This difference depends on the nature of the sonorous body; the particular figure and quantity thereof; and even, in some cases, on the part of the body where it is struck; and this is that which constitutes what we call *different tones*.

The cause of this difference appears to be no other than the different velocities of the vibrations of the *sound*ing body. In effect, the tone of a *sound*, is found, by abundance of experiments, to depend on the nature of those vibrations, whose differences we can conceive no otherwise, than as having different velocities: and since it is proved, that the small vibrations of the same chord, are all performed in equal time; and that the tone of a *sound*, which continues for some time after the stroke, is the same from first to last: it follows, that the tone is necessarily connected with a certain quantity of time in making each vibration, or each wave; or that a certain number of vibrations or waves, accomplished in a given time, constitute a certain and determinate tone.—From this principle, are all the phenomena of *tune* deduced.

From the same principle, arise what we call *concord*, &c. which are nothing but the results of frequent unions and coincidences of the vibrations of two sonorous bodies, and consequently of the waves and undulating motions of the air, occasioned thereby.

On the contrary, the result of less frequent coincidences of those vibrations, is what we call a *discord*.

Another considerable distinction of SOUNDS, with regard to music, is, that, whereby they are denominated *long* and *short*; not with regard to the sonorous body's retaining a motion once received, a longer or a less time, though gradually growing weaker; but to the continuation of the impulse of the efficient cause on the sonorous body, for a longer or a shorter time, as in the notes of a violin, &c. which are made longer or shorter, by strokes of different length or quickness.

This continuity, is, properly, a succession of several *sounds*, or the effect of several distinct strokes, or repeated impulses on the sonorous body, so quick, that we judge it one continued *sound*; especially if it be continued in the same degree of strength: and hence arises the doctrine of *measure* and *time*.

Sounds, again, are distinguished, with regard to music, into *simple* and *compound*; and that two ways.—In the first, a

sound is said to be *compound*, when a number of successive vibrations of the sonorous body and the air, come so fast upon the ear, that we judge them the same continued *sound*; as in the phenomenon of the circle of fire, caused by putting the fired end of a stick in a quick, circular motion: where, supposing the end of the stick in any point of the circle, the idea we receive of it there, continues till the impression is renewed by a sudden return.

A *simple sound*, then, with regard to this composition, should be the effect of a single vibration, or of so many vibrations as are necessary to raise in us the idea of *sound*.—In the second sense of composition, a *simple sound* is the product of one voice, or one instrument, &c.

A *compound sound*, consists of the *sounds* of several distinct voices or instruments all united in the same individual time and measure of duration, that is, all striking the ear together, whatever their other differences may be.—But in this sense, again, there is a two-fold composition; a natural and an artificial one.

The natural composition, is that proceeding from the manifold reflexions of the first *sound* from adjacent bodies, where the reflexions are not so sudden, as to occasion echo's; but are all in the same tune with the first note.

The artificial composition, which alone comes under the musician's province, is, that mixture of several *sounds*, which being made by art, the ingredient *sounds* are separable, and distinguishable from one another.—In this sense, the distinct *sounds* of several voices or instruments, or several notes of the same instrument, are called *simple sounds*; in contradistinction to the *compound* ones, wherein, to answer the end of music, the simples must have such an agreement in all relations, chiefly as to acuteness and gravity, as that the ear may receive the mixture with pleasure.

Another distinction of *sounds*, with regard to music, is that, whereby they are said to be *smooth* and *even*, or *rough* and *harsh*, also *clear* and *hoarse*; the cause of which differences, depends on the disposition and state of the sonorous body, or the circumstances of the place: but the ideas of the differences must be sought from observation.

Smooth and *rough sounds* depend, principally, on the *sounding* body; of these we have a notable instance in strings that are uneven, and not of the same dimension or constitution throughout.

M. Perrault, to account for roughness and smoothness, maintains, there is no such thing as a *simple sound*; but that the *sound* of the same chord or bell, is a compound of the *sounds* of the several parts of it; so that where the parts are homogeneous, and the dimensions, or figure uniform, there is always such a perfect mixture and union of all the *sounds*, as makes one uniform and *smooth sound*: contrary conditions, produce harshness. In effect, a likeness of parts and figure, makes an uniformity of vibrations, whereby a great number of similar and coincident motions conspire to fortify and improve each other, and unite, for the more effectual producing of the same effect.

This account he confirms, from the phenomenon of a bell, which differs in tone, according to the part it is struck in; and yet strike it any where, there is a motion over all the parts. Hence, he considers the bell as composed of an infinite number of rings, which, according to their different dimensions, have different tones; as chords of different lengths have; and when struck, the vibrations of the parts immediately struck, specify the tone, being supported by a sufficient number of consonant tones in other parts. This must be allowed, that every note of a stringed instrument, is the effect of several *simple sounds*: for there is not only the *sound* resulting from the motion of the string; but that from the motion of the parts of the instrument, which has a considerable effect in the total *sound*, as is evident from hence, that the same string on different violins, *sounds* very differently.

But Perrault affirms the same of every string in itself, and without considering the instrument. Every part of the string, he says, has its particular vibrations, different from the gross and sensible vibrations of the whole; and these are the causes of different motions and *sounds* in the particles, which uniting, compose the whole *sound* of the string, and make an uniform composition, wherein the tone of the particular part struck, prevails; and all the others mix under a due subordination with it, so as to make the composition smooth and agreeable. If the parts be unevenly, or irregularly constituted, the *sound* is harsh; which is the case in what we call *false strings*, and various other bodies; which, for this reason, have no certain and distinct tone, but a composition of several tones, which do not unite and mix, so as to have one predominant, to specify the total tone.

As to *clear* and *hoarse sounds*, they depend on circumstances that are accidental to the sonorous body: thus a voice or instrument will be hollow and hoarse, if raised within an empty hoghead; that yet is clear and bright out of it: the effect is owing to the mixture of other and different *sounds*, raised by reflexion, which corrupt and change the species of the primitive *sounds*.

For *sounds* to be fit to obtain the end of music, they ought to be smooth and clear, especially the first; since without this, they cannot have one certain and discernible tone, capable of being compared to others, in a certain relation of acuteness, of which the ear may judge; and of consequence they can be no part of the object of music.

Upon the whole, then, with Mr. Malcolm, we call that an *harmonic* or *musical sound*, which being clear and even, is agreeable to the ear, and gives a certain and discernible tune; (hence called *tunable sound*) which is the subject of the whole theory of harmony.

HARMONICAL SOUND. See the article HARMONICAL.

SOUND, in geography, denotes a strait, or inlet of the sea, between two capes or head-lands.

The **SOUND** is used, by way of eminence, for that famous strait, which joins the German sea to the Baltic.

It is situate between the island of Zealand and the coast of Schonen. It is about sixteen leagues long, and in general five broad, excepting against the castle of Cronenberg, where it is but one; so that there is there no passage for vessels, but under the cannon of the fortresses.

This has given occasion to the Danes to settle a toll on all vessels, which is said to be one of the best revenues of the crown of Denmark; and to forbid all pilots from passing through the great and little belt, which are two other inlets into the Baltic, though somewhat less commodious than the former.

All nations who traffic into this part of the North, are subject to this toll; the Swedes, indeed, were exempted from it by the treaty of 1644; but by the treaty of 1720, they are excluded the privilege; and put on the same footing with their neighbours.

By the treaty of Spire made between the Danes and Charles V. the toll for this passage was fixed at 2 rix nobles for a ship of 200 tons: yet in the year 1640 the same was risen to upwards of 500 rix dollars.

The connivance of our K. James I. who had married a daughter of Denmark, and the wars which the Hollanders had been long engaged in for their liberty, furnished the occasion for so grievous an exaction.—Of late years the toll has been again reduced to an easier footing.

Cromwell was bent on extorting this passage from the Danes; and had, probably, effected it, but that ere the fleet he sent for the purpose arrived there, he died.

The origin and progress of this imposition (which from an easy contribution voluntarily paid by merchants for maintaining lights on certain places of the coast, and whereof the K. of Denmark was only treasurer or trustee, grew at length to be a heavy burthen on trade, as well as a kind of servile acknowledgment of his sovereignty of these seas) is given in the account of Denmark, c. 3. p. 11. *Jeqq.*

SOUND-BOARD, the principal part of an organ, and that which makes the whole machine play.

The *sound-board* or *summer*, is a reservoir, into which the wind drawn in by the bellows, is conducted by a port-vent, and hence distributed into the pipes placed over the holes of its upper part. This wind enters them by valves, which open by pressing upon the stops or keys, after drawing the registers, which prevent the air from going into any of the other pipes, but those it is required in.

Organs, whose longest blind pipes are four foot, have their *sound-board* from five to six feet. Organs of 16 feet have two *sound-boards*, which communicate the wind from one to the other, by a pewter port-vent.

SOUNDING, in navigation, the act of trying the depth of the water, and the quality of the bottom, by a line and plummet, or other artifice.

There are two kinds of lines occasionally used in *sounding* the sea; the *sounding line* and the *deep sea line*. See *DEEP SEA LINE*.

The **SOUNDING line**, is the thickest and shortest, as not exceeding 20 fathom in length; and marked at two, three, and four fathoms, with a piece of black leather between the strands; and at five, with a piece of white leather.

The *sounding line* may be used when the ship is under sail, which the *deep sea-line* cannot.—The plummet is usually in form of a nine-pin, and weighs 18 pounds; the end is frequently greased, to try whether the ground be sandy or rocky, &c.—Near banks, shores, &c. they ought to be *sounding* continually.

Dr. Hook has invented a manner of *sounding* the depth of the deepest sea, without any line; only by a wooden globe, lighter than water, to which, at a little distance is a piece of lead or stone fixed, by means of a springing wire in the first, fitted into a staple in the second. The whole being let gently down, with the stone or lead foremost, as soon as that arrives at the bottom, it will stop; but the ball, by the impetus it has acquired in descending, will be carried a little lower after the weight is stopped; by which means the springing wire will be enabled to fly back, and disengaging itself, the globe will re-ascend.—By observing, then, the time of the ball's stay under water by a watch or pendulum, and the help of some tables, the depth of the sea is found. In some experiments made in the Thames with a maple globe,

globe, $5\frac{1}{2}$ inches in diameter, and weighing 4 pound and a half, lined with pitch; and a conical weight 11 inches long, the sharp end downwards; at the depth of 19 feet, there passed six seconds; and at the depth of 10 feet $3\frac{1}{4}$ seconds between the immersion and emergence of the ball. From these numbers given, the depths, at any other stays, may be computed by the rule of three.

S O U P*, or *Soop*, a kind of pottage made of bread, and broth, or of the juice of flesh, or other matters; usually served at the beginning of a meal.

* The word is French, formed from the Italian, *zuppa* or *suppa*, of the Latin, *sopa*, wine boiled away to a third part. Others derive it from the Celtic, *souben*, which signifies the same.

Supp is esteemed essential to a French dinner. Sometimes they heighten the relish by the addition of onions, or leeks, or cabbage or turnips, &c.

SOURCE. See the article **SPRING**.

SOUTH direct dial. See the article **DIAL**.

SOUTH sea company. See the article **COMPANY**.

SOUTHERN hemisphere, } See { **HEMISPHERE**.

SOUTHERN ocean, } See { **OCEAN**.

SOUTHERN signs. See the article **SIGN**.

SOWING. See **SEMINATION** and **SEMERADOR**.

SOWNE, a term used in the exchequer; seeming to be a corruption from the French *souvenu*, remembered.

Such effreats and casualties as the sheriff by his industry cannot get or levy, are said to be effreats that *sowne* not, that is, are not to be remembered, or are not in demand.—On the contrary, effreats that *sowne*, are such as he may gather.

SPA, a town in the bishoprick of Liege in Germany, famous for its mineral waters. Those of the Pouhon spring in *spa* are preferred, by our chief physicians*, to any others in or near the country of Liege; particularly to the waters of Bru; which they complain have been imposed on the public, to their and their patients frequent disappointment.

* Broxholme, Burton, Hawys, Hollings, Lee, Mead, Pellet, Robinson, Shadwel, Sloane, Stuart, and West: who were pleased to recommend Mr. Eyre, for his integrity, as a proper person to be entrusted with the patent granted him by the prince and bishop of Liege, empowering him to imprefs his highness's arms in glass on the neck of each flask, which he should fill with the true Pouhon water. See Supplement, article **SPA-WATER**.

SPAAD, or **SPALT**, **SPATUM**, a word used in several different senses; sometimes, for a species of English fibrous talc, or of gypsum; and sometimes for spar.

The various kinds of *spaad* are found pretty frequently in England and Germany; and sometimes brought from the Levant: they are all soft, and easily pulverized.

SPACE, **SPATIUM**, a simple idea, the modes whereof, are distance, capacity, extension, duration, &c.

Space, considered barely in length between any two bodies, is the same idea which we have of distance.

If it be considered in length, breadth, and thickness, it is properly called *capacity*.

When considered between the extremities of matter, which fills the capacity of *space* with something solid, tangible and moveable, it is then called *extension*.

So that extension is an idea belonging to body only; but *space*, it is plain, may be considered without it.

Space, therefore, in the general signification, is the same thing with distance considered every way, whether there be any solid matter in it, or not.

Each different distance is a different modification of *space*; and each of any different *space*, is a simple mode of this idea. Such are an inch, foot, yard, &c. which are the ideas of certain stated lengths, which men settle in their minds for the use, and by the custom of measuring.—When these ideas are made familiar to mens thoughts, they can in their minds repeat them as often as they will, without joining to them the idea of body, and frame to themselves the ideas of feet, yards and fathoms, beyond the utmost bounds of all bodies; and by adding these still to one another, they can enlarge their idea of *space*, as much as they please.

From this power of repeating any idea of distance, without being ever able to come to an end, we come by the idea of immensity.

Another mode, or modification of *space*, is taken from the relation of the parts of the termination of extension, or circumferenced *space* amongst themselves; and this is what we call *figure*.—This, the touch discovers in sensible bodies, whose extremities come within our reach; and the eye takes, both from bodies and colours whose boundaries are within its view; where, observing how the extremities terminate, either in straight lines, which meet at discernible angles; or in crooked lines, wherein no angles can be perceived; by considering these as they relate to one another in all parts of the extremities of any body or *space*, it acquires

the idea we call *figure*: which affords to the mind infinite variety.

Another mode belonging to this head, is that of *place*. Our idea of place is nothing but the relative position of any thing, with reference to its distance from some fixed and certain points: whence we say, that a thing has, or has not changed place, when its distance either is, or is not altered with respect to those bodies, with which we have occasion to compare it. That this is so, we may easily gather from hence; that we can have no idea of the place of the universe: though we can of all its parts.

Another mode of *space*, is the idea which we get from the fleeting, and perpetually perishing parts of succession, which we call *duration*. The simple modes of it are any different lengths of it, whereof we have distinct ideas, as hours, days, years, &c. time, and eternity. The idea of succession is got by reflecting on that train of ideas, which constantly follow one another in our minds, as long as we are awake.

The distance between any parts of this succession is what we call *duration*: and the continuation of the existence of ourselves, or any thing else commensurate to the succession of any ideas in our minds, is what we call *our own duration*, or that of another thing co-existing with our thinking.

A man having once got this idea of duration, can apply it to things which exist while he does not think: and thus we measure the time of our sleep, as well as that wherein we are awake.

Space is usually divided into *absolute* and *relative*.

Absolute SPACE, is that considered in its own nature; without regard to any thing external; which always remains the same, and is infinite and immovable.

Relative SPACE, is that moveable dimension, or measure of the former, which our senses define by its positions to bodies within it; and thus the vulgar use for immovable *space*.

Relative *space*, in magnitude and figure, is always the same with absolute; but it is not necessary it should be so numerically: as if you suppose a ship to be, indeed, in absolute rest, then the places of all things within her, will be the same absolutely and relatively, and nothing will change its place: but, suppose the ship under sail, or in motion, and she will continually pass through new parts of absolute *space*: but all things on board, considered relatively, in respect to the ship, may be, notwithstanding, in the same places, or have the same situation and position, in regard to one another.

Proper and absolute motion, is defined to be the application of a body to different parts of absolute, that is, or infinite and immovable *space*.

The Cartesian, who make extension the essence of matter, assert, that the *space* any body takes up, is the same thing with the body itself; and that there is no such thing as mere *space*, void of all matter, in the universe: but this see disproved under the article **VACUUM**.

SPACE, in geometry, denotes the area of any figure; or that which fills the interval or distance between the lines that terminate it.

The *parabolic space*, is that included in the whole parabola.

The *conchoidal space*, and the *cissoidal space*, are what are included within the cavities of the conchoid and cissoid.

By the new methods now introduced, of applying algebra to geometry, it is demonstrated, that the conchoidal and cissoidal spaces, though infinitely extended, are yet finite magnitudes.

Cycloidal SPACE, } See the articles { **CYCLOIDAL**.

Elliptical SPACE, } See the articles { **ELLIPTICAL**.

SPACE, in mechanics, the line a moveable body, considered as a point, is conceived to describe by its motion. See **MOTION**.

SPADE.—*Turfing SPADE*, } See the articles { **TURFING**.

SPADING, } See the articles { **SPAYING**.

SPAGYRIC*, an epithet given to chymistry; which is called the *spagyric art*, or *medicina spagyrica*; and to chymical physicians, who are also called *spagyrist*.

* Vossius derives the word from the Greek, *σπασ*, to extract, and *αγωγη*, *congrigare*, to collect: which are the two principal offices of chymists.—Paracelsus first introduced the word.

SPAGYRICAL physicians. See the article **PHYSICIAN**.

SPAHIS, horse-men in the Ottoman army; chiefly raised in Asia.

The great strength of the grand seignior's army consists in the janizaries, who are the foot, and the *spahis*, who are the horse.

The aga or commander of the *spahis*, is called *spahi agasi*. See **AGA**.

SPAN, a measure taken from the space between the thumb's end, and the tip of the little finger, when both are stretched out.

The *span* is estimated at three hand's breadths, or nine inches.

SPANISH, or SPANISH language. See LANGUAGE.

SPANISH black,
SPANISH coinage,
SPANISH coins,
SPANISH epocha,
SPANISH fires,
SPANISH inquisition,
SPANISH measures,
SPANISH money,
SPANISH order,
SPANISH plough,
SPANISH academy,
SPANISH silks,
SPANISH wax,
SPANISH white,

BLACK.
COINAGE.
COIN.
EPOCHA.
CANTHARIDES.
INQUISITION.
MEASURE.
MONEY.
ORDER.
PLOUGH.
ACADEMY.
SILK.
WAX.
WHITE.

See the articles

SPAR, in natural history, a shining, stony substance, generally, though improperly, supposed to be compounded of crystal, incorporated with lac lunæ, or other mineral, earthy, stony, or metallic matter; frequently found in caves and grotto's, and in the clefts of rocks, lead-mines, &c.

The late criterions of fossils, established by Mr. Hill, prove *spar* and crystal to be two wholly different bodies. The one easily calcifiable into lime, the other vitrifiable into the finest glass: the one soluble in acids, the other not to be affected by any menstruum.

Mr. Beaumont, in the Philosophical Transactions, endeavours to account for the origin and growth of *spar*.

Spar, he observes, may be formed three ways; either from steam alone; or from steam coagulating dew, as it falls on the ground, or waters issuing from the joints of rocks; or it may grow up from earths and clays. To say nothing of the whimsical account we have from Switzerland, viz. that snow by long lying and continual frosts, becomes hardened into *spar*. We have instances of the first kind in many grotto's where *spar* produced from steam, hang like icicles; iron ore being often found also to grow in the same manner. And as this *spar* grows downwards; so in many places, from the sides of it, issue little plants of *spar*, shooting upwards, contrary to the tendency of the others. An instance of the second, we are said to have in a certain place in Italy.

For the third kind of generation of *spar*, never before taken notice of by naturalists; Mr. Beaumont gives us instances of it in Mendip hills, and other mines wherein are subterranean vaults or grotto's. In the bottoms of some of these is a steam incumbent thereon; and from the earth in these places, there shoot up spires of various heights, &c. from the first buddings out of it, till it become as high as a man's finger; the biggest ordinarily an inch in diameter. These spires have all irregular ridges and furrows; and some sooner, some later, begin on the tops to be congealed into *spar*; and so gathering a crust downwards by degrees, are all at last, as it were turned into an absolute white *spar*, or stone. See Supplement, article SPAR.

SPARADRAP, SPARADRAPUM, in pharmacy, &c. an ancient name for a kind of fear-cloth; or a linen cloth smeared on both sides with some kind of plaister, or unguent.

The *sparadrap* is sometimes also called *tela Gualteriana*, or *tela Gualteri*; sometimes, *tela emplastica*.

It is prepared by melting a sufficient quantity of some plaister or unguent, and dipping a linen cloth therein, till such time as it have imbibed its fill. It is then taken out, cooled and polished on a marble.

There are as many different kinds of *sparadraps*, as there are of plaisters for the cloth to be dipped in.

SPARRING, among cock-fighters, is the fighting a cock with another to breathe him.—In *sparring*, they put hots on their spurs, that they may not hurt one another.—To *spar* the cock, imports in general, to breathe him, in order to embolden him to fight.

SPASM, SPASMA, or SPASMUS, ΣΠΑΣΜΑ, or ΣΠΑΣΜΟΣ, a Greek term, of equal import with the Latin, *convulsio*, and English, *convulsion*.

A *spasmus* happening after the taking hellebore, or any other violent purgative, is mortal.—There are *spasms* peculiar to certain members, and distinguished by particular names: that of the mouth is called *spasmus cynicus*; that of the penis, *sartrialis*, &c.

Cardan distinguishes two kinds of *spasms*: the first consisting in a constant contraction of the muscles, which renders the members rigid, and inflexible. The second, in sudden, unnatural motions and palpitations, frequently intermitting and beginning again.

Accidental *spasms* are of short continuance: there are some arising from flatulencies; others from bites of venomous beasts, from the puncture of a nerve, the acrimony of the humours velleitating the stomach, excessive cold, hysterical vapours, &c.

SPASMODIC, something belonging to a *spasm*, or convulsion; as a *spasmodic* medicine, *spasmodic* disease, &c.
Hunger, according to M. Hecquet, is a *spasmodic* affection of the fibres of the stomach; unless it arise from the fibres

being too much moistened by the liquor thereof, so as to incapacitate them for their office. See HUNGER.

SPATULA*, or SPATHULA, an instrument used by surgeons, and apothecaries; made flat at one end, and round at the other: serving to spread their plaisters, and unguents withal.

* The word is formed from the Latin, *spatula*, of the Greek, *εραβη*, which signifies the same.

The surgeons have made steel *spatula's*.—And the apothecaries have also large ones of wood, to stir their drugs in cisterns, tempering, or boiling them.

SPAVIN*, a disease in a horse; being a swelling, or stiffness usually in the ham, which causes him to halt.

* The word is formed from the French, *spavin*, which signifies the same.

There are two kinds of *spavins*, viz. the Ox-SPAVIN, which is a callous tumour, at the bottom of the ham, on the inside; hard as a bone, and very painful.—While it is yet young, some horses only halt with it, at the first coming out of the stable.

Dry-SPAVIN, which is more easily perceived, by the horse's raising one of his hind legs, with a twitch, higher than the other: but sometime it is found on both legs.

This kind, when some call *string-halt*, frequently degenerates into the *ewy-spavin*; for which there is no remedy, but to apply the fire; and even this is not always successful. There are two other kinds of *spavin*, which have their seat in the hoof, viz. the

Blood SPAVIN, a soft tumour which grows through a horse's hoof, and is usually full of blood.

Bone SPAVIN, a crusty substance growing on the inside of the hoof under the joint.

SPAWS, mineral waters arising out of the earth; impregnated with nitre, sulphur, allum, bitumen, coppers, or other mineral matter in passing through the strata thereof; and hence endowed with some medicinal qualities, cathartic, diuretic, pectoric, alterant or the like. See Supplement, article WATERS MINERAL.

SPAYING, or SPADING, the operation of castrating the females of several kinds of animals, as fows, bitches, &c. to prevent any further conception, and promote their fattening. It is performed, by cutting them in the mid flank, on the left side, with a sharp knife or lancet, taking out the uterus and cutting it off, and so stitching up the wound, anointing the part with tar, and keeping the animal warm for two or three days.

The usual way, is to make the incision a-flope, two inches and a half long, that the fore-finger may be put in towards the back, to feel for the ovaries, which are two kernels as big as acorns on both sides the uterus, one of which is drawn to the wound, the string thereof cut, and thus both taken out.

SPEAKER of the house of commons, a member of the house elected by a majority of the votes thereof, to act as chairman, or president, in putting questions, reading bills or bills, keeping order, reprimanding the refractory, adjourning the house, &c.

The first thing done by the commons upon the first meeting of a parliament, is to chuse a *speaker*; who is to be approved of by the king; and who upon his admission, begs his majesty, that the commons, during their sitting, may have *free access to his majesty*; *freedom of speech in their own house*, and *security from arrests*.

The *speaker* is not allowed to persuade or dissuade, in passing of a bill; but only to make a short and plain narrative; nor to vote, unless the house be equally divided.

The lord chancellor, or keeper, is usually *speaker of the house of lords*. The *speaker of the convocation*, is called the *prolocutor*. See PROLOCUTOR.

SPEAKING, the art or act of expressing one's thoughts in articulate sounds or words.

Pliny, Ælian, Plutarch and other authors, make mention of several beasts that have *spoke*; and Pliny himself, speaks with assurance, in his history, of an ox that *spoke*. Philostratus, in his life of Apollonius, gives the like quality to an elm, and even to ships. Homer makes Xanthos, one of Achilles's horse's, *spoke*; wherein he has been followed by Oppian. But these are all fabulous stories: we have much better authority for a serpent, and an ass's *speaking*. See LANGUAGE.

SPEAKING-trumpet. See TRUMPET and STENTOROPHONIC.

SPECIAL, something that is particular, or has a particular designation; from the Latin, *species*.—In opposition to *general*, of *genus*. See GENERAL, PARTICULAR, SPECIES and GENUS.

The king in his letters, frequently says, of our *special grace*, full power and royal authority.

SPECIAL office,
SPECIAL attorney,
SPECIAL fee tail,
SPECIAL issue,

See the articles
ASSISE.
ATTORNEY.
FREE tail,
ISSUE.

SPECIAL

SPE

SPECIAL tail. See the article **TAIL**.

SPECIAL verdict, &c. See the article **VERDICT, &c.**

SPECIALTY, in law, is most commonly taken for a bond, bill, or other the like instrument in writing.

Sometimes it is also used for a special or particular acquaintance.

SPECIES, an idea, which relates to some other more general one; or is comprized under a more universal division of a genus.

The word is Latin, formed from the ancient verb, *specio*, I see; as if a *species* of things were a collection of all the things seen at one view.

Species is a mere term of relation: and the same idea may be a *species*, when compared to another more general one; and a genus, with regard to a more particular one.—Thus body is a genus, with regard to an animate and inanimate body; and a *species*, with regard to substance.

The last *species*, is that which can only be divided into individuals.

Animal is a *species*, with regard to body; and man is a *species* with regard to animal. God destroyed mankind by the deluge; but he preserved the *species*.

SPECIES, in logic, is one of the five words, called by Porphyry, *universals*.

SPECIES, in rhetoric, is a particular thing, contained under a more universal one.

The orators also call it *hypothesis*: *E. gr.* virtue is to be loved, is the *genus* or *thesis*. Temperance is to be preserved here, at this time, is the *species* or *hypothesis*.

SPECIES, in the ancient music, denotes a sub-division of one of the genera.

The genera of music were three, the *enharmonic*, *chromatic*, and *diatonic*; the two last of which were variously subdivided into *species*: nor was the first without *species*, though those had not particular names as the *species* of the other two had.—These *species* were also called the *chroai*, colours of the genera.

SPECIES, in optics, the image painted on the retina by the rays of light reflected from the several points of the surface of an object, received in at the pupilla, and collected, in their passage through the crystallin, &c.

Philosophers have been in great doubt, whether the *species* of objects, which give the soul an occasion of seeing, are an effluvia of the substance of the body; or a mere impression which they make on all ambient bodies, and which these all reflect, when in a proper distance and disposition; or, lastly, whether they are not some other more subtle body, as light, which receives all these impressions from bodies, and is continually sent and returned from one to another, with the different figures and impressions it has taken.—But the moderns have decided this point by their invention of artificial eyes, wherein the *species* of objects are received on a paper or linen cloth in the same manner as they are received in the natural eye.

The ancients have distinguished the *species*, whereby objects become visible, into *impressio* and *expressio*.

Impressed SPECIES, are such, as come from without; or are sent from the object to the organ: such are those we have already been speaking of.

Expressed SPECIES, are those, on the contrary, which proceed from within; or that are sent from the organ to the object.

Le Clerc, in his system of vision, by one of those revolutions very frequent in philosophical opinions, has called upon the flag again the *species impressæ*, of the ancient philosophers. For, according to him, it is not by *species* or images impressed on the optic nerve, that the soul sees objects; but by rays, which she herself directs to them, and which she uses as a blind man does his staff, to grope out objects.

The Peripatetics account for vision, from a kind of *intentional SPECIES*, thus: every object, *lay* they, expresses a perfect image of itself on the air next to it. This expresses another lesser one on the air next to that; and this a third still less. Thus are the images continued from the object to the crystallin, which these philosophers hold the principal organ of seeing. These they call *species intentionales*; and to account the better for their generation, they affirm, that objects exhibit them in the same manner, as mirrors do a man's face. See **VISION**.

SPECIES, in theology, denote the appearances of the bread and wine in the sacrament, after consecration.—Or, as the Romanists define them, the accidents remaining in the bread and wine, whereby they become sensible to us, after their substance is destroyed.

The *species* of the bread, &c. are its whiteness, quantity, figure, malleableness, &c.—Or wine, its flavour, quickness, specific gravity, &c.

The generality of Romish divines, hold, that the *species* are absolute accidents.—And the Catholics, who are bound to deny any such things as absolute accidents, are greatly puzzled to explain the *species*, when at incensing the canon of hereby. F. Magnan is forced to assert, that the *species* are mere delusions and appearances, which God impresses on our senses.

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SPE

SPECIES, in commerce, are the several pieces of gold, silver, copper, &c. when having passed their full preparation, and coined, are current in public.

SPECIES denied, or cited drawn, are such as the sovereign has forbidden to be received in payment.

Light SPECIES, are those which fall short of the weight prescribed by law.

Falſe SPECIES, are those of different metal or alloy from what they should be, &c.

SPECIES, in algebra, are the symbols, or characters, whereby quantities are represented.

SPECIFIC, in philosophy, that which is proper and peculiar to any thing; or that characterizes it, and distinguishes it from every other thing. See **PROPER, &c.**

Thus the attracting of iron is *specific* to the load-stone, or is a *specific* property of the load-stone: a just definition should contain the *specific* notion of the thing defined, or that which specifies and distinguishes it from every thing else.

SPECIFIC, in medicine, a remedy, whose virtue and effect is peculiarly adapted to some certain disease; is adequate thereto; and exerts its whole force immediately thereon.

Thus quinquina, or the Jesuits bark, is held a *specific* for intermitting fevers or agues; mercury for the venereal disease, &c.

Authors make mention of three kinds of *specific* medicines.—1^o. Such as are eminently and particularly friendly to this or that part; as to the heart, the lungs, the brain, the stomach, &c.

2^o. Such as seem to attract, expel, or evacuate some determinate humour, by a kind of specific power they are endowed with; as *jeopis* supposed to purge watery humours; rhubarb, bile, &c. See **PURGATIVE**.

3^o. Such as remove the cause of a disease, by some sudden property, without our knowing how or why; or the manner of whole operations, we are entirely ignorant of, and have only learnt their effects by experience.

In the use of these last, there is no enquiry into the nature of the disease; no regard had to the symptoms or phenomena: nor is the medicine to be at all adapted to the particular circumstances thereof. All that we regard, is the name of the disease, and that of the remedy: as, immediately upon finding an intermitting fever, we prescribe the bark: to allay pain, opium; or to expel poison, leave particular antidote.

On this footing, a *specific* medicine seems to stand in opposition to a *scientific* or *methodic* medicine.

The mild operation of some alterant medicines by insensible perspiration, sweat and urine, may have led some men into this notion of *specific* alternatives, or the transmutation of poisonous into innocent juices. Physicians are apt to think they cure diseases specifically, when they do not bleed, purge, vomit, or salivate. But it is certain, mercury when it cures the lues without salivation, does not act specifically any more than when the highest salivation is raised by it; when it does not salivate, it infallibly and sensibly passes off by the cutaneous and venal glands.

Several mineral and metalline substances, especially the compositions of sulphur and mercury, as the ethiops and cinabar, may in deed cure many diseases; but then they do it by acting as evacuates, by attenuating, dissolving and carrying off the viscid concretions and foulnesses of the stomach and intestines, and thus cleansing the foul passages, and restoring them to their natural action: not by any alternative or *specific* operation.

SPECIFIC waters. See the article **WATER**.

SPECIFIC gravity, in hydrostatics, denotes that gravity, or weight peculiar to each species, or kind of natural body; and whereby it is distinguished from all other kinds.

In this sense, a body is said to be *specifically heavier* than another, when under the same bulk it contains a greater weight than that other; and that other is said to be *specifically lighter* than the first.—Thus, if there be two equal spheres, each a foot in diameter; only the one wood, the other lead since the leaden one is found heavier than the wooden one, it is said to be *specifically* or in *specie*, heavier; and the wooden one *specifically lighter*.

This kind of gravity, some call *relative*; in opposition to *absolute*; *rarity*, which increases in proportion to the quantity or mass of the body.

Law of the SPECIFIC gravity and levity of bodies.—1. If two bodies be equal in bulk, their *specific gravities* are, to each other, as their *absolute gravities*.—Thus a body is said to be twice as heavy, *specifically* as another, if it have twice its gravity under the same bulk.

Hence, the *specific gravities* of equal bodies, are as their densities.

2. The *specific gravities* of bodies of the same weight, are in the reciprocal ratio of their bulks. Hence the masses of two bodies of the same weight, are in a reciprocal ratio of their bulks.

3. The *specific gravities* of two bodies are, in a ratio, compounded of the direct ratio of the absolute gravities, and the reciprocal ratio of their bulks.

reciprocal one of their bulks. —Hence, again, the *specific gravities* are as the densities.

4. A body *specifically* heavier than a fluid, loses so much of its weight therein, as is equal to a quantity of the fluid of the same bulk.

For, suppose a cubic inch of lead immersed in water: a cubic inch of water will, thereby, be expelled from its place: but the weight of this water was sustained by the resistance of the ambient water. Therefore, such a part of the weight of the leaden cube, must be sustained by the resistance of the ambient water, as is equal to the weight of the water expelled. The gravity of the body immersed, therefore, must be diminished by so much.

Hence, 1°. Since a fluid *specifically* heavier, has a greater weight, in the same bulk, than a lighter; the same body will lose a greater part of its weight in a fluid, *specifically* heavier, than in a lighter: and therefore it weighs more in a lighter than a heavier.

2°. Equal homogeneous bodies weighing equally in air, lose their equilibrium if one of them be immersed in a heavier fluid; the other in a lighter.

3°. Since the *specific gravities* are as the absolute gravities under the same bulk; the *specific* gravity of the fluid, will be to the gravity of the body immersed, as the part of the weight lost by the solid, to the whole weight.

4°. Two solids equal in bulk, lose the same weight in the same fluid: but the weight of the *specifically* heavier body, is greater than that of the *specifically* lighter; therefore, the *specifically* lighter, loses a greater part of its weight, than the *specifically* heavier.

5°. Since the bulks of bodies equal in weight, are reciprocally as the *specific gravities*; the *specifically* lighter, loses more weight in the same fluid than the heavier; wherefore, if they be in *equilibrium* in one fluid, they will not be so in another; but the *specifically* heavier, will preponderate, and that the more, as the fluid is denser.

6°. The *specific gravities* of fluids, are as the weights lost by the same solid immersed in the same.

To find the *SPECIFIC gravity* of a fluid.—On one arm of a balance suspend a leaden globe; and to the other, fasten a weight, which is in *equilibrium* therewith in the air. Immerse the globe successively in the several fluids, whose *specific gravities* are to be determined, and observe the weight which balances it in each. These several weights, subtracted, severally, from the first weight, the remainders are the parts of the weight lost in each fluid. Whence the ratio of the *specific* gravity of the fluids is seen.

Hence, as the densities are as the *specific gravities*; we find the ratio of the densities of the fluids at the same time.

This problem is of the utmost use; as by it, the degree of purity or goodness of fluids, is easily found; a thing, not only of service in natural philosophy; but also in common life, and in the practice of physic.

At different seasons of the year, the *specific gravities* of the same fluids, are found different. *Joan. Casp. Eisensteindius*, in his *Disquisitionis nova de ponderibus*, &c. gives us variety of experiments relating hereto: the principal whereof, to save the trouble of too frequent experiments, we shall here subjoin.

Table of *SPECIFIC gravities* of several fluids.

A cubic inch Paris measure.	In summer.	In winter.
O. D. G.	O. D. G.	O. D. G.
Of mercury	7 1 60	7 2 14
Oil of vitriol	7 59	7 71
Spirit of vitriol	5 38	5 38
Spirit of nitre	6 21	6 44
Spirit of salt	5 49	5 55
Aqua fortis	6 23	6 35
Vinegar	5 15	5 21
Distilled vinegar	5 11	5 15
Burgundy wine	4 67	4 75
Spirit of wine	4 32	4 42
Pale ale	5 1	5 9
Brown ale	5 2	5 7
Cows milk	5 27	5 25
Goats milk	5 24	5 28
Urine	5 14	5 19
Spirit of urine	5 45	5 53
Oil of tartar	7 27	7 43
Oil of olives	4 53	4 58
Oil of turpentine	4 39	4 46
Sea water	6 12	6 18
River water	5 10	5 13
Spring water	5 11	5 14
Distilled water	5 8	5 11

That the *specific gravity* may be found the more accurately; the weight of the thread not immersed in the fluid, is to be subtracted from the weight of the solid in air; and the force necessary to make the thread *float* (if it be *specifically* lighter) is to be added to the weight lost. But if the thread that sustains the solid be heavier than the fluid; the whole weight of the thread in the air is to be subtracted from the weight of the solid in air; and the weight the thread loses from the weight lost in the fluid. Indeed, this precaution may be spared, if in examining the *specific gravity* of several

fluids, care be taken that the same thread be used, and to the same depth in each.

6. To determine the ratio which the *specific gravity* of a fluid has to the *specific gravity* of a solid, that is, *specifically* heavier than the fluid.

Weigh any mass of the solid in a fluid, and in a second weight therein: the *specific gravity* of the fluid, will be to that of the solid, as the part of the weight lost in the first is to its whole weight.

7. The *specific gravities* of equally heavy bodies, are reciprocally as the quantities of weight lost in the same fluid. Hence we find the ratio of the *specific gravities* of solid, by weighing masses thereof, that are equal in air, in the same fluid; and noting the weights lost by each.

The *specific gravities* of various solids, have been determined by many authors. Martin Ghetaldus, particularly, and the *specific gravities* various bodies had, especially metallic ones; which were borrowed thence by Oughtred. In the Philosophical Transactions, we have ample tables of *specific gravities*, by various authors.

It will be sufficient for us to give those of some of the more useful bodies, as determined with great care and accuracy by M. Petit; and published by F. Berneſſe; and from him by several others.

Table of the *SPECIFIC gravities* of several solids.

An hundred pound weight of gold is equal in bulk to

71 of mercury	3½ of fine tin
6½ of lead	20 of loaf-silver
5½ of silver	21 of marble
4½ of copper	14 of stone
45 of brass	1½ of sulphur
42 of iron	5 of wax
31 of tin	3 of water

8. A body *specifically* heavier, descends in a fluid *specifically* lighter, with a force equal to the excess of its weight, over that of an equal quantity of the fluid.

Hence, 1°. The force which sustains a *specifically* heavier body in a fluid, is equal to the excess of the absolute gravity of the body, above that of the fluid, under the same bulk: *e. gr.* 47; pound of copper loses 5½ pounds of its weight in water; therefore a power of 42 pounds is able to sustain it.

2°. Since the excess of the weight of a solid over the weight of a fluid *specifically* heavier, is less than that over the weight of a *specifically* lighter fluid under the same bulk; it will descend with less force in a *specifically* heavier fluid than in a lighter; and, consequently, it will descend more slowly in the former than in the latter.

9. A *specifically* lighter body, sinks in a heavier fluid, till the weight of a quantity of the fluid, equal in bulk to the part immersed, be equal to the weight of the whole body.

Hence, 1°. Since the *specific gravities* of bodies of the same weight, are reciprocally as their bulks; and the bulks of fluids equal in weight, are as the parts of the same solid immersed therein; the *specific gravities* of fluids are reciprocally, as the parts of the same body immersed therein.

2°. A solid, therefore, immerses deeper in a lighter fluid than in a heavier, and deeper as the proportion of the *specific gravity* of the solid to that of the fluid is greater.

3°. If a body be of the same *specific gravity* with a fluid; the whole body will be immersed; and it will remain in any given place of the fluid.

4°. If a *specifically* lighter body be wholly immersed in a fluid; it will be urged by the collateral columns of the fluid, to ascend with a force equal to the excess of the weight of the fluid, bulk for bulk, over the weight of the solid.

5°. A body, therefore, *specifically* lighter, lying on the bottom of a vessel, will not be raised up, unless the heavier fluid rise above such a part, as is equal in bulk to a quantity of the fluid of the same weight with the whole solid.

10. The *specific gravity* of a solid is to the *specific gravity* of a lighter fluid, wherein it is immersed, as the bulk of the part immersed, is to the whole bulk.

11. The *specific gravities* of equal solids, are as their parts immersed in the same fluid.

12. The weight and bulk of a *specifically* lighter body, and the weight of the *specifically* heavier fluid, being given, to find the force required, to keep the solid wholly immersed under the fluid.

As this force is equal to the excess of the weight of the fluid beyond that of an equal bulk of the solid; from the given bulk of the solid, and the weight of a cubic foot of water, find, by the rule of three, the weight of a bulk of water, equal to that of the body. From this subtract the weight of the solid; the remainder is the force required. *E. gr.* Suppose the force necessary to detain a solid eight feet in bulk, and 100 pounds in weight, under water, required: since a cubic foot of water is found to weigh 70 pound, the weight of water under the bulk of eight feet, is 560; whence, 100 pound, the weight of the solid, being subtracted; the remainder 460 pound, is the force necessary to detain the solid under water.

Hence, since a *specifically* lighter body ascends in a heavier fluid, with the same force that would prevent its ascent: by the present problem, we can likewise find the force where-with a *specifically* lighter body ascends in a heavier.

SPE

13. The weight of a vessel, to be made of a *specifically* heavier matter; and that of a *specifically* lighter fluid, being given: to determine the cavity the vessel must have, to swim on the fluid.

The weight of a cubic foot of the fluid being given; the bulk of the fluid equal to the weight of the vessel, is found by the rule of three. If, then, the cavity be made a little bigger than this, the vessel will have less weight under the same bulk, than the fluid, and will therefore be *specifically* lighter than the same, and consequently, it will swim. *E. gr.* Suppose it required to make an iron ball of 30 pounds weight, so as it shall swim upon water. Since the weight of a cubic foot of water is 70 pound, the quantity of water equal to 30 pounds, will be found $728'' 571''$; and therefore the cube of the diameter of the sphere is $1392174''$, whence the cube root being extracted $11'' 1''$ is the diameter of a sphere of water of 30 pounds. If, therefore, the diameter of the cavity be made a little bigger, *e. gr.* $1\frac{1}{2}$ or 2 feet; so much less of the ball will be immersed as the diameter is increased.

14. The force employed to retain a *specifically* lighter solid, under a heavier fluid; and the weight lost by a heavier solid in a lighter fluid, are each added to the weight of the fluid, and weigh together with it.

The several theorems here delivered, are not only all demonstrable from the principles of mechanics; but are conformable to experiment. In effect, experience is here found to answer exactly to calculation, as is abundantly evident from the courses of philosophical experiments, now frequently exhibited; where the laws of *specific* gravitation are well illustrated.

SPECILLUM, or **SPECULUM**, an instrument, wherewith surgeons search and dilate wounds, &c. See **SPECULUM**.

SPECIOUS arithmetic, is that branch which is conversant in quantities denoted by *species*, that is, by the letters of the alphabet.—In contradistinction to that, where the quantities are expressed by numbers, which is called *numerous arithmetic*.

Specious arithmetic, is what we more usually call *algebra*.

SPECTACLE, **SPECTACULUM**, *specu*; some extraordinary object, which draws the view and attention; and is not beheld without some emotion, or passion of the mind.

The term is chiefly used by the ancients, for theatrical and amphitheatrical performances: for comedies, combats of gladiators, and of beasts, and even for solemn processions, as those of the circus, &c.

The people of Rome were extremely fond of *spectacles*; and the Roman historians observe, there was no surer way of gaining their affections, and making parties to introduce tyranny and oppression, than by the use of *spectacles*.

SPECTACLES, an optic machine, consisting of two lens's set in horn, or other matter; and applied on the nose; to assist in defects of the organ of sight.

Old people and all presbyter, use *spectacles* of convex lens's, to make amends for the flatness of the eye, which does not make the rays converge enough to have them meet in the retina.

Short-sighted people, or myopes, use concave lens's, to keep the rays from converging so fast, through the great roundness of the eye, which is such, as to make them meet ere they reach the retina.

In Spain, and at Venice especially, *spectacles* are used with a different view: all the people of note and fashion there, have them continually on their noses; a folly, that has its source in the natural pride of those people, who value themselves on a profound wisdom; and affect to stare very near at every thing; as if their eyes were weakened, and wore out with excess of attention. *Vign. de Maru.*

F. Cherubin, a capuchin, describes a kind of *spectacle* telescope, for the viewing of remote objects with both eyes; hence called *binoculi*. Though F. Rheita had mentioned the same before him, in his *Oculus Emach* and *Eliae*.—The same author invented a kind of *spectacles*, with three or four glasses, which performed extraordinarily.

Spectacles were certainly unknown to the ancients; yet are they not of so late a date as the telescope. Francisco Redi, in a very learned treatise on *spectacles*, will have them to have been invented in the 13th century, between the years 1280 and 1311; and adds, that Alexander Desjuna, a monk of the order of Predicants of St. Catherine at Pisa, first communicated the secret, which was of his own invention; upon learning, that another person had it as well as himself. This history is wrote in the chronicles of that convent.

The same author tells us, that in an old manuscript still preserved in his library, composed in 1299, *spectacles* are mentioned as a thing invented about that time: and that a famous Jacobus, one Jourdon de Rivalto, in a treatise composed in 1305, says, expressly, that it was not yet 20 years, since the invention of *spectacles*. He likewise quotes Bernard Gordon in his *Lilium medicum*, wrote the same year, where he speaks of a collyrium, good to enable an old man to read without *spectacles*.

SPE

Da CANGE, in his Glossary, carries the invention of *spectacles* to a much earlier date, than there is a Greek manuscript in the French king's library, which shews, that *spectacles* were made in the year 1150: reverend the antiquity of the *memoirs de la regne*, under the word *lunettes*, inclines to Redi's side; and quotes a passage from Jordan's sermons, which says, that *spectacles* had not been 50 years in use; and Salvetti has observed, that those sermons were composed between the years 1230 and 1236.

SPECTATOR, a person present at a spectacle.

Among the Romans, **SPECTATORS**, **SPECTATORES**, more particularly denoted a kind of gladiators, who had received their discharge; and were frequently hired to spectate, as *gladiatores*, at the combats of gladiators, &c. which the people were entertained withal.

SPECULARIA, the art of preparing, and making *specula*, or mirrors.—Or, the laws of mirrors, their phenomena, causes, &c. called also *catoptrics*.

SPECULARIS lapis, in natural history, is a kind of flint stone, such as glass; whence it is also called *luciferous glass*; it is used in several countries where it is found, for window-lights, and with us, for covering small pictures, &c.

The *lapis specularis* is a species of talc; it splits easily into thin laminae or plates.

SPECULATION.—*Certainty of SPECULATION*. See **CERTITUDE**.

SPECULATIVE geometry, }
SPECULATIVE mathematics, } See { **GEOMETRY**.
SPECULATIVE physics, } { **MATHEMATICS**.
 } { **MUSICAL**.
 } { **PHILOSOPHY**.

SPECULUM, *specu*, in optics, any polished body, impervious to the rays of light: such as water in wells and deep rivers, polished metals, and glasses lined with mercury, or any other opaque matter, popularly called *looking-glasses*.

For the several kinds and terms of *specula*, *specula*, *catoptrics*, and *catoptra*, with their theory, and phenomena, and the methods of preparing, grinding them, &c. See **MIRROR** and **GRINDING**.

For the laws and effects of *specula* of various forms, see **REFLECTION**, and **BURNING GLASS**.

SPECULUM, among largeons, the same with *specillum*.—More particularly,

SPECULUM auris, is an instrument, wherewith they dilate the fundament, to examine fores, extract bones, or let out any peccant matter that may be there lodged.

SPECULUM femoris, is an instrument used to examine and dress corrupted places in the privy parts of women.—Its form is the same with that of the *speculum ani*.

SPECULUM oris, is an instrument serving to examine disorders in the mouth.—There are two kinds: the one common; the other bigger and stronger, fit not only to keep down the tongue; but also the lower jaw; while the mouth is surveyed, to the very extremity of the throat, and the necessary remedies applied.

SPEECH, the act, or art of expressing a man's thoughts, by certain signs invented for that purpose.

These signs are principally sounds made by the voice, and letters.

SPEECH, in grammar, denotes an assemblage of several words ranged in order.

The grammarians generally make *eight parts of speech*; i. e. eight kinds of words used in discourse, viz. *noun, pronoun, verb, participle, adverb, conjunction, preposition, and interjection*; each of which see under its proper article.

F. Buffier, one of the last and best writers on grammar, only admits of three parts of speech, viz. *noun, verb and modificative*; which last includes the *adverb, conjunction* and *See preposition*.

SPELL, a kind of charm, to drive away a disease, by hanging a word or sentence written on a paper about the neck. See **CHARM**.

SPELL, in the sea language. To **SPELL**, is to let go the sheet and bowlines of a sail, and brace the weather-brace, that the sail may lie loose in the wind.

To do a **SPELL**, is to do any thing by turns, for a short time, and then leave it.

To give a **SPELL**, is to be ready to work in such a one's room. *Pregh SPELL*, is when fresh men come to work; especially when the rowers are relieved with another gang.

SPELLING, that part of grammar properly called *orthography*.

Dr. Jones gives the following rules, or maxims of *spelling*.

1^o. That all words were originally pronounced, as *spelt*.
2^o. That in all words, whose sounds have been since altered (the origin of the difficulty of *spelling*) the alteration was made for the sake of ease, and pleasure.

And hence, 3^o. All words that can be written several ways, must be *spelt* according to the hardest, least, and most unusual sound.

SPELLER, or **SPELTRE**, *spelt*; a kind of imperfect metal, which

which some mistakenly confound with bismuth: others making it a sort of antimony ore.

Spelter is a kind of crude mineral, hard, white, and brilliant; which though not perfectly malleable, yet stretches a little under the hammer: and is otherwise called *zincage*. It is procured in great quantities at the mines of Gosselaar in Saxony; and is ordinarily fold in large, square, thick cakes, into which it is melted for the convenience of carriage.

It is used to purge and whiten tin, in making of pewter. Those who imagine that the *spelter* is put in, on this occasion, to increase the weight, are mistaken; since in melting five or six hundred weight of pewter, they scarce put in a pound of *spelter*. See *Supplement*, article *ZINC*.

SPERM, SPERMA, ΣΠΕΡΜΑ, the seed whereof an animal is formed. See *SEED*.

SPERMA-CETI, or *parma-fitty*, in pharmacy, is a whitish, fleshy substance, prepared from oil; principally from that of a cetaceous fish, called by some, the *male whale*, by others *cachetol*, and by the Latins *orca*; distinguished from the common whale, by its having teeth, in lieu of whale-bone; and by a bunch on its back.

The ancients were strangers to the nature of this preparation; and even Schröder seems in doubt, whether to reckon it an animal, or mineral substance.

It had its name *sperma-ceti*, seed or sperm of whale, given it, no doubt, to raise its value, by a notion of its scarcity: the oil it is properly to be made from, is found in a large trunk four or five foot deep, and ten or twelve long, filling almost the whole cavity of the head, and seeming to supply the office of brain and cerebellum.

The method of preparing it, is a secret in the hands of a very few: the process is said to be thus.—The matter being taken out of the animal, is melted over a gentle fire, and put into moulds, like those wherein sugar-loaves are formed. When cold, and drained, it is taken out and melted over again; and this they continue to do till it be well purified, and become white. It is then cut with a knife for the purpose, and reduced into flakes, such as we have from the druggists. Some of our druggists have now got the art of making it from the sediment or faeces of any kind of oil. It must be chosen white, clear, and transparent, of a sweetish smell, which some fancy to partake of that of the violet: some sophisticate it with wax; but the deceit is discovered, either by the smell of the wax, or by the dulness of the colour. Some also sell a preparation of oil gained from the tail of the whale, instead of that from the brain; which last kind turns yellow, as soon as opened to the air. In the general, there is no merchandize that should be kept closer from the air than *sperma-ceti*.

Sperma-ceti is of great use in medicine. Quincy says, it is a noble remedy in the asthma, &c. though chiefly used in bruises, inward hurts, and after delivery. But it is certain, its greatest property, and that which makes it so much in vogue in many places, is its softening the skin. Whence it comes to be used by the ladies in pastes, washes, &c.

Sperma-ceti candles, are of modern manufacture: they are made smooth, with a fine glass, free from rings and scars, superior to the finest wax-candles in colour and lustre; and, when genuine, leave no spot or stain on the finest silk, cloth, or linen.

SPERMATIC, ΣΠΕΡΜΑΤΙΚΟΣ, in anatomy, something belonging to the sperm or seed.

The ancients made a general division of the parts of the animal body into *spermatic*, and *sanguineous*.—*Spermatic parts*, are those, which by their colour, &c. bear some resemblance to seed; and were supposed to be formed thereof: such are the nerves, membranes, bones, &c.—*Sanguineous* are those supposed to be formed of the blood, after conception.

But the moderns, with much better reason, hold all the parts to be *spermatic* in this sense, and either formed originally of the ovum of the female, or of the semen of the male. M. Andry speaks of *spermatic worms* in the human body. See *WORMS*.

SPERMATIC vessels, called also *vasa præparantia*, are certain vessels appointed for bringing the blood to the testicles, &c. to be secreted and prepared into seed; and for carrying back again the blood, remaining after the secretion is effected.

The *spermatic vessels* are two arteries, and as many veins.

The *SPERMATIC arteries* arise from the fore-part of the trunk of the aorta, below the emulgents.—*V. Tab. Anat. (Angiol.) fig. 1. n. 51. (Splanchn.) fig. 1. lit. p. p. &c.*

Their structure is very singular, in that, contrary to the fabric of all other arteries, which are largest at their exit from the trunk, these are smallest at their origin, and grow bigger in their progress towards the testes. By this means, the blood receives a check at its last going off for those parts, which disposes it for the later changes, &c. it is to pass.—The same end is answered in quadrupeds, by having these arteries curled and contorted in their passage like a screw.

The reason why nature has taken another method in man,

Mr. Cowper observes, is, that in that case, the abdominal muscles must have been larger than they are, by which means, the intestines would have been frequently let down into the scrotum; an inconvenience which quadrupeds are secured from, by the horizontal position of their bodies.

The *spermatic arteries*, in their progress, meeting with the *spermatic veins*, enter together with them the *arteria lunella* of the peritonæum, where, insinuating into the duplicature of the process, and being clothed therewith, they pass on to within three or four fingers breadth of the testicles, where they divide into two unequal branches; the bigger of which goes to the testicle, and is distributed therein (see *TESTICLE*.) And the less in the parastata or epididymis. See *PARASTATA*.

The *SPERMATIC veins* take the same course with the arteries; only a little above the testicles, they split into several branches, which uniting, form a plexus, called *corpus varicosum pampiniferum*, or *pyramidale*. The blood returned by the *spermatic veins*, is delivered on the right side to the cava, and on the left, into the emulgent vein.—See *Tab. Anat. (Angiol.) fig. 6. n. 2*.

SPERMATOCELE, in medicine, a kind of rupture, occasioned by a distention of the femoral vessels, whereby they are let all into the scrotum.

SPHACELUS*, or **SPHACELISMUS**, in medicine, a total corruption or mortification of any part, occasioned by an interception of the blood, and spirits.

* The word is Greek, σφακελός, formed, perhaps, of σφαρην, I kill.—It is sometimes, also, called *carass*, and sometimes *foderatio*. See *NECROSIS* and *SIDERATIO*.

Sphacelus is distinguished from *gangrene*, which is only a mortification begun, and, as it were, the road to a *sphacelus*, which is the state, and perfection thereof.

The *sphacelus* is distinguished by the lividness or blackness of the part affected; its stoniness, insensibility, and cadaverous smell.

The common causes of the *sphacelus*, are close ligatures, excessive colds, great inflammations, bites of mad dogs, &c. A *sphacelus* foot, according to Aquependente, ought to be cut off in the mortified part, near the live part. And when the foot is off, the dead flesh left behind, is to be consumed by the application of an actual cautery, repeated several times, till the patient feel the heat of the fire. See *Supplement*, article *AMPUTATION*.

SPHÆRISTERIUM, ΣΦΑΙΡΙΣΤΗΡΙΟΝ, in antiquity, the seventh part of the ancient gymnasium; being that wherein the youth practised tennis-playing.

The *sphæristerium* or tennis-court, was between the place, named *palaestra*, and that where they ran races, which was between the portico's and the outer wall: though Vitruvius does not make mention of it in the description he gives of the ancient gymnasium.

The exercise here performed was called σφαίρισμα, *sphæristica*, and σφαίρισμα, *sphæromachia*, which some will have to have differed from the modern tennis; but it is not known wherein the difference consisted.

The Milesians were particularly averse to this exercise; and the Athenians were as remarkably fond of it.—These latter frequently gave the freedom of their city to the *sphæristæ*, or masters in this art, by way of compliment.

SPHENOIDAL suture, in anatomy, a suture thus called, from its encompassing the os sphenoides, which it separates from the os frontis, the os petrosum and os occipitis.

SPHENOIDES, in anatomy, os cuneiforme; a bone of the head, common to the cranium, and upper jaw.

It is situate in the lower part of the skull, whereof it is, as it were, the basis, and is connected to all the other members thereof, by the *sphenoidal suture*.—See *Tab. Anat. (Osteol.) fig. 7. n. 5*.

Its form is irregular, and not easy to be described; whence some have called it *multiforme*.

It has its name *sphenoides*, from the Greek, σφην, *cuneus*, wedge; by reason of the manner of its insertion into the other bones of the skull.

In adults, it is one continued bone; but in young children, it sometimes consists of three, and sometimes of four distinct pieces.

SPHENOIDES sella. See the article *SELLA*.

SPHENOPHARYNGÆUS, in anatomy, a pair of muscles, called also *pterygopharyngæus*, *cephalopharyngæus*, &c. See *PTERYGOPHARYNGÆUS*.

SPHENOSTAPHYLINUS, in anatomy, a muscle of the larynx. It descends from a round, fleshy origination, near the root of a process of the os sphenoides, and is implanted into the posterior part of the uvula, where it joins its partner.—It serves to draw the uvula upwards and backwards; and hinders the masticated aliment from passing into the foramina narium in deglutition.

SPHERE, SPHÆRA, ΣΦΑΙΡΑ, in geometry, a solid body contained under one single surface, and having a point in the middle,

middle, called the *centre*, whence all lines drawn to the surface, are equal.

The *sphere* is supposed to be generated by the revolution of a semi-circle, ABC (*Tab. Geom.*, fig. 34.) about its diameter AC, which is also called the *axis of the sphere*, and the extrem points of the axis, A and C, the *poles of the sphere*.

Properties of the SPHERE.—1°. A *sphere* is equal to a pyramid, whose base is equal to the surface, and its height to the radius of the *sphere*.

Hence a *sphere* being esteemed such a pyramid, its cube or solid content, is found like that of a pyramid.

2°. A *sphere* is to a cylinder, standing on an equal base, and of the same height, as 2 to 3. Hence, also, may the cube or content of the *sphere* be found.

3°. The cube of the diameter of a *sphere*, is to the solid content of the *sphere*, nearly as 300 to 157: and thus, also, may the content of the *sphere* be measured.

4°. The surface of a *sphere* is quadruple the area of a circle described with the radius of the *sphere*.—For since a *sphere* is equal to a pyramid, whose base is the surface, and its altitude the radius of the *sphere*: the surface of the *sphere* is had, by dividing its solidity by a third part of its semi-diameter. If, now, the diameter of the circle be 100, the area will be 7850; consequently, the solidity 1570000; which divided by a third of the semi-diameter, 100, the quotient is the surface of the *sphere* 31400; which is manifestly quadruple the area of the circle.

The diameter of a SPHERE being given, to find its surface and solidity.—Find the periphery of the circle described by the radius of the *sphere*.

Multiply this, found, into the diameter; the product is the surface of the *sphere*. Multiply the surface by a sixth part of the diameter, the product is the solidity of the *sphere*.

Thus, supposing the diameter of the *sphere* 56, the periphery will be found 175; which multiplied by the diameter, the product 9800 is the surface of the *sphere*; which multiplied by one sixth part of the diameter, gives the solidity 91057. Or, thus;

Find the cube of the diameter 175616; then to 300157, and the cube found, find a fourth proportional, 91057. See **PROPORTIONAL**. This is the solidity of the *sphere* required.

For segments and sectors of *spheres*, see **SEGMENT** and **SECTOR**.

Doctrine of the SPHERE, } See the articles } **SPHERICKS.**
Projection of the SPHERE, } **PROJECTION.**

SPHERE of activity of any body, is that determinate space or extent, all round about it, to which, and no farther, the effluvia continually emitted from that body, do reach, and where they operate according to their nature.

Thus we see the magnetical effluvia have certain bounds and limits, beyond which they will have no influence to turn, or attract the needle: but where-ever a needle is placed, so as it may be moved by a load-stone, it may be said to be within the *sphere* of activity of the stone.

SPHERE, in astronomy, that concave orb or expanse, which invests our globe, and in which the heavenly bodies, sun, stars, planets and comets, appear to be fixed, at an equal distance from the eye.

This is also called the *sphere of the world*; and is the subject of the spherical astronomy.

This *sphere*, as it includes the fixed stars, whence we also occasionally call it, the *sphere of the fixed stars*, is vastly great.

The diameter of the earth's orbit is so small, in respect of the diameter hereof, that the centre of the *sphere* is not sensibly changed by any alteration of the spectator's place in the several parts of the orbit: but still, in all the points of the earth's surface, and at all times, the inhabitants have the same appearance of the *sphere*; that is, the fixed stars seem to possess the same points in the surface of the *sphere*.

—For our way of judging of the places, &c. of the stars, is to conceive right lines drawn from the eye or the centre of the earth, through the centres of the stars, and continued thence, till they cut the foresaid *sphere*; the points where these lines terminate therein, are the apparent places of those stars.

The better to determine the places of the heavenly bodies in the *sphere*, several circles are imagined to be described in the surface thereof; hence called *circles of the sphere*.

Of these, some are said to be *greater*, as the ecliptic, meridian, equator, &c. others *less*, as the tropics, parallels, &c.

Of these, again, some are moveable, or owe their origin to the motion of the earth, &c. such are the ecliptic, secondaries of the ecliptic, &c. See each circle under its proper head; as **EQUATOR**, **ECLIPTIC**, **HORIZON**, &c.

SPHERE, in geography, &c. denotes a certain disposition of the circles on the surface of the earth, with regard to one another; which varies in various parts thereof.

The circles originally conceived on the surface of the *sphere*

of the world, are almost all transferred, by analogy, to the surface of the earth; where they are conceived to be drawn directly underneath those of the *sphere*, or in the same planes therewith; so that were the planes of those of the earth continued to the *sphere*, they would coincide with the respective circles thereon.—Thus it is we have a horizon, meridian, equator, &c. on the earth.

As the equator in the heavens divides the *sphere* into two equal parts; the one north and the other south; so does the equator on the surface of the earth, divide the globe in the same manner.

And as the meridians in the heavens, pass through the poles of the horizon; so do those on the earth, &c.

With regard, then, to the position of some of these circles in respect of others, we have a *right*, a *parallel*, and an *oblique sphere*.

Right SPHERE, is that where the equator cuts the horizon of the place at right angles: for the particular phenomena, &c. whereof, see **RIGHT SPHERE**.

Parallel SPHERE, is where the equator is parallel to the sensible horizon, and in the plane of the rational. See **PARALLEL SPHERE**.

Oblique SPHERE, is where the equator cuts the horizon obliquely. See **OBLIQUE SPHERE**.

Armillary, or *artificial SPHERE*, is an astronomical instrument, representing the several circles of the *sphere*, in their natural order; serving to give an idea of the office and position of each thereof, and to solve various problems relating thereto.

It is thus called, as consisting of a number of *circles* or *rings* of brass, or other matter, called by the Latins, *armillæ*, from their resembling of bracelets, or rings for the arm.

By this, it is distinguished from the *globe*, which, though it have all the circles of the *sphere* on its surface, yet is not cut into *armillæ* or *rings*, to represent the circle simply and alone; but exhibits also the intermediate spaces, between the circles.

Armillary spheres, are of different kinds, with regard to the position of the earth therein; where, they become distinguished into *Ptolemaic* and *Copernican spheres*: in the first whereof, the earth is in the centre; and in the latter near the circumference, according to the position which that planet obtains in those systems.

The *Ptolemaic SPHERE*, is that commonly in use, and is represented (*Tab. Astronomy*, fig. 21.) with the names of the several circles, lines, &c. of the *sphere*, inscribed thereon. In the middle, upon the axis of the *sphere*, is a ball, T, representing the earth; on whose surface are the circles, &c. of the earth. The *sphere* is made to revolve about the said axis, which remains at rest: by which means, the sun's diurnal and annual course about the earth, are represented according to the Ptolemaic hypothesis: and even by means hereof all problems relating to the phenomena of the sun and earth, are solved, as upon the celestial globe; and after the same manner; which see described under the article **GLOBE**.

The *Copernican SPHERE*, represented (fig. 22.) is very different from the Ptolemaic, both in its constitution and use; and is more intricate in both. Indeed the instrument is in the hands of so few people, and its use so inconsiderable, except what we have in the other more common instruments, particularly the globe and Ptolemaic *sphere*, that we shall be easily excused the not taking up room, with any description thereof.

Harmony of the SPHERES, } See the articles } **HARMONY.**
Obliquity of the SPHERE, } **OBLIQUITY.**
Rectifying of the SPHERE, } **RECTIFYING.**

Dialling SPHERE. See the article **DIALLING**.

SPHERICAL angle, is the mutual inclination of two planes, whereby a *sphere* is cut.

Thus the inclination of the two planes, CAF and CEF (*Tab. Trigonometry*, fig. 9.) forms the *spherical angle* ACE. See **SPHERE**.

The measure of a *spherical angle*, ACE, is an arch of a great circle AE, described from the vertex C, as from a pole, and intercepted between the legs CA and CE.

Hence, 1°. Since the inclination of the plane CEF, to the plane CAF, is every where the same; the angles in the opposite intersections C and F, are equal.

2°. Hence the measure of a *spherical angle* ACE, is described with the interval of a quadrant AC or EC, from the vertex C between the legs CA, CE.

If a circle of the *sphere*, AEBF (fig. 8.) cut another CEDF, the adjacent angles, AEC and AED are equal to two right ones; and the vertical angles AEC and DEB equal to one another. The former likewise holds of several angles formed on the same arch CED, at the same point E. Hence, any number of *spherical angles*, as AEC, AED, DEB, BEC, &c. made on the same point E, are equal to four right angles. See **SPHERICAL triangle**.

SPHERICAL triangle, a triangle comprehended between three

arches of great circles of a sphere, intersecting each other in the manner thereof. See TRIANGLE.

Properties of SPHERICAL triangles.—1. If in two spherical triangles, (Tab. Trigonometry, fig. 10.) ABC and abc , $A=a$, $BA=ba$ and $CA=ca$: then will B and the sides, including the angles, be respectively equal, the whole triangles are equal: that is, $BC=bc$, $B=b$ and $C=c$.

Again, in two spherical triangles $A=a$, $C=c$, and $AC=ac$; then will $B=b$, $AB=ab$ and $BC=BC$. Lastly, if in two spherical triangles $AB=ab$, $AC=ac$, and $BC=bc$, then will $A=a$, $B=b$ and $C=c$; the demonstrations whereof, coincide with those of the like properties in plain triangles. The theorems of the congruency of rectilinear triangles, extending to all other curvilinear, circular, parabolic, &c. provided their sides be similar. See TRIANGLE.

2. In an equilateral triangle ABC (fig. 11.) the angles at the base, B and C , are equal; and if in any triangle, the angles B and C , at the base BC , are equal; the triangle is equilateral.

3. In every spherical triangle, each side is less than a semi-circle: any two sides taken together are greater than the third; and all the three sides together are less than the periphery of a great circle: and a greater side is always opposed to a greater angle, and a less side to a less angle.

4. If in a spherical triangle BAC (fig. 12.) two legs AB and BC taken together, be equal to a semi-circle; the base AC being continued to D ; the external angle BCD will be equal to the internal opposite one BAC .

If the two legs together, be less than a semi-circle, the external angle BCD , will be greater than the internal opposite one A : and if the legs be greater than a semi-circle, the external angle BCD , will be less than the internal opposite one A ; and the reverse of all these holds, viz. if the angle BCD be equal to, greater, or lesser than A ; the sides AB and BC are equal to, greater, or lesser than a semi-circle.

5. If in a spherical triangle ABC , two sides AB and BC , be equal to a semi-circle; the angles at the base A and C , are equal to two right ones: if the sides be greater than a semi-circle, the angles are greater than two right ones; and if less, less. And, conversely.

6. In every spherical triangle, each angle is less than two right ones; and the three together, are less than six right angles, and greater than two.

7. If in a spherical triangle BAC (fig. 13.) the sides AB and AC be quadrants; the angles at the base, B and C , will be right angles; if the intercepted angle A be a right angle, BC will be a quadrant: if A be obtuse, BC will be greater than a quadrant; and if acute, less. And, conversely.

8. If in a spherical rectangular triangle, the side BC (fig. 14.) adjacent to the right angle B , be a quadrant; the angle A will be a right angle; if BE be greater than a quadrant, the angle A will be obtuse; and if BD be less than a quadrant, the angle A will be acute. And, conversely.

9. If in a spherical rectangular triangle, each leg be either greater or less than a quadrant; the hypotenuse will be less than a quadrant. And, conversely.

10. If in a spherical triangle ABC (fig. 15.) rectangular only at B , one side CB be greater than a quadrant, and the other side AB less; the hypotenuse AC will be greater than a quadrant. And, conversely.

11. If in a spherical obliquangular triangle ACB (fig. 16.) both angles at the base, A and B , be either obtuse or acute; the perpendicular CD let fall from the third angle C to the opposite side AB , falls within the triangle; if one of them, A , be obtuse; and the other, B , acute; the perpendicular falls without the triangle.

12. If in a spherical triangle ACB , all the angles A , B and C be acute; the sides are each less than a quadrant. Hence, if in an obliquangular spherical triangle, one side be greater than a quadrant, one angle is obtuse, viz. that opposite to this side.

13. If in a spherical triangle ACB , two angles A and B , be obtuse, and the third C acute; the sides AC and CB opposite to the obtuse sides, are greater than a quadrant; and that opposite to the acute side A , B , is less than a quadrant. Hence, if the two sides be less than a quadrant, the two angles are acute.

14. If in a spherical triangle, the several sides be each greater than a quadrant; or only two of them greater, and the third be equal to a quadrant; the several angles are obtuse.

15. If in an obliquangular spherical triangle, two sides be less than a quadrant, and the third greater; the angle opposite to the greatest will be obtuse, and the rest acute.

Resolution of SPHERICAL triangles. See TRIANGLE.

SPHERICAL astronomy, that part of astronomy which considers the universe, such as it appears to the eye. See ASTRONOMY.

Under *spherical astronomy*, then, come all the phenomena and appearances of the heavens and heavenly bodies, such as we perceive them; without any enquiry into the reason, the theory, or the truth thereof. — By which it is distinguished

from *theoretical astronomy*, which considers the real structure of the universe, and the causes of their phenomena.

In *the spherical astronomy*, the world is conceived to be a concave, spherical surface, in whose centre is the earth, or rather the eye, about which the visible frame revolves, with stars and planets fixed in the circumference thereof. And on this supposition all the other phenomena are determined.

The *theoretical astronomy* teaches us, from the laws of optics, &c. to correct this scheme, and reduce the whole to a juster system. See SYSTEM.

SPHERICAL compasses. See the article COMPASSES.

SPHERICAL geometry, the doctrine of the sphere; particularly of the circles described on the surface thereof, with the method of projecting the same on a plane; and measuring their arches and angles when projected.

SPHERICAL trigonometry, the art of resolving spherical triangles, i. e. from three parts of a spherical triangle given, to find the rest. — E. gr. From two sides and one angle; to find the other two angles, and the third side. See SPHERICAL triangle.

SPHERICITY, the quality of a sphere; or that whereby a thing becomes spherical or round.

The *sphericity* of pebbles, fruits, berries, &c. as also of drops of water, quick-silver, &c. and of bubbles of air under water, &c. Dr. Hook takes to arise from the incongruity of their particles with those of the ambient fluid, which prevents their coalescing; and by pressing on them, and encompassing them all round equally, turns them into a round form.

This, he thinks, appears evidently, from the manner of making small round shot of several sizes, without casting the lead into any moulds; from drops of rain being formed, in their fall, into round hail-floes; and from drops of water falling on small dust, sand, &c. which dust produce an artificial round mass; and from the small, round, red-hot balls, formed by the collision or fusion of flint and steel, in striking fire.

But all these cases of *sphericity* seem better accounted for, from the great principle of attraction; whereby the parts of the same fluid drop, &c. are all naturally ranged as near the centre as possible, which necessarily induces a spherical figure: and, perhaps, a repelling force between the particles of the drop, and of the medium, contributes also not a little thereto.

SPHERICKS, the doctrine of the sphere, particularly of the several circles described on the surface thereof; with the method of projecting the same in plano.

The principal matters shewn herein, are as follow:

1. If a sphere be cut in any manner, the plane of the section will be a circle, whose centre is in the diameter of the sphere.

Hence, 1°. The diameter HI (Tab. Trigonometry, fig. 17.) of a circle, passing through the centre C , is equal to the diameter AE of the generating circle; and the diameter of a circle, as FE , that does not pass through the centre, is equal to some chord of the generating circle.

Hence, 2°. As the diameter is the greatest of all chords, a circle passing through the centre, is the greatest circle of the sphere; and all the rest are lesser than the same.

Hence also, 3°. All great circles of the sphere are equal to one another.

Hence also, 4°. If a great circle of the sphere pass through any given point of the sphere, as A ; it must also pass through the point diametrically opposite thereto, as B .

Hence also, 5°. If two great circles mutually intersect each other, the line of section is the diameter of the sphere, and therefore two great circles intersect each other in points diametrically opposite.

Hence also, 6°. A great circle of the sphere, divides it into two equal parts or hemispheres.

2. All great circles of the sphere, cut each other into two parts; and, conversely, all circles, that thus cut each other, are great circles of the sphere.

3. An arch of a great circle of the sphere, intercepted between another arch HIL (fig. 18.) and its poles A and B , is a quadrant.

That intercepted between a less circle DEF , and one of its poles A , is greater than a quadrant; and that between the same, and the other pole B , less than a quadrant; and, conversely.

4. If a great circle of the sphere pass through the poles of another, that other passes through the poles of this. And if a great circle pass through the poles of another, the two cut each other at right angles; and, conversely.

5. If a great circle, as $AFBD$, pass through the poles A and B of a lesser circle DEF , it cuts it into equal parts; and at right angles.

6. If two great circles $AEBF$ and $CEDF$ (fig. 19.) intersect each other in the poles E and F of another great circle $ACBD$; that other will pass through the poles H and I , and I of the circles $AEBF$ and $CEDF$.

7. If two great circles $AEBF$ and $CEDF$, cut each other mutually; the angle of obliquity AEC , will be equal to the distance of the pole H .

8. All circles of the sphere, as GF and LK (fig. 20.) equally distant from its centre C, are equal; and the further they are removed from the centre, the less they are. Hence, since of all parallel chords, only two, LR and IK, are equally distant from the centre; so all the circles parallel to the same great circle, only two are equal.

9. If the arches FH and KH, and GI and IL, intercepted between a great circle LMH, and the lesser circles GNF and LOK, be equal, the circles are equal.

10. If the arches FH and GI of the same great circle AIBH, intercepted between two circles GNF and IMH, be equal, the circles are parallel.

11. An arch of a parallel circle IG (fig. 9.) is similar to an arch of a great circle AE; if each be intercepted between the same great circles CAF and CEF.

Hence, the arches AE and IG, have the same ratio to their peripheries; and, consequently, contain the same number of degrees. And hence the arch IG is less than the arch AE.

12. The arch of a great circle, is the shortest line which can be drawn from one point of the surface of the sphere to another: and the lines between any two points on the same surface, are the greater, as the circles whereof they are arches are the less.

Hence, the proper measure, or distance of two places on the surface of the sphere, is an arch of a great circle intercepted between the same.

SPHEROID*, SPHEROIDES, ΣΦΑΙΡΟΙΔΗΣ, in geometry, a solid approaching to the figure of a sphere, though not exactly round, but oblong; as having one of its diameters bigger than the other; and generated by the revolution of a semi-ellipse about its axis.

* The word is formed from *σφαῖρα*, sphere, and *ἰδω*, shape.

When it is generated by the revolution of the semi-ellipse about its greater axis, it is called an *oblong spheroid*.—And when generated by the revolution of an ellipse about its less axis, an *oblate spheroid*.

The contour of a dome, Daviler observes, should be half a *spheroid*. Half a sphere, he says, is too low to have a good effect below.

For the solid dimension of a *spheroid*, it is $\frac{4}{3}$ of its circumscribing cylinder: or it is equal to a cone, whose altitude is equal to the great axis, and the diameter of the base to four times the less axis of the generating ellipse.

Or a *spheroid* is to a sphere described on its greater axis, as the square of the less axis to the square of the greater: or it is to a sphere described on the less axis, as the greater axis to the less.

SPHINCTER*, in anatomy, a term applied to a kind of circular muscles, or muscles in form of rings, which serve to close and draw up several orifices of the body, and prevent the excretion of the contents.

* The word is formed from the Greek, *σφινγω*, *sphingo*, or *convictor*, something that binds and constricts a thing very closely; these muscles having an effect much like that of a pincel.

SPHINCTER ani, is a circular muscle, serving to shut the anus, and keep the excrements from coming away involuntarily. It is near two inches broad, and is carried down below the rectum, near an inch. It is fastened on the sides to the bones of the coxendix, and behind to the os sacrum: and before, in men, to the accelerator urinae; and in women, to the vagina uteri. Some would have it to be two muscles, and some three; but without any found reason.

SPHINCTER gulae, } See the articles { **OESOPHAGÆUS.**
SPHINCTER labiorum, } **CONSTRICTOR.**

SPHINCTER vaginae, a constrictor muscle, serving to hinder the reflux of the blood from the clitoris, &c. in coition.

SPHINCTER vesicae, is a muscle consisting of circular fibres, placed at the exit of the bladder, to prevent the perpetual dropping of the urine.—See *Tab. Anat.* (Splanchn.) fig. 9. tit. 4.

It keeps the bladder constantly shut; and is only opened, when by the contraction of the abdominal muscles, the bladder is compressed, and the urine forced out.

SPHINX, ΣΦΙΓΞ, in sculpture, &c. a figure or representation of a monster of that name, famed among the ancients, now mostly used as an ornament in gardens, terraces, &c.

It is represented with the head and breasts of a woman, the wings of a bird, the claws of a lion, and the rest of the body like a dog.

It is supposed to have been engendered by Typhon, and sent by Juno, to be revenged on the Thebans. Its office, they say, was to propole dark, enigmatical questions to all passers-by; and if they did not give the explication thereof, to devour them.

It made horrible ravages, as the story goes, on a mountain near Thebes, and could not by any means be destroyed, till after Oedipus had solved the following riddle: What animal is it, that in the morning walks on four legs, at noon on two, and at night on three? The answer was MAN.

Among the Egyptians, the *sphinx* was the symbol of religion; by reason of the obscurity of its mysteries. And on the same account, the Romans placed a *sphinx* in the promos or porch of their temples.

SPICA virginis, a star of the first magnitude in the constellation virgo.

Its place is in the more southerly hand. Its longitude, according to Mr. Flamsteed, is 159° 51' 22"; its latitude 29° 1' 59" south.

SPICE, any kind of aromatic drug, that has hot and pungent qualities: such are pepper, nutmeg, ginger, cinnamon and cloves.

Some also apply the word to divers other medicinal drugs brought from the east; as fenna, calas, frankincense, &c. See each under its proper article.

Carder of SPICES. See the article **CARDIER.**

SPIDERS silk, } See the articles { **SILK.**
SPIDERS web, } **WEB.**

SPIKENARD, *nardus*, or *SPICA nardi*, a kind of vegetable shoot growing even with the ground, and sometimes, in part, within the ground; it is warm, spicy, cordial and alexipharmic; and as such is used in the composition of Venice-treacle.

The ear or *spica*, is about the length and thickness of a finger; very light, covered with long, reddish hairs, of a strong smell, and a bitterish, sharp taste. There are several of these ears from the same root. The stem is small, and the root of the thickness of a quill.

The *spica-nardi*, is usually reckoned in the number of roots.

—It is also called *nardus Indica*; because brought from the East-Indies.

It is accounted a stomachic, nephritic and carminative, proper to strengthen the stomach, and to promote the discharge of urine, and disperse flatulencies.

There is also another kind, called *spica-celtica*, growing in the Pyreneans, and the mountains of Iberia: this has much the same virtues with valerian; and is not nearly of equal esteem with the former.

SPIKING up the ordnance, a sea phrase, used for fastening a quoin with *spikes* to the deck, close to the breech of the carriages of great guns; that they may keep close and firm to the ship's sides, and not get loose when the ship rolls, and by that means endanger the breaking out of the butt-head of a plank. See **QUOIN**.

SPINA ventosa, in medicine, &c. denotes a caries or rottenness of a bone, with swellings, and other bad symptoms.

SPINAL marrow. See the article **MEDULLA spinalis**.

In the history of the royal academy of sciences, for the year 1714, we have an instance of a foetus born without either brain, cerebel, or *spinal marrow*, though perfectly well formed in other respects. It had gone its natural time; lived two hours; and even gave signs of life, upon sprinkling the baptismal water on its head.—Instances of this kind, as this is not the only one we meet withal, furnish a terrible objection against the existence of the animal spirits, which should be generated in the brain, or at least in the cerebel or *spinal marrow*; and which are generally allowed of such absolute necessity in the animal economy.

SPINAL nerves. See the article **NERVE**.

SPINALIS, in anatomy, a muscle on the side of the neck, arising from the five superior processes of the vertebrae of the thorax, and the inferior of the neck; and which in its ascent, becoming more fleshy, is inserted into the inferior part of the vertebrae of the neck, laterally. It serves to draw the neck backwards.

Medulla SPINALIS. See the article **MEDULLA**.

SPINDLE, in the sea language, is the smallest part of a ship's capstan, which is betwixt the two decks.

The *spindle* of the jeer capstan hath whelps to heave the viol. See **CAPSTAN**.

The axis of a wheel of a watch or clock, is also called the *spindle*, and its ends the *pevets*.

SPINE*, *SPINA dors*, in anatomy, the series or assemblage of vertebrae, or bones of the back, which sustain the rest of the body, and to which are connected the ribs.—See *Tab. Anat.* (Osteol.) fig. 3. lit. A A. fig. 7. lit. A A.

* It has its name *spine*, by reason the hind part thereof is edged, or *spiny*.—Some call it the *canalis sacri*.

The *spine* is usually divided into four parts; the neck, which contains seven vertebrae; the back twelve; the loins five; and the os sacrum four.

The *spine* includes a kind of medulla, much resembling that of the brain, hence called *medulla spinalis*, or *spinal marrow*. See **MEDULLA**.

SPINET, or **SPINNET**, a musical instrument, ranked in the second or third place among harmonious instruments.

It consists of a chest or belly, made of the most porous and refinous wood to be found; and a table of fir glued on slips of wood called *summers*, which bear on the sides. On the table is raised a little prominence, wherein are placed as many pins as there are strings to the instrument.

The instrument is played by two ranges of keys, the foremost range being in the order of the diatonic scale; and the other range set backwards in the order of the artificial notes or semi-tones.

The keys are so many long, flat slips of wood, which when touched and pressed down at one end, make the other rail,

a jack, which sounds the strings by means of the end of a crow's quill, wherewith it is armed. The thirty first strings are of brass, the other more delicate ones should be of steel or iron wires. They are all stretched over two bridges glued to the table.

The figure of the *spinet* is along square, or parallelogram. Some call it a *harp cauchée*, and the harp, an *inverted spinet*. The *spinet* is generally tuned by the ear; which method of the practical musicians, is founded on this supposition, that the ear is a perfect judge of an octave and fifth. The general rule, is to begin at a certain note, as *c*, taken towards the middle of the instrument, and tune all the octaves up and down, and also the fifths, reckoning seven semi-tones to each fifth, by which means the whole is tuned. Sometimes to the common or fundamental play of the *spinet*, which is the great octave, is added another similar one in unison, and a third in octave to the first; to make the harmony the fuller. They are played either separately or together; which is called the *double* or *triple spinet*. Sometimes a play of violins is added, by means of a bow, or a few wheels parallel to the keys, which press the strings, and make the sounds last as long as the musician pleases; and heighten and soften them, as they are more or less pressed. The harpsicord is a kind of *spinet*, only with another disposition of the keys. See **HARPSICORD**.

The instrument takes its name from the little quills ends, wherewith the strings are drawn, which are supposed to resemble *spinæ*, thorns.

SPINIS.—*Attachiamenta de SPINIS & bosca*. See **ATTACHIAMENTA**.

SPINNING, in commerce, the act or art of reducing flax, flax, hemp, wool, hair, or other matter into thread. *Spinning*, is either performed on the wheel, or with a distaff and spindle, or with other machines proper for the several kinds of working.—Hemp, flax, nettle-thread, and other like vegetable matters are to be wetted in *spinning*; silks, wools, &c. are spun dry, and do not need water; yet there is a way of *spinning* silk as it comes off the caterpillars, where hot, and even boiling water is to be used. See **SILK**.

SPINOSISM. See the article **SPINOZISM**.

SPINOUS *fish*. See the article **FISH**.

SPINOZISM, or **SPINOSISM**, the doctrine of *Spinoza*; or, atheism and pantheism proposed after the manner of *Spinoza*. The great principle of *Spinozism* is, that there is nothing properly and absolutely existing, but matter, and the modifications of matter; among which are even comprehended, thoughts, abstract and general ideas, comparisons, relations, combinations of relations, &c.

Benedict *Spinoza*, or *Esplinoza*, was a man well known in Holland. He was born a Jew at Amsterdam; but did not make profession of any religion, either the Jewish or Christian.—He composed several books in Latin; the most celebrated whereof, is his *Tractatus Theologico-Politicus*, wherein he overturns the foundation of all religion: the book, accordingly, was condemned by a public decree of the states; though it has since been sold publicly, and even reprinted, both in Latin and French, in that country, and lately in English at London.

Spinoza, here, insinuates, that all religions are only political engines, calculated for the public good; to render the people obedient to magistrates, and to make them practise virtue and morality.

He does not here lay down his notion of the Deity openly; but contents himself with suggesting it.—In his *Ethicks*, published among his posthumous works, he is more open and express; maintaining, that God is not, as we imagine him, an infinite, intelligent, happy and perfect Being; nor any thing, but that natural virtue, or faculty, which is diffused throughout all creatures.

Numbers have undertaken to refute *Spinoza's* doctrine; but all very weakly, except what we have in Dr. Clarke's sermons at Boyle's lecture.—Withius in Holland, Majus in Germany, and de la Mothe in England, wrote against his *Tractatus*; but Bredenbourg, according to M. Bayle, succeeded best on the subject; who, however, is said to have afterwards been a convert to *Spinozism*, and to have written a demonstration of the truth of it.—The writers against *Spinoza's* *Ethicks*, are Velthuylius in his *Tractatus de cultu naturali & origine moralitatis*; de Verle, in *L'Impie convaincu, ou dissertation contre Spinoza*; Poirer in *Fundamenta atheismi versa*; Wittichius in *Anti-Spinoza*; Lami in *Nouvel atheisme renversé*; Jaquelot in *Dissertations sur l'existence de Dieu*; Jens in *Examen Philosophicum sextæ definitionis partis primæ Ethicæ Bened. Spinozæ*. Besides many others enumerated in Colerus's life of *Spinoza*, p. 132. Jenichen's *Hist. Spinozismi Lernhesian*, p. 58. 1699. Buddeus's *Theses de Atheismo & Superstitione*, cap. 1. §. 26. and Fabricius's *Syllab. Script. de veritate religionis christianæ*, p. 357. 1699.

Spinoza, in his *Tractatus* above-mentioned, is very full on the subject of the authors of the scriptures; and endeavours to shew, that the Pentateuch is not the work of Moses; contrary to the common opinion, both of the Jews, and

Christians. He has also his particular sentiments, as to the authors of the other books.—This part of the work has been answered by M. Huert, in his *Demonstratio Evangelica*; and by M. Simon, in his *Hist. Crit. du vieux Test.* See **PENTATEUCH**.

Spinozism is a species of naturalism, or pantheism, or hylotheism, as it is sometimes called, i. e. of the dogma which allows of no other God but nature, or the universe; and, therefore, makes matter to be God.—Accordingly, Buddeus, in a dissertation *de Spinozismo ante Spinozam*, proves at large, that *Spinoza's* doctrine of God and the world, is far from being his own invention, but that it had been held by many philosophers of different sects, both among the Chaldeans and Greeks.—It is certain, the opinion of the Stoicks, and those who held an *anima mundi*, was not far from it. Lucan introduces Cato discoursing thus:

*Eisne Dei jedes nisi terra, & pontus, & air,
Et cælum, & citius? superes quid querimus ultra!
Jupiter est quædam; vides, quædamq; mereris.*

Luc. Pharf. l. 9. v. 578.

Strato likewise, and others among the Peripateticks, maintained something very like it; and what is more, though no ancient sect seems farther removed from *Spinozism* than the Platonic, as they attributed the greatest freedom to God, and carefully distinguished him from matter; yet Gundlingius has proved at large, that Plato gave matter much the same origin with *Spinoza*.—But the sect that approached nearest to *Spinozism*, was that which taught that all things were one, as Xenophanes the Colophonian, Parmenides, Melissus, and especially Zeno Eleatic, whence it obtained the name of the *Eleatic system of atheism*.—To the same may also be reduced the opinion of those, who held the first matter for God, as Almaricus and David of Dinantum. Add that the sect of Foe in China and Japan, that of the Soufi in Persia, and that of the Zindikites in Turkey, are found to philosophize much after the manner of *Spinoza*.

The chief article in *Spinoza's* system are reducible to these.—That there is but one substance in nature; and that this only substance is endued with an infinite number of attributes, among which are extension and cogitation.—I hat all the bodies in the universe are modifications of this substance considered as it is extended; and that all the souls of men are modifications of the same substance considered as cogitative.—That God is a necessary and infinitely perfect being, and is the cause of all things that exist, but is not a different being from them.—That there is but one being and one nature; and that this nature produces within itself, by an immanent act, all those which we call creatures.—And that this being is at the same time both agent and patient, efficient cause and subject; but that he produces nothing but modifications of himself.

Thus is the Deity made the sole agent as well as patient in all evil, both physical and moral, that called *malum pœne*, as well as *malum culpæ*: a doctrine fraught with more impieties than all the heathen poets have published concerning their Jupiter, Venus, Bacchus, &c.—What seems to have led *Spinoza* to frame this system, was the difficulty of conceiving, either that matter is eternal, and different from God, or that it could be produced from nothing, or that an infinite and free being could have made a world such as this is.—A matter that exists necessarily, and which nevertheless is void of activity, and subject to the power of another principle, is an object that startles our understanding; as there seems no agreement between the three conditions.—A matter created out of nothing is no less inconceivable, whatever efforts we make to form an idea of an act of the will that can change what before was nothing, into real substance. Besides its being contrary to that known maxim of philosophers, *ex nihilo nihil fit*.—In fine, that an infinitely good, holy, free Being, who could have made his creatures good, and happy, should rather chuse to have them wicked, and eternally miserable, is no less incomprehensible; and the rather, as it seems difficult to reconcile the freedom of man with the quality of a being made out of nothing.

These appear to have been the difficulties which led *Spinoza* to search for a new system, wherein God should not be distinct from matter, and wherein he should act necessarily, and to the extent of all his power, not out of himself [*ad extra*] but within himself.—But it is certain, if the new system rescue us from some difficulties, it involves in others much greater.—For,

1^o. It is impossible the universe should be but one substance; since every thing that is extended must necessarily have parts; and what has parts must be compounded. And as the parts of extension do not subsist in each other, it follows, either that extension in the general is not substance, or that every part of extension is a different substance. Now, according to *Spinoza*, extension in general is an attribute of substance. And he allows, with other philosophers, that the attributes of substance do not differ really from the substance itself. He must therefore allow, that extension in general is substance; whence it will follow, that every part of extension is a particular substance: which overturns the whole system.

If it be objected, that *Spinoza* does not consider different bodies, as different parts of extension, but as different modifications of it: the distinction between *part* and *modification*, we doubt will hardly save him. For let him avoid the word *part* as much as he please, and substitute that of *modality* or *modification* for it, the doctrine will amount to much the same: the characters of diversity are not less real and evident, when matter is divided into modifications, than when it is divided into parts. The idea of the universe will still be that of a compound being, or an aggregate of several substances.

For proof of this, it may be observed, that modalities are beings which cannot exist without the substance which modifies them; whence it follows, that the substance must be found where-ever its modalities are found; and even that the substance must be multiplied in proportion as the number of incompatible modifications is multiplied: so that where-ever there are five or six of these modifications, there must be five or six substances. It is evident, that a square figure, and a circular figure are incompatible in the same piece of wax.

Whence it follows, that the substance modified by the square figure cannot be the same substance with that modified by the round figure. So when I see a round and a square table in a room, I may safely assert, that the extension which makes the subject of the round table is a distinct substance from the extension which is the subject of the square table: since otherwise it would follow, that the square and round figures might be found in the same subject at the same time.—The subject, therefore, that is modified by two figures, must be two substances.

2^o. If it be absurd to make God extended, as this robs him of his simplicity, and makes him be composed of parts; it is still worse to reduce him to the condition of matter, the lowest of all beings, and that which most of the ancient philosophers ranked immediately above nothing: matter! the theatre of all sorts of changes, the field of battle of contrary causes, the subject of all corruptions and generations; in a word, the being of all others most incompatible with the immutability of the Deity!

The *Spinozists*, indeed, maintain, that it is not susceptible of any division; but the argument they alledge in proof of it, we have elsewhere shewn to be false: it is, that for matter to be divided, it is necessary that one of the parts be separated from the other by a void space, which is impossible: since, they say, there is no vacuum in nature. See *VACUUM*.

3^o. If *Spinozism* appear extravagant when we consider God as the subject of all the mutations, corruptions and generations in bodies; it will be found still worse, when we consider him as the subject of all the modifications of thinking. It is no small difficulty, to unite extension and thinking in the same substance; since it is not an union like that of two metals, or of water and wine, that will serve the purpose: these last require only juxtaposition; whereas to combine thinking and extension requires an identity; thinking and extended are two attributes identified with the substance; and consequently they are identified with each other, by the fundamental rule of all logic.

Again, when we say, that a man *denies this, affirms that, likes that, &c.* we make all those attributes fall on the substance of his mind, not on his thoughts, which are only accidents or modifications of it. If therefore what *Spinoza* advances be true, that men are modalities of God; it would be false to say, *Peter denies, likes, wills, &c.* since in reality, on this system, it is God that denies, wills, &c. and consequently all the denominations which arise from the thoughts, desires, &c. of men, fall properly and physically on the substance of God. From whence it also follows, that God affirms and denies, loves and hates, wills and nills the same thing, at the same time, and under the same conditions: contrary to the great principle of reasoning: *opposita sunt quæ & neq; de se inveniunt, neq; de eodem tertio secundum idem, ad idem, eodem modo atq; tempore verè affirmari possunt*; which must be false, if *Spinozism* be true: since it cannot be denied but some men love and affirm what others hate and deny, under all the conditions expressed in the rule.

4^o. But if it be physically absurd, to say the same subject is modified at the same time with all the different thoughts of all men; it is horrible when we consider it in a moral light. Since it will follow, that the infinite, the all-perfect Being is not constant, is not the same one moment, but is eternally possessed even with contrary passions; all the uniformity in him in this respect, will be, that for one good and wise thought he will have twenty foolish and wicked ones. He will not only be the efficient cause of all the errors, iniquities and impurities of men, but also the passive subject of them, the *subjectum inhectans*. He must be united with them in the closest manner that can be conceived, even by a penetrative union, or rather an identity, since the mode is not really distinct from the substance modified.

SPINSTER, in law, an addition usually given to all unmarried women, from the viscount's daughter downwards.

Yet Sir Edward Coke says, *generosa* is a good addition for a gentlewoman; and that it to a person be named *spinster*.

in any original writ, appeal or indictment, she may abate and quash the same.

Spelman says, that anciently, even queens used the distaff and spindle; whence *spinster* became a common appellation for all women.

SPIRACLE. See the article *VENT*.

SPIRAL, in geometry, a curve line, of the circular kind, which in its progress recedes from its centre; as in winding from the vertex, down to the base of a cone. See *SPIRE*. It is called from its inventor, *Archimedes's spire*, or *helix*; and is thus described.—Divide the periphery of a circle *APpA* (*Tab. Geometry, fig. 39.*) into any number of equal parts, by a continual bisection in the points *p*. Into the same number of parts divide the radius *CA*, and make *CM* equal to one part, *Cm* to two parts, &c.—Then will the points *Mm, m, &c.* be points in the *spiral*, which connected, will give the *spiral* itself.

This is more particularly called the *first spiral*, and the space included between its centre, and the point *A*, the *spiral space*.

This first *spiral* may be continued to a *second spiral*, by describing another circle with double the radius of the first; and the second may be continued to a *third*, by a third circle, &c.

Hence 1^o. *AP* is to the periphery, as *CM* to the radius. Wherefore, if the periphery be called *p*, the radius *AC = r*, *AP = x*, *PM = y*; then will *CM = r - y*; consequently as *p : r :: x : r - y*, we shall have *pr - py = rx*.

2^o. If *CM = y*; then will *rx = py*. Which equation the *spiral* has in common with the quadratrix of Dinostratus, and that of Tschirnhausen; and therefore *r² x² = p² y²* will serve for infinite *spirals* and quadratrices. See *QUADRATRIX*.

3^o. The lines *Mm, m, &c.* are to one another as the arches of the circle, intercepted between *MA* and those lines: and, when continued, making equal angles with the first and second *spirals*, are in arithmetical proportion.

4^o. Lines drawn from *M* to the second *spiral*, are to each other as the said arches, together with the whole periphery added on both sides.

Quadrature of SPIRALS, } See *QUADRATURE*.
Logistic SPIRAL, } See *LOGISTIC*.

SPIRAL, in architecture and sculpture, denotes a curve that ascends, winding about a cone or spire; so as all the points thereof continually approach the axis.

By this it is distinguished from the *helix*, which winds about the same manner, around a cylinder.—Ignorant architects confound the two: but the more knowing distinguish them carefully. See *HELIX*.

The *spiral* line may be conceived to be thus generated.—If a right line, as *AB* (*Tab. Geometry, fig. 40.*) having one end fixed at *B*, be equally moved round, so as with the other end *A*, to describe the periphery of a circle; and at the same time, a point be conceived to move forward, equally from *B* towards *A* in the right line *AB*, so as that the point describes that line, while the line generates the circle: Then will the point, with its two motions, describe the curve *B, 1, 2, 3, 4, 5, &c.* which is called a *spiral line*, and the plain space contained between the *spiral line*, and the right line *BA*, is called the *spiral space*.

Again, if the point *B* be conceived to move twice as slow as the line *AB*; so that it shall get but half way along *BA*, when that line shall have formed the circle; and if then, you imagine a new revolution to be made of the line carrying the point, so that they shall end their motion at last together; there will be formed a double *spiral line*; as in the figure: from the manner of which, may be easily drawn these corollaries.

1. That the lines *B 12, B 11, B 10, &c.* making equal angles with the first and second *spiral* (as also *B 12, B 10, B 8, &c.*) are in arithmetical proportion.

2. The lines *B 7, B 10, &c.* drawn any how to the first *spiral*, are to one another as the arches of the circle intercepted betwixt *BA*, and those lines: because whatever parts of the circumference the point *A* describes, as suppose *7*, the point *B* will also have run over *7* parts of the line *AB*.

3. Any lines drawn from *B* to the second *spiral*, as *B 13, B 22, &c.* are to each other, as the aforesaid arches, together with the whole periphery added on both sides: for at the same time that the point *A* runs over *12*, or the whole periphery, or perhaps *7* parts more, shall the point *B* have run over *12*, and *7* parts of the line *AB*, which is now supposed to be divided into *24* equal parts.

Proportional SPIRALS, are such *spiral* lines as the rhumb lines on the terrestrial globe, which, because they make equal angles with every meridian, must also make equal angles with the meridians in the stereographic projection on the plane of the equator; and therefore will be, (as Dr. Halley observes) *proportional spirals* about the polar point.—From whence he demonstrates, that the meridian line, is a scale of log-tangents of the half meridian complements of the latitudes. See *RHUMB* and *LOXODROMIC*.

SPIRAL stairs, in building. See *STAIRS*.

SPIRATION. See *EXPIRATION*, *INSPIRATION*, *PER-SPIRATION*, *RESPIRATION* and *TRANSPIRATION*.

SPIRE*, **SPIRA**, in the ancient architecture, is sometimes used for the base of a column; and sometimes for the astragal or tore.

* The word is formed from the Latin, *spire*, the folds of a serpent, which bear some resemblance thereto, or from the Greek, *σπῆρα*, the coil of a rope.

SPIRIT, **SPRITUS**, in medicine, the most subtle and volatile part, or juice of the body; by means whereof, the functions, and operations thereof are supposed to be performed.

The ancients made a four-fold division of *spirits*; into *vital*, *animal*, *natural* and *genital*: whereof, the first they placed in the heart; the second in the brain; the third in the stomach and liver; and the last in the testicles: but as this division is founded on a false hypothesis, it is now deservedly set aside.

The moderns usually divide *spirits* into *vital* and *animal*.

Vital SPIRITS, are only the finest, and most agitated parts of the blood; whereon its motion, and heat depend.

Animal SPIRITS, are an exceedingly thin, subtle, moveable fluid juice or humour separated from the blood in the cortex of the brain, and thence received into the minute fibres of the medulla, and by them discharged into the nerves, by which it is conveyed through every part of the body, to be the instrument of sensation, muscular motion, &c.

The *animal spirits*, called also *nervous spirits* and *nervous juice*, only differ from the *vital spirits*, in that these last are still mixed and blended with the grosser parts of the blood, and circulate along with it: whereas, the *animal spirits* are secreted thence by the glands whereof the cortical substance of the brain is composed; and have a motion, circulation, &c. peculiar to themselves.

Dr. Willis conceives, that the *animal spirits* are prepared by a proper distillation of the subtlest part of the arterial blood, brought by the carotides into the cortex of the brain; and shews, that the blood contained in the sinuses of the dura mater, acts in this distillation in the same manner as fire does in the chymical distillations performed by defluxion, where being placed over the matter to be distilled, it makes the subtlest parts thereof descend.

The existence of the *animal spirits* is controverted by some: but the infinite use they are of in the animal economy, and the exceedingly lame account we should have of any of the animal functions without them, will still keep the greatest part of the world on their side. And, in effect, the learned Boerhaave has gone a good way towards a demonstration of their reality.

The blood brought to the brain by the carotides, and vertebral arteries, he shews, is wonderfully prepared, secreted, elaborated and changed from its natural state, before it arrives there; inasmuch as, contrary to the nature of the rest, instead of cohering by fire, it immediately resolves wholly into a thin vapour, without leaving any faeces behind. And is thus exceedingly well fitted for the formation of so extraordinary a fluid.

He shews, further, that the *animal spirits* are not formed from the cruor, but from the serum of the blood, which Malpighi's history of the growth of the fœtus in an incubated egg, shews to be divisible into parts or corpuscles inconceivably smaller than the cruor.

He adds, that the nature of this juice is such, as that no salts or oils in the body can contribute any thing to it; and that in all appearance, it is only a most subtle, pure water; which liquor is found to resemble these *spirits* in its extraordinary miscibility, mobility, solidity, softness, simplicity and want of elasticity.

The same author shews, further, from the magnitude of the carotides and vertebrals, their straight uninterrupted course, the great quantity of blood they bring, the bulk of the cortex, &c. that there must be a very great quantity of this liquor; that there is fresh prepared every moment of life; and that it is driven, every moment, by the action of heat, &c. from the brain and cerebell, to all the parts of the body furnished with nerves; which motion, he shews from the exceeding fineness, crookedness, &c. of the ramifications, must be very gentle, equable and constant, one part continually driving before it another.

Upon the whole, it is no wonder that this fluid escapes the notice of our senses; and that no ligatures, wounds, punctures, injections or the like, make either it or the apertures of the nerves through which it flows, visible: nor does it avail, what some who allow the existence of the *animal spirits*, urge against their being any coherent juice or liquor, viz. that we should find it ooze out and wet the adjacent parts, upon cutting a nerve, as we do in cutting a lymphatic, &c. or that upon binding a nerve, the upper-part would swell; that the agitations which objects make on the filaments, would be deadened, &c. that it is impossible a liquor should have two opposite motions at the same time; and that the velocity of the sensations, and rapidity of the mo-

tions of man, prove, that the *animal spirits* are rather an aura or even light than a liquor. *Mem. de Trev.*

For the secretion of the *animal SPIRITS* from the blood, and the apparatus in order thereto, see **BRAIN** and **SECRETION**.—For the course of the *animal SPIRITS*, and the vessels through which they are carried, see **NERVE** and **CIRCULATION**.—For the office of the *animal SPIRITS* in muscular motion and sensation, see **MUSCULAR** and **SENSATION**.

SPIRIT, **SPRITUS**, in the Newtonian physics, denotes a most subtle, penetrative substance, which pervades all, even the densest bodies, and lies hid therein; and by the force and action whereof, the particles of bodies attract each other, at very small distances, and when contiguous, cohere: and by which electric bodies act at greater distances, both attracting and repelling the neighbouring corpuscles; and light is emitted, reflected, and inflected, and warms bodies; and all sensation is excited; and the members of animals moved at the influence of the will, viz. by vibrations of this *spirit*, propagated through the solid capillaments of the nerves, from the external organs of sense to the brain, and from the brain to the muscles.

SPIRIT, in chymistry, is one of the principles of natural bodies, called also *mercury*.

The chymical principle *spirit*, is a fine, subtle, volatile, penetrating, pungent liquor, which rises ordinarily before the phlegm or water, and sometimes after it.

The great properties of this liquor are, that it penetrates and opens solid bodies, corrodes, breaks, and even dissolves certain mixt bodies, coagulates others, and produces an infinity of other effects, many of them even contrary to one another.

In the general, the chymists give the denomination *spirits* to all the fine, subtle, not-aequeous particles, raised from bodies by heat, and reduced into liquors by distillation.—Such are *spirit* of vitriol, of nitre, of salt, &c.

They also apply the name *spirits*, to those aqueous liquors which are drawn by liquefaction, when they are impregnated with salts, or other active principles, raised, together with them, by the violence of the fire.

These, when they excite any sensation of heat on the tongue, are particularly called *acid*, or *sharp spirits*.

When they make any erosion on the tongue, they are called *corrosive spirits*.

Such as taste somewhat like common salt, are called *saline spirits*.

Such as partake of the taste or smell of common sulphur *sulphureous spirits*.

And when this taste is very strong, *urinous spirits*.

Such as take fire readily, *inflammable* or *ardent spirits*.

Such where the acid predominates, though qualified with a little sulphur, &c. are called *mixt spirits*.

In this sense, the chymists are said to draw a *spirit* from sulphur, salt and other bodies, when they extract the essence, or the subtlest part thereof, by distillation or otherwise.

SPIRITS, is also a general name among distillers, for all distilled liquors that are neither oil, nor phlegm.

SPIRIT of wine, is only brandy rectified once or more times, by repeated distillations.

One may even make a perfect rectification of brandy into *spirit of wine*, at one single distillation, by using a chymical instrument consisting of several cucurbites, described by Glauber, and by many other means.

Spirit of wine is used in dying, as a non-colouring drug, and though giving no colour itself, serving to prepare the stuffs to receive other colours.—Its consumption is also very considerable in several other works and manufactures; particularly the making of varnish.

Ethereal SPIRIT of wine, (called by some *vegetable ether*, or the *ether of plants*) is a denomination given, by some modern chymists, to a liquor endued with very extraordinary properties; prepared from spirit of wine, and oil of vitriol.

Dr. Probenius, who first brought it into England, describes it as the purest fire, yet at the same time as a most fluid water. Being poured on the hand, it feels cold; yet is so inflammable, that it catches fire and kindles even at a considerable distance from a candle. It is extremely light, and miscible with water, yields an aromatic smell, and is so volatile, and evaporates so fast, that it scarce seems to wet the finger dipped in it. *Phil. Transf. n. 413, p. 283. Mem. Acad. R. an. 1734, p. 56.*

Phosphorus being dissolved in this liquor, and the solution poured into a tub of warm water, a blue flame is produced, with smoke, and a small degree of warmth.

Some of this *ethereal spirit of wine*, being poured into a tub of cold water, the author tells us, is set on fire and yields a copious flame by the touch of the point of the operator's sword *.—After the deflagration, the water is found cold. *Vid. Phil. Transf. n. 428, p. 55, 58.*

* But it must be observed, that the sword is first privately warmed,

ed, and in applying it, the point is dextrously rubbed against a bit of phosphorus lodged for the purpose on the side of the tub. —What pity to see chymistry deified with such legerdemain!

SPIRIT of sulphur, is a spirit drawn from sulphur set on fire; the most subtle part whereof, is converted into a liquor, by sticking to a glass bell suspended over it, whence it falls drop by drop, into a trough, in the middle whereof is placed the stone pot wherein the sulphur is burnt.

This spirit is held good for the same diseases, as spirit of vitriol, being in reality not different from it.

SPIRIT of salt, is an acid liquor drawn, by chymistry, from sea salt.

The best, is that prepared in England. It was, at one time, much used in medicine; but has not, perhaps, all the virtues ascribed to it. The common spirit of salt, being very corrosive, may be dulcified, by letting it digest three days in a gentle sand heat, with an equal quantity of spirit of wine mixed therewith.

SPIRIT of vitriol, is a liquor prepared from vitriol dried in the sun, or in defect thereof, by the fire, and then distilled by chymical operations several times repeated; first by a reverberatory fire, and then in balneo Marie.

It is held excellent against the epilepsy, as well as against burning and malignant fevers.—The last spirit drawn from vitriol, and which is improperly called oil of vitriol, is used in the dissolution of metals and minerals.

SPIRIT of amber,

See the articles } AMBER.

SPIRIT of sal armoniac, } See the articles } ARMONIAC.

SPIRIT, is also used for any incorporeal being, or intelligence.—In which sense, God is said to be a spirit: angels are spirits; and the devil, is an evil spirit.

In this sense, the human soul is also called a spirit, from its thinking and reflecting powers, which cannot be conceived to reside in any thing material.

F. Malebranche observes, it is extremely difficult to conceive what it is, that should make the communication between the body and the spirit; for if the spirit have no material parts, it cannot move the body: but the argument must be false some how or other; for we believe that God can move bodies, and yet we do not attribute any material parts to him.

SPIRIT, in theology, is used by way of eminence, for the third Person in the holy trinity: called the Spirit, Holy Spirit, or Holy Ghost.

The Macedonians, &c. deny the divinity of the Spirit: the Socinians his existence, and the Arians his co-equality with the Father.

Divines express the manner wherein the Spirit was produced, by an active spiration or breathing of the Father and the Son; whence the denomination *spiritus*, q. d. breath.

Order of the holy SPIRIT. See HOLY GHOST.

SPIRIT, is also used among divines, for the divine power, and virtue; and the communication thereof to men.

In this sense, the Spirit is said to have gone out on the face of the deep, Gen. 1. 2. And the prophets to have been possessed with the Spirit of God.—Providence, in this sense, is that universal Spirit whereby God makes all nature to act. Thus the holy virgin is said to have conceived of the Spirit.

Private SPIRIT, is a term that made a great figure in the controversies of the two last centuries. It signifies the particular sense or notion each person has of the dogmata of faith, and the truths of religion, as suggested by his own thoughts, and the persuasion he is under with regard thereto.

The first reformers denying strenuously any infallible interpreter of the scripture, or any settled judge of controversies; maintained, that every person was to interpret and judge of revealed truths, by his own light, assisted by the grace of God; and this was what they called *private spirit* or judgment.

Against this, the arguments used by the Romanists are, that revealed truths being one and the same for all believers; the rule God has given us for judging of them, ought to represent them to us uniformly and the same; but the *private spirit* informs Luther one way, and Zuingleus another. It divides Oecolampadius, Bucer, Osiander, &c. And the doctrine it discovers to the Confessionists, is quite different from that it shews the Anabaptists and Menonites, in the very same passage of scripture.

SPIRIT, *Spiritus*, is also used in prosody, to signify the greater, or less degree of breath employed in the pronunciation of the initial Greek vowels, and of the letter *ε*.

In founding the vowels we may observe, every vowel has its found by a simple conformation of the mouth; wherein the breath has little or no concern, as being confined in the arteria aspera: The spirits or breaths, which are placed on the initial vowels in words, are to denote the force this initial vowel is to have from the breath, when the word is pronounced. If the found of this vowel be smooth, as all the founds of the vowels naturally are, this is termed *spiritus lenis*, a mild breath; but if this vowel be to be pronounced with a more vehement expulsion of the air, this is termed *spiritus asper*, or a rough breath or asperate; and when the asperate and acute are in the same syllable, the mark of the

breath in the initial vowel only signifies that the vowel is to be pronounced with a stronger breath than the initial mild vowels; for asperates do not alter the tone of any syllable, but only strengthen, increase and swell the tone.

Art of SPIRITS, } See the articles } ART.

Modes of SPIRITS, } See the articles } MODE.

SPIRITUALITIES of a bishop, are such profits as arise to him from the benefit of his jurisdiction in his diocese, and not as a baron of parliament.

Such are those of his visitations, institutions, ordinations, presentation money, &c.

Guardian of the SPIRITUALITIES. See GUARDIAN.

SPIRITUALISM *επιστημη*. See the article COSMOS.

SPIRITUALIZATION, in chymistry, the action of extracting spirits from natural bodies. See SPIRIT.

Spiritualization, is an operation that belongs principally to fermented salts; and then to fermented juices and liquors; the fermentation rendering the spirits volatile and inflammable. Spirit of wine is sometimes *spiritualized* to that degree, that upon throwing a quantity into the air, not a drop shall fall down; but the whole evaporate and be left.

SPIRITUS aceti. See the article ACETUM.

SPIRITILE. See the article SALIVA and SPUTUM.

SPITTLE, a corruption of the word hospital. See HOSPITAL.

SPLAIT shoulder; see the article SHOULDER.

SPLANCHNOLOGY*, in anatomy, a discourse on, or explication of the viscera.—See Tab. Anat. p. 3. where the object of this branch is represented.

* The word is formed from the Greek, σπλανχνη, *cisus*, intestine, and *λογος*, discourse.

Sarcology is divided into three parts, viz. *splanchnology*, *myology*, and *angiology*. Of these *splanchnology*, is that which treats of the internal parts, and particularly of the viscera.

SPLEEN, ΣΠΛΗΝ, *lien*, in anatomy, a soft, spongy, viscus, of a darkish red, or rather livid, colour, ordinarily resembling the figure of a tongue, though sometimes triangular, and sometimes roundish.—See Tab. Anat. (Splanchn.) fig. 1. lit. m.

The spleen is usually single, though sometimes there are two, and sometimes three found. It is situate in the left hypochondrium, between the spurious ribs and the stomach; it is somewhat convex on the side towards the former, and concave towards the latter. Its ordinary length is six inches; its breadth three, and its thickness one. It is connected to the omentum, and by means of that and the blood vessels, to the stomach and left kidney, and sometimes to the diaphragm.

It is covered with two tunics; the external derived from the peritonæum, and connected to the internal only by intervention of the blood vessels. The inner consists of fibres very curiously interwoven. From this, probably, are derived those innumerable cells or little bladders, which make up the main bulk of the spleen: though Malpighi rather takes them to arise from the venous duct. The cells communicate with each other, and discharge themselves into the trunk of the splenic vein. Their inside, according to Malpighi, is furnished with various minute glands adhering together; six, seven, or eight whereof form a kind of small conglomerate glands, wherein the arteries and veins seem to terminate.

Its blood vessels are the splenic artery, which furnishes it with blood, from the celiac; and the splenic vein, which carries it thence, by the porta, to the liver. See SPLENIC.

Its nerves come from the plexus lienaris, near the bottom of the stomach. The vessels are all, as soon as they enter the spleen, wrapt up in one common capsula or membrane, and plentifully distributed together throughout the substance of the spleen. Besides these, there are lymphatics in great abundance.

The anastomoses between the arteries and veins or the spleen, are more apparent than in any other part of the body. And this viscus is observed to be furnished with a greater proportion of blood than any other part.

The use of the spleen has been disputed in all ages; both, as no immediate use thereof appears from dissection, and as we find, that animals from whom it has been cut, live very well without it. All the effects, &c. following the cutting it from a dog, are, that the animal grows more sallow than usual; that it urinates more frequently; is more hungry than ordinary; and for the first days is troubled with a vomiting and nausea. It is added, that it is necessary the part be taken away to make a good runner.

Hence some have imagined that the spleen only served to make a balance in the weight of the body, others that it was only intended for the sake of humors; others hold it an useless load, and one of nature's redumances; others, a pit, or common-store, to discharge the excess of the blood into; and others a fuse, by the heat whereof, the action of the stomach is animated.

Many of the ancients took it to be the receptacle of the atrabiles, or melancholic humour; for which reason, some of them

them call it the *organ of laughter*.

Mr. Cowper, from the great quantity of blood, and the apparent inoculations of the *spleen*, draws a very natural conjecture of the use thereof; at least of the peculiar mechanism. He takes, then, the *spleen* to be only a subordinate organ, ministering to the circulation; and thinks, that by this congress of the arterial and venal blood, an impetus is communicated to the latter; by which its progress through the ramifications of the porta to the cava, is promoted, which would otherwise be so broke by the double ramifications of the porta, as almost to want strength sufficient to carry to the heart.

The action or effect of the *spleen*, according to Dr. Boerhaave, is to receive the fresh arterial blood, prepare it in its glands, and pour it into its cells; to return what blood is left from this action, to the little veins, and thence to the splenic vein; to mix the humour thus prepared, with the nervous juice, and to prepare, attenuate, and more intimately unite them together into one humour.

Malpighi, and afterwards Dr. Keil, and some others, take the *spleen* to be a viscus assistant to the liver, in the secretion, &c. of the bile. We have observed, that by reason of the nearness of the liver and heart, and the swift motion of the blood in the aorta, a humour consisting of particles that combine so slowly as those of the bile do, could not be prepared but by bringing the blood round about through the stomach, intestines and omentum, &c. to the liver, to abate its velocity.

Now Dr. Keil conjectures, that those parts were not sufficient to receive all the blood necessary to be sent to the liver; and that therefore nature framed the *spleen*, into whose cavities the blood being poured from a small artery, moves at least as slowly as any that passes otherwise to the liver; by which means the particles that compose the bile in the blood which passes through the ramus splenicus, by so long and slow a circulation, have more chances for uniting than otherwise they would, had they been carried by the branches of the coeliac directly to the liver; consequently without the *spleen*, such a quantity of bile as is now secreted, that is, as nature requires, could not have been separated by the liver.

See *Supplement, article SPLEEN*.

SPLEEN is also used for a disease, by physicians more usually called the *hypochondriac disease*.

SPLENETIC, ΣΠΛΗΝΙΚΟΣ, a person affected with opilations and obstructions of the spleen.

In *splenic* people, the spleen is swelled beyond the natural bulk, or it is hardened, so as to shew a scirrhus tumour therein.

Splenic people are distinguished by a livid, lead-coloured complexion; and their character is to be very prone to laughter; which is an expedient nature is supposed to make use of, to evacuate the too redundant humour the spleen is charged withal: whence it is that the ancients made the spleen the organ of laughter; and hence that popular saying of a person laughing heartily, that he *vents his spleen*.

SPLENETIC waters; see the article **WATER**.

SPLENETIC vessels, a large artery, and vein of the spleen.

The **SPLENETIC artery**, arteria SPLENICA, is a trunk of the left coeliac, serving to bring the blood from that artery to the spleen, to be there secreted, prepared, &c. Its progress is very much contorted; and after its arrival at the surface of the spleen, it is diffused through the substance thereof in small branches, which seem to terminate in the cells.

The **SPLENETIC vein**, vena SPLENICA, is formed out of the several minute veins of the spleen, uniting as they quit the surface thereof. It carries the blood secreted, &c. in the spleen, to the left branch of the vena porta, to be thence conveyed to the liver, there to be further prepared and converted into bile.

The *splenic vein* and *artery* manifestly communicate with each other: for water being poured into one of them, presently discharges itself by the other.

SPLENI, in anatomy, a pair of muscles, called also from their form *triangulares*.—See *Tab. Anat. (Myol.) fig. 2. ** fig. 6. n. 5. fig. 7. n. 6.

They arise from the four upper spines of the vertebrae of the back, and from the two lower of the neck, and ascending obliquely, adhere to the upper transverse processes of the vertebrae of the neck, and are inserted into the upper part of the occiput. They pull the head backward to one side, and are called *splenii*, from a supposed resemblance to an ox's spleen.

SPLINT, or **SPLINT**, among farriers, a callous, insensible excrescence, or gristle, that sometimes sticks to an horse's flank bone; generally on the inside, below the knee.

If there be one opposite thereto on the outsidie, it is called a *pegged*, or *pinned splint*, because it does as it were, pierce the bone, and is extremely dangerous; some call this a *double splint*, and others a *through splint*.

SPLINTS, in surgery, pieces of wood used in binding up broken limbs.

The word is also sometimes used for the pieces of a fractured bone.

SPLICE, at sea.—They say, a cable or rope is *spliced*, when the ends of two pieces being untwisted, the several strands are wrought into one another by a fidd.

Also, when an eye is to be made at the end of a rope, the ends of the strands, are, by a fidd, drawn into the ends of the other rope strands; and this is called a *splice*.

To **SPURCE**, among gardeners, is to graft the top of one tree into the stock of another, by cutting them sloping, and fastening them together.

SPLINT. See the article **SPLINT**.

SPODIUM, in pharmacy, a kind of absorbent calc, or ashes, esteemed drying, and by some held to have the same virtues with coral.

The *sodium* of the ancient Greeks was a greyish kind of crement, found in form of ashes on the hearths of furnaces wherein brass was made; and called by them *σπιδιον*, which literally signifies *ashes*.

Sodium is a metalline powder, nearly a-kin, both in origin and use, to tutia and pompholyx; only it is heavier than either.

The *sodium* of the Arabian physicians, as Avicenna and others, was made of the burnt roots of rushes, and reeds.

Some moderns also make a *sodium* of ivory burnt and calcined to a blackness.—This is sometimes counterfeited, by burning bullocks or dogs bones; but these are of no value.

The *anti SPODIUM*, which the ancients substituted for their *sodium*, was made of myrtle leaves, galls, and some other ingredients, calcined.

SPOILS, SPOLIA, whatever is taken from an enemy in war.

Among the Greeks, the *spoils* were divided in common among the whole army; only the general's quota was the biggest.

By the military discipline of the Romans, the *spoils* belonged to the republic; particular persons had no title to them; and such of the generals, as valued themselves on their probity, always carried them to the public treasury.—Sometimes indeed, the pillage was distributed by the general among the soldiery, to encourage them, or to reward them: but this was not done without a world of prudence and reservedness, otherwise it came under the crime of Peculate.

The consuls Romulus and Veturius, were condemned for having sold the *spoils* taken from the Æqui. Livy, lib. 8.

SPONDAULA*, ΣΠΟΝΔΑΥΛΗΣ, in antiquity, a player of the flute, or other wind instrument of that kind, who, during the offering of sacrifice, performed some suitable air in the priest's ear to prevent his hearing any thing that might distract him, or lessen his attention.

* The word is formed from the Greek *σπῶνδω, libatio, and ἀνὰ, flute*.

SPONDEE, SPONDÆUS, in the Greek and Latin prosody, a foot or verse, consisting of two long syllables.—As *ver-tunt*.

The *spondee* is a grave measure: all Greek and Latin hexameters regularly end with a *spondee*. See **VERSE**, and **MEASURE**.

There are also *spondaic verses*; that is, verses composed wholly of *spondees*, or at least that end with two *spondees*, as, *Constitit atque oculis Phrygia agmina circumspexit*.

SPONDYLUS, ΣΠΟΝΔΥΛΟΣ, a term antiently used for a vertebra of the spina dorli.

SPONGE. See the article **SPONGE**.

SPONGIOSA, in Anatomy, an epithet given to several parts of the body, by reason of their texture, which is porous and cavernous, like that of the sponge: as

Corpora SPONGIOSA penis, called also *corpora cavernosa* and *nerosa*. See **CAVERNOSA corpora**.

Ossa SPONGIOSA of the nose, called also *ossa tribunata* and *cribriformia ossa*. See **CRIBRIFORME**.

SPONTANEOUS*, SPONTANEUS, in the schools, a term applied to such motions of the body, and mind, as we perform ourselves, without any constraint.

* The word is formed from the Latin adverb, *sponte*, of one's own accord.

Thus in morality, those actions performed upon an inward and natural principle, conformable to our own inclinations, excluding all constraint, but not excluding necessity; are called *spontaneous actions*.

In medicine, an evacuation effected without any application for that purpose, is called a *spontaneous evacuation*.—And a lassitude or weariness, not occasioned by any preceding fatigue, is called a *spontaneous weariness*.

It is held a grievous and dangerous error, with regard both to religion and morality, to hold that human liberty only consists in *spontaneity*: M. le Clerc has been very harshly treated, for making St. Augustin of this opinion. See **LIBERTY**, and **FREEDOM**.

SPONTANEOUS generation. See **EQUIVOCAL generation**.

SPONTANEOUS precipitation. See **PRECIPITATION**.

SPOONING, or **SPOOMING**, in the sea language. When a ship being under fail, in a storm at sea, cannot bear it; but is forced to put right before the wind; the seamen say, the *spoons*.

And when in such a case, there is danger lest she should bring her masts by the board, with her rolling about, or feel under water, and so founder, they usually set up the fore-sail to make her go the steadier, especially if there be sea-room enough: this they call *spooping with the fore-sail*.

SPORADES, in astronomy, a name which the ancients gave to such stars as were not included in any constellation.

These the moderns more usually call *informes* or *extraconstellarij* stars.

Many of the *sporades* of the ancients have been since formed into new constellations: *e. gr.* of those between leo and ura major, Hevelius has formed a constellation, called *leo minor*; of those between ura minor and auriga, the same person has formed another constellation called *lynx*: and of those under the tail of ura major, another called *canis venaticus*, &c.

SPORADIC, ΣΠΟΡΑΔΙΚΟΣ, in medicine, an epithet given to such diseases as have some special or particular cause, and are dispersed here and there, affecting only particular constitutions, ages, &c.

* The word is formed from the Greek *σπορα*, dispersed, spread, of *σπορα*, I sow, strew, &c.

Sporadic stands in opposition to *epidemic* diseases, which are those arising from a general cause, and that are common to all kinds of persons, of what complexion and quality soever.

SPORTULA, in antiquity, a dole or largess, either of meat or money, given by princes or great men, to the people or poor.

The *sportula* was properly the panier, or basket wherein the meat was brought; or wherewith the poor went to beg it: thence the word was transferred to the meat itself; and thence to money sometimes given in lieu of it.

Sportula was also frequently used in opposition to *vestra cena*, a formal or plentiful meal; as in Martial—*promissa est nobis sportula, vestra data*.

St. Cyprian gives the denomination, *sportulantes fratres*, to such clergymen as then received gifts, or gratuities, for their maintenance.

SPOTS, in astronomy, dark places observed on the disks or faces of the sun, moon, and planets.

The *spots* in the sun are only visible through a telescope: some distinguish them into *maculae* or dark *spots*, and *faculae* or bright *spots*; but there seems but little foundation for any such division. See *MACULÆ* and *FACULÆ*.

The *solar spots* have not been long observed. They are very changeable as to number, form, &c. and are sometimes in a multitude, and sometimes none at all.

Some imagine they may become so numerous, as to hide the whole face of the sun; at least the greatest part of it; and to this ascribe what Plutarch tells us, *viz.* that in the first year of the reign of Augustus, the sun's light was so faint and obscure, that one might look steadily at it with the naked eye.

To which Kepler adds, that in 1547, the sun appeared redish, as when viewed through a thick mist; and hence conjectures, that the *spots* in the sun are a kind of dark smoke or clouds floating on the surface thereof.

Others will have them stars or planets transiting the body of the sun.—But it is much more probable they are opaque bodies in manner of cruets, formed like the scums on the surface of liquors.

The *lunar spots* are fixed. Some will have them the shadows of the mountains, or uneven places of the moon's body; but their constancy discredits this opinion.—The more general and probable opinion is, that the *spots* in the moon, are seas, lakes, morasses, &c. which absorbing part of the sun's rays, reflect the fewer to us; so as to appear in form of dark *spots*: whereas the earthy parts, by reason of their solidity, reflect all their light, and thus appear perfectly bright.—M. Hartsoeker has another opinion, and takes the *spots* in the moon, many of them at least, for forests, groves, &c. the leaves and branches whereof, intercept the rays reflected from the ground, and send them elsewhere.

The astronomers reckon about forty-eight *spots* on the moon's face; to each whereof they have given names. The twenty-first is one of the most considerable, and is called *Tycho*.

Planetary spots.—Astronomers find that the planets are not without their *spots*. Jupiter, mars, and venus, when viewed through a telescope, show several very remarkable ones; and it is by the motion of these *spots*, that we conclude the rotation of the planets round their axes, in the same manner as that of the sun is deduced from the motion of his maculae.

SPOUT, or **Water-SPOUT**, in natural history, an extraordinary meteor, or appearance at sea, and sometimes at land, very dangerous to ships, &c. oftentimes observed in hot, dry weather; and called by the Latins, *typha*, and *sipho*; by the French, *trompe*, &c.

Its first appearance is in form of a deep cloud, the upper part whereof is white, and the lower black. From the lower part of this cloud there hangs, or rather falls down, what we properly call the *spout*, in manner of a conical tube, biggest at top. Under this tube is always a great boiling and flying

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up of the water of the sea, as in a jet d'eau. For some yards above the surface of the sea, the water stands as a column or pillar; from the extremity whereof it spreads and goes off, as in a kind of smoke. Frequently, the cone descends so low, as to touch the middle of this column, and continue for some time contiguous to it; though sometimes it only points to it, at some distance, either in a perpendicular or in an oblique line. See *Tab. Nat. Hist.* fig. 20.

Frequently it is scarce distinguishable, whether the cone or the column appear the first, both appearing all of a sudden against each other. But sometimes the water boils up from the sea to a great height, without any appearance of a *spout* pointing to it, either perpendicularly or obliquely. Indeed, generally, the boiling or flying up of the water, has the priority, this always preceding its being formed into a column. Generally, the cone does not appear hollow, till towards the end; when the sea-water is violently thrown up along its middle, as smoke up a chimney. Soon after this, the *spout* or canal breaks and disappears; the boiling up of the water, and even the pillar, continuing to the last, and for some time afterwards; sometimes till the *spout* form itself again, and appear a-new; which it sometimes does several times in a quarter of an hour.

M. de la Pryme, from a near observation of two or three *spouts* in Yorkshire, described in the *Philosophical Transactions*, concludes, that the *water-spout*, is nothing but a gyration of clouds by contrary winds, meeting in a point or centre; and there, where the greatest condensation and gravitation is, falling down into a pipe or great tube, somewhat like Archimedes's spiral screw; and in its working and whirling motion, absorbing and raising the water, in the same manner as the spiral screw does; and thus destroying ships, &c.

Thus June the 21st, he observed the clouds mightily agitated above, and driven together; upon which they became very black, and were hurried round, whence proceeded a most audible whirling noise, like that ordinarily heard in a mill. Soon after, there issued a long tube or *spout*, from the center of the congregated clouds, wherein he observed a spiral motion, like that of a screw; by which the water was raised up. Again, August 15, 1687, the wind blowing at the same time out of several quarters, created a great vortex and whirling among the clouds; the centre whereof, every now and then, dropt down, in shape of a long, thin, black pipe, wherein he could distinctly behold a motion like that of a screw, continually drawing upwards, and screwing up, as it were, wherever it touched. In its progress it moved slowly over a grove of trees, which bent under it like wands in a circular motion. Proceeding, it tore off the thatch from a barn, bent a huge oak tree, broke one of its greatest branches, and threw it to a great distance. He adds, that whereas it is commonly said, the water works and rises in a column, before the tube comes to touch it; this is doubtless a mistake, owing to the fineness and transparency of the tubes, which do most certainly touch the surface of the sea, before any considerable motion can be raised therein; but which do not become opaque and visible, till after they have imbibed a considerable quantity of water.

The dissolution of *water-spouts*, he ascribes to the great quantity of water they have glutted; which by its weight impeding their motion, whereon their force, and even existence, depends, they break and let go their contents; which use to prove fatal to whatever is found underneath.

A notable instance hereof, we have in the *Philosophical Transactions*, related by Dr. Richardson. A *spout* in 1718, breaking on Emott-moor, nigh Coln, in Lancashire, the country was immediately overflowed; a brook, in a few minutes, rose six feet perpendicularly high; and the ground whereon the *spout* fell, which was sixty-six feet over, was tore up to the very rock, which was no less than seven feet deep; and a deep gulf was made for above half a mile; the earth being raised on either side in vast heaps.

In Pliny's time, the seamen used to pour vinegar into the sea, to alluage and lay the *spout*, when it approached them: our modern seamen think to keep it off, by making a noise with filing and scratching violently on the deck; or by discharging great guns to disperse it.

SPOUTING fountain. See the article **FOUNTAIN**.

SPRAIN. See the article **STRAIN**.

SPRING, *fons*, in natural history, a fountain, or source of water arising out of the ground.

The origin of *springs* or fountains, is a thing much controverted among our late naturalists.—Mell, Mariotte and Perrault ascribe it to rains: their doctrine is, that the rain-water penetrates the earth till such time as it meets a clayey soil or stratum; which proving a sufficient solid bottom, to sustain and stop their descent, they glide along it that way to which the earth declines, till they meet with a place or aperture in the surface, through which they may escape, and make the head of a river.

Now, that the rain is sufficient for this effect, appears hence; that upon calculating the quantity of rain and snow which falls yearly on the tract of ground, that is to furnish, for instance,

stance, the water of the Seine; it is found, that river does not take up above one sixth part of it.

Springs ordinarily arise at the feet of mountains: the reason, say they, is, that mountains collect the moist waters, and give them the greatest descent the same way: and that if we sometimes see springs on high grounds, and even on the tops of mountains; they must be brought from other remoter places, considerably higher, along beds of clay or clayey ground, as in their natural channels.—If then there happen to be a valley between a mountain, on whose top is a *spring*, and the mountain that is to furnish it with water, the *spring* must be looked on as water conducted from a reservoir of a certain height through a subterraneous channel, to make a jet of an equal or somewhat less height.

This theory M. de la Hire has taken under examination, in its most essential article, and that where the authors seem to have been the least distrustful.—He has endeavoured to find, by experiment, whether rain or snow water could penetrate the earth as low as the clayey stratum: the result of his enquiry, is, that they do not penetrate even sixteen inches deep, in a quantity sufficient to form the smallest collection of water on a solid bottom. Nay, this he found when the earth he made his experiment on, was quite naked of all herbs and plants; but as soon as ever any of these came up, and were grown to any bulk, so far was the rain that fell, from being able to gather itself at the depth of sixteen inches, that it was not sufficient even to feed the plants, but there was a necessity for watering them. For the quantity of water expended in the ordinary sort of plants, see *VEGETATION*.

Dr. Halley refers the origin of *springs* merely to vapours raised by the heat of the sun, or of subterraneous fires, from the sea, lakes, rivers, &c. These vapours thus raised, he supposes, are by the winds, carried over the low-lands, to the several mountains and ridges of mountains, and are there compelled, by the stream of air, to mount with it to the tops, where the atmosphere being very rare and cold, retains but a small part of them; the rest is condensed into dew, which presently precipitates, gleeting down by the crannies of the stones; and part of it entering the caverns of the hills, is gathered therein, as in a *Bason*; which being once full, the overplus must run down at the lowest part of the reservoir, and breaking out by the side of the hills, form single *springs*, many of which running down by the valleys or guts between the ridges of the hills, and at length uniting, form rivulets, and many of these meeting in a common channel form rivers.

Now to shew that vapour is a sufficient fund to supply all our *springs*, rivers, &c. the same excellent author makes an estimate of the quantity of vapour raised from the sea, by the action of the sun: the result of an experiment he made to that purpose was, that the thickness of water evaporated from the surface of the sea, in the space of two hours, in summer-time, is one fifty-third part of an inch; which for the ease of calculation, being only supposed to be $\frac{1}{50}$; the quantity of $\frac{1}{50}$ of an inch will be found exhaled in twelve hours.—On this principle, every mile square will be found to evaporate, in twelve hours, 6914 tons of water, and every square degree, thirty-three millions of tons. The area of the Mediterranean then being estimated at 160 square degrees, it will lose in vapour, in a summer's day, 5280 millions of tons.

Yet the quantity of water thus raised, great as it is, is only the remains of what is raised another way, viz. by the winds, which sometimes sweep the water off much faster than the sun takes it up.

To find now the quantity of water the Mediterranean receives, allow the most considerable rivers it receives, viz. the Iberus, Rhone, Tyber, Po, Danube, Neister, Boristhenes, Tanais, and the Nile, each to furnish ten times as much water as the Thames; not that any of them are in reality so great, but so to allow for the lesser rivulets: but the Thames is found, by calculation, to evacuate 20300000 tons of water daily. All the nine rivers abovementioned, therefore, will only evacuate 1827 millions of tons in a day, which is little more than a third of what is raised in that time in vapour.

After all that can be said in favour both of rain and vapour, it must be owned, they are both still pressed with great difficulties; and there is still room to look out for a better theory. The perpetuity of divers *springs*, always yielding the same quantity of water, when the least rain or vapour is afforded, as well as when the greatest, is a strong objection to both. Mr. Derham mentions one in his own parish of Upminster, which he could never perceive by his eye to be diminished in the greatest droughts, even when all the ponds in the country, as well as an adjoining brook, have been dry for several months together; nor ever to be increased in the most rainy seasons, excepting perhaps for a few hours, or at most for a day, from sudden and violent rains. Had this *spring* its origin from rain or vapour, there would be found an increase and decrease of its water corresponding to those of its causes; as we actually find in such temporary *springs*, and have undoubtedly their rise from rain and vapour: add to

this another considerable thing in this Upminster *spring*, and thousands of others, viz. that it breaks out of so inconsiderable a hillock or eminence, as can have no more influence in the condensation of the vapours or stopping the clouds, than the lower lands about it have. The very highest ground in the country, he finds is not above 133 yards above the level of the sea; and what is such an inconsiderable rise of land, to a perennial condensation of vapours, fit to afford so considerable a *spring*? or the high lands of the whole country, to the maintaining all its fountains and rivulets?

Other naturalists, therefore, have recourse to the sea, and derive the origin of *springs* immediately thence; but how the sea-water should be raised up to the surface of our earth, and even to the tops of the mountains, is a difficulty they cannot agree upon.

Some fancy a kind of hollow, subterranean rocks to receive the watery vapours from the bottom of the earth, and to act the part of alembics, in condensing and converting them into water.—Others, as M. de la Hire, &c. set aside the necessity of alembics, and think it enough that there be large subterranean reservoirs of water at the height of the sea, whence the warmth of the bottom of the earth, or even the central fire (if there be such a thing) may raise vapours, which pervading not only the intervals and fissures of the strata, but the bodies of the strata themselves, at length arrive near the surface; where, being condensed by the cold, they glide along on the first bed of clay they meet withal, until an aperture in the ground lets them out. M. de la Hire adds, that the salts of stones and minerals may contribute to the obtaining and fixing the vapours, and converting them into water. But we have a still more natural and easy way of exhibiting the rise of the sea water up into mountains, &c. by putting a little heap of sand, ashes, a loaf of bread, or the like, in a bason of water: in which case the sand, &c. will represent the dry land, or an island; and the bason of water, the sea, about it.—Here, the water in the bason will rise to, or near the top of the heap, in the same manner, and from the same principle, as the waters of the sea, lakes, &c. rise in the hills.—The principle of ascent in both, is, doubtless, the same with that of the ascent of liquids in capillary tubes, or between contiguous planes, or in a tube filled with ashes; all which are now generally accounted for from the doctrine of attraction.

SPRING, *Vér*, in cosmography, denotes one of the seasons of the year; commencing, in the northern parts of the world, on the day the sun enters the first degree of aries, which is about the 10th day of March, and ending when the sun leaves gemini.

Or, more strictly and generally, the *spring* begins on the day, when the distance of the sun's meridian altitude from the zenith, being on the increasing hand, is at a medium between the greatest and least.—The end of the *spring* coincides with the beginning of summer.

SPRING, *Elaster*, in physics, denotes a natural faculty, or endeavour of certain bodies to return to their first state, after having been violently put out of the same by compressing, bending them or the like.

This faculty, the philosophers usually call *elastic force*, or *elasticity*.

Fleas only jump to those excessive heights, by means of a *springy* membrane, easily visible by a microscope, and whereof we have a curious figure in Dr. Hook's Micrography. By the elastic force of this *spring*, they are enabled to cap 200 times the height of their own body. See *FLEA*.

Nature has provided for the regular sowing of the seeds of several kinds of plants, by furnishing them with a *spring*, which is wound sometimes round the outside, and sometimes round the inside of the case wherein the seeds are contained. This *spring*, when stretched to a certain pitch by the full growth and maturity of the seed, suddenly, either breaks in two, as when on the outside, and tears the case along with it; or else, by its vehement effort to unbend itself, as when in the inside, it bursts the case into two parts like cups, and disperses the seeds.

SPRING, is more particularly used in the mechanic arts for a piece of tempered steel put in several machines to give them motion, by the endeavour it makes to unbend itself.

In watches, it is a fine piece of well-beaten steel, coiled up in a cylindrical case or frame, which by stretching itself forth, puts the wheels and the whole movement in motion.

The *spring* of a lock, pistol, or the like, is a piece of steel violently bent, which beats back the bolt, or strikes down the cock, when set at liberty.

SPRING compasses. See the article *COMPASSES*.

SPRING of the air, or its elastic force. See *AIR* and *ELASTICITY*.

SPRING a mast.—So the seamen call it, when a mast is cracked, but not quite broken, in any part. See *MAST*.

SPRING-tide, is the increasing of a tide after a dead neap. See *TIDE*.

The *spring tides* happen about three days before the full or change of the moon; but the top or height of the *spring-tides*, is three days after the full or change; then the water runs

runs highest with the flood, and lowest with the ebb, and the tides run more strong and swift, than in the neaps. See NEAP.

SPRINGE, a snare or device made of twisted wire, to catch birds or small beasts.

SPRINGY, or *elastic* bodies, are such, as having had their figure changed by the stroke or percussion of another body, can recover again their former figure; which bodies, that are not elastic, will not do.

Thus if a piece of steel be bent any way, it will recover again its former straightness; but a piece of lead will stand bent in any form.

SPUNGE, or **SPONGE**, **SPONGIA**, a kind of marine plant, found adhering to rocks, shells, &c. under cover of the sea water, or on the sides of the rocks about the shore.

The ancients distinguished two kinds, *male* and *female*: but the moderns make only one kind; which, however, they distinguish with regard to its texture, into *coarse* and *fine*.

Naturalists have been embarrassed in all ages, whether to range *sponge* in the animal, mineral or vegetable family? Some would have it a concretion formed of the sea-mud; and others an animal, at least a zoophyte from its motion of contraction and dilatation, but it is now allowed to be a real plant.

The greatest part of our *sponges* are brought from the Mediterranean, especially from Nicaria, an island thereof, near the coast of Asia.

The diving or fishing for *sponges* is there reckoned the top qualification in the youth, who all get the better wives as they excel the more herein. To this proof, the men refer the preference among several suitors; placing themselves on the brink of the sea, to be witnesses of the address of each; and giving themselves as a prize to the conqueror.

The fine or small *sponges* however are the most esteemed; and usually come to us from Constantinople. Their goodness consists in their being very white and light, and the holes small and close; the larger and coarser come from the coasts of Barbary, particularly about Tunis and Algier.

The *sponge* is a very useful matter in the arts. In physic it serves to foment parts inflamed. By analysis, it yields a deal of volatile, sharp salts, like other sea-plants. Taken inwardly it chokes; and is for that reason cut small, and fried or dipped in honey, and given to quadrupeds to kill them, which it seldom fails to do, by swelling and preventing the passage of the food into the intestines.

In *sponges* are found a kind of fishes called *cystilithi*, held good for the worms in young children, and to this purpose given in powder.

Pyrotechnical SPONGES, are made of the large mushrooms or fungous excrescences growing on old oaks, alders, firs, &c. which being boiled in common water, then dried and well beaten, are put in a strong ley, prepared with salt-petre, and again dried in an oven.

These make the black match or tinder brought from Germany, used to receive and sustain the fire struck from a flint and steel, &c.

SPUNGES, is also used in gunnery, for a long staff or rammer, with a piece of sheep or lamb-skin wound about its end, to serve for scouring great guns when discharged, before they be charged with fresh powder.

SPUNGING, in gunnery, the clearing a gun's inside with an instrument called a sponge, in order to prevent any sparks of fire from remaining in her, which would endanger the life of him who should load her again. See CANNON.

SPUN-YARN, among sailors, the yarn of untwisted ropes, whose ends are seraped and beaten thin, in order to be let into the ends of other ropes, and so made as occasion shall require.

SPUR*, was anciently a piece of the armour of a cavalier, fastened to the talar, that is, the hind part of that piece of a complete armour, which covers the legs and feet.

* The word is derived from the German, *spohr*, or rather the Saxon *spara*, or Danish *spor*, which all signify the same.

At present, the *spur* is a piece of iron, or other metal, consisting of two branches encompassing the horseman's heel, and a rowel in form of a star, advancing out behind, to prick the horse.

Louis le Debonnaire forbid ecclesiastics the profane fashion of wearing *spurs*.—Anciently the difference between the knight and esquire was, that the knight wore gilt *spurs*, whence the appellation of *eques auratus*, and the esquire silvered ones.

SPURIOUS diseases, are such as in some symptoms cannot be brought under any distinct head, and therefore are called by the name of others, with which they most agree.—Whereas, also, they are often denominated *bastards*, *nati*.

Such are a *spurious* or bastard pleurisy, a *spurious* peripneumony, a bastard quinsy, a *spurious* peripneumony, &c. See PLEURISY, PERIPNEUMONY, &c.

SPURIOUS fish, is an appellation by some given to the fish of the lips, gums, and that of the glands, &c.

SPURIOUS medals,

SPURIOUS ribs,

SPURIOUS sutures,

MEDALS.

RIBS.

SUTURE.

SPUR-WAY, a horse-way through a man's grounds, through which one may ride, by right or custom.

SPUTUM, in medicine, &c. the spittle or excrement voided at the mouth.

An examen of the *sputum*, is of great consequence in phthical cases, and Bennet in his *Quattrum tabidum*, applies himself in a particular manner thereto.—The *sputum sanguinis*, is a very dangerous symptom in that disease.

SPY, a person paid to watch the actions, motions, &c. of another; particularly as to what passes in an army.

When a *spy* is discovered in a camp, he is immediately hanged.—Wictefort says, an embassador is an honourable *spy*, under protection of the law of nations.

SQUADRON*, a body of horse, whose number of men is not fixed, but is usually from one hundred to two hundred.

* The word is formed from the Italian *squadroni*, of the Latin *squadra*, used by corruption for *quadrato*: in regard, at first, the *squadroni* were always square, and could also be the Latin, *quadrata*.

The *squadron* usually consists of three troops; and each troop of fifty men: it never exceeds two hundred, because a greater number cannot be advantageously posted, nor have room to act in narrow grounds, woods, marshes, &c.

The eldest troop takes the right of the *squadron*, and the second the left, the youngest being in the centre.

A *squadron* is always drawn up three deep, or in three ranks; with the length of an horse between each rank.—The standard is always bore in the centre of the first rank.

SQUADRON of ships, a division, or part of a fleet, commanded by a vice or rear admiral, or some other commander or commodore.

The number of ships in a *squadron* is not fixed: a small number of vessels, if they lie in a body, and have the same commander, may make a *squadron*.

If there be a great number, they are usually divided into three *squadrons*. And if the *squadrons* be numerous, each *squadron* is divided into three divisions, distinguished by their flags and colours.

SQUAMMOUS, **SQUAMMOSUS**, in anatomy, an epithet given to the *spinous* or *false* latæes of the skull; because composed of *squammæ*, or scales, like those of fishes, or like tiles laid so as to reach over one another.

The *suturæ frontales*, are also called *medullæ*, and *temporales* from their terminating the temples, or ossa temporis.

SQUARE, *Quadratum*, in geometry, a quadrilateral figure, both equilateral and equiangular.

To find the area of a **SQUARE**: seek the length of one side; multiply this by itself; the product is the area of the square. Thus, if the length of a side be 345, the area will be 119225: and if the side of a square be 10, the area will be 100.

Since, then, a decempeda contains 10 feet, a foot 10 digits, &c. a square decempeda contains 100 square feet, a square foot 100 square digits, &c.

The Properties of a **SQUARE**, are, that its angles are all right, and, consequently, its sides perpendicular; that it is divided into two equal parts, by a diagonal; that the diagonal of a square is incommensurable to the side.

For the ratio of **SQUARES**: they are to each other in the duplicate ratio of their sides.—E. gr. a square whose side is double another, is quadruple of that other square.

SQUARE of the cube, } See the article } POWER.

SQUARE of the square, } See the article } POWER.

SQUARE number, the product of a number multiplied by itself.

Thus 4, the product of 2 multiplied by 2; or 16 the product of 4 multiplied by 4, are square numbers.

Such number is called a *square number*, because it may be ranged into the form of a square, by making the root, or factor the side of the square.

The difference of two square numbers, whose roots are not unity, is an uneven number, equal to double the root of the less, increased by unity.

Hence we have an easy method of constructing square numbers for a number of roots proceeding in the natural series; the double of the root of the antecedent increased by unity, being continually to be added to the preceding square.

Thus, if $n=1$; $2n+1=3$; if $n=2$; then will $2n+1=5$; if $n=3$; then will $2n+1=7$; if $n=4$; then will $2n+1=9$, &c. Thus, by a continual addition of the uneven numbers, arise the square numbers.

SQUARE root, a number considered as the root of a second power or square number; or a number by whose multiplication into itself, a square number is generated. See ROOT.

Thus the number 2, being that by whose multiplication into itself, the square number 4 is produced; is, in respect hereof, called a *square root*, or the *square root* of 4.

Since, as unity is to the *square* root, so is the root to the *square* number; the root is a mean proportional between unity and the *square* number.

A *square* root consisting of two parts, is called a *binomial*; as $20+4$.

If it consists of three, a *trinomial*, as $6+2+1$.

Now, every *square* number of a *binomial* root, is demonstrated to be compounded of the *square* of the first part, the product of double the first into the second, and of the *square* of the other part.

To extract the *SQUARE* root out of any given number; see EXTRACTING of roots.

SQUARE, *norma*, is also an instrument made of wood or metal, serving to describe and measure right angles withal; such is *LEM*, (*Tab. Geom. fig. 42.*)

It consists of two rules or branches fastened perpendicularly at one of their extremes.—When the two branches are moveable on a joint, it is called a *bevel*.

To examine whether or no a *square* be exact, describe a semicircle *AEF*, of any length, at pleasure; and therein, from each extreme of the diameter *A* and *F*, draw right lines to a point taken at pleasure in the periphery, as *E*: to the sides of the angle *AEF*, apply the *square*, so as its vertex may fall on *F*. If this be possible, that *square* is just.

Geometrical SQUARE, a compartment frequently added on the face of the quadrant, called also *line of shadows*, and *quadrat*. See *QUADRAT*.

Magic SQUARES. See *MAGIC square*.

SQUARE battle, or *battalion* of men, is one that hath an equal number of men in rank and file.

To form any number of men into a *square* battle, as suppose 500, extract the nearest *square* root of 500, which is in integers 22, and that will give the number of men for rank and file.—There will be a remainder of 16 men, who may be disposed of, as the commander thinks best.

Hollow SQUARE, in the military art, is a body of foot drawn up with an empty space in the middle, for the colours, drums and baggage; faced and covered by the pikes every way to keep off the horse.

<i>SQUARE</i> cap,	} See	<i>CAP.</i>
<i>SQUARE</i> character,		<i>HEBREW.</i>
<i>SQUARE</i> foot,		<i>FOOT.</i>
<i>SQUARE</i> nails,		<i>NAIL.</i>
<i>SQUARE</i> niche,		<i>NICHE.</i>
<i>SQUARE</i> pedestal,	} See	<i>PEDESTAL.</i>
<i>SQUARE</i> pillar,		<i>PILLAR.</i>
<i>SQUARE</i> roof,		<i>ROOF.</i>
<i>SQUARE</i> winding stairs,		<i>STAIRS.</i>
<i>SQUARING</i> ,		<i>QUADRATURE.</i>
<i>SQUIF</i> ,	} See	<i>SKIFF.</i>
<i>Wine of SQUILLS</i> ,		<i>SCILLÆ.</i>
<i>SQUILLÆ</i> ,		<i>WINE.</i>
<i>SQUILLITIC</i> ,	} See	<i>SCILLITIC.</i>
<i>SQUINANCY</i> , or <i>esquinancy</i> ,		<i>QUINZY.</i>
<i>SQUINTING</i> ,		<i>STRABISMUS.</i>

ST, an indeclinable term, chiefly used to command silence.

The Romans had these two characters wrote over the doors of their eating rooms, as who should say, *sed tace*, or *silentium tene*.

Porphyry observes, the ancients made a point of religion of it, not to speak a single word in passing in or out of the doors.

STABLESTAND, in the forest law, is when a person is found at his stand in the forest, with a cross-bow, or long-bow, ready to shoot at a deer, or else standing close by a tree with greyhounds ready to slip.

This is one of the four evidences, or presumptions, by which a man is convicted of intending to steal the king's deer; the other three being back-berond, bloody-hand, and dog-draw. See *FOREST*.

STACK of wood, among husbandmen, is a pile of wood three foot long, as many broad, and twelve foot high.

STACTE, *STAKTH* in pharmacy, a fatty refinous liquid matter, of the nature of a liquid myrrh.

This liquor is very odoriferous, and is held mighty precious; making, alone, the perfume, called by Dioscorides, *stacte*, which, he says, smells finely, though very bitter to the taste. We have none of it now, but what is sophisticated; and what the apothecaries call *stacte*, is usually no more than liquid storax. See *Supplement, article STACTE*.

STADIUM *, *STADION*, an ancient Greek long measure, containing 125 geometrical paces, or 625 Roman feet; corresponding to our furlong.

* The word is formed from the Greek, *stasis*, station; and it is said, on this occasion, that Hercules, after running so far at one breath, stood still.—The Greeks measured all their distances by *stadia*, which they call *stadia*.

Eight *stadia* make a geometrical or Italian mile; and 20, according to M. Dacier, a French league: but according to others, 24 make the league.

Guillette observes, that the *stadium* was only 600 Athenian feet, which amount to 625 Roman, 566 French royal feet,

or 604 English feet: so that the *stadium* should only have been 113 geometrical paces.—It must be observed however, that the *stadium* was different in different times, and places.

STADIUM was also the course or career, wherein the Greeks run their races.

Vitruvius describes it as an open space 125 paces long, terminated at the two extremes with two posts, called *carcer* and *meta*.

Along it was built a kind of amphitheatre, where the spectators were placed to see the athletes exercise running, wrestling, &c.

There were *stadia* likewise, covered over, and encompassed with colonnades and porticoes, serving for the same exercises in ill weather.—Captives children used to run the *stadium*. Ablanc. See *GYMNASTIC*.

A more natural derivation of the word *stadium*, from *stasis*, station, than that popular one mentioned in the last article, may be drawn from the athlete stopping and resting, when at the end of this course: whence the name might be applied to the same distance, measured in any other place.

STADTHOLDER *, *STADTHOULDER*, or *STATHOLDER*, a governor, or lieutenant of a province, in the United Netherlands; particularly that of Holland: where the word is most used, by reason of the superior importance of the government of that province.

* Menage derives the word from *stade*, state; and *bouids*, holding, *q. d.* lieutenant of the states: others will have it compounded of *stad*, or *stade*, stead, or place, and *bouder*, holding, in regard this officer held the place of the counts, and represented them in their absence.

The *stadtholder*, i. e. the *stadtholder* of Holland, is the first member of the republic: he is chief of all the courts of justice; and may preside therein when he pleases. All sentences, judgments, &c. are dispatched in his name.—When an office becomes vacant in any of the courts, the states propose three persons to the *stadtholder*, who is to chuse one of them.

He can even pardon criminals, which is a sovereign prerogative; and he has the choice of scabines, or chief magistrates in each city; to which end the council of the city always present him two persons, one of which he appoints.

In several cities, he has the same right of nominating the burgo-masters, and counsellors; as at Rotterdam, Dort, &c. He has also a power to cashier the magistrates, and put others in their room, when he finds it necessary for the public good; upon giving a reason for the same.

By article VI. of the union of Utrecht, the states constitute him arbiter of all the differences that may arise between the states of the several provinces; or between the cities and the members of the states of the province.

To the dignity of *stadtholder*, is inseparably annexed, that of captain, and admiral-general of the province; in which quality, he names all the officers, and disposes of all military posts.—It is he takes care of the execution of the ordinances of the states; and his authority gives him a right to receive and give audience to ambassadors from foreign princes, and even to send ambassadors on his own private affairs.

The office of *stadtholder* is very ancient: the counts not being able to reside in Holland, appointed *stadtholders* to command in their absence, in the several provinces; besides a governor general of all the seventeen provinces of the Netherlands.

William I. prince of Orange, was *stadtholder* of Holland and Zealand, at the time when the Dutch shook off the Spanish yoke; which enabled him to contribute greatly to that happy event.

In 1567, the states thought fit to suppress the office of *stadtholder*, by edict; and resolved it should never be conferred on any person for the future: but in 1672, William III. prince of Orange, afterwards king of England, being elected captain and admiral-general by the states; some months afterwards they revoked the edict of suppression in favour of that prince, who was declared *hereditary stadtholder*; an honour never conferred before.

STAFF, *baculus*, an instrument ordinarily used to rest on, in walking.—Card. Bona observes, in his treatise of liturgies, that anciently, those who used a *staff* in the church to lean on, were obliged to lay it by, and to stand alone, firm and upright, while the gospel was a reading; to testify their respect, by their posture, and to shew they were ready to obey Jesus Christ, and to go wheresoever he should command them.

The *staff* is also frequently used as a kind of natural weapon, both of offence and defence.—The Lacedæmonians never wore any swords in time of peace; but contented themselves with a thick, crooked *staff*, which was peculiar to them.

Among the Romans, M. St. Evremont observes, blows with a *staff* were the gentlest correction they gave their slaves; inasmuch as they received them over their cloaths.

Among the masters of honour and arms, it is held a greater affront to be beaten with a *staff*, than with a sword; because the sword is the instrument of war, the *staff* the instrument of outrage.

Blows with a *staff* are very severely punished by the French laws: by a regulation of the marshals of France, in 1653, for reparations and satisfactions of honour, it is adjudged, that a person who shall strike another with a *staff*, shall be imprisoned a whole year; unless six months be moderated, upon paying 3000 livres, applicable to the nearest hospital; beside which, the offender is to ask pardon of the offended on his knees, &c. ready to receive from him a like number of blows with a *staff*; which, on some occasions, the latter may be obliged to give; if he have too much generosity to do it of himself.

By another regulation of the marshals in 1679, he who strikes with a *staff*; after receiving blows with the fist in the heat of a fray, is condemned to two years imprisonment; and to four, if he struck first with the fist.

Almacantar STAFF,	} See	ALMACANTAR.
Augural STAFF,		LITUUS.
Back STAFF,		BACK STAFF.
Passoral STAFF,		CROSIER.
Whip STAFF,		WHIP.
Cross STAFF,		CROSS STAFF.
Fore STAFF,		FORE STAFF.
Jacob's STAFF,		RADIUS ASTRONOMICUS.

STAFF, in music, five lines, on which, with the intermediate spaces, the notes of any sort or piece of music are marked. Guido Arctin, the great improver of the modern musick, is said to be the first who introduced the *staff*; marking his notes, by setting points (•) up and down them, to denote the rise and fall of the voice; and each line and space he marked at the beginning of the *staff*, with Gregory's seven letters, a, b, c, d, e, f, g.

But others will have the artifice of an older date; and Kircher particularly affirms, that in the Jesuits library at Messina, he found an old Greek M.S. book of hymns, above seven hundred years old; wherein some hymns were written on a *staff* of eight lines, marked at the beginning with eight Greek letters. The notes or points were on the lines, but no use was made of the spaces.

STAFF, in heraldry. See the article BATTOON.

STAFF, in surveying, a kind of stand, whereon to mount a theodolite, circumferentor, plain table, or the like, for use. It consists of three legs of wood, joined together at one end, whereon the instrument is placed; and made peaked at the other, to enter the ground.—Its upper end is usually fitted with a ball and socket. See BALL and SOCKET.

Field STAFF,	} See	FIELD.
Quarter STAFF,		QUARTER.
STAFF officers,		OFFICER.
Ward STAFF,		WARD.

STAGE, in the modern drama, the place of action and representation; included between the pit, and the scenes.

The *stage* answers to the proscenium or pulpitum of the ancient theatre.

Laws of the STAGE, are the rules and decorums to be observed, with regard to the economy and conduct of a dramatic performance to be exhibited on the *stage*.—These relate, principally, to the unities, the disposition of the acts and scenes, the unravelling, &c.

STAGGERS, or STAVERS, in the manage. See STAVERS.

STAIRCASE, an ascent inclosed between walls, or a ballustrade, consisting of *stairs* or steps, with landing places and rails; serving to make a communication between the several stories of a house.

The construction of a complete *staircase*, is one of the most curious works in architecture. The common rules to be observed therein are as follow,

1^o. That it have a full free light, to prevent accidents of slipping, falling, &c.

2^o. That the space over head be large and airy, which the Italians call *un bel spicato*, good ventilation, in regard a man spend much breath in mounting.

3^o. That the half paces, or landing places, be conveniently distributed for repaling in the way.

4^o. That to prevent rencounters, &c. the *staircase* be not too narrow; but this last is to be regulated by the quality of the building.

5^o. That care be taken in placing the *staircase*, so as the stairs may be distributed, without prejudice to the rest of the building.

The kinds of *staircases* are various: in some, the stairs are *straight*, in others *winding*; in others both ways, or *mixt*. Again, of *straight stairs*, called also *fliers*, some fly directly forwards; others are square; others triangular; and others are called *French flights*.

Of *winding stairs*, called also *spiral*, or *cockle stairs*, some are square, some circular, and some elliptical.—And these again, are various; some winding round a solid, and others round an open newel.

Lastly, of *mixed stairs*, some are called *dog legs*; others both wind about a solid newel, and fly about a square open newel.

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Straight STAIRS, are such as always fly, that is, proceed in a right line; and never wind: whence their denomination.

—Of these there are several kinds, as,

Direct fliers, or *plain fliers*, which pass directly from one floor to another, without turning either to the right or left; these are seldom used, except for garret or cellar stairs.

Square fliers, which fly round the sides of a square newel, either solid or open; having at every corner of the newel, a square half step, taking up; or a circle. So that they fly from one half step to another, and the length of the *stairs* is perpendicular to the side of the newel.

Triangular fliers, which fly round by the side of a triangular newel, either solid or open, having at each corner of the newel a trapezoid half step, taking up; or a circle: so that they fly from one half step to another; and their length is perpendicular to the side of the newel.

French fliers, which fly, first directly forwards, till they come within the length of a *stair* of the wall; and then have a square half pace, from which you immediately ascend to another half pace, from which the *stairs* fly directly back again, parallel to their first flight.

Winding STAIRS, are such as always wind, and never fly; of these there is great variety; as,

Circular winding STAIRS, whereof there are four kinds, viz. such as wind about a solid newel, the fore edge of each being in a right line, pointing to the centre of the newel; commonly used in church steeples, and great old houses: such as wind round an open newel, the fore side of each being in a right line, pointing to the centre of the newel; as those in the Monument, London: such as wind round a solid newel, only the fore side of each, an arch of a circle, either concave or convex, pointing near to the circumference of the newel: and such as resemble the last, in all other respects, save that they have an open newel.—Any of these *winding stairs* take up less room than other kinds.

In *stairs* that wind round a solid newel, architects make the diameter of the newel either 6, 8, 10, or 12: or that of the *staircase*, according as that is in figures.—If very small, the newel is but 6, and if large, 12.

In *stairs* that wind round an open newel, Palladio orders the newel to be 1/2 the diameter of the *staircase*; though there does not appear any reason why the newel here should not be proportioned to the *staircase*, as in the former.

As to the number of *stairs* in each revolution; Palladio orders, that in a *staircase* of 6 or 7 foot diameter, the *stairs* in each revolution be 12; if the diameter be 8, the *stairs* to be 16; if 9 or 10, the *stairs* to be 20; and if 13, to be 24.

Elliptical winding STAIRS, whereof there are two kinds: the one winding round a solid, the other round an open newel, they are much of the same nature as circular stairs, excepting, that in the one, the newel is a circle, and in the other an ellipse.

Square winding STAIRS, are such as wind round a square newel, either solid or open; the fore side of each square being in a right line, pointing to the center of the newel.

Triangular winding STAIRS, are such as wind round a triangular newel; the fore side of each being a right line, pointing to the centre of the newel.

Columniated winding STAIRS: Palladio mentions a *staircase* in Pompey's portico at Rome, set on columns, so, as that the light they receive from above may distribute itself to all parts alike.

Double winding STAIRS: Scamozzi mentions a *staircase* in this form, made by Picaro del Bergo, and Jean Culin, at Seimburg in France, in the king's palace.—It is so contrived, as that two persons, the one ascending, and the other descending, shall never meet.

Dr. Grew describes a model of this kind of *staircase*, kept in the museum of the Royal Society. The foot of one of the *staircases*, he says, is opposite to that of the other, and both make a parallel ascent, and within the same cylinder. The newel in the middle is hollow, and built with long apertures, to convey light from candles placed at the bottom, and on the sides of the newel, into both cases.

Quadruple winding STAIRS: Palladio mentions a *staircase* of this form, in the castle of Chambor near Bloys. It consists of four *staircases*, carried up together, having each its several entrance, and going up one over another, in such manner, as that being in the middle of the building, the four serve to lead to four apartments: so that the people of the one need not go up and down the *stairs* of the other; yet being open in the middle, they all see each other pass.

Mixt STAIRS, are such as partly fly, and partly wind; whence some call them *fliers* and *winders*.—Of these there are several kinds, as,

Dog-legged STAIRS, which first fly directly forwards, then wind a semi circle, and then fly directly backwards, parallel to that.

Square fliers and winders, have a square newel, either solid or open, and fly by the sides of the newel, winding a quadrant of a circle at each corner.

Solid and open newelled flyers and winders, are of two kinds; the one winds a quadrant of a circle about a solid newel, then flies by the side of a square open newel; then winds again, by the side of a solid newel, then flies again, and so alternately.—The other flies first, then winds, and then flies again, alternately.

STAIRS, in building, the steps whereby we ascend and descend, from one story of a house to another.

The dimensions of *stairs* are differently assigned by different authors: in this however they agree, that they must not be more than six, nor less than four inches high; nor more than eighteen, nor less than twelve inches broad; nor more than sixteen, nor less than six foot long, each *stair*.—But these measures have only regard to fine buildings; ordinary houses are excepted: yet even in these, the *stairs* are not to exceed eight inches in height; nor be less than nine inches in breadth; nor three feet in length.

To reduce the dimensions of *stairs* to some natural, or at least geometrical standard, Vitruvius borrows the proportions of the sides of a rectangle triangle, which the ancient school expressed by the numbers 3, 4, and 5. The first for the perpendicular height; the second for the horizontal breadth; and the third for the whole slope or inclination, from the edge of one *stair* to that of another.

But this rule is set aside, and with good reason, by the modern builders. For, on this principle, the lower the *stairs*, the narrower they must be; and *stairs*, for instance, four inches high (such as we find mentioned in ancient architects) must be but $5\frac{1}{4}$ inches broad.

One rule to be regarded in the making of *stairs*, is, that they be laid according to the Italian phrase, *con un tantino da scarpa*, i. e. somewhat sloping, or a little highest behind, that the foot may, as it were, both ascend and descend at once; which, though observed by few, is found a secret and delicate deception of the pains in mounting.

STALACTITES, or **STAGONITES**, in natural history, a sparry sort of icicles, which often hang down from the tops or arches of grotto's, and subterranean caverns; and from the roofs of buildings, and capitals of pillars of such places as are built over hot springs, &c.

Of this kind are the *vitruvian stalacticum*; the *minera ferri stalactica*, and the common dropstones of spar.

The *stalactites* which incrustate, or line the tops and sides of caves, &c. are often manifestly formed of sparry particles, raised in vapour, and condensed on the stones they hang from. Those in the cave on the top of Bredon hill, Mr. Denham fancies, might be formed by the rain's soaking through, and carrying with it impregnations from the stones; the hill, there, being all rocky.

STALE, the urine of cattle. See URINE.

STALE also denotes a living fowl, put in any place to allure and bring others where they may be taken. See DECOY.

For want of these, a bird, shot, his entrails taken out, and dried in an oven, in his feathers, with a stick thrust through to keep it in a convenient posture, may serve as well as a live one.

STALK, in botany, the stem, or stock of a plant.

Stalks are distinguished into several kinds, viz. the *naked stalk*, which has no leaves on it.—*Crested stalk*, which has furrows, or ridges.—*Winged stalk*, which has foliated appendages on both sides.—*Striped stalk*, which is of two or more colours, &c.

Fruticose STALK. See the article FRUTICOSE.

STALKING, a term of considerable import in fowling; applied to a kind of screen, or device to hide the fowler, and amuse the game, while he gets within shot.

Of such devices there are several kinds, viz.

1. *STALKING hedge*, which is an artificial hedge, two or three yards long, and a yard and half high, made with small wands, to be light and portable, yet bushed out like a real hedge, with stakes to support it, while the fowler takes his aim.

STALKING horse, is an old horse trained up for the purpose, which will gently walk up and down as you would have him, in water, &c. beneath whose fore-shoulder, the sportsman shelters himself and gun. When thus got within shot, he takes aim from before the fore-part of the horse; which is much better than shooting under his belly.

To supply the defect of a real *stalking horse*, an artificial one is frequently made, of old canvas, shaped in form of a horse, with his head bent down, as if grazing; stuffed with any light matter, and painted.—In the middle it is fixed to a staff shod at the foot, to stick into the ground while aim is taken.—For change, when the fowls begin to be used to the *stalking horse*, and to know it, some *stalk* with an ox, cow, deer or the like.

Others use a *stalking-tree*, and others a *stalking-bush*.

STAMINA*, in botany, those fine threads, or capillaries growing up within the flowers of tulips, lilies and most other plants, around the style or pistil.

* The word is Latin, and literally signifies threads.

On the tops of the *stamina*, or chives, grow those little capsule or knobs, called *apices*, which M. Tournesot makes

essential to the *stamina*; whence M. Reaumur, who assures us in the memoirs of the French academy, that he could never discover any apices on the threads of the fucus marinus, refuses to call them *stamina*; though he adds, one may not improperly suppose that the apices fall as soon as the threads or *stamina* begin to be unfolded.

In some tubular flowers, as the narcissus, digitalis, &c. M. Geoffroy observes the *stamina* are exceedingly short; and in some flowers there are no *stamina* at all, as in the long aristolochia, wherein the apices are immediately fastened on the capsule which incloses the fruit. In some other flowers, as those of thistles, lettuce, chicory, &c. the apices are inclosed in the *stamina*; several of which uniting form a little tube in manner of a scabbard, in the inside whereof are the apices furnished with their farina; the rest of the cavity being taken up by the pistil; which is a little thread placed on the embryo of the seed.

M. Tournesot takes the use of the *stamina* to be, as it were, so many excretory canals, for discharging the growing embryo of its redundant juices; and of these excretments of the fruit, he takes that farina or dust, found in the apices, to be formed.

But M. Geoffroy, Mr. Bradley, and other late writers on plants, as well as some former, assign the *stamina* a nobler use. These authors, explaining the generation of plants, in a manner analogous to that of animals, maintain the use of the *stamina* to be to secrete, in their fine capillary canals, a juice, which being collected, hardened and formed into a farina or dust in the tips or apices, is thence, when the plant arrives at maturity, discharged, by the bursting of the apices, upon the top of the pistil; whence is a passage for it to descend into the uterus, where being received, it impregnates and fecundifies the plant.

On this principle, it may be said, that the same flower contains both sexes, which contribute each their part to the generation: that the *stamina* are the male part; and the farina, which is always found of an oily, glutinous nature, the seminal liquor; and that the pistil is the female part, which conducts the semen to the ova or embryo's.

STAMINA, in the animal body, are those simple, original parts, which existed first in the embryo, or even in the seed; and by whose distinction, augmentation, and accretion by additional juices, the human body, at its utmost bulk is supposed to be formed.

All that is essential to the animal, are the *stamina*, which exist in *ovo*; the rest being foreign, additional and even accidental.

The *stamina* seem to coincide with the solids, which are surprisingly small in quantity.

STAMINEOUS flowers, among botanists, are such as are so far imperfect, as to want those coloured leaves, which we call *petals*; and which only consist of a cup, and a pistil surrounded by *stamina*.

Such plants as bear *stamineous* flowers, Mr. Ray makes to constitute a large genus which he calls *herbæ flore imperfectæ, sive apetalæ, staminævæ*.—And these he divides into such as,

1. Have their fruit or seed totally divided from the flower; which are such plants as are said to be of different sexes; the reason of which is, that from the same seed, some plants shall arise with flowers, and no fruit; and others, with fruit, and no flowers: such are hops, hemp, some stinging nettles, spinach, mercurialis and phyllon.

2. Such as have their fruit only a little disjoined from their flowers; as the ambrosia, bardana minor, ricinus, and the heliotropium tricocon.

3. Such as have their fruit immediately contiguous, or adhering to their flower: and the seed of these is either: 1. Triangular; of which sort, some are lucid and shining; as the lapathum, rhubarbarum, and bistorta, to which also may be added the pericaria: others are rough and not shining; as the helleborus albus, fegopyrum, convolvulus niger, and the polygonum. 2. Such as have a roundish seed, a little flattened or compressed, or of any other figure but the former triquetrous or triangular one; and these have their flower, or the calyx of the flower, adhering to the bottom or basis of the seed or fruit; as the potamogeton, blitum sylvestre, parietaria, atriplex, blitum fativum, amaranthus holosericeus, and the faxifraga aurea. 3. Such whose flowers adhere to the top of the seed; as the beta, asarum, alchimilla. And to these kind of plants, Mr. Ray reduces also the kali geniculatum, and sedum fruticosum, the scoparia or belvedere of the Italians.

STAMPING-mill, or *knocking-mill*, an engine used in the tin-works, to bruise the ore small.

STANCHEONS, in building. See PUNCHION.

STAND, *Stable STAND*. See STABLESTAND.

STANDARD*, in war, a sort of banner or flags, bore as a signal for the joining together of the several troops belonging to the same body. See FLAG, &c.

* Du Cange derives the word from *standardum* or *stantarum*, *standardum* or *stardole*, words used in the corrupt Latin, to signify the principal flag of an army. Menage derives it from the German, *stander*, or the English, *stand*.

The *standard* is usually a piece of silk, a foot and half square, on which is embroidered the arms, device, or cypher of the prince, or of the colonel.—It is fixed on a lance, eight or nine foot long, and is carried in the centre of the first rank of a squadron of horse.

The *standard* is used for any martial ensign of horse; but more particularly for that of the general; or the royal *standard*.—Those born by the foot are rather called *colours*. See *COLOUR*.

The ancient kings of France bore St. Martin's hood for their *standard*. The Turks preserve a green *standard* born by Mahomet, with a great deal of devotion; as believing it to have been brought down by the angel Gabriel. Every time it is displayed, all who profess the Mahometan faith, are obliged to take arms; those who refuse, are to be deemed as infidels.

STANDARD, in commerce, the original of a weight, measure, or coin, committed to the keeping of the magistrate, or deposited in some public place, to regulate, adjust, and try the weights used by particular persons in traffic.

The justness of weights and measures, is of that consequence to the security and good order of trade, that there is no civilized nation but makes it part of their policy to preserve the equality thereof by means of *standards*. The Romans and Jews even seem to have affixed a kind of religious worship to these *standards*, by laying them up in their temples, as it were under the eye of their deities.

The *standards* of weights and measures in England, are appointed by Magna Charta, to be kept in the Exchequer, by a special officer, called the *clerk*, or *comptroller*, of the market. See *CLERK of the market*.

The *standard* of gold coin is 22 carats of fine gold and 2 carats of alloy in the pound weight troy; and the French, Spanish, and Flemish gold, are nearly of the same fineness.—The pound weight is cut into forty-four parts and a half, each current for 21 shillings.

The *standard* of silver is 11 ounces and two penny weight of silver, and 18 penny weight of alloy of copper. Whether gold or silver be above or below *standard*, is found by assaying.

STANDARDS, or **STANDELS**, in husbandry, are young trees, reserved at the felling of woods, for growth of timber.

STANNARIES, **STANNARIA**, the mines and works, where tin is dug, and purified; as in Cornwall, Devonshire, &c.

There are four courts of the *stannaries* in Devonshire, and as many in Cornwall; and several liberties were granted to them by several acts of parliament, in the time of Edward I. &c. though somewhat abridged under Edward III. and 17 Car. I. c. 15.

STANZA*, in poetry, a certain stated number of grave verses, containing some perfect sense, terminated with a rest, or pause.

* The word is Italian, and literally signifies a stand or station, because of the pause to be made at the end of each *stanza* or complete sense.

What the *couplet* is in songs, and the *strophe* in odes, the *stanza* is in the greater and graver pieces, as epic poems, &c. Indeed the Italians scarce write any poems, but they divide them into *stanza's*.—There are *stanza's* of four, six, eight, ten, twelve verses, and sometimes of an uneven number of verses, as five, seven, &c. but these last are somewhat more difficult to execute, by reason of the three verses to one rhyme. The French lay it down as a rule, that if the first *stanza* begin with a masculine, or a feminine verse, the second is to begin and end with the same.

Every *stanza* ought not only to contain a perfect sense, but to be terminated with some lively and ingenious thought, or some just and pertinent reflexion.

Stanza's were first introduced from the Italian into the French poetry, about the year 1580, and thence they were transferred into the English.

The use of *stanza's* in tragedy, or comedy, is condemned by all the best critics: for though we speak verse on the stage, it is still presumed we are speaking prose. *Stanza's* shew a degree of ingenuity on the part of the poet, which has nothing of nature in it on the part of the actor. Add to this, that *stanza's* are not fit to express every thing: wrath, threatening, &c. are very ill on a regular *stanza*: though irresolution, reveries, and every thing that leads the actor to think on what he is to resolve, agrees well enough with the unequal cadence of the *stanza*.

STAPES, in anatomy, a little bone situate in a cavity of the fenestra ovalis; thus called from its resembling a stirrup. See *EAR*.

The *stapes* is one of the four little bones fastened to the tympanum of the ear, first discovered and published, as Fallopius tells us, by Jo. Phil. ab Ingrassia, a physician of Sicily. Its use is in stretching, or relaxing the membrana tympani.

STAPHYLINUS. See *PALATOSTAPHYLINUS*, *PERISTAPHYLINUS*, *PTERYGOSTAPHYLINUS*, and *SPHENOSTAPHYLINUS*.

STAPLE*, **STAPULA**, primarily signifies a public place,

or market, whither merchants, &c. are obliged to bring their goods to be bought by the people: as the Greve, or the places along the Seine, for the wines and corns at Paris; whither the merchants of other parts are obliged to bring those commodities.

* *Vossius* and *Ménage* derive the word from *stapulus*, which is found in the Ripuary laws, signifying a place where justice is administered. Others derive it from the German *stap*, or Latin *stapula*, which *Boethius* derives further, from the German *stapelen*, to put in a heap.

STAPLE, also signifies a city or town, where merchants jointly agree to carry certain commodities, as wool, cloth, lead, tin, &c. in order to their being commodiously sold by the great. In England, *staples* were settled and appointed to be constantly kept at York, Lincoln, Newcastle upon Tyne, Norwich, Westminster, Canterbury, Chichester, Winchester, Exeter, and Bristol; to which places merchants and traders were to carry goods to sell in those parts.

The *staple* commodities of England, were chiefly wool, leather, cloth, tin, lead, &c. though by *staple goods*, is now generally meant any proper saleable commodities, not easily subject to perish.

The principal *staples* now existing, are Amsterdam for all goods from the East-Indies, Spain, the Mediterranean, and the Baltic: Flushing for those of the West-Indies; Middleburgh for French wines; Dort for Rhenish wines and English cloth; Verre in Zealand for Scotch merchandizes, &c. The *staples* in the Levant, called by the French, *Béchellers*, i. e. *scaples*, are such cities where the English, French, Dutch, Italians, &c. have consuls, factors, and magazines; and whither they send vessels regularly each year.—The principal of these are Smyrna, Alexandretta, Aleppo, Scyda, Cyprus, Salée, Alexandria, Cairo, Tunis, Algiers, Tripoli, the Morea, Candia, and the islands of the Archipelago. See *FACTORY*.

Statute STAPLE, } See the articles { **STATUTE**
Law of the STAPLE, } **LAW**.

STAR, **STELLA**, in astronomy, a general name for all the heavenly bodies.

The *stars* are distinguished, from the phenomena of their motion, &c. into *fixed* and *erratic*.

Erratic or **wandering STARS**, are those whose distances and places with regard to each other, are continually changing. These are what we properly call *planets*.

Though to the same class, may likewise be referred, what we popularly call *blazing stars*, or *comets*.

Fixed STARS, called also, by way of eminence, *stars*, are those which continually keep the same distance, with regard to each other.

The principal points that have come under the consideration of astronomers concerning the *fixed stars*, are their *distance*, *magnitude*, *number*, *nature* and *motion*.

Distance of the fixed STARS.—The *fixed stars* are bodies exceedingly remote from us; indeed, so remote, that we have no distances in the planetary system to compare to them.

Their immense distance is argued hence, that they have no sensible parallax: that is, that the diameter of the earth's orbit bears no sensible proportion thereto; but they are seen the very same, in all the points thereof. Mr. Flamsteed, indeed, seems to have discovered a small parallax: *si rius*, e. gr. he finds to have a parallax of twenty seconds. Admitting this we have data enough to determine their distance, a thing hitherto despaired of.

For thus, the sun's parallax being had, and his mean distance being 34377 semi-diameters of the earth, the distance of *si rius* from the earth will be found to be 35477064 semi-diameters of the earth. See *PARALLAX*.

Mr. Huygens attempts the distance of the *stars* by another method, viz. by making the aperture of a telescope so small, as that the sun through it appears no bigger than *si rius*. In this state he found the sun's diameter to be as 1 to 27664 of his diameter, when seen with the naked eye. Were the sun's distance, then, 27664 times as great as it is, it would be seen of the same diameter with *si rius*; so that allowing *si rius* to be equal in magnitude with the sun (which is a very reasonable supposition) the distance of *si rius* from the earth, will be found to be to that of the sun from the earth, as 27664 to 1. On which principle, *si rius* will be 951005328 semi-diameters of the earth distant from our earth.

If it be urged, that these methods are too precarious, to conclude any thing from them, yet this we can demonstrate, that the *stars* are remoter than saturn, the most distant of all the planets, nay, that they are vastly more remote than saturn, as saturn has a great parallax, and the *fixed stars* scarce any at all.

The *magnitudes of the fixed STARS*, appear to be very different; which difference probably arises, not from any diversity in their real magnitudes, but from their distances, which are different. From this difference, the *stars* become distributed into seven several classes, called *magnitudes*.

The first class, or *stars* of the first magnitude, are those nearest us, and whose diameters are, therefore, biggest. Next these,

these, are those of the second magnitude, and so on to the sixth, which comprehends the smallest *stars* visible to the naked eye. All beyond these are called *telescopic stars*. Not that all the *stars* of each class appear justly of the same magnitude; there is a great latitude in this respect; and those of the first magnitude, appear almost all different in lustre and size. Other *stars* there are, of intermediate magnitudes, which astronomers cannot refer to one rather than another class, and therefore they place them between the two.

Procyon, for instance, which Ptolemy makes of the first magnitude, and Tycho of the second, Mr. Flamsteed lays down as between the first and second.

Thus, instead of six several magnitudes, we have really six times six.

Some authors assert, that the *stars* of the first magnitude, subtend an angle of at least a minute; but the earth's orbit seen from the *fixed stars*, we have observed only subtends an angle of twenty seconds; and hence they conclude, that the diameter of the *stars* is vastly greater than that of the earth's whole orbit.

Now a sphere, whose semi-diameter only equals the distance between the sun and earth, is ten millions of times greater than the sun: consequently, they say, the *fixed stars* must be much more than ten millions of times greater than the sun.

But here is a mistake; for the diameters, even of the largest *stars* viewed through a telescope, which magnify, *e. gr.* a hundred times, subtend no sensible angle at all, but are mere lucid points.

The *stars* are likewise distinguished, with regard to their situation, into *asterisms* or *constellations*, which are nothing but assemblages of several neighbouring *stars*, considered as constituting some determinate figure, as of an animal, &c. and denominated therefrom: a division as ancient as the book of Job; wherein we find mention of orion and the pleiades, &c.

Besides the *stars* thus distinguished into magnitudes and constellations, there are others not reduced to either. Those not reduced into constellations, are called *informes*, or *unformed stars*; of which kind, several I left at large, by the ancients, have been since formed into new constellations by the modern astronomers; as *ser Caroli* by Dr. Halley, *scutum Sobieski*, by Hevelius, &c.

Those not reduced to classes or magnitudes, are called *nebulous stars*, being such as only appear faintly, in clusters, in form of little lucid nebulae or clouds.

The number of STARS appears to be vastly great, almost infinite; yet have astronomers long ago ascertained the number of those visible to the eye; which are found vastly fewer than one would imagine.—Hipparchus 125 years before the incarnation, on occasion of a new *star* then appearing, made a catalogue of the *stars*, i. e. an enumeration thereof with an exact description of their magnitudes, situations, longitude, latitude, &c. that it might be known, if any like change should happen for the future in the heavens. Hipparchus made the number of visible *stars* 1022. These were reduced into forty-eight constellations, and he laid it down, that if there sometimes appeared more in winter nights, it was owing to a deception of the sense.—Ptolemy added four *stars* to Hipparchus's catalogue, and made the number 1026.—In the year 1437, Ulug Beigh, grandson of Tamerlane, in a new catalogue he made, only gave 1017. But in the seventeenth century, when astronomy began to be retrieved, their number was found to be much greater.—To the forty-eight constellations of the ancients, were added twelve new ones, discovered towards the south pole, and two towards the north; besides several others not universally admitted, as the flower de lis, the royal oak, &c.

Tycho Brahe published a catalogue of 777 *stars*, from his own observations; which Kepler, from Ptolemy and others increased to 1163, Ricciolus, to 1468, and Bayer, to 1725: Dr. Halley added 373 observed by him, within the antarctic circle.—Hevelius, from his own observations, and those of Dr. Halley, and the ancients, made a catalogue of 1888 *stars*; and Mr. Flamsteed has since made a catalogue of no less than 3000 *stars*, all from his own most accurate observations.

Of these 3000, it is true, there are many only visible through a telescope; nor does a good eye scarce ever see more than an hundred at the same time in the clearest heaven: the appearance of innumerable more, frequent in clear winter nights, arising from our sight's being deceived by their twinkling, and from our viewing them confusedly, and not reducing them to any order. Yet for all this, the *stars* are really almost infinite. Riccioli makes no scruple to affirm, in his new *Almagest*, that a man who should say there are above twenty thousand times twenty thousand, would say nothing improbable.

For a good telescope directed almost to any point of the heavens, discovers numbers that are lost to the naked sight: particularly in the milky way, which is nothing but an assemblage of *stars*, too remote to be singly seen, but so closely disposed, as to give a luminous appearance to that part of the heavens where they are.

In the single constellation of the pleiades, instead of six or

seven *stars* seen by the best eye, Dr. Hook, with a telescope twelve foot long, told seventy-eight; and with larger glaziers many more of different magnitudes. And F. de Rheita, a capuchin, affirms, that he has observed above 2000 *stars* in the single constellation of orion.

The same author found above 188 in the pleiades. And Huygens looking at the *star* in the middle of orion's sword; instead of one found it to be twelve. Galileo found eighty in orion's sword; twenty-one in the nebulous *star* of his head; and thirty-six in the nebulous *star* præsepe.

The changes that have happened in the STARS, are very considerable; contrary to the opinion of the ancients, who held, that the heavens and heavenly bodies were incapable of any change, the matter thereof being permanent and eternal, infinitely exceeding the hardness of diamonds, and not susceptible of any different form. And, in effect, till the time of Aristotle, and even two hundred years afterwards, there had no change been observed.

The first was in the year 1253, before the incarnation; when Hipparchus discovering a new *star* to appear, was first induced to make a catalogue of the *stars*, that posterity, as we have observed, might perceive any future changes of the like kind.

In the year 1572, Tycho Brahe observed another new *star* in the constellation casiopeia, which was, likewise, the occasion of his making a new catalogue. Its magnitude, at first, exceeded that of the biggest of our *stars*, sirius and lyra; it even equalled that of venus, when nearest the earth; and was seen in fair day-light. It continued sixteen months; towards the latter end whereof, it began to dwindle, and at last totally disappeared, without any change of place in all that time.

Leonicus tells us of another *star* appearing in the same constellation, about the year 955, which resembles that of 1572, and quotes another ancient observation, whereby it appears, that a new *star* was seen about the same place in 1264.

Dr. Keil takes those to have been all the same *star*; and does not know but it may make its appearance a new 152 years hence.

Fabricius discovered another new *star* in the neck of the whale, which appeared and disappeared several times in the years 1648 and 1662. Its course and motion, are described by M. Bouillaud.

Simon Marius discovered another in andromeda's girdle, in 1612 and 1613; though M. Bouillaud says, it had been seen before in the 15th century. Another was observed by Kepler in serpens. Another of the third magnitude in the constellation cygnus, near the bill, in the year 1601, which disappeared in 1626, and was observed again by Hevelius in 1659, till the year 1661, and again in 1666 and 1671, as a *star* of the sixth magnitude.

It is certain, from the ancient catalogues, that many of the ancient *stars* are not now visible. This is particularly notorious in the pleiades, or seven *stars*, whereof only fix are now visible to the eye; a thing long ago observed by Ovid: witness the verse, *Quæ septem dici, fix tamen esse solent.*

M. Montanerie, in his letter to the Royal Society in 1670, observes that there are now wanting in the heavens, two *stars* of the second magnitude, in the stern of the ship argo and its yard; which had been seen till the year 1664. When they first disappeared it is not known; but he assures us, there was not the least glimpse of them in 1668. He adds, he has observed many more changes in the *fixed stars*, even to the number of an hundred.

For the nature of the fixt STARS, their immense distance leaves us greatly at a loss about it. What we can gather for certain from their phenomena, is as follows:

1°. That the fixt *stars* are greater than our earth. This is demonstrable thus: suppose two *stars* C and D (*Tab. Astronomy*, fig. 7.) the one in the eastern horizon, and the other in the western. As soon as D arrives in C; C will appear in D. But since both move with the same velocity, while C describes the arch CHD; the *star* D describing an arch equal to CDH, will appear in F: wherefore, if the *stars* C and D be less than the earth, the *star* C will not be seen in the eastern horizon, when the other D is arrived at the western: But as this is contrary to experience, it follows, that the *stars* being in L and S, and there seen at the same time by spectators in A and B, are greater than the earth A B.

2°. The fixt *stars* are farther distant from the earth, than the farthest of the planets. For we frequently find the fixt *stars* hid behind saturn's body, the most distant of the planets.

3°. The fixt *stars* shine with their own light: for they are much farther from the sun than saturn, and appear much smaller than saturn; but since, notwithstanding this, they are found to shine much brighter than saturn, it is evident they cannot borrow their light from the same source as saturn does, viz. the sun: but since we know of no other luminous body beside the sun, whence they might derive their light; it follows, that they shine with their own native light. Hence 1°. we deduce, that the fixt *stars* are so many suns; for they have all the characters of suns.

2°. That in all probability, the *stars* are not smaller than our sun.

3°. That

3°. That it is highly probable, each *star* is the centre of a system, and has planets or earths revolving round it, in the same manner as round our sun, *i. e.* it has opaque bodies illuminated, warmed and cherished by its light.

How immense then, does the universe appear! Indeed it must either be infinite, or infinitely near it.

Kepl^r, it is true, denies, that each *star* can have its system of planets as ours has; and takes them all to be fixed in the same surface or sphere; urging, that were one twice or thrice as remote as another, it would appear twice or thrice as small, supposing their real magnitudes equal; whereas there is no difference in their apparent magnitudes, justly observed, at all. But to this we oppose, that Huygens has not only shewn that fires and flames are visible at distances where other bodies, comprehended under equal angles, disappear; but it should likewise seem, that the optic theorem about the apparent diameters of objects being reciprocally proportional to their distances from the eye, does only hold while the diameter of the object has some sensible ratio to its distance.

4°. The *stars* which appear and disappear by turns, being always found to increase in magnitude at their first appearance, and to decrease as they begin to disappear, and being likewise still visible through telescopes, for some time after they are lost to the naked eye (of which we have various instances in the *Philosophical Transactions*) seem to be no more than planets performing their periods about the fixt *stars*, as their respective suns; unless any person should rather incline to Dr. Keil's opinion, *viz.* that the *stars* lose their brightness, and disappear, by their becoming covered with maculae or spots, such as are frequently found to overpread the sun.

5°. Those temporary *stars*, which, upon their disappearing, have never been found to return again; are most probably conjectured to be of the number of comets, which make long excursions from their suns, or the centers of the upper planetary systems, *i. e.* from the fixt *stars*; returning too seldom to have their returns perceived.

Motion of the STARS.—The fixt *stars* have two kinds of motion; one called the *first*, *common* or *diurnal motion*, or the *motion of the primum mobile*: by this they are carried along with the sphere or firmament wherein they appear fixed, round the earth, from east to west, in the space of twenty-four hours.

The other, called the *second* or *proper motion*, is that whereby they go backwards from west to east round the poles of the ecliptic, with an exceeding slowness, as not describing above a degree of their circle in the space of seventy-one or seventy-two years, or 54 seconds in a year.

Some have imagined, I do not know on what grounds, that when they are got round to the points, whence they first departed, nature will have finished her course, and the *stars* having performed their career, the heavens will remain at rest, unless the being, who first gave them motion, appoint them to begin another circuit.

On the footing of this calculation, the world should last about 3000 years, according to Ptolemy; 25816 according to Tycho; 25920 according to Riccioli; and 24800 according to Cassini.

In effect, the latitudes of the fixt *stars*, we find, by comparing the observations of the ancient astronomers with those of the moderns, continue still the same; but their longitude is by this second motion always increasing.

Thus, *e. g.* the longitude of cor leonis, was found by Ptolemy, *A. D.* 138 to be 2° 30'; in 1115 it was observed by the Persians to be 7° 30'; in 1364, by Alphonsus, 20° 40'; in 1586, by the prince of Hesse, 24° 11'; in 1601, by Tycho, 24° 17'; and in 1609, by Mr. Flamsteed, 25° 31' 20'; whence the proper motions of the *stars* according to the order of the signs in circles parallel to the ecliptic, is easily inferred.

It was Hipparchus who first suspected this motion, upon comparing the observations of Tymocharis and Aristyllus with his own. Ptolemy, who lived three centuries after Hipparchus, demonstrated the same by undeniable arguments.

Some it is true have imagined a change in the latitudes of the *stars*; but such an opinion has little countenance from observation.

Tycho Brahe makes the increase of longitude in a century 1° 25'; Copernicus 1° 23' 40" 12"; Flamsteed and Riccioli 1° 23' 20"; Bullialdus 1° 24' 54"; Hevelius 1° 24' 46" 50"; whence, with Flamsteed, the annual increase of the longitudes of the fixt *stars* may be well fixed at 50'.

From these data, the increase of the longitude of a *star* for any given time, is easily had; and hence the longitude of a *star* for any given year, being given, its longitude for any other year is readily found: *e. g.* the longitude of sirius in Mr. Flamsteed's tables for the year 1690 being 9° 49' 1"; its longitude for the year 1724 is found, by multiplying the interval of time, *viz.* 34 years by 50', the product 1700" or 28' 2" added to the given longitude, will give the longitude required, 10° 17' 3".

The principal phenomena of the fixt *stars*, arising from their common and proper motion, besides their longitude,

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are their altitudes, right ascensions, declinations, occultations, culminations, risings and settings; which see under their proper articles, ALTITUDE, ASCENSION, DECLINATION, and OCCULTATION.

The several *stars* in each constellation, *e. g.* in taurus, bootes, hercules, &c. their longitudes, latitudes, magnitudes, names, places, &c. as fixed by Mr. Flamsteed in the *Britannic Catalogue*; see under the proper article of each constellation, TAURUS, BOOTES, HERCULES, &c.

To learn to know the several fixt *stars* by the globe; see GLOBE.

The parallax and distance of the fixt *stars*, see under PARALLAX and DISTANCE.

Circumpolar STAR,	} See.	{	CIRCUMPOLAR.
Morning STAR,			MORNING.
Place of a STAR,			PLACE and APPARENT.
Pole STAR,			POLE.

STAR, in fortification, a little fort with five or more points, or salient and re-entering angles, flanking one another, and their faces 90 or 100 foot long.

Formerly, *star* forts were frequently made in lines of circumvallation, after two or three redoubts. See REDOUBT and SCORCE.

STAR, in pyrotechny, a composition of combustible matters, which being born or thrown aloft into the air, exhibits the appearance of a real *star*.

Stars are chiefly used as appendages to rockets, a number of them being usually inclosed in a conical cap or cover at the head of the rocket, and carried up with it to its utmost altitude, where the *stars* taking fire, are spread around, and exhibit an agreeable spectacle.

To make STARS; mix three pounds of salt petre, eleven ounces of sulphur, one of antimony, and three of gunpowder dust: or twelve ounces of sulphur, six of salt petre, five and a half of gunpowder dust, four ounces of oilbanum, one of mastic, camphir, sublimated mercury, and half a one of antimony and orpiment.

Moisten the mass with gumwater, and make it into little balls of the size of a chestnut, which dry either in the sun or the oven. These set on fire in the air, will represent *stars*.

STAR, in heraldry, denotes a charge frequently born on the shield, and the honourable ordinaries, in the figure of a *star*. It differs from the *mullet*, or spur-rowel, in that it is not pierced as this last is.

It usually consists of five rays or spokes. When it has six or eight, as among the Germans and Italians, particular mention must be made thereof in blazoning.

On medals, STARS are marks of consecration and deification, being intended as symbols of eternity.—F. Joubert says, they sometimes express the children of princes reigning; and sometimes the children dead, and placed in the rank of deities.

STAR, is also a badge of the honourable orders of the garter and bath. See GARTER.

Order of the STAR, or our lady of the STAR, an order of knighthood instituted by king John of France in the year 1352, denominated from a *star* they wore on the stomach.

At first there were but thirty knights; but the order in time became depreciated by the multitude of persons admitted, without any distinction. For which reason, Charles VII. when grand-master thereof, quitted it, and gave it the chevalier du Guet, knight of the watch at Paris, and his archers, who still wear a *star* on their coats. But this account is contradicted by others; who will have the order instituted by king Robert in 1022 in honour of the holy virgin, and to have fallen into disrepute during the wars of Philip de Valois.

Justiniani mentions another order of the *star*, at Messina in Sicily, called also the order of the crescent. This was instituted in the year 1268, by Charles of Anjou, brother of St. Louis, king of the two Sicilies.

Others will have it instituted in 1464, by Renatus duke of Anjou, who took the title of king of Sicily. At least, it appears from the arms of this prince, that he made some alteration in the collar of the order; for instead of flower-de-luces and *stars*, he only bore two chains, whence hung a crescent, with the old French word *lez*, which in the language of Rebus, signified *lez* in a crescent.

The order being dropt into obscurity, was raised again by the people of Messina, under the name of the noble academy of the knights of the *star*; reducing the ancient collar to a single *star* placed on a forked cross, and the number of knights to sixty-two. Their device was, *manservant regibus astra viam*,

M R

which they expressed by the four initial letters

A V

the *star* in the middle.

STAR, in the manage.—White STARS in the forehead, are esteemed good marks in all horses, except white and grey ones: where nature fails to produce this good criterion, our jockies have frequent recourse to art. See HORSE.

The method of making *stars*, practised among the Dutch, is to roast a large onion in hot ashes, and when near thoroughly

roughly done, to divide it in two, and dip it in scalding hot walnut oil. This done they immediately apply the flat side thereof to the place the *star* is to be on, and keep it there half an hour. After taking it off, they anoint the scalded place with ointment of roses: in a short time, the scurf skin falls off and white hair grows up in its room; but the middle always continues bare of hair, which is the certain characteristic of an artificial *star*.

The method most used among us, is to shave the hair from the place it is to be made on; then to apply a little oil of vitriol with a feather, or the like, passing it lightly over the bald place. This eats away the roots of the former hair, which will be succeeded by white. The fore is healed up with copperas and green ointment.

To make a *black star*, on a white or other coloured horse; wash the place to be changed, frequently, with fern roots and sage boiled in lye; and they say it will breed black hairs.

The same may be done, by beating four milk galls and rust together, and anointing the part therewith.

A *red star* is made with an ounce of aqua-fortis, a pennyworth of aqua-vitæ, and silver to the value of eighteen-pence, all heated together in a glass, and the place anointed therewith. This immediately turns the hair to a perfect red; but it lasts no longer than till the horse casts his coat; when it is to be renewed.

STARBOARD, denotes the right hand side of a ship: as larboard does the left.

They say, *starboard the helm*, or *helm a starboard*, when the man at the helm should put the helm to the right side of the ship.

STARCH, a fecula, or sediment, found at the bottom of vessels wherein wheat has been steeped in water; of which fecula, after separating the bran from it, by passing it through sieves, they form a kind of loaves, which being dried in the sun, or an oven, is afterwards broke into little pieces, and so sold.

The best is white, soft and friable, easily broke into powder. Such as require very fine *starch*, do not content themselves, like the starch-men, with refuse of wheat, but use the finest grain. The process is as follows;

Method of making STARCH of wheat.—The grain being well cleaned, is put to ferment in vessels full of water, which they expose to the sun, when in its greatest heat; changing the water twice a day, for the space of eight or twelve days, according to the season. When the grain bursts easily under the finger, they judge it sufficiently fermented. The fermentation perfected, and the grain thus softened; it is put, handful by handful, in a canvas bag, to separate the flour from the husks, which is done by rubbing and beating it on a plank, laid a-crofs the mouth of the empty vessel that is to receive the flour.

As the vessels are filled with this liquid flour, there is seen swimming a-top a reddish water, which is to be carefully skimmed off from time to time, and clean water is to be put in its place; which, after stirring the whole together, is all to be strained through a cloth or sieve, and what is left behind, put into the vessel with new water, and exposed to the sun for some time. As the sediment thickens at the bottom, they drain off the water four or five times, by inclining the vessel, but without passing it through the sieve. What remains at bottom, is the *starch*, which they cut in pieces to get out, and leave it to dry in the sun. When dry, it is laid up for use.

To use *starch*, they take as much as is needed, and steep it in water over night, changing the water four or five times. The starchmen using the refuse of wheat, only observe a part of all these things in their process; but their *starch* falls far short of this.

Starch is used along with smalt, or stone blue, to stiffen and clear linen. The powder thereof is also used to whiten, and powder the hair.

It is also used by the dyers to dispose their stuffs to take colours the better.

STAR-CHAMBER, *camera stellata*, was a chamber at Westminster, so called, from its roof being painted with gilt stars. See **CHAMBER**.

STAR-FORT, or *redoubt*, in fortification, is a work with several faces, generally composed of from five to eight points, with salient and re-entering angles flanking one another; every one of its sides containing from twelve to twenty-five fathoms. See **FORT**, and **REDOUBT**.

STARTING, among brewers, the putting of new beer, or ale, to that which is decayed, to revive it again.

STATE, or *estate*, an empire, kingdom, province, or extent of country under the same government. See **E-STATE**.

The *states*, or *states* of the king of England, include the British islands, and the West India plantations, as Virginia, Carolina, Maryland, &c. to which may be added the dutchies of Brunswick-Lunenbourg, Bremen, &c.

Free STATE. See the article **FREE**.

STATE is also used for the policy or form of government of a

nation.—Hence, ministers of *state*; reasons of *state*, &c. See **GOVERNMENT**.

Politicians distinguish several forms of *state*, viz. the *monarchic*, as that of England; see **MONARCHY**: the *democratic*, as that of Rome and Athens; see **DEMOCRACY**: the *oligarchic*, as that of Venice; see **OLIGARCHY**: and the *aristocratic*, as that of Sparta; see **ARISTOCRACY**.

STATE of a *disalt*, the same with *acme*. See **ACME**.

STATED wind. See the article **WIND**.

STATER, an ancient coin, weighing four Attic drachms: it was either of silver, or gold; the former worth about two shillings four-pence sterling.

STATERA Romana, or stiliard, a name given to the Roman balance.

STATES, a term applied to the several orders, or classes of a people, assembled to consult of matters for the publick good.

STATES-GENERAL, the name of an assembly, consisting of the deputies of the seven United Provinces.

In this assembly, the deputies of each province, what number soever they be, have only one voice, and are esteemed as but one person; the votes being given by provinces. Each province presides at the assembly in its turn, according to the order settled among them: Guelderland presides first, then Holland, &c.

This assembly is the representative of the sovereignty of the union, which resides properly in the general assembly of the states themselves of all the several provinces: but as that assembly ordinarily consists of seven or eight hundred persons, it was resolved, after the departure of the earl of Leicester, in order to avoid expence, and the confusion of so numerous a body, that the provincial estates should, for the future, be ordinarily represented by their deputies, under the name of the *states-general*, who were always to reside at the Hague, and who alone are now called *states-general*.

Since that new regulation, there have been but two general assemblies of the *states* of the provinces; the former held in 1600 at Berg-op-Zoom, to confirm the truce agreed on with the arch-duke Albert, with the greater solemnity: and the latter in 1651.

STATES of Holland, an assembly consisting of the deputies of the councils, or colleges of each city; wherein resides the sovereignty of that province.

Originally, none but the nobility and the six principal cities had seats, or voices in the *states*.—At present there are the deputies of eighteen cities.—The nobility have the first voice. The other provinces of the union have likewise their *states*, representing their sovereignty: deputies from which constitute what they call the *states-general*.

STATHOLDER. See the article **STADTHOLDER**.

STATICAL baroscope. See **BAROSCOPE**, and **BAROMETR**.

STATICKS, **STATICE**, a branch of mathematics, which considers weight or gravity, and the motion of bodies arising therefrom.

Those who define mechanics, the science of motion, make *statics* a member thereof, viz. that part which considers the motion of bodies arising from gravity.

Others make them two distinct doctrines; restraining mechanics to the doctrine of motion and weight in reference to the structure and power of machines; and *statics* to the doctrine of motion considered merely as arising from the weight of bodies, without any immediate respect to machines.—On which footing, *statics* should be the doctrine or theory of motion; and mechanics the application thereof to machines.

For the laws of **STATICKS**, see **GRAVITY**, **DESCENT**, &c.

STATICKS, **STATICI**, in medicine, a kind of epileptics, or persons seized with epilepsies.

Statics differ from *catleptics*, in that, these last have no sense of external objects, nor remember any thing that passes at the time of the paroxysm: whereas the *statici* are all the while taken up with some very strong lively idea, which they remember well enough, when out of the fit.

STATION, in geometry, &c. a place pitched upon to make an observation, take an angle, or the like.

An inaccessible height or distance is only to be taken, by making two *stations*, from two places, whose distances are known.—In making maps of provinces, &c. *stations* are fixed on all the eminences, &c. of the country, and angles taken thence to the several towns, villages, &c.

In surveying, the instrument is to be adjusted by the needle, to answer the points of the horizon, at every *station*; the distance from the last *station* to be measured, and an angle to be taken to the next *station*: which includes the whole business of surveying.

In levelling, the instrument is rectified, that is, it is placed level, at each *station*, and observations made forwards and backwards.

Line of STATION in perspective. See the article **LINE**.

STATION, in astronomy, the position or appearance of a planet in the same point of the zodiac for several days.

As the earth, whence we view the motions of the planets,

is out of the centre of their orbits, the planets appear to proceed irregularly; being sometimes seen to go forwards, that is from west to east, which is called their *direction*; sometimes to go backwards, or from east to west, which is called their *retrogradation*.

Now between these two states, there must be an intermediate one, wherein the planet neither appears to go backwards nor forwards, but to stand still and keep the same place in her orbit; which is called her *station*.

STATION, STATIO, in church history, is applied to the fasts of the fourth and sixth days of the week; that is, Wednesday and Friday; which many among the ancients observed with much devotion, till three of the clock in the afternoon. S. Peter of Alexandria, in his *Cannical Epistle*, can. 15. observes, that it was appointed conformably to ancient tradition, to fast weekly on those days: on Wednesday, in memory of the counsel the Jews took to put our Saviour to death; and on Friday, on account of his passion.—Some regard to which is still had by the church of England. See **ABSTINENCE**.

STATION is also used in the church of Rome, for a church where indulgences are to be had on certain days. It was St. Gregory that fixed the *stations* at Rome, i. e. the churches where the office was to be performed each day of Lent, and on solemn fast days. These *stations* he marked down in his *Sacramentary*, as they now stand in the *Roman Missal*; appropriating them chiefly to the patriarchal and titular churches: but though the *stations* were fixed, the archdeacon did not fail at each *station*, to publish to the people the following *station*.

STATION is also a ceremony in the Romish church, wherein the priests or canons go out of the choir to sing an anthem before the crucifix, or the image of our lady.—This ceremony is ascribed to S. Cyril.

STATIONARY, in astronomy, the state of a planet when it seems to remain immovable in the same point of the zodiac.

The planets having sometimes a progressive and sometimes a retrograde motion; there will be some point wherein they appear *stationary*. Now a planet will be seen *stationary*, when the line that joins the earth's and planet's center, is constantly directed to the same point in the heavens; that is, when it keeps parallel to itself.—For all right lines drawn from any point of the earth's orbit, parallel to one another, do all point to the same star; the distance of those lines being insensible, in comparison of that of the fixed stars.

Saturn is seen *stationary*, at the distance of somewhat more than a quadrant from the sun; jupiter at the distance of 52°, and mars at a much greater distance.

Saturn is *stationary* eight days, jupiter four, mars two, venus one and a half, and mercury an half; though the several *stations* are not always equal.

STEATOCELE, ΣΤΕΑΤΟΚΗΛΗ, in medicine, a rupture, or tumour of the scrotum, consisting of a fatty substance resembling suet collected therein.

STATUARY, STATUARIA, a branch of sculpture, employed in the making of statues.

Statuary is one of those arts wherein the ancients surpassed the moderns: indeed it was much more popular, and more cultivated among the former than the latter.—It is disputed between *statuary* and painting, which of the two is the most difficult and the most artful.

The invention of *statuary* was at first very coarse. Leon Battista Alberti, who has an express treatise on statues, imagines that it took its rise from something casually observed in the productions of nature, that, with a little help, seemed disposed to represent the figure of some animal.—The common story is, that a maid, full of the idea of her lover, made the first essay, by the assistance of her father's implements, who was a potter. This, at least, is pretty certain, that earth was the first matter *statuary* was practised upon.

STATUARY is also used for the artificer, who makes statues. Phidias was the greatest *statuary* among the ancients, and Michael Angelo among the moderns.

STATUARY column, } See the articles } **COLUMN.**

STATUARY fountain, } See the articles } **FOUNTAIN.**

STATUE, STATUA, a piece of sculpture in full relief,

representing a human figure.

Daviler more scientifically defines *statue* a representation in high relief and insulate, of some person distinguished by his birth, merit, or great actions; placed as an ornament in a fine building, or exposed in a public place to preserve the memory of his worth.

Thence, the term *statue* is only applied to figures on which the word being formed from the Latin, *statua*, the body; or from *stare*, to stand.

They are finished with the chisel, of several matters, as marble, wood, plaster, &c.

They are also cast of various kinds of metal, particularly brass, iron, and lead.—For the method of casting statues, see **FOUNDRY of statues**.

Dædalus, the son of Eupalmus, who lived not only before the siege of Troy, but even before the expedition of the Argonauts, among many other notable contrivances ascribed to him, is said to have been the inventor of *statues*.—And yet it is certain, there were *statuaries* before him; only it was he who first found how to give them action and motion, and to make them appear as if alive. Before him, they made them with the feet joined together, never intending to express any action. He first loosened the feet of his, and gave them the attitudes of people walking and acting.—The Phœnicians are said to have been the first who erected *statues* to the gods. The Greeks succeeded in their *statues* beyond the Romans; both the workmanship and the fancy of the Roman *statues* were inferior to the Grecian. Indeed we have very few remaining, that have escaped the injuries of time.

Statues are usually distinguished into four general kinds. —The first, are those less than the life: of which kind we have several *statues* of men, of kings, and of gods themselves.

The second, those equal to the life: in which manner it was, that the ancients, at the publick expence, used to make *statues* of persons eminent for virtue, learning, or the services they had done.

The third, those that exceed the life: among which, those which surpassed the life once and a half, were for kings and emperors; and those double the life, for heroes.

The fourth kind, were those that exceeded the life twice, thrice, or even more; and were called *colossal*.

Every *statue* resembling the person it is intended to represent, is called *statua iconica*.

Allegorical STATUE, that which, under a human figure, or other symbol, represents something of another kind, as a part of the earth, a season, age, element, temperament, hour, &c.

Caryatic STATUE, } See the articles } **CARYATIDES.**

Colossal STATUE, } See the articles } **COLOSSUS.**

Curule STATUES, those which are represented in chariots drawn by bigæ, or quadrigæ, that is, by two, or four horses: of which kind there were several in the Circus's, Hippodromes, &c.—or in cars, as we see some with triumphal arches on antique medals.

Equestrian STATUE, that which represents some illustrious person on horseback—as that famous one of Marcus Aurelius at Rome; and that of king Charles I. at Charing-cross.

Greek STATUE, denotes a figure that is naked and antique; it being in this manner the Greeks represented their deities, athletes of the olympic games, and heroes.

The reason of this nudity, whereby the Greek *statues* are distinguished, is, that those who excelled wrestling, wherein the Greek youth placed their chief glory, always performed naked.

The *statues* of heroes were particularly called *Achilleian statues*, by reason of the great number of figures of that prince, in most of the cities of Greece.

Hydraulic STATUE, any figure placed as an ornament of a fountain, or grotto; or that does the office of a jet d'eau, a cock, spout, or the like, by any of its parts, or by any attribute it holds.—The like is to be understood of any animal serving for the same use.

Pedestrian STATUE, a *statue* standing on foot—as that of king Charles II. in the Royal Exchange, and that of king James II. in the Privy Gardens.

Persian STATUE. See the article **PERSIAN order**.

Roman STATUES, is an appellation given to such as are clothed, and which receive various names from their various dresses.

Those of emperors with long gowns over their armour, were called *statue paludate*; those of captains and cavaliers, with coats of arms, *thoracate*; those of soldiers, with cuirasses, *loricate*; those of senators and augurs, *trabate*; those of magistrates with long robes, *togate*; those of the people with a plain tunic, *unicate*; and, lastly, those of women with long trains, *stolata*.

The Romans had another division of *statues*, into *divine*, which were those consecrated to the gods; as Jupiter, Mars, Apollo, &c.—*Heroic*, which were those of the demi-gods; as Hercules, &c.—and *Augusti*, which were those of the emperors; as those two of Cæsar and Augustus, under the portico of the capitol.

Foundry of STATUES, } See the articles } **FOUNDRY.**

Pedestal of STATUES, } See the articles } **PEDESTAL.**

Plinth of STATUES, } See the articles } **PLINTH.**

Repairing a STATUE. See the article **REPAIRING**.

STATURE, the size or height of a man.—From the Latin,

statum, of *stare*, to stand.

The *statue*, or pitch of a man, is found admirably well adapted to the circumstances of his existence. Had man, observes Dr. Grew, been a dwarf; he could scarce have been a reasonable creature: For, to that end, he must have had a jolt-head; and then he would not have had body and blood to supply his brain with spirits: or if he had had a small proportion

portional head, there would not have been brain enough for him; and, if Adam had been a giant, he could not have been commodiously supplied with food: for there would not have been flesh enough of the best edible beasts to supply his voracity; or if the beasts had been made proportionably greater, there would not have been grass enough, &c. See DWARF and GIANT.

It is a common opinion, however, and has been so ever since Moses' time, that people in the earliest ages of the world, much surpassed the moderns in stature; and it is true, we read of men, both in sacred and profane history, whose pitch appears surprising: but then it is true, they were even then esteemed giants.

The ordinary stature of men, Mr. Derham observes, is, in all probability the same now, as at the beginning; as may be gathered from the monument, mummies, &c. still remaining. The oldest monument in the world, is that of Cheops, in the first pyramid of Egypt, which Mr. Graves observes, scarce exceeds the measure of our ordinary coffins. The cavity, he says, is only 6.488 feet long, 2.218 feet wide, and 2.160 deep: from which dimensions, and those of several embalmed bodies, observed by him in Egypt, that accurate writer concludes, there is no decay in nature; but that the men of this age are of the same stature as those three thousand years ago.

To these we have other and later instances to add from Harkwell: the tombs at P. A. which are some thousands of years old, are yet no longer than ours. The same may be said of Athelstan's in Malmesbury church; and of Sheba's in Paul's, of the year 693, &c.

The like evidence we have from the ancient armour, shields, vessels, &c. dug up at this day, *a. gr.* the brass helmet dug up at Metaurum, fits one of our men; yet it is allowed to have been left there at the overthrow of Alcubal. Add, that Augustus was five foot nine inches, which was the measure of our queen Elizabeth; only the queen exceeded the emperor by two inches, allowance being made for the difference between the Roman and our foot.

STATUS *de manerio*, in ancient records, denotes all the tenants and legal men within the lands of a manor, assembled in their lord's court, to do their customary suit, and enjoy their rights and privileges.

STATUTE, **STATUTUM**, in its general sense, signifies a law, ordinance, decree, &c. See **LAW**, **DECREE**, &c.

STATUTE, in our laws and customs, more immediately signifies an act of parliament, made by the three estates of the realm; and having the force of a law. See **LAW**, and **PARLIAMENT**.

Accessory by **STATUTE**, } See the articles } **ACCESSORY**.
Action upon the STATUTE, } **ACTION**.

STATUTE *sessions*, called also *petit sessions*, are meetings in every hundred, to which constables repair, and others, both masters and servants, for deciding differences between masters and servants, rating of wages, bestowing people in service, who being fit to serve, either refuse to seek, or cannot get masters.

STATUTE *merchant*, is a bond of record acknowledged before one of the clerks of the *statutes* merchant and mayor or chief warden of the city of London, or two merchants of the said city for that purpose assigned, or before the mayor, chief warden, or master of other cities or towns, or other sufficient men for that purpose appointed; sealed with the seal of the debtor and of the king, which is of two pieces, the greater to be kept by the mayor, chief warden, &c. and the lesser by the said clerks. Its effect is, that if the obligor pay not the debt at the day, execution may be awarded against his body, lands, and goods; and that the obligee shall hold the same till the debt be levied.

Tenant per STATUTE *merchant*. See **TENANT**.

STATUTE *staple*, is a sort of *statute* merchant, relating to merchants, and merchandizes of the staple. See **STAPLE**. The *statute* staple is of two kinds; *proper*, and *improper*.

The *proper* is a bond of record, acknowledged before the mayor of the staple, in the presence of one or more constables of the staple; by virtue of which the creditor may forthwith have execution of the body, lands, and goods of the debtor, on non-payment.

Improper is a bond of record, founded upon the statute 23 Hen. VIII. c. 6. of the nature of a proper *statute* staple as to the force and execution of it, and acknowledged before one of the chief justices; or in their absence, before the mayor of the staple, and recorder of London.

STAYERS, or **STAGGERS**, among farriers, a giddiness in a horse's head, which ends in madness.

It is frequently occasioned, by turning out a horse to graze too soon, before well cold; where, by hanging down his head to feed, ill vapours and humours are generated, which oppressing the brain, are the proximate cause of this disease. Sometimes it comes by over exercise in hot weather, which inflames the blood, &c. and sometimes by noisome smells in the stable, excessive eating, &c.

The signs of it, are dimness of sight, reeling, and staggering, watery eyes, &c. At length, for very pain, he beats his head against the wall, thrusts it into the litter, rises and lies down with fury, &c.

The methods of cure are various; but they all begin with bleeding.

STAVES, **FLAG STAVES**, } See **FLAG** *staves*.
Leading *staves*, } **LEVELLING** *staves*.
Tip *staves*, } **TIP** *staves*.

STAY, in the sea language, a big, strong rope, fastened to the top of one mast, and the foot of that next before it, towards the prow, serving to keep it firm, and prevent its falling astwards, or towards the poop. See *Tab. Ship. fig. 1. n. 29. 33, 78, 85, 120.* See also the article **MAST**.

All masts, top-masts, and flag-staves, have their *stays*; except the spirit-fail top-masts. That of the main-mast is called the *main stay*.

The main-mast, fore-mast, and those belonging to them, have also *back stays*, to prevent their pitching forward, or over-board; as going on either side her. See **BACK** *stays*.

To *STAY* a ship, or *bring her on the STAYS*, is to manage her tackle and sails, so as that she cannot make any way forward, which is done in order to her tacking about.

STEADY, a word of command at sea, for the man at the helm to keep the ship *steady* in her course, and not to make angles (or *yaws*) as they call them) in and out. See **HELM**.

STEATOMA, **STREATOMA**, a kind of swelling, or abscess; consisting of a matter much like suet; soft, without pain, and without discolouring the skin; contained in a cystis, and easily turned out upon incision.

STEEL, a kind of iron refined, and purified by the fire, with other ingredients; which renders it whiter, and its grain closer, and finer than in common iron. See **IRON**.

Steel, of all other metals, is that susceptible of the greatest degree of hardness, when well tempered; whence its great use in the making of tools and instruments of all kinds.

The true method of making *steel* has been greatly concealed, and the public long abused by counterfeit ones. The following method we have from Agricola; and it is affirmed by Kircher to be that practised in the island of Ilva; a place famous in all ages for the manufacture of good *steel*, from the time of the Romans to ours.

Heat a quantity of iron red hot, cut it into small pieces, mix it with any kind of stone that easily melts. This mixture put by little and little into a crucible, first filled with charcoal-dust, and heated red-hot; when melted off, three, four, or more pieces of iron are to be put in the middle of it; there boil them five or six hours with a strong fire. The workman is to stir the melted matter often, that the pieces of iron may soak in the smaller particles of the melted matter; which particles consume, and thin the grosser ones of the iron pieces, and are, as it were, a ferment to them, and make them tender. One of the pieces is now taken out of the fire, and put under the great hammer, to be drawn out into bars, and wrought; and hot as it is, plunged into cold water. Thus tempered, it is again worked upon the anvil; then breaking it, it is considered, whether in any part it looks like iron; or whether it be wholly condensed, and turned into *steel*. See *Supplement*, article **STEEL**.

Damascus **STEEL**, } See the articles } **DAMASCUS**.
Engraving on **STEEL**, } **ENGRAVING**.
Foggot of **STEEL**, } **FAGGOT**.
Nealing of **STEEL**, } **NEALING**.

STEEL, in medicine. See the article **CHALYBEAT**.

Steel Wine. See the article **WINE**.

STEELYARD, or **STILYARD**, in mechanics, a kind of balance called also *statera Romana*, or the *Roman balance*; by means whereof, the gravities of different bodies are found by the use of one single weight.

Construction of the STEELYARD.—It consists of an iron beam AB (*Tab. Mech. fig. 35.*) wherein a point is assumed at pleasure, as C, and on this a perpendicular raised CD. On the shorter arm AC, is hung a scale or balon to receive the bodies weighed: the weight I is shifted this and that way on the beam, till it be a counter-balance to one, two, three, four, &c. pounds placed in the scale; and the points are noted wherein I weighs as one, two, three, four, &c. pounds. From this construction of the *steelyard*, the manner of using it is apparent. But the instrument being very liable to deceit, is therefore not to be countenanced in commerce.

Spring **STEELYARD**, is a kind of portable balance, serving to weigh any matter, from about one to forty pounds.

It is composed of a brass tube, into which goes a rod, and about that is wound a spring of tempered steel in a spiral form. On this rod are the divisions of pounds and parts of pounds, which are made by successively hanging on to a hook fastened to the other end, one, two, three, four, &c. pounds.

Now the spring being fastened by a screw, to the bottom of the rod; the greater weight is hung on the hook, the more will the spring be contracted, and, consequently, a greater part of the rod will come out of the tube; the proportions of which greater weights are indicated by the figures appearing against the extremity of the tube.

STEEPLE, an appendage generally raised on the western end of a church, to hold the bells.

*Steeple*s are denominated from their form, either *spire*, or *tower*.—The first, are such as rise continually diminishing either conically or pyramidically.

The latter are mere parallelepipeds, and are covered a-top, plat-form like.

In each kind, there is usually a sort of windows or apertures to let out the found; and is continued, at the same time, as to drive it down.

Mafius, in his treatise of bells, treats likewise of *steeples*. The most remarkable in the world, is that at Pisa, which leans all on one side, and appears every moment ready to fall; yet is in no danger. This odd disposition, he observes, is not owing to a shock of an earthquake, as is generally imagined; but was contrived so at first by the architect; as is evident from the ceilings, windows, doors, &c. which are all in the level.

STEER, *Hog* **STEER**. See the article **HOG**.

STEERAGE, the act of steering. See **STEERING**.

The word is also used for a place in a ship, next below the quarter-deck, before the bulk-head of the great cabin; where the steer-man stands and lodges.—See *Tab. Ship*. fig. 2. n. 102.

STEERING, in navigation, the directing a vessel from one place to another, by means of the helm and rudder.

He is held the best *steers-man*, who uses the least motion in putting the helm over to and again, and who keeps the ship best from making yaws; that is, from running in and out.

There are three methods of *steering*, 1°. By any mark on the land, so as to keep the ship even by it.—2°. By the compass, which is by keeping the ship's head on such a rhumb or point of the compass, as best leads to port.—3°. To steer as one is bidden or coned; which, in a great ship, is the duty of him that is taking his turn at the helm.

See **COND.**—For the theory and effect of *steering*; see **SAILING**, **COURSE**, &c.

STEGANOGRAPHY, **ΣΤΕΓΑΝΟΓΡΑΦΙΑ**, the art of secret writing, or of writing in cyphers; known only to the persons corresponding.

One *Aeneas Tacitus*, two thousand years ago, as we are told by Polybius, had invented twenty different manners of writing, so as no body, but those let into the secret, could understand any thing of the matter.

But now-a-days, hardly any thing can be written by this art, but what may be deciphered, and the meaning perfectly discovered. And to this art of deciphering, that excellent mathematician, Dr. Wallis, hath contributed much. See **DECIPHERING**.

STEGNOSIS, **ΣΤΕΓΝΩΣΙΣ**, an obstruction of any natural discharge, especially that by the pores.

STEGNOTICKS*, **ΣΤΕΓΝΟΤΙΚΑ**, in medicine, remedies proper to close, and stop the orifices of the vessels, or emunctories, when relaxed, stretched, lacerated, &c.

* The word is formed from the Greek *stego*, *impede*, *conspire*, I hinder, close.

Such are pomegranate leaves, red roses, plantain leaves, tormentil roots, &c.—*Stegnotics* are proper in the hæmorrhoids, and other fluxes of blood.

STELLA, } See the articles **PSEUDO stella**.

STELLAR, } **INTER stellar**.

STELLATE plants, such as have their leaves growing on the stalks, at certain distances, in the form of a star with rays; or such flowers as are star-like, or full of eyes resembling stars.

Mr. Ray makes the *stellate plants*, so called from the disposition of their leaves, the tenth genus of English plants; of which kind are cross-wort, mollugo, wild madder, asperula, or woodruff, gallium or ladies bed-straw, aparine or cleavers, and rubia tinctorum or dyers madder.

STELLIONATE*, **STELLIONATUS**, in the civil law, a kind of crime committed by a fraudulent bargain, where one of the parties sells a thing for what it is not.

* Cujas says, the word comes from *stellio*, a very subtle kind of lizard.—We find mention hereof in the *code*, leg. ix. tit. 34. As, if I sell an estate for my own, which belongs to another; or convey a thing as free and clear, which is already engaged to another; or put off copper for gold, &c.

The Romans frequently used *stellionatus* to express all kinds of crimes that had no proper names.

STEM, in botany, that part of a plant arising out of the root, and which sustains the leaves, flowers and fruits. In trees, the *stem* is called the *trunk* or *stock*; in Latin *caudex* and *truncus*.

In herbs, it is ordinarily called the *stalk*; by the Latins *caulis* and *scapus*, when straight like a column. See **STALK**. When slender, and creeping on the ground, as that of nummulary, some authors call it *viticulus*.

In the several kinds of corn and plants of that kind, it is more properly called *culmus*.

The *stem* of the plant, according to Dr. Grew, is no more than the cutis or skin which at first covers the two lobes,

and the plane of the seed, and which is further dilated as the plant grows.

STEM of a ship, is that main piece of timber which comes bending from the keel below, where it is *scarfed* as they call it, that is pieced in; and rises computing right before the fore-castle.

This *stem* it is, which guides the rake of the ship; and all the butt ends of the planks forwards, are fixed into it.

This in the section of a first rate ship, is called the *main stem*.—See *Tab. Ship*. fig. 1. lit. b. fig. 2. n. 1.

STENCH. See the article **STINK**.

STENT (OROPHONIC tube), a speaking trumpet; thus called from *Stentor* (a person mentioned in the fifth book of the Iliad, who, as Homer tells us, could call louder than fifty men) and *steno*, *voice*. The *stentorophonic* horn of Alexander the Great is famous; with this it is said he could give orders to his army at the distance of 100 stadia; which is above twelve English miles. See **SPEAKING trumpet**.

STEP. See the articles **PACE**, **STAIR**, &c.

STEP and *Leap*, in the manege, one of the seven airs or artificial motions of a horse; consisting, as it were, of three airs; viz. the pace or step which is terra a terra; the raising which is a curvet; and the whole finished with a fault or leap.

The *step*, properly, puts a horse on the hand, and gives him a rise to leap; like one that runs before he leaps, that he may go the higher, or the further.

For leaps of all kinds, the rider is not to give any aids or helps with his legs; only to hold the horse well up with the bridle-hand when he rises before, that he may rise the higher behind; when he begins to rise behind, he is to put the bridle hand a little forwards to hold him before, and stay him there on the hand, as if he hung in the air; timing the motion of the bridle hand so, as to take him like a ball on the bound, which is the great secret in leaping.

STEPHENS'S water. See the article **WATER**.

STERCORARIANS*, or **STERCORANTIS**, a name which those of the Romish church anciently gave to such as held that the host was liable to digestion, and all its consequences, like other food.

* The word is formed from the Latin, *stercor*, dung.

Card. Humbert in his answer to Nicetas Pectoratus treats him as a *stercorantist*, merely for holding, that the eucharist breaks the fast; which opinion he imagined led directly into *stercorantism*.

STEREOBATA*, or **STEREOBATES**, in the ancient architecture, the basis or foundation, whereon, a column, wall or other piece of building is raised.

* The word is formed from the Greek *stereo*, *solid*, *prop*.

This answers pretty well to the continued socle or base of the moderns.

Some confound it with the ancient *stylobata*, or pedestal; but in effect, the *stereobata* is that to the *stylobata* which the *stylobata* is to the spira or base of the column. See **PEDESTAL**.

STEREOGRAPHIC projection of the sphere, is that where-in the eye is supposed to be placed in the surface of the sphere.

Stereographic projection is, the projection of the circle of the sphere on the plane of some one great circle; the eye being supposed placed in the pole of that circle.

The method and practice of this projection, in all the principal cases, viz. on the planes of the meridian, equinoctial and horizon, is as follows.

STEREOGRAPHIC projection on the plane of the meridian.—

Let **ZONE** (*Tab. Perspect.* fig. 22.) be the meridian, **Z** and **N** the poles, as also the zenith and nadir; **EQ** the equinoctial and horizon; **ZN** the equinoctial colure, and prime vertical circle; **Z 15 N**, **Z 30 N**, **Z 45 N**, &c. are hour circles or meridians, and also azimuths, because the pole is in the zenith. To describe these circles, find the points, 15, 30, 45, 60, &c. in the equinoctial, by setting the half tangent of their distance from **Z**; and then their centres are found by setting their co-secants, both ways, from their points of intersection with the equator: **35**, **55**, and **75**, &c. are the northern and southern tropics, which are described by setting the half tangent of 23 degrees 30 minutes from **Z** each way; then the tangent of its complement, viz. 66 degrees 30 minutes, each way from thence on the colure produced, gives their centres. By this method, all parallels of declinations may be drawn.—Or you might have set the co-secant of the parallel from the centre of the primitive, which would also have found the same point for the centre of the parallel, whose radius is equal to the tangent of its distance from its pole.

The parallels in this projection, are also almucantars, or parallels of altitude; **32**, **37** is the ecliptic, which must be divided from the division on the scale of half tangents; but denominated according to the signs of the zodiac, reckoning 30 degrees to each sign.

STEREOGRAPHIC projection on the plane of the equinoctial.—

Let SC (fig. 23.) be the meridian, and solstitial colure; EN the equinoctial colure, and hour circle of 6; P the north pole; \odot \ominus , the northern tropic; E \odot N the northern half of the ecliptic (whose center is found by setting off the secant of 23 degrees 30 minutes from \odot) and its pole is at a the intersection of the polar circle and meridian, being the place through which all circles of longitude must pass; and EZ N the horizon of London, which is described thus: set the half tangent of the co latitude, from P to Z; then the tangent of the same, set from P to O, or its secant from Z to O, gives its centre; and its pole will be at b 38 degrees 30 minutes, (in the half tangents) distant from F, where b is at the zenith.

To draw any other circles in this projection; 1. For circles of longitude, which must all pass through a, and the several degrees of the ecliptic; set the tangent of 66 degrees, 30 minutes, from a downwards, on the meridian produced; which will find a point, through which a perpendicular, drawn to the meridian, shall contain in it the centres of all the circles of longitude, whose distances set off to the radius P a, shall be the tangents of the degrees of their distances from the meridian SPC (which is that belonging to 180 degrees.)—

2. All parallels of declination are drawn by setting the half tangents of their distances from P.—3. All azimuths or vertical circles must pass through b at the zenith: since, therefore, the zenith is 38 degrees 30 minutes distant from P, set the co-secant of that (or the secant of 51 degrees 30 minutes) from b on the meridian extended below, and that will find the point x, the centre of the azimuth of east and west, viz. E b N; and the centres of all the rest are in a line, that is perpendicular to the meridian, and drawn through x.—4. Circles of altitude or almucantars are all parallel to the primitive circle: is not in the plane of the projection; thus the circle O e, is a parallel of altitude 50 degrees above the horizon.—5. All hour-circles are straight lines from the centre to the limb.

STEREOGRAPHIC projection on the plane of the horizon.—

First draw a circle representing the horizon, and quarter it with two diameters; then will z be the zenith of the place, 12 z 12 the meridian; 6 z 6 the prime vertical, or azimuth of east and west; (fig. 24.) make z P = half tangent of 38° 30'. (or tangent of 19° 15') P shall be the pole of the world. Make z E = half tangent of 51° 30' (or tangent of 25° 45') and E o = secant

of 38 degrees 30 minutes; then shall o be the centre of the equinoctial \odot \ominus 6. In this projection, almucantars are all parallel to the primitive circle: and azimuths are all right lines passing through z the centre of the primitive, to the equal divisions in the limb. Parallels of declinations are all lesser circles, and parallel to the equinoctial, and their intersections with the meridian are found, by setting the half-tangent of their distance from the zenith, fourthward or northward, or both ways from z.—Their centres are found, by bisecting the distance between those two points; for the middle will be the center of the parallel. Thus z \odot = half-tangent of 20° 00' = distance of the tropic of \odot from the zenith ———— to the fourthward, or distance of the tropic of φ from the zenith ———— downward from z, And z φ = half tangent of 75° 00' } to the northward, or upward from z.

For the hour-circles make z c = tangent of 51° 30', or P c = secant of 51° 30', draw GCT perpendicular to the produced meridian: then, if from c with the radius z c, you set off the tangents of 15° 30' 45°, &c. both ways, you will have the centers of the several hour-circles, 7 and 5, 8, 4, &c.

Note, in all stereographic projections, all diameters are measured on the scale of half-tangents; and this is the ground of all dialling, or the true projection of the hour-circles of the sphere on any given plane. See SPHERICKS.

STEREOGRAPHY*, the art of drawing the forms or figures of the solids upon a plane.

* The word is formed from the Greek στερεο, solid, and γραφω I describe.

STEREOMETRY*, ΣΤΕΡΕΟΜΕΤΡΙΑ, that part of geometry, which teaches how to measure solid bodies, i. e. to find the solidity, or solid content of bodies; as globes, cylinders, cubes, vessels, ships, &c.

* The word is formed of the Greek στερεο, solid; and μετρο, measure.

The methods hereof, see under the respective bodies, as GLOBE, SPHERE, CYLINDER, &c. See also GAUGING.

STEREOTOMY*, the art or act of cutting solids, or making sections thereof; as walls and other members in the profiles of architecture.

* The word is formed from στερεο, and τομω, section.

STERILITY*, the quality of a thing that is barren; in opposition to fecundity.

* The word is formed from the Latin sterilitas, of sterilis, barren.

Sterility was held a grievous affliction by the wives of the ancient patriarchs. Nature has annexed sterility to all monstrous productions, that the creation might not degenerate. Hence the sterility of mules, &c.

Women frequently become sterile after a miscarriage or a difficult labour, by reason the uterus or some other of the genital parts are injured thereby.

The sterility of mercury, say the alchemists, resembles that of women who are too cold and moist; and who, by being purged and heated, would be cured of their sterility, as mercury is when purged according to the rules of art.

STERLING, a term frequent in the English commerce.

A pound, shilling, or penny sterling, signifies as much as a pound, shilling, or penny of lawful money of England, as settled by public authority.

Antiquaries and critics are greatly divided, as to the origin of the word sterling. Buchanan fetches it from the castle of Striveling or Sterling in Scotland, where a small coin was anciently struck, that in time, according to him, came to give name to all the rest.—Camden derives the word from *esterling* or *esterling*; observing, that in the reign of King Richard I. money coined in the east parts of Germany, began to be of especial request in England, by reason of the purity thereof, and was called *esterling money*, as all the inhabitants of those parts were called *Easterlings*; some of whom, skilled in coinage, were soon after sent for over to perfect the English money, which was thenceforward denominated from them, *sterling*, for *esterling*, or *esterling*; not, says Camden, from Striveling in Scotland, nor from *stella*, a star, which some dream to have been coined thereon; 'for in old deeds, the English species are always called *nummi esterlingi*, which implied as much as good and lawful money, &c.—Sommer, again, derives the word from the Saxon, *stere*, a rule or standard; intimating, that this, as to weight and fineness, was to be the common standard of all current money.

In Stow, and some other of our ancient writers, *sterling*, or *esterling* is also used for a certain coin, in value amounting nearly to our silver-penny: and on some occasions we find the same word *sterling* used in the general for a piece of money; it being observable, that, for a good while together, there was no other coin but pennies, with which *sterlings*, or *esterlings* were become synonymous: much as among the ancients, the words *denarius* and *nummus* were used.

STERN of a ship, usually denotes all the hindermost part of her; but properly, it is only the outmost part abaft. See SAIL, ADAPT, &c.

STERN, among hunters, is the tail of a wolf, or a grey-hound.

See TAIL.

STERN Chf. See the article CHASE.

STERNOHYOIDEUS, in anatomy, a pair of muscles arising from the upper and internal part of the bone of the sternum, and part of the clavicle, and adjoining part of the first rib, with a broad origin; and running from the alpera arteria, glandulae thyroidea, and cartilago testiformis, terminates in the base of the os hyoides. It draws the bone straight downward.—See Tab. Anat. (Myl.) fig. 2. n. 7, 8.

STERNOHYOIDEUS, in anatomy, a pair of muscles of the larynx; arising in the sternum, or breast-bone, and terminating in the cartilago thyroidea. They serve to draw down that cartilage.

STERNUM, STERNON, the breast-bone, a cartilaginous sort of bone which makes the forepart of the breast, and into which the ribs are fitted.—See Tab. Anat. (Osteol.) fig. 3. n. 11.

In adults, it consists of one single piece; but in infants, of several, according to the diversity of age. Kerkringius tells us, he has never seen more than six. They continue cartilaginous until seven years of age; and are not very solid afterwards, but spongy.

At the lower extremity of the sternum, is a cartilage, called *xiphoides* or *eniformis*, because resembling the point of a sword.

The use of the sternum is to defend the heart, and to receive the extremities of the true ribs. See RIB.

STERNUTATION. See the article SNEEZING.

STERNUTATIVE, or STERNUTATORY, a medicine proper to produce sneezing.

Sternutatives, called also *sternicks*, are of two kinds, gentle and violent. Of the first kind are betony, sage, marjoram, tobacco, and the whole fashionable tribe of snuffs.

Of the latter kind are euphorbium, white hellebore, peltory, &c.

Sternutatives operate by their sharp, pungent parts vellicating the inner membrane of the nose, which is exceedingly sensible, and occasioning the serous matter contained in the glands of the nose, and in several sinusses situate in the base of the cranium, and the os frontis, to be expelled.

STEW,

STEW, a small kind of fish-pond, the peculiar office whereof is, to maintain fish, and keep them in readiness, for the daily uses of a family, &c.

The fish bred in the large ponds, are drawn out and put in here. For two large ponds of three or four acres a-piece, it is advisable to have four *stews*, each two rods wide, and three long. The *stews* are usually in gardens, or at least near the house, to be more handy, and the better looked to.

The method of making them, is to carry the bottom in a continual decline from one end, with a mouth to favour the drawing with a net. See **POND**.

STEWs *, or **STUES**, were also places anciently permitted in England, to women of professed incontinency, for the profligate of their bodies to all comers.—They were under particular rules, and laws of discipline, appointed by the lord of the manor.

* The word is probably borrowed from the French, *stues*, hot baths, in regard women are wont to prepare themselves for venereal acts, by bathing.

STEWARD, or **SENE**SCHAL, an officer, whereof there are various kinds; thus called from the Saxons, *steld*,stead, place, or room, and *ward*, keeper, *q. d.* a deputy, or person appointed in the place of another.

Lord High STEWARD of England, is the first and highest officer of the crown; as having the power of what we call a *vice-roy*, the Danes, &c. *stadtholder*, and the Swedes, *reichs droffet*, *q. d.* *vice rex*. Chamberlayne.

Common lawyers call him *magnus Angliæ senescallus*. His office, as expressed in an ancient record, is to supervise and regulate the whole kingdom, both in time of peace and war, immediately under the king and after him; an authority so very great, that it has not been judged safe, to trust it any longer in the hands of any subject.

The office was hereditary and permanent in the family of the dukes of Lancaster, till the time of Henry IV. since whom it has only been made *pro hac vice*, occasionally: as to officiate at a coronation; at the arraignment and trial of some nobleman for treason, or other great crime.—During his childhood, he bears a white staff in his hand; and the trial, &c. ended, he breaks his staff, and with it, his commission expires.

Lord STEWARD of the *houshold*, is an officer to whom the state of the king's house is committed; to be ruled and guided at his discretion.

He has authority over all officers and servants of the king's house, except those of the chapel, chamber, and stable; which are under the lord chamberlain, master of the horse, and dean of the chapel.

STEWARD of a *ship*, is he who receives all the victuals from the purser; and is to see it well stowed in the hold: all things of that nature belonging to the ship's use, are in his custody: he looks after the bread, and distributes out the several messes of victuals in the ship.

He hath an apartment for himself in the hold, which is called the *steward's room*.—See *Tab. Ship*, fig. 2. lit. Y.

STIGMATA, **STIM**MATA, in natural history, denotes points, or specks usually seen on the sides of the bellies of insects; particularly of the caterpillar kind, where they are very apparent.

They are nothing but the extremities of certain vessels terminating in the sides at each nodus or incisure, and serving them for lungs.

STIGMATA, in antiquity, certain marks impressed on the left shoulder of the soldiers, when lifted.

STIGMATA, were also a kind of notes, or abbreviations; consisting only of points, disposed various ways, as in triangles, squares, crosses, &c.

STIGMATA, is also a term introduced by the Franciscans, to express the marks, or prints of our Saviour's wounds, impressed by him on the body of their seraphic father, St. Francis. It was one morning, about the feast of the Exaltation, in the year 1224, that St. Francis, being at prayers on mount Alverna, whither he had retired to pass the Michaelmas Lent; saw a seraph with six burning wings, in other respects like a man; with his hands and his feet stretched upon a cross. With two of the wings he covered his body, two were raised over his head, and with two he flew swiftly down. Five rays proceeded from the five wounds of the person crucified, and were directed to the correspondent five parts of the body of the saint.

Upon the vision's disappearing, he saw the marks of the nails, &c. on his own hands and feet; the same as he had seen them in the image of the crucifix. His hands and feet were found pierced with nails in the middle; the marks of the heads of the nails were plainly seen within the flesh on one side, and those of the points clenched on the other. On his right side appeared a red scar, as from the wound of a spear, which frequently run with blood, and stained his gown, &c. The good man, we are told, took a world of pains to hide the *stigmata*; but those of his hands and feet were seen in his life time, maugre all his endeavours, by several of the brotherhood, who affirmed it upon oath, and by some cardinals, says St. Bonaventure, who attested the miracle both by word and writing, and expressed it in the hymns, anthems, &c. composed in honour of St. Francis.

After his death, they were seen by fifty of his religious, as well as by St. Clara and her nuns, and an infinite number of seculars; many of whom felt them with their hands, to be the more certain.

A solemn feast was hereupon appointed to be annually celebrated, in memory of the miracle, called the *feast of the stigmata of St. Francis*; and a peculiar mass or office was composed for the same.

An archi-confraternity was erected on the same occasion, by Frid. Pizzi, a Roman chirurgion, in the year 1594.

STIBIUM, **STIBI**, or **STIMMI**, an ancient name for antimony, now seldom used.

STILE and **STILUS**. See the article **STYLE**.

STILES, in carpentry, denote the upright pieces which go from the bottom to the top in any waincot, or the like.

STILLATITIOUS *airs*, are such as are procured by distillation,—in opposition to those got by infusion, expression, &c.

STILLYARD, **STILYARD**, or **STEELYARD**, in commerce.—The company of the **STILLYARD** was a community, or corporation of foreign merchants, established at London; thus called, from the place where they had their residence, called the *Stillyard*, near the bridge, which was assigned them by act of parliament; and which, in some records, is called *Gnillbaldia Teutonorum*; being, as some write, a broad place, or yard, where much steel had used to be sold.

This company was created in the year 1215, under Hen. III. in favour of the free cities of Germany, who had been assiduous to him in his wars against France.

It had rendered itself mistress of all the English manufactures, particularly those of cloth; which it was allowed not only to sell throughout the kingdom, but also to transport abroad.

The prejudice these privileges did, and by which the company frequently abused the nation, occasioned its being broke, by sentence of the judges, under Edward IV. But it redeemed its rights and lasted to the year 1552, when it was suppressed by Edward VI.

STIMULATING, **STIMULANS**, a property in angular or sharp bodies, whereby they vellicate, and cause vibrations and inflections of the fibres of the nerves, and a greater derivation of nervous fluid into the parts affected.

Stimulants produce pain, heat, redness, &c.—They may be reduced to violent penetrating depilatories, gentle sinapisms, vellicatives, and caustics. See **SINAPISM**, **VESICATORY**, &c.

STING, *aculeus*, an apparatus in the body of certain insects, in form of a little spear; serving them as a weapon of offence.

The *sting* of a bee, or wasp, is a curious piece of mechanism: it consists of a hollow tube, at the root whereof is a bag full of sharp, penetrating juice, which, in stinging, is injected into the flesh through the tube.

Within the tube, Mr. Derham has observed, there lie two small sharp-bearded spears: in the *sting* of a wasp, he told eight beards on the side of each spear, somewhat like the beards of fish-hooks. See *Tab. Nat. Hist.* fig. 29 & 30.

One of these spears in the *sting*, or sheath, lies with its point a little before the other; to be ready, as should seem, to be first darted into the flesh, which once fixed, by means of its foremost beard, the other then strikes in too; and so they alternately pierce deeper and deeper, their beards taking more and more hold in the flesh: after which, the sheath or *sting* follows, to convey the poison into the wound; which, that it may pierce the better, is drawn into a point, with a small slit below that point, for the two spears to come out at.

By means of these beards it is, that the animal is forced to leave its *sting* behind it, when disturbed, before it can have time to withdraw the spears into their scabbard.

STINK, or **STENCH**, a disagreeable smell exhaling from a corrupted, or other body; and which is prejudicial to the nose and brain.

A *stinking* breath is usually the result either of diseased lungs, or else of scorbutic gums, &c.

A *stinking* nose, *factor naris*, is the result of a deep ulcer within the nose, whence arise fetid scabs, &c.—Its cause, according to Galen, is a sharp, putrid humour falling from the brain, on the processus mamillares.—This is reckoned by the civilians, one of the legal causes of annulling marriage.

STIPEND, **STIPENDIUM**, among the Romans, signified the same with *tribute*; and hence *stipendiarii* were the same with *tributarii*.

STIPITE, *Nativi de STIPITE*. See **NATIVI**.

STIPULATION, in the civil laws, the act of *stipulating*; that is, of treating, and concluding terms, and conditions to be inserted in a contract.

Stipulations were anciently performed at Rome, with abundance of ceremonies; the first whereof was, that one party should interrogate, and the other answer, to give his consent and oblige himself.

By the ancient Roman law, no body could *stipulate*, but for himself; but as the tabelliones were public servants, they were

were allowed to stipulate for their masters; and the notaries succeeding the tabelliones have inherited the same privilege.—The stipulation had its origin in the *lex aquilia*, and another law of the emperor Arcadius.

The word is formed from the Latin, *stipula*, a straw; because, in making a sale, a straw was given the purchaser, in sign of a real delivery. Which custom is still retained in some parts of France, particularly at Verdun. The custom always has been on this occasion, for the two parties to break a straw between them, and each take his moiety; which they afterwards joined again, to recognize their promise.

STIRROP, or **STIRRUP**, a rest or support for the horseman's foot; serving to keep him firm in his seat, and to enable him to mount.

The great art of a cavalier in the ancient tournaments, was to make his antagonist lose his *stirrop*, that is, slip the foot out of it.

For combating, it is a rule to have the right foot *stirrop* somewhat shorter than the other.

Stirrups are allowed a modern invention: Menage observes, that St. Jerom is the first author who mentions them.—Matthioli relates, that the Turks have a knack of poisoning their *stirrups*, with so subtle and penetrating a poison, that it makes its way through the boots, and kills the rider. F. le Comte tells us, that the Tartars ride cross-legged, and with their *stirrups* exceedingly short.

STOCK, in gardening, &c. the stem or trunk of a tree.

For **STOCKS** of fruit trees; the best to graft apples on, are those raised of kernels of wildings, and crabs of the most thriving trees.

Though the fruit always take after the graft; yet the *stock* has some influence. A wild *stock* is always found to enliven a dull apple.

To have a quantity of *stocks* to graft on; old trees are to be cut down within two inches of the ground, which will cause a multitude of suckers to rise from the roots. When these are risen half a yard, they are to be covered up with good earth a foot thick, and as soon as they have put forth roots, in winter, they are to be conveyed into the nursery, where, in a year or two, they will be ready to graft. Cherry *stocks*, plum *stocks*, and pear *stocks*, may be thus raised from suckers, as well as from stones or seeds; but those raised this latter way are preferred.

Brokers STOCK, } See the articles { **BROKER**.
Capital STOCK, } **CAPITAL**.
Pen STOCK, } **PEN STOCK**.

STOCKFISH, or **STOCKFISCH**, in commerce, a kind of dried, salted fish; of a greyish ash-colour, only the belly somewhat whiter.

The commerce of *stockfish* is very considerable in Holland, both from the great consumption thereof in the country, and from their vending their vessels therewith. It is said to take its name from being as hard as a *stock*, or from its needing to be beaten with a stick, to fit it for eating. See **FISHERY**.

STOCKING, that part of the cloathing of the leg and foot, which immediately covers their nudity, and screens them from the rigor of the cold.

Anciently, the only *stockings* in use, were made of cloth, or of milled stuffs sewed together; but since the invention of knitting and weaving *stockings* of silk, wool, cotton, thread, &c. the use of cloth *stockings* is quite out of doors.

The modern *stockings*, whether wove or knit, are a kind of plexus formed of an infinite number of little knots, called *fitches*, *loops*, or *masses*, intermingled in one another.

Knit STOCKINGS are wrought with needles made of polished iron, or brass wire, which interweave the threads, and form the masses the *stocking* consists of.

This operation is called *knitting*; the invention whereof it were difficult to fix precisely; though it is commonly attributed to the Scots, on this ground, that the first works of this kind came from thence.—It is added, that it was on this account, that the company of *stocking* knitters established at Paris 1527, took for their patron St. Fiacre; who is said to have been the son of a king of Scotland.

Woven STOCKINGS are ordinarily very fine: they are manufactured on a frame or machine made of polished iron; the structure whereof is exceedingly ingenious, but withal exceedingly complex, so that it were very difficult to describe it well, by reason of the diversity and number of its parts; nor is it even conceived, without a deal of difficulty, when working before the face.

The English and French have greatly contested the honour of the invention of the *stocking loom*; but the matter of fact, waving all national prejudices, seems to be this, that it was a Frenchman who first invented this useful and surprizing machine; and who, finding some difficulties in procuring an exclusive privilege, which he required, to settle himself at Paris, went over into England, where his machine was admired, and the workman rewarded according to his merit.

The invention thus imparted to the English, they became so jealous hereof, that for a long time it was forbid, under pain of death, to carry any of the machines out of the island, or to communicate a model thereof to foreigners.—But, as it

was a Frenchman first enriched our nation with it, so a Frenchman first carried it abroad; and, by an extraordinary effort of memory and imagination, made a loom at Paris, on the idea he had formed thereof, in a voyage he made to England. This loom, first set up in the year 1656, has served for the model of all those since made in France, Holland, &c.

Fulling of STOCKINGS. See the article **FULLING**.

STOCKS, in ship carpentry, a frame of timber and great posts, made a-thwart, to build pinnaces, galleys, boats, and such small craft, and sometimes small frigates upon.

Hence we say, *a ship is on the stocks*, when she is building.

STOICAL fate. See the article **FATE**.

STOICISM, the doctrines and opinions of Zeno's followers, called *stoicks*.

STOICKS, a sect of ancient philosophers, the followers of Zeno; thus called from the Greek, *στοιχος*, porter, in regard Zeno used to teach under a portico, or piazza.

The author of this sect, Zeno, was of Cittium, a town in Cyprus, inhabited by a colony of Phœnicians; whence he is supposed to have borrowed many of his dogmata from the Pœnietan philosophy, which many learned men maintain was, itself, borrowed from the Jewish: though it must be allowed, there appear as many things in the *stoick* philosophy, borrowed from Plato's and Socrates's school, as from that of Moses.

Zeno making a trading voyage from Cittium to Athens, richly freighted with Tyrian purple, was shipwrecked not far from port; upon which, we are told, consulting the oracle how he should best spend the rest of his life, he was answered, *ὁ ζηνὸς ἀποθανεῖν τοῦ νομοῦ*, by becoming of the same colour with the dead: upon which he applied himself to the study of the ancient philosophers; and became a hearer of Crates the Cynic.—But Laertius tells us, he had too much natural modesty to suffer him to give into the Cynic impudence.

From Crates, he had recourse to Xenocrates, then to Polemon; and at length he began to think of instituting a new sect.—To this purpose, a *στοιχος*, called from the pictures of Polignotus therein, the *portico*, was pitched on. Here, using to walk and philosophize; he was soon attended by a great number of disciples, hence called *στοιχοι*, *Stoicks*. He became exceedingly revered at Athens, for the probity and severity of his life and manners, and the consistency thereof with his doctrine; inasmuch that the Athenians decreed him, when living, a golden crown, and used in dubious times to deposit the keys of the city with him: and after his death, they consecrated an altar to him.

One of his chief followers was Cleanthes, who was succeeded by Chrysippus, and he by Diogenes Babylonius, Antipater, Panætius, and Posidonius among the Greeks; and by Cato, Varro, Cicero, Seneca, the emperor Antoninus, &c. among the Romans; and by Pantenus, and Clemens Alexandrinus, among the Christians.

The *Stoicks* cultivated logic, physics, metaphysics, &c. but chiefly ethics.—The principal of the dogmata of the former kinds, are as follows.

That there are certain *καταληψεις*, *comprehensions*, (which others call *νομοι κοιναι*, *common notions*, or *innate ideas*, or *principles*, and Cicero, *inchoata intelligentia*, beginnings of understanding) naturally found in the mind: that God is the femal cause of the universe: that the world is an animal; which opinion the *Stoicks* maintained in common with the Platonists, by reason of God's inhabiting and informing every part thereof, in quality of an anima mundi. See **ANIMA**.—That nature is an artificial fire, tending to generation: and, that the world is to be destroyed at last by a conflagration.

For the morality of the *Stoicks*, it was couched much in paradoxes: as, that a wife man is void of all passion or perturbation of mind: that pain is no real evil; but that a wife man is happy in the midst of the severest torture: that a wife man is always the same, and always joyful: that none but a wife man is free; all others are slaves: that none but a wife man is rich: that none but a wife man ought to be esteemed a king, magistrate, poet, or philosopher: that all wife men are great: that all things are a wife man's who is contented with himself: that wife men are the only friends, and the only lovers: that nothing ever happens to a wife man beyond expectation: that all virtues are inviolably connected together: that all good things are equal, and equally to be desired; and that goodness admits of no increase or diminution.

Whether virtue might be lost or no, was hotly disputed among them? Chrysippus held it might, by drunkenness and atrabilis; Cleanthes, that it could not, by reason of the firmness of the *καταληψεις*, *comprehensions*.

They owned but one God; whom, however, they called by various names, as *Mind*, *Fate*, *Jupiter*, &c. by which they did not mean various things; but various powers and relations of the same things. Providence, they expressed under the name of *Fate*, which Chrysippus defines to be a natural series or composition of things mutually following each other

by an immutable nexus or tie, fixed from all eternity. Lastly, they held, that the human soul survived the body.

STOLE*, *Stola*, a sacerdotal ornament, worn by the Romish parish priests over the surplice, as a mark of superiority in their respective churches.

* The word is Greek, *stola*, signifying a long robe, or vestment.

The *stole* is worn by other priests over the alb, at celebrating of mass; in which case, it goes a cross the shoulders: and by deacons over the left shoulder, scarf-wise.

The *stola* is a broad swath, or slip of cloth or stuff, larding from the neck to the feet, with three crosses therein.—The bishops anciently pretended, that the parish priests were never to appear before them, but in their *stoles*. In Flanders and Italy, they always preach in *stoles*. It is supposed to be a representation of the borders of the long robe worn by the Jewish high priests.

The *stola* of the ancient Romans, &c. was very different from that now in use: the former was a kind of robe utter for women than men; though it was held a robe of honour among all nations. Kings themselves sometimes used it, and sometimes bestowed it as a reward of virtue.

Groom of the STOLE, the eldest gentleman of his majesty's bed-chamber; whose office and honour it is, to prevent and put on his majesty's first garment or shirt every morning; and to order the things in the chamber. See **Bed-chamber**.

Order of the STOLE, an order of knights instituted by the kings of Arragon; though as to the particular author, or time of the institution, we are in the dark. The first time we hear of it, is under Alphonsus V. who mounted the throne in 1416. Justiniani takes it to have been instituted about the year 1332.

Order of the golden STOLE, a military order at Venice; thus called from a golden *stole*, which the knights wore over the left shoulder, reaching down to the knee, both before and behind, a palm and a half broad. None are raised to this order but the patricians or noble Venetians. Justiniani observes, that the time of the institution of this order is unknown.

STOMACH, *Stomachus*, *ventriculus*, in anatomy, a hollow, membranous, organical part of an animal, destined to receive the food after deglutition, and to convert it into chyle.

—See *Tab. Anat. (Splanchn.)* fig. 2. lit. d. d. h.

Its form is longish, compared by some to a gourd, by others to a bag-pipe. It is situate in the epigastrium, declining a little further to the left than the right. Its upper part is connected to the diaphragm, the bottom to the cawl; the right side to the duodenum, and the left to the spleen.

It has two orifices, one at each end. The left orifice is properly called *oesophagus*, from *oesos*, mouth; and also *cardia*: this is joined to the oesophagus, of which it seems to be only a continuation.—By this orifice, the aliments enter the stomach; where being digested, they ascend obliquely to the pylorus, or right orifice, which is united to the first of the intestines.—See *Tab. Anat. (Splanchn.)* fig. 2. lit. b.

The *stomach* consists of four membranes or coats: the first and inmost is formed of short fibres, which stand perpendicularly upon the fibres of the next coat, and are to be seen plainly towards the pylorus: when the *stomach* is distended with meat, these fibres become thick and short. Whilst they endeavour to restore themselves by their natural elasticity, they contract the cavity of the *stomach* for the attrition and expulsion of the aliments.—This coat is much larger than the rest, being full of plaits and wrinkles, and that chiefly about the pylorus: these plaits retard the chyle, that it runs not out of the *stomach* before it be sufficiently digested.—In this coat, there are also a great number of small glands which separate a liquor, which besmears all the cavity of the *stomach*, and helps the concoction of the aliments; for which reason this coat is called the *tunica glandulosa*.—See *Tab. Anat. (Splanchn.)* fig. 2. lit. i.

The second is much finer and thinner; it is altogether nervous; is of an exquisite sense, and is called *nervosa*.—See *Tab. Anat. (Splanchn.)* fig. 2. lit. k.

The third is muscular, being made of straight and circular fibres: the straight run upon the upper part of the *stomach*, between its superior and inferior orifices; and the circular run obliquely from the upper part of the *stomach* to the bottom. Of these, the innermost defend towards the right side, and the outermost towards the left; so that by their action, both ends of the *stomach* are drawn towards its middle, and the whole is equally contracted: by their contraction and continual motion, the attrition and digestion of the aliments is in great measure performed.

The fourth tunic is common; it comes from the peritonæum. The *stomach* sends veins to the porta, and branches to the gastroplicia, accompanied with others of the celiac; all lying immediately under the fourth coat.

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The eighth pair of nerves gives two considerable branches to the *stomach*, which are spread much about the upper orifice; by which it is rendered very sensible: whence also proceed, the great sympathy between the *stomach*, head, and heart on account whereof, Van Helmont thought, that the soul had its seat in the upper orifice of the *stomach*.

For the motion of the *STOMACH*; Dr. Putt, in the *Physiophilical Transactions*, acquaints us, that in directing a dog, he found the peristaltic motion of the guts continued through the *stomach*; the pylorus, which is situated as high as the diaphragm, being, in every voluntary swallow, below the very bottom of the *stomach*; so that he could manifestly observe a contraction in the middle of the *stomach*, at every motion downwards, passing it in so as to compress whatever was contained in its cavity. The contractions, he observes, were as regular as any he ever observed in the guts, and adds, that he has since observed the same in these others; whence one may fairly enough conclude it holds of all.

Hence, we easily see the reason of the quick distribution of the nourishment; the food being no sooner opened by the drink and spittle, &c. than it has a free motion through the pylorus into the intestines, from this compression in the middle of the *stomach*.

Ruminating animals have four *stomachs*; yet it is observed that some of these, which have four in Europe, have only two in Africa, probably by reason the herbs in Africa are more nourishing.

Birds that live ordinarily of seeds covered with a tough rind, have a kind of *stomach*, called the *crop*, or *gizzard*, consisting of four large muscles without-side, and a hard callous membrane within.—Such as live on flesh, as eagles, vultures, &c. have only one *stomach*.

STOMACHIC, *Stomachicus*, a medicine that strengthens the *stomach*; and promotes the office of digestion. See **STOMACH**, and **DIGESTION**.

Of this kind are wormwood, tharbar, mint, mastic, aloes, pepper, cinnamon, and aromatic digesters: good wine is also a *stomachic*.

STOMACHIC, in anatomy, is applied to the arteries, veins, &c. of the *stomach*; called also *gastric*.

The *stomachic* veins terminate in the trunk of the vena porta, and the splenic vein.—The *stomachic* arteries arise from the celiac.—The *stomachic* nerves come from the eighth pair.

STOMACHIC coronary, { See the articles **CORONARY**.

STOMACHIC water, { See the articles **WATER**.

STONE, in natural history, a hard, solid body, neither malleable, fusible by fire, nor soluble in water; formed by succession of time, in the body of the earth.

For the origin and formation of **STONES**, M. Tournefort, on his return from the east, in the year 1702, proposed to the royal academy, a new theory.

On a curious survey of the famous labyrinth of Crete, he observed, that several people had engraven their names in the living rock, whereof its walls are composed; and, what was very extraordinary, the letters whereof they cut, instead of being hollow, as they must have been at first (being all cut with knife-points) were prominent, and flowed out from the surface of the rock, like so many ballo relievo's. This he says, is a phenomenon no otherwise accountable, than by supposing the cavities of the letters filled insensibly, with a matter issuing from out of the substance of the rock; and which even issued in greater abundance than was necessary for filling the cavity. Thus is the wound made by the knife healed up, much as the fracture of a broken bone is consolidated by a callus, formed of the extravasated nutritious juice, which rises above the surface of the bone: and this resemblance is the more just; as the matter of the letters was found whitish, and the rock itself greyish.

Something very like it is observed in the barks of trees, wherein letters have been cut with the knife; so that the poet had reason to say, that the characters grew as the trees themselves grew: *crescent illas, crescit ætæ amores*.

M. Tournefort supports his opinion by similar callus's apparently formed in several other *stones*, which had re-united after, by accident, they had been broken.

From these observations, he says, it follows, that there are *stones* which grow in the quarries, and of consequence that are fed; that the same juice which nourishes them, serves to rejoin their parts when broken; just as in the bones of animals, and the branches of trees, when kept up by bandages; and, in a word, that they vegetate.

There is, then, no room to doubt but that they are organized; or that they draw their nutritious juice from the earth. This juice must be first filtrated and prepared in their surface; which may be here esteemed as a kind of bark; and hence it must be conveyed to all the other parts.

It is highly probable, the juice which filled the cavities of the letters, was brought thither from the bottom of the roots; nor

nor is there any more difficulty in conceiving this, than in comprehending how the sap should pass from the roots of our largest oaks, to the very extremities of their highest branches.

It must be owned, that the heart of these trees is exceedingly hard; and yet those of Brazil, called *iron wood*, guaiacum, and ebony are much harder. Coral is as hard in the sea as out of it, and sea mushrooms, which every body allows to grow, are true *stones*, and so, like the common *stones*, are used in America to make lime of.

None, we believe, ever doubted that shells grow by means of a nutritious juice; and yet this juice is conveyed along the narrow canals of these excessively hard bodies, as well as through those of plants, which are much less hard.

Some *stones*, then, he concludes, must be allowed to vegetate and grow like plants: but this is not all; he adds, that probably they are generated in the same manner; at least that there are abundance of *stones*, whose generation is inconceivable, without supposing that they come from a kind of seeds, wherein the organical parts of the *stones* are wrapped up in little; as those of the largest plants are in their seeds.

The *stones* called *cornu Ammonis*, *lapis Judaicus*, *asprettes*, those of Bologna and Florence, the several kinds of pyrites, crystals of the rock, and an infinity of other *stones* he supposes to have their several seeds; as much as mushrooms, truffles, and various kinds of mosses, whose seeds were a long time before they were discovered.

He continues, how should the *cornu Ammonis*, which is constantly in figure of a volute, be formed without a seed, containing that same structure in little? who moulded it so artfully? and where are the moulds? Far from this, these kinds of *stones* are found in the earth, like common flints. Nor were either their moulds, or any thing like them, ever discovered.

M. Tournefort examines the several kinds of *stones* above-mentioned, and finds them under the same necessity of seed. Again, that immense quantity of pebbles, wherewith the Crau of Arles is covered, he thinks a strong argument in behalf of this theory.

The country there, for twenty miles round, is full of roundish pebbles; which are still found in equal abundance, to whatever depth you dig. M. Peirefc, who first proposed the generation of *stones* by means of seeds (though he took the word *seed* in a very different sense from M. Tournefort) first brought this extraordinary collection of them as a proof thereof. In effect, how could so many similar pebbles be formed? There is no saying they are coeval with the world, without asserting at the same time, that all the *stones* in the earth were produced at once; which were to go directly contrary to the observations above-mentioned.

Among the seeds of *stones*, M. Tournefort observes, there are some, which do not only grow soft by the juices of the earth, but even become liquid. These, then, if they penetrate the pores of certain bodies, grow hard, petrify, and assume the figure or impression of the body: thus what we call *pestitites*, *conchites*, *mytilites*, *ostracites*, *nautilites*, *echinites*, &c. are real *stones*, the liquid seeds whereof have insinuated into the cavities of the shells called *pestit*, *concha*, *mytilus*, *ostrea*, *nautilus*, and *echinus*.

On the contrary, if those liquid seeds fall on flints, on shells, sand, &c. they inclose those several bodies, and fixing between them, form a kind of cement, which yet grows like other *stones*. It is highly probable that such rocks as are only an assemblage of cemented flints, have been formed by a number of these liquid feeds; in like manner as the quarries full of shells: unless the rocks have enveloped these bodies in their growth.

He even supposes, that there are seeds of real *stones* inclosed in the spawn of certain shell-fish; as well as that hard solid matter destined to the forming their shells.

There is, says he, a particular kind of shell-fish, called *pholas*, which are never found any where but in the cavities of flints, which are always found exactly fitted to receive them. Now, it is highly improbable the fish should come and dig such a niche to spawn in; it is much more likely, the *stones* they are found inclosed in, were at first soft; and that the matter they are formed of, was originally found in the spawn, in like manner as the matter which forms the egg-shell, is really found in the seed thereof.

From the whole, he concludes, that the seed of *stones*, and even of metals, is a kind of dust which probably falls from them while they are alive, i. e. while they continue to vegetate as above. This dust may be compared to the seeds of several plants, which no microscope ever yet discovered; though their existence is not at all to be doubted.

Probably, flints and pebbles are among *stones*, what truffles are among plants: nor is this opinion new; Pliny assures us, that Theophrastus and Mutianus believed, that *stones* produced *stones*: and Gregory Nazianzen adds, that there were authors who even believed that *stones* made love, *ἔτι καὶ ἀφ' ἑαυτῶν γαμήθ' καὶ διὰ τῶν ἑαυτῶν*. *Poem. de Virgin.* All this however is founded on the imperfect knowledge of those times. Since Mr. Tournefort's days we have discovered

other ways of formation for the *Lapis Judaicus* and *Cornu ammonis*, the first being only a petrification of the spines of an *Echinus Marinus*; and the other of a shell-fish nearly allied to the *Nautilus* kind. See *Supplement, articles Fossil, JUDAICUS LAPIS, and CORNU AMMONIS.*

M. Geoffroy accounts for the origin and formation of *stones*, in a different manner.—He lays it down as a principle, that all *stones*, without exception, have been fluid; or at least a soft paste, now dried and hardened: witness the *stones* wherein are found foreign bodies; witness, also, figured *stones*, &c.

On this principle, he examines the formation of the different kinds of *stones*; and shews, that the earth alone suffices for the same, independent of all salts, sulphurs, &c. The metallic particles contained in flints, give them their colour; but these are only accidents: for proof of which, he instances the sapphires and emeralds of Auvergne, which lose all their colour by a moderate fire consuming their metallic parts; but without any damage to their transparency; they being hereby rendered mere crystals.

To view rock crystal, indeed, one would not take it for earth; and yet earth it must be, not water congealed, as the ancients imagined.

M. Geoffroy conceives two kinds of primitive particles in the earth.—Those of the first kind, are exceedingly fine, thin lamellæ, equal to each other, or nearly so. Now, when these meet together, from any cause whatever, in a sufficient quantity; the regularity and equality of their figures determines them to range themselves equally and regularly; and thus to form a homogeneous compound, which is very hard, from the immediate contact of the parts; and very transparent, by reason of their regular disposition, which leaves a free passage to the rays of light every way: and this is crystal.

The parts of the second kind have all sorts of irregular figures; and must accordingly form assemblages that are much opaker and less hard. Now crystal is formed wholly of parts of the first kind; and all other *stones* of a mixture of the two kinds of parts together: this mixture is absolutely necessary, in order to unite and bind together the parts of the second kind, and give them a hardness and consistence, without which they would only make a sand or dust. Water, now appears the fittest vehicle, to carry the parts of the first kind. This is seen from several petrifying springs, which infiltrate the pipes through which their waters are conveyed, or even solid bodies laid in them for some time. The water does not dissolve those earthy parts; it only keeps them in fusion, as it does the juices wherewith plants are fed.

This water, thus charged with earthy particles of the first kind, M. Geoffroy calls the *stone*, or *crystalline juice*, whereof those bodies are primarily formed. See *Supplement, article CRYSTAL.*

STONES are of various kinds, with regard to the places they are produced in: the most common are formed under ground; others in the bodies of men, and other animals; others seem to be generated by the sea, as pumice, &c. and others, to be the effect of a petrifying virtue in certain waters. Of these, some serve simply for magnificence, and ornament; as all those called,

Precious STONES; which make the commerce of lapidaries and jewellers. See *PRECIOUS stone*, and *GEM.*

Others are much useful, if one might credit all the virtues attributed to them, and are used in medicine; such as bezoards, *Jews stone*, *eagles stone*, &c.

Others, again, are used in painting; either to prepare colours from, by calcining and grinding them, or to be used as crayons or pencils for designing: of which number are the *Armenian stone*, black lead, ruddle, &c.

Lastly, much the greatest quantity, and those too of the most immediate and common use, are those employed in building; such as *free stone*, *marble*, *lime stone*, *fire stone*, &c. See *MARBLE*, &c.

For *Free STONE*, that dug in the peninsula of Portland, and thence called *Portland stone*, is much used; being softer and whiter than *Purbeck stone*, and being commonly raised out of quarries in bigger blocks than that.

Some also call *Ryegate*, or *fire stone*, *free stone*. Mr. Boyle observes, that a competent knowledge of the nature of the juice found in *stones* used in building, is of the last importance; the same *stone* dug out of the same quarry at one season, being found to moulder away in a few winters, which dug at another season, will stand the weather for many ages: and there are others, which, though dug at the proper season, make but ruinous building, if used at an improper season.

The same author adds, that as there are some sorts of *stones* which will decay in a few years, there are others will not have attained their full hardness in thirty or forty years, or even much more.

STONES are divided by bishop Wilkins into *vulgar*, *middle priced*, and *precious*.

1. *Vulgar STONES*, or such as are of little price, are distinguishable by their different magnitudes, uses, and consistence, into the

- Greater magnitudes of *stone*, used either about
 1. *stones*, whether of
 2. *balls*; chiefly being of a
 3. *softer* consistence, whether natural or factitious,
 4. *free stone*,
 5. *brick*.
 6. *harder* consistence; not easily yielding to the tool of
 7. *the workman*, growing either in
 8. *great masses*,
 9. *2 raggs*.
 10. *lesser* masses; whether such as are for their figure,
 11. *more knobbed and unequal*; used for the striking of
 12. *fire*, either the more common, which is less heavy;
 13. *or less common*, which is more heavy, as having
 14. *something in it of a metalline mixture*,
 15. *3 flint*,
 16. *marcasite*, *fire stone*.
 17. *more round and even*,
 18. *4 pebble*.
 19. *Roof*, or pavement, being of a laminated figure, either
 20. *natural*, or factitious,
 21. *5 slate*,
 22. *5 tile*.
 23. *Metals* either for the
 24. *sharpening*, or trying of them,
 25. *6 whet stone*,
 26. *touch stone*.
 27. *polishing*, or cutting of them; being either of a more
 28. *spongy and soft*, or of a more hard consistence,
 29. *7 pumice*,
 30. *emery*.
 31. *lesser* magnitudes, either more, less, or minute,
 32. *8 sand*,
 33. *gravel*.

2. *Middle priced STONES*, are either of a
 1. *shining* politure, or capable of it; whether of a
 2. *simple white colour*, and more soft consistence,
 3. *1 alabaster*.
 4. *sometimes white*, sometimes black or green, and some-
 5. *times variegated* with veins, growing in greater or lesser
 6. *masses*,
 7. *2 marble*, *porphyry*,
 8. *agate*.
 9. *spotted with red*, upon a greenish colour, or with spots of
 10. *gold colour* upon blue,
 11. *3 jaspis*, *heliotrope*,
 12. *lapis lazuli*.
 13. *Transparency*, either
 14. *brittle*, whether natural or factitious,
 15. *4 crystal*,
 16. *glass*.
 17. *hissile* into flakes, either greater or lesser,
 18. *5 selenite*, *Muscovia glass*, or *ising glass*,
 19. *spars*.
 20. *Relation* to metals, attracting iron, or making of brads,
 21. *6 lead stone*,
 22. *cadmia calaminaris*.
 23. *Incumbustible* nature,
 24. *7 amiantus*, *asbestos*.
 25. *Strange* original; not being properly minerals, though usually
 26. *reckoned amongst* them; but either a submarine plant,
 27. *or supposed* to proceed from a liquid bitumen,
 28. *8 coral*, *coralline*,
 29. *amber*.

3. *Precious STONES*; which see under the article PRECIOUS
 4. *stone*.
 5. *Bolanian STONE*,
 6. *Calamine STONE*,
 7. *Eagle STONE*,
 8. *Emery STONE*,
 9. *Fire STONE*,
 10. *Horsham STONE*,
 11. *Jewish STONE*,
 12. *Infernal STONE*,
 13. *Lime STONE*,
 14. *Philosophers STONE*,
 15. *Pumice STONE*,
 16. *Roll-rich STONES*,
 17. *Sanguine STONE*,
 18. *Touch STONE*,
 19. *Whet STONE*,
 20. *See the articles*
 21. *BOLANIAN*.
 22. *CALAMINARIS*.
 23. *ÆTITES*.
 24. *EMERY*.
 25. *FIRE*.
 26. *HORSHAM*.
 27. *JUDÆICUS*.
 28. *LAPIS infernalis*.
 29. *LIME stone*.
 30. *PHILOSOPHERS*.
 31. *PUMICE*.
 32. *ROLL*.
 33. *SANGUINE*.
 34. *TOUCH*.
 35. *WHET stone*.

STONE also denotes a certain quantity, or weight of some commodities.

A *stone* of beef at London, is the quantity of eight pounds: in Herefordshire, twelve pounds: in the North, sixteen pounds.—A *stone* of glass is five pounds; of wax, eight pounds.

A *stone* of wool (according to the statute of 11 Hen. VII.) is to weigh fourteen pounds; yet in some places it is more, in others less; as in Gloucestershire, fifteen pounds; in Herefordshire, twelve pounds.

Among horse-courfers, a *stone* is the weight of fourteen pounds.

CASTING in STONE. See the article CASTING.

Character on STONES,
Engraving on STONES,
Face of STONE,
Painting on STONE,
Sculpture in STONE,
STONE of scandal.
 See the articles
 CHARACTERS.
 ENGRAVING.
 FACE.
 PAINTING.
 SCULPTURE.
 SCANDAL.

STONE, in medicine, is the denomination of a disease, called also *calculus*, and *lithiasis*: and, occasionally, the *gravel*. It consists of a stony concretion, formed either in the bladder or kidneys; which prevents the discharge of urine, and occasions violent pains.

The *stone*, Etmuller says, is not a disease, but the product of a disease: the disease, properly, is the *lithiasis*, or the disposition of the kidneys and bladder to generate *stones*.

The *stone* is generated, according to some authors, of the earthy viscid parts of the blood, hardened in course of time, by the heat of the kidneys; much after the manner as brick is baked in a kiln.—Dr. Quincy supposes it generated of the harder parts of the urine, pent up by the streightness of the ducts, and brought into contact and cohesion.—Etmuller ascribes the *stone*, sometimes to the stoney and metallic particles of our foods and drinks, which the reins, through weakness and relaxation thereof, cannot reject; but more usually to the unequal strength of the kidneys: whence it is that we see one kidney often breeds *stones*, the other remaining sound.

The matter of the *stone* in the bladder, is first formed in the pelvis of the kidneys; whence falling into the bladder, it becomes augmented by new lamellæ or coats.

The diagnostic signs of the *stone* in the kidneys, are, 1^o A fixed obtuse pain in the region of the loins, seeming like a weight loading the reins. As the *stone* falls out of the pelvis into the ureter, the pain is exceedingly acute and racking, which holds till either the *stone* be got into the bladder, or returned again to the pelvis. 2^o An inflexibility of the spina dorsii, from the extension and compression of the nerves. 3^o A stupor of the thigh and leg of that side, from the consent of parts. 4^o A retraction of the testicle. 5^o A very small quantity of urine, either thin and limpid, or bloody. But as soon as the *stone* is got into the bladder, the urine becomes thick, turbid, blackish and in great quantity.

The diagnostics of the *stone* in the bladder, are a sense of heaviness in the perineum and inguinal region, a perpetual and troublesome desire of making water, which is followed with a sharp pain, principally in the glans of the penis, whence a prolapsus of the anus. But the surest way of finding it, is by the touch, viz. by thrusting the finger or a catheter up the anus.

The cure of the *stone*, is either by a liquor that will dissolve or break the concrete *stone*; so that it may be evacuated piece-meal: which is called a *lithontriptic*; or by enlarging the capacity of the vessels; or by the operation of cutting, called *lithotomy*.

We have yet no assured lithontriptic known, how many soever may pretend to it; the most noted, are Mrs. Ste. hens's medicines, Tipping's liquor, and Rogers's powder.

The most usual cure is by cutting; the various manners whereof, see under LITHOTOMY.—In some desperate cases, the *stone* has been known to make itself a way through the spinal muscles.

Dr. Lister observes, that *stones* are found, not only in the bladder and kidneys, but also in the pituitary ducts, the brain, liver, lungs, stomach, intestines, and joints of the hands and feet; to which may be added, that in the *Philosophical Transactions*, we have likewise accounts of *stones* in the pineal gland, the heart, gall-bladder, &c.

Stones are distinguished into three kinds, *white*, *red*, and *yellow*; which last are the most usual.

Decker recommends calcined egg-shells as excellent in all suppressions of urine; Hamilton, limited oil; and Mr. Boyle the herb artemart.

STONE-BLUE, a preparation used in washing linen. See INDIGO and SMALT.

STONEHENGE, in antiquity, a famed pile or monument of huge stones on Salisbury plain, six miles distant from that city. It consists of the remains of four ranks of rough *stones* ranged one within another, some of them, especially in the outermost and third rank, are twenty feet high, and seven broad; sustaining others, laid across their heads, and fastened by mortises: so that the whole must have anciently hung together.

Antiquaries are divided, as to the origin, use, structure, &c. of this wonderful fabric. Most of them take the *stones* to be artificial, and to have been made on the spot; which seems the more probable, as we are pretty well assured the ancients had the art of making *stones* with sand, and a strong lime or cement; and as the *stones* seem too big for land carriage; and yet are in a plain, which for some miles round scarce affords any *stones* at all.—Inigo Jones, however, a better judge than most antiquaries, is positive that the *stones* are all natural; and there is hardly any architect or naturalist who examines the grain of them exactly, but will be of his

his mind.—As to their unweildiness, which is brought as an argument against their being portable, it is without foundation; they being really but trifles compared to many other stones which are known to have been thus carried. The legends give us various other accounts; some will have them brought miraculously by St. Patrick, from Ireland; others, &c.

As to its use, some antiquaries take it to have been an ancient temple of the Druids; others, of the Romans, dedicated to Cæsar; in which they are confirmed by its having been open at p. Others, reading the name, *stone hegin*, maintain it to have been a monument erected in memory of Hengist, the first general of the Saxons in England; others will have it a funeral monument, raised to that brave Roman, Brutus, Aurelius Ambrosius; to which opinion, some circumstances of his actions, the still remaining Latin name of the place (Mons Ambrosii) and that very ancient Welsh proverb, *Mal gwanth Emrys*, Like the work of Ambrosius, give some countenance.

Asians are now pretty well agreed, that it was a British temple, and Dr. Thomas takes it might easily be made probable, that the temple was dedicated to the sun and moon. Y. Stedel *conjectures* a temple referred to the British Druids.—Ingo Jones has given a fine course of the work, and strives hard to persuade the world, that it was Roman; but Dr. Linnæus, who took his measures on the spot, assures us, he could by no means reconcile them with that scheme.

STOOL, *anus*, in medicine. A thing is said to be voided by stool, when it is discharged by the anus, or fundament. In the Philosophical Transactions, we have instances of sick persons voiding factitious stones, balls, &c. by stool.

Cuckoo Stool. See the article **CUCKOO**.

STOOMING of wine, the putting bags of herbs, or other ingredients into it.

STOOPING, in falconry, is when a hawk being upon her wings, at the height of her pitch, bends down violently to take the fowl.

STOPS, **STOPPING**, } in grammar. See { **POINTS**.
PUNCTUATION.

Saturday STOP. See the article **SATURDAY**.

STORAX, or **STYRAX**, a resinous, odoriferous, gum, brought from Syria; whereof there are two, or three kinds; *red storax*, *storax calamita*, and *liquid storax*.

Red or *dry STORAX*, called also *styx incense*, is a gum or resin oozing out at an incision made in the trunk and biggest branches of a tree, called *storax arbor*, not unlike our quince tree. Its fruit is of the size of a filbert, and contains a white, oily kernel, of a smell perfectly like *storax*.

It must be chosen in a mass, of a reddish colour, soft and fat, and of an agreeable smell, bearing no resemblance to liquid *storax*.—That in cakes, in balls, &c. is all sophisticated; and is only a wretched composition of liquid *storax*, and the impurities of the true red *storax*, and other drugs. That in powder is still worse.

Red *storax* is of some use in medicine; and is also used by the perfumers.

STORAX calamita, (thus called from the reeds or quills, in Latin, *calami*, it was anciently brought in,) is, by some, held to be only a composition of several excellent drugs; and among the rest, of red *storax*, whence its name: though authors have generally taken it for a natural gum, different from the red *storax*. Hoffman's conjecture is, that it only differs from the other in age; the *storax* growing higher coloured with keeping.

It must be chosen in fine white tears, very dry, and not bitter; sometimes it is in reddish masses, full of these whitish tears, only mixed with a ruddy substance. These two kinds are esteemed excellent pectorals, stomachics, and cephalics.

Liquid STORAX, is a kind of factitious resin, of a greyish colour, compounded of true *storax*, common resin of the pine oil, and wine, beaten with water, into the consistence of an unguent.

The druggists also call it *stacte*, to distinguish it, and sell it for the better price.

The best is that of Holland. It is easily kept in a cellar, by pouring water on it from time to time. It is an ingredient in an unguent which experience has shewn to be excellent against the scorbuts, and gangrene.

STORE. *Bill of STORES*. See the article **BILL**.

STORGE, **STORIM**, a Greek term, frequently used by naturalists, to signify that parental instinct, or natural affection, which all, or most animals bear their young.

The *storge* is an admirable principle implanted by the all-wise Creator throughout the animal world, for the preservation thereof; and is governed by such rules as make it best contribute thereto. By means of this, with what care and alacrity do animals nurse their young? and what dangers will they brave for their security? even the most timorous creatures, which at other times fly the face of men, dogs, &c. will, for the sake of their young, expose themselves.

Thus hens instead of flying from, will assault such as meddle with their brood; and partridges, before their young can fly, will frequently drop down before the dogs, first at leas, then at greater distances, to dodge, and draw them off, from pursuing their young. With what concern do they look about their young in places of safety? and some even admit them for shelter into their bodies.

Thus the opposum, Dr. Tyfon observes, has a curious bag on purpose for the securing and carrying about her young; The same author adds, from Cyprian, that the dog fish, upon any storm or danger, receives her young into her belly, which come out again when the fright is over. And it is said the Quatina and glaucous do the like.

With what tenderness do others seek and prepare the food for their young, teach them to suck, cherish, or lull them to rest, &c. like so many nurses, deputed by the Creator to take care of his creatures? and still in proportion, as they grow up and become fit to look to themselves, this *storge* abates; and at length, when no longer needed, becomes extinct. Mr. R. observes, that young doves are fed with meat first eat by the dam, and sodden a-while in her probosc. And Cælius observes, that the old female Ethiopian takes no food but from the male, after this manner.

The returns made by the young to the parent animal, when grown old, are not less considerable. Pliny says of rats, that they nourish their aged parents with eminent piety.

St. Ambrose, and after him Olaus Magnus, observe of the crane, that when the parents, through old age, are bereft of their feathers, and left half naked, their offspring stand around them, and cherish them with their own feathers; that they seek food for them; and when nature, as it often happens, repairs their decays, and restores them to strength again, they take them up by turns, on their wings, and habituate their unpractised limbs to their ancient art of flying.

STORM, in the military art. See **ASSAULT**.

STOVE, in building, a hot house or room.

Palladius observes, that the ancients used to warm their rooms with certain secret pipes, which came through the walls, conveying heat to several parts of the house, from one common furnace. Whether this were a common custom, says Sir Henry Wotton, or a curiosity, we cannot determine; but it was certainly, both for prompt and use, far beyond the German *stoves*.

STOVE, among confectioners, denotes a little closet well closed on all sides, wherein are several stories or rows of shelves made of wares one above another, for the drying of sweetmeats.

STOWAGE, in the sea-language, the putting of goods orderly into the hold of a ship; the most ponderous and heavy next the ballast.

STRABISMUS, **STREBIEMOS**, a disorder of the eye, which makes it look a-squint, either upwards, downwards, or sideways. The *strabismus* consists in a retraction of the ball of the eye, towards one side; occasioned by a convulsion, or a palsy of one of its muscles.

Children are apt to acquire it through the carelessness of their nurses, in placing them always on the same side the light, or of any other remarkable object that occasions them to turn their eyes that way.

To remedy it, care is to be taken, that the light, or other notable body, be placed on the other side of them; or else a mask put on them, the holes whereof are so disposed, as that to see through them, the child be obliged to turn his eyes the opposite way.

STRAIGHT, **STREIGHT**, or **STRAIT**, in hydrography, a narrow sea, or gut, shut up between lands on either side, and affording a passage out of one great sea into another.

The most celebrated *streight* in the world, is that of Gibraltar, which is about one hundred and thirty miles long and twelve broad, joining the Mediterranean sea, with the Atlantic ocean.

The *streights* of Magellan, discovered in 1520, by F. Magellan, were used some time, as a passage out of the north into the south sea; but since the year 1616, that the *streight* of le Maire has been discovered, the former has been disused; both because of its length, which is full three hundred miles, and because the navigation thereof is very dangerous, from the waves of the north and south seas meeting herein, and clashing.

The *streight* at the entrance of the Baltic, is called the *Sound*. See **SOUND**.—That between England and France, *Le pas de Calais*, or the *channel*.—There are also the *streights* of Babelmandel, of Weigats, of Jesso, of Anian, of Davis, and Hudson, &c.

STRAIGHT is also used in geography, for an isthmus, or neck of land between two seas; preventing the communication thereof.

STRAIGHT archer, } See the articles { **ARCH**.
STRAIGHT stairs, } **STAIRS**.
STRAIN, or **SPRAIN**, a violent extension of the sinews or tendons of some muscle.

STRAINED *sugar*. See the article SUGAR.

STRAINING*, is the clarification of a liquor, by passing it through a sieve, or filter.

* The word is derived from the French, *strindre*; which is formed from *ex*, out of; and *stringere*, to press.

STRAIT. See the article STRAIGHT.

STRAND and *stream*, in ancient customs, a freedom from all impositions upon goods or vessels by land or water.

STRANDED*, is when a ship is by tempest, or ill steerage, run on ground, and so perishes.

* The word is formed from the Saxon *strand*, a shore or bank of the sea, or a great river.

STRANGER, in law, denotes a person who is not privy, or party, to an act.

Thus a *stranger* to a judgment, is he to whom a judgment does not belong: in which sense the word stands directly opposed to *party* or *privy*.

STRANGURY*, ΣΤΡΑΓΓΟΥΡΙΑ, in medicine, a disease occasioning a frequent and involuntary emission of urine, in very small quantities, and, as it were, drop by drop; with an intense pain.

* The word is formed from the Greek, *σπασθ*, *gutta*, drop, and *ουρη*, urine.

The *strangury* arises from the too great acrimony of the urine, which velleicating the nervous parts of the bladder, occasions a continual inclination to urinate.

New beer, and other liquors, not well fermented, frequently occasion the *strangury*.—The extreme sharpness of the urine in the *strangury*, sometimes produces an ulcer in the bladder.

Some authors confound the *strangury*, which the Latins call *urineæ stititidum*, with the *urineæ incontinentia*.

—The difference between them consists in this, that in the former, the urine comes away with pain, in the latter without. The former proceeds from the acrimony of the urine; and the latter from a relaxation or palsy of the sphincter of the bladder, which cannot keep the neck thereof close shut.

STRAP, among furgeons, a sort of band used to stretch out limbs in the setting of broken, or disjoined bones. See BANDAGE.

STRAPADO*, or STRAPPADO, a kind of military punishment, wherein the criminal's hands being tied behind him, he is hoisted up with a rope, to the top of a long piece of wood, and let fall again almost to the ground; so that by the weight of his body in the shock, his arms are dislocated. —Sometimes he is to undergo three *strapado's* or more.

* The word is formed from the French *estrappade*, which signifies the same; and which is supposed to come from the old proverb *strapper*, to break, extirpate; or from the Italian *strappare*, of the verb *strappare*, to wrest by force.

STRATA, in natural history, the several beds, or layers of different matters, whereof the body of the earth is composed. The *strata* include all the layers of earths, minerals, metals, stones, &c. lying under that upper tegument or *stratum*, the turf, or mould.

The time when those several *strata* were laid, was doubtless at the creation; unless, with some great naturalists, as Steno, Dr. Woodward, &c. we suppose the globe of earth to have been dissolved by the flood.

At that time, says Mr. Derham, whenever it was that the terrestrial globe was in a chaotic state, and the earthy particles subside, then these several beds were reposit in that commodious order, wherein they are now found; and that, as it differed, according to the laws of gravity; the lower still heavier than the upper.

But Dr. Leigh, in his *Natural History of Lancashire*, speaking of the coal-pits, denies the *strata* to lie according to the laws of gravitation; observing that the *strata* there, are first a bed of marle, then free-stone, next iron-stone, then coal, or channel mire, then some other *strata*, then coal again, &c. This determined Mr. Derham to make a nicer enquiry into the matter; accordingly, in 1712, he caused divers places to be bored, laying the several *strata* by themselves; and afterwards determined very carefully their specific gravity. The result was, that in his yard, the *strata* were gradually specifically heavier and heavier, the lower and lower they went; but in another place in his fields, he could not perceive any difference in the specific gravities.

Acquainting the Royal Society therewith, their operator Mr. Haukebee, was ordered to try the *strata* of a coal-pit, which he did to the depth of thirty *strata*: the thickness and specific gravity of each whereof, he gives us in a table in the *Philosophical Transactions*; and from the whole makes this inference, that it evidently appears, the gravities of the several *strata* are in no manner of order; but purely casual, as if mixed by chance.

STRATAGITHMETRY*, in war, the art of drawing up an army, or any part of it, in any given geometrical figure; and of expressing the number of men contained in such a figure, as they stand in array, either near at hand, or at any distance assigned. Harris.

* The word is formed from the Greek, *στρατη*, army, and *μετρον*, number, and *μετρον*, measure.

STRATAGEM, ΣΤΡΑΤΗΓΗΜΑ, a military wile; or a de-

vise: wily, for the surprising, or deceiving an enemy.

* The word is formed from the Greek, *στρατηγος*, I lead or command an army.

The ancients dealt mightily in *stratagems*; the moderns wage war more openly, and on the square.—Frontinus has made a collection of the ancient *stratagems* of war.

STRATEGUS, ΣΤΡΑΤΗΓΟΣ, in antiquity, an officer among the Athenians, whereof there were two chosen yearly, to command the troops of the state.

Platach says, there was one chose from out of each tribe, but Pollux seems to say, they were chose indifferently out of the people. It was the people themselves made the choice, and that on the first day of the year, in a place called *Pylos*.

The two *strategi* did not command together; but took their turns, day by day; as we find from Herodotus and Cornelius Nepos. Sometimes, indeed, when a person was found of merit vastly superior, and exceedingly famed in war, the command was given to him alone; but it was ever a rule, not to put any person in the office, but whose name was in Attica, and who had children, that there might be some assistance, and securities for his conduct and return.

STRATIFICATION, STRATIFICATIO, in chemistry, the arrangement of different matters, in several strata or layers, alternately; called also by the Latins, *stratum super stratum*; and marked in books of chymistry with SSS.

This operation is used in calcining of minerals or metals with salts or other matters.

To purify gold by cæmentation, they *stratify* laminae, or plates of gold in a crucible, with a dry pale called *camelt*.

STRAY. See the article ESTRAY.

STREAM-anchor, is a small anchor made fast to a stream-cable; for a ship to ride by in gentle streams, and in fair weather. See ANCHOR.

STREAM-works, are certain works in the tin-mines, when the miners follow the veins of metal, by cutting trenches, &c. See TIN.

STREIGHT. See the article STRAIGHT.

STREN/E, in antiquity, *new year's gifts*; presents made out of respect on new-year's day; as a happy augury for the ensuing year.

The ancient lawyers derive the word hence, That these presents were only given *viris strenis*; Symmachus adds, that the use hereof was first introduced by king Tullius, Romulus's colleague, who received branches of vervain gathered in the sacred grove of the goddess Strenia, as a happy preface of the beginning year.

Anciently, a pound of gold was given to the emperors every new-year's day, by way of *strena*.—Du Cange observes, that *strena* or *strenna*, denoted a kind of tribute which the people of Dalmatia or Croatia paid to the Venetians, or to the kings of Hungary, whom they obeyed voluntarily.

STRENGTH, *vis*, force, or power.

The *strengths* of different animals of the same species, or of the same animal at different times, are demonstrated to be in a triplicate proportion of the quantities of the mass of their blood: the whole *strength* of an animal, is the force of all the muscles taken together; therefore, whatever increases *strength*, increases the force of all the muscles, and of those serving digestion, as well as others. See MUSCLE.

Yet, notwithstanding the truth of this, the quantity of blood may be increased in such circumstances, as to abate the *strength*. The equilibrium between the blood and vessels being destroyed, wonderfully lessens the *strength*. The sudden suppression of perspiration, though it increases the quantity of the blood, as it must considerably do, by Sanctorius's calculation, yet it lessens the *strength*; because the retained matter, being what ought to be evacuated, so alters the texture of the blood, as to make it unfit for muscular motion. Suppose the increase of quantity to be connected with an extraordinary viscosity, the quantity of small separable parts decreasing, as the viscosity increases, the quantity of animal spirits separated in the brain, will be less; and the tension of the fibres being in proportion to the animal spirits forced into them, they will not be able to counterpoise the great weight of the blood, and so the *strength* will be diminished.

Bellini proves, that if the blood be so vitiated, as to increase or diminish *strength*; it amounts to the same as if the blood were in a natural state, but its quantity increased or diminished in the same proportion: so that the blood, when vitiated, may so impair the *strength* of the muscles, as even to spoil digestion; and yet in some cases, it may be so vitiated, as to help digestion, and increase *strength*.

M. de la Hire, in a calculation of the *strength* of a man in drawing and bearing, shews, that the *strength* of an ordinary man walking in a horizontal direction, and with his body inclining forwards, is only equal to twenty-seven pounds; which is much less than one would have imagined.

He adds, that this force would be much greater, if the man were to walk backwards; and that it is; for this reason, the watermen fetch their oars from before backwards: and though he observes, the gondoliers of Venice fetch them the contrary way, yet this is, because they chuse to lose the advantage

... of strength, to have the ... if they are ... the numerous turns ... canals they there meet ...

It is known by experience, that a horse draws, horizontally, ... much as seven men; consequently, his power ... with ... A horse, as to pulling, ... has a great ... over a load, both in the strength of its muscles, ... of the whole body; but the man has the advantage over the horse in ascending. M. de la Hire shews, ... with 100 pounds a-piece, will ascend a ... with more ease and expedition, than a horse ... with 300 pounds.

He well illustrates us with abundance of instances of extraordinary strength: Clumber, provost of the great church of Meſnia in 1529, he tells us, carried a pipe of wine out of the cellar, and laid it in the cart.--Mayolus saw one hold a marble pillar with his hand three foot long, and one in diameter when he took it from the air, and caught again like a ball.--A little man in Mantua, called *Ridamus*, could break a cable.--A ... of ... ascended up stairs, an ass laden with wood, and threw both into the fire. At Constantinople, in 1581, one lifted a piece of wood which twelve men could scarce raise, then lying all along, he bore a stone which ten could but just roll on him.--G. of Fronsburgh, baron of Mundleheim, could raise a man off his feet with his middle finger, and shove a cannon out of its place.--Canden saw a man dance with two men in his arms, two on his shoulders, and one on his back. Patanus, captain of the Corsicans, could tear an horse-shoe; and the fame is reported of the late Augustus king of Sardinia. On Putney common, is a stone with an inscription mentioning a man, who in that place out-drew five horses in his own team.--A gigantic woman of the Netherlands, could lift a barrel of Hamburg beer.--Mr. Carew had a tenant that could carry six bushels of wheat in meal (of fifteen gallons measure) with the lubber a top of it. And J. Brown of the same country, could carry the carcass of an ox. See Hakewell's *Apology*, p. 238.

STRENGTHENERS, *corroborants*, such medicines as add to the bulk and firmness of the solids.

Strengtheners differ from *cordials*, as a bandage does from a nethe-crust: the latter are such as facilitate and drive on the vital actions; but the former, such as confirm the stamina, and maintain the solids in such a condition, as to exert themselves into action on all proper occasions, with the greatest force and vigour.

The continual waste, which constant motion makes in the constitution, were it not for frequent and proper supplies, would soon wear the body quite out. The attritions and abrasions of the circulating fluids, would quickly carry away the canals in which they circulate, were not somewhat furnished in their composition, which is suited to fall into, adhere with, and recruit that which is washed off. And those particles must be much more disposed so to do, whose adhesions are great, when once they come into contact; such are those of bodies we call *glutinous*, and which easily form themselves into jellies, and such like consistencies: for the parts of such bodies are very light, by the over-proportion of their textures to their solidities, whereby their motions are both more languid, when in circulation; and when they stop, their cohesions will be much the stronger, with whatsoever they happen to fall into contact. See **NUTRITION**. Medicines of this tribe, are therefore of great service in hectic; where the swift motion of a thin, sharp blood, wears away the substance of the body, instead of nourishing it: for they not only retard the inordinate motion, but give such a weight and confidence to the juices, as fits them also for nourishment.--There are likewise other causes, which may weaken the solids, by admitting, or occasioning them to relax too much.

Whatever therefore acts as a stimulus, and crisps and corrugates the fibres into a more compacted tone, which moist and rare and pointed bodies do, will remove such weakness, and increase strength: and as too much moisture may also contribute to such a relaxation, what has no other quality but that of absorbing, and drying up such superfluous humidities, may defend, though accidentally, to come under this denomination.

STRETCH.--When at sea, they are going to hoist the yard, or hale the sheet; they say, *stretch forward the sheets*: meaning, that the part which the men are to hale by, should be put into their hands, in order to their hauling.

STRÆ, in the ancient architecture, the lifts, fillets or rays which separate the fringes or flutings of columns.

STRÆ, among naturalists, denote the small grooves or channels in the shells of cockles, scollops, &c.

STRICTOR, in anatomy, the same as *spincter*. See **SPINCTER**.

STRIGES, in the ancient architecture, are what in the modern we call *flutings*.

They were thus denominated, as being supposed to have been originally intended to imitate the folds or plaits in womens robes; which the Latins call *frige*.--The fillets or spaces between them, were called *stria*.

STRIKE, or **SPRYKE**, a measure, containing four bushels; two of which make a quarter.

A STRIKE off, is as much as can be heeled at one handful.

STRIKE, is a sea word variously used.--When a ship in a fight, or upon meeting with a man of war, lets down, or lowers her top-masts, at least half-mast high; they say, *she strikes*: meaning, she yields or submits, or pays her devoir to that man of war, as the palfrey by.

When a top-mast is to be taken down, they say, *strike the top-mast*.

And when any thing is let down or lowered into the hold, they call it *striking down into the hold*.

Also, when a ship touches ground in a shoal-water, they say, *she strikes*.

STRIFE a bull. See the article **HULL**.

STRIKING.--The punishment appointed by our laws, for *striking within the king's court*, whereby blood is drawn, is, that the criminal shall have his right hand struck off, in a most sad and solemn manner.

For *striking in Westminster-hall*, while the courts of justice are sitting, the punishment is imprisonment for life, and forfeiture of one's estate.

STRIKING watch. See the article **WATCH**.

STRING, in music. See the article **CHORD**.

If two strings or chords of a musical instrument only differ in length; their tones, that is, the number of vibrations they make in the same time, are in the inverse ratio of their lengths.

If they only differ in thickness, their tones are in the inverse ratio of their diameters.--As to the tension of strings, to measure it regularly, they must be conceived stretched or drawn by weights; and then, ceteris paribus, the tones of two strings are in a direct ratio of the square roots of the weights which stretch them, that is, *a. gr.* the tone of a string stretched by a weight, *4*, is an octave above the tone of a string, stretched by the weight *1*.

It is an observation of very old standing, that if a viol or lute string, be touched with the bow, or hand, another string on the same, or another instrument, not far from it, if in unison to it, or in octave, or the like, will at the same time tremble of its own accord. See **UNISON**.

But it is now found, that not the whole of that other string doth thus tremble; but the several parts, severally, according as they are unisons to the whole, or the parts of the string so struck. Thus supposing

A B to be an upper octave to *a c*, and *a*-----B

therefore an unison to each half of it *a*-----c

stopped at *b*. If while *a b* is open, A B be struck, the two halves of this other, that is *a b* and *b c* will both tremble; but the middle point will be at rest; as will be easily perceived, by wrapping a bit of paper lightly about the string *a c*, and removing it successively from one end of the string to the other. In like manner, if A B were an upper twelfth to *a c*, and consequently, an unison to its three parts *a x*, *x 2* and *2 c*; if *a c* being open, A B be struck, its three parts *a x*, *x 2* and *2 c* will severally tremble; but the points *x* and *2* remain at rest. This, Dr. Wallis tells us, was first discovered by Mr. T. Piggot of Wadham college, without knowing that Mr. Noble had observed it before. To which we may add, that M. Sauveur, long afterwards, proposed it to the Royal Academy at Paris, as his own discovery, as it is like enough it might be; but upon his being informed, by some of the members then present, that Dr. Wallis had published it before, he immediately resigned all the honour thereof.

STRINGENT.--Line of Defence **STRINGENT**. See **LINE**.

STRING-HALT, a sudden twitching or snatching up of an horse's hinder leg, much higher than the other, as if he trod on needles; generally befalling only the best mettled horses, and ranked in the number of spavins. See **SPAVIN**.

It frequently happens upon taking cold, after hard riding, or fore labour; especially upon walking him when too hot, which chills the blood, and so benumbs the sinews, as to take away the sense and feeling of the member.

To cure it, the middle vein is taken up above and underneath the thigh; under which is found a string, which is to be cut away, and the part anointed with butter and salt.

STRIPED flak, } See the articles **STALK**.

STRIPED velvet, } **VELVET**.

STROAKING, a method of cure which some people have given into, in certain diseases, consisting in a mere application of the hand to the part affected, in the way of friction or rubbing.

That friction has very considerable uses in many diseases, is allowed.

But as to the particular efficacy of the *stroak* of particular persons; we see little foundation for it in nature. Experience indeed, seems to afford some; to which we do not well know what to object.

Mr. Thoreby, in the *Philosophical Transactions*, gives several remarkable instances of cures performed by that famous *stroaker*, Mr. Greatrix. Mr. Thoreby's own brother being seized with a violent pain in his head and neck; Mr. Greatrix

trix coming accidentally thither, gave immediate ease to his head, by *only stroking* it with his hand: he then fell to *stroke* his back; whence the pain immediately fled to his right thigh: then he parried it with his hand to the knee, from thence to the leg, ankle, foot, and at last to the great toe, where it grew more violent; but upon rubbing there, it vanished.

Another relation of the same author having a great pain and weakness in her knees, which occasioned a white swelling; that had remained on her several years, in spite of all means; the same *stroaker* rubbing both her knees, gave her present ease; the pain flying downwards from his hand, till he drove it out of the toes: after which the swelling soon went absolutely away.

Mr. Thotelsby gives various other like instances, all among his acquaintance; and adds, that when Mr. Greatrix *stroaks* only for pains, he uses nothing but his hand; but that for ulcers, or running sores, he uses spittle on his hand or fingers.

STROBILITES *vinum*. See VINUM.

STROPHE, in the Greek and Latin poetry, a stanza, or certain number of verses including a perfect sense; succeeded by another, consisting of the same number and measure of verses, and in the same disposition and rhythmus, called *antistrophe*.

What the couplet is in songs, and the stanza in epic poetry; *strophe* is in odes.

The word is Greek, *στροφή*, formed from *στροφή*, I turn; because at the end of the *strophe*, the same measures returned again; or rather, as the term related principally to the music or dancing, because at first coming in, the chorus, or the dancers turned to the left, and that measure ended, they turned back again to the right.

STRONG place, } See the article } **PLACE**.

STRONG pulse, } See the article } **PULSE**.

STRUCTURE, in architecture. See BUILDING.

STRUMÆ*, in medicine, tumours arising most usually on the neck and throat; called also *scrophule*, and, popularly the *evil*, or *king's evil*.

* The word is Latin, formed, as some will have it, *à struendo*, because they grow intensively. *struunt affurgunt* — The Greeks call them *σφαιδία*, sores. See Supplement, article STRUMÆ.

STRIKE. See the article STRIKE.

STUC*, or **STUCCO**, in building, a composition of white marble pulverized and mixed with plaster or lime; the whole sifted, and wrought up with water; to be used like common plaster.

* This is what Pliny means by *marmoratum opus*; and *albarium opus*. See MOSAIC, &c.

Of this are made statues, busts, basso relievo's, and other ornaments of architecture. See STATUE, &c.

STUES. See the article STEWS.

STUFF, in commerce, a general name for all kinds of fabrics of gold, silver, silk, wool, hair, cotton or thread, manufactured on the loom; of which number are velvets, brocades, mohair, fattsins, taffetys, cloths, ferges, &c.

STUFF is particularly used, for certain kinds of slight woollen stuffs, used principally for linings and womens wear; as linseys, ratens, &c.

Bleaching of STUFFS, } See { **BLEACHING**.

Cross-grained STUFF, } See { **CROSS-GRAINED**.

Pulling of STUFFS, } See { **PULLING**.

STUM, the flower of wine set a working.

Hence to *stam*, is to put certain ingredients into sick and decayed wine, in order to revive it, and make it brisk.

STUMBLING, in the manage, &c. a vice in a horse, either natural or accidental.

The natural arises from the sinews of the fore-legs being somewhat too straight, which cramps the horse, and prevents his using his legs with the necessary freedom and nimbleness. — The way to cure them, is to cut him of the cords, *i. e.* to make a slit on the top of his nose, and with a cornet, to raise up the great sinews, to cut them afunder, and heal them up again with a proper salve.

The accidental arises from a splint, wind-gall, being foundered, pricked, stubbed, gravelled, &c.

STUNG. — **Adder STUNG**. See the article ADDERSTUNG.

STUPA. See the article STUPHA.

STUPIFIERS, in medicine, the fame as narcotics, and opiates. See NARCOTIC, and OPIATE.

STUPHA, **STUPA**, **STUPE**, sometimes denotes a fomentation. See FOMENTATION.

STUPOR, a numbness, occasioned by any accidental bandage that stops the motion of the blood and nervous fluids, or by a decay in the nerves, as in a palsy, &c.

STYGIAN liquors; a term which some chymists apply to the concive acid spirits, as aqua regia, from their efficacy in destroying or dissolving mixt bodies.

STYLE, **ΣΤΥΛΟΣ**, a kind of bodkin, wherewith the ancients wrote on plates of lead, or on wax, &c. and which is still used to write on ivory leaves, and paper prepared for that purpose, &c.

This is the origin of all the other significations of the same word in English.

STYLE, **ΣΤΥΛΟΣ**, in chymistry, denotes a long steel instrument, which goes continually to a point at one end, so as to be of a conical form; serving either to expand and open, or to be thrust into a part.

The *style* is frequently used to be thrust in red-hot, in canulae, and to be pulled out again, immediately: it is put in and drawn out successively, as often as is necessary. In order to do this, it is good to have two *styles*, to be put in alternately.

STYLF, in dialling, denotes the gnomon or cock of a dial, raised on the plane thereof, to project a shadow.

STYLE, **ΣΤΥΛΟΣ**, in botany, the part rising up in the middle of a flower, and bearing, by its lower part, on the rudiment of the fruit.

This, we more usually call the *pistil*: though Bradley makes a distinction; calling it *style* when it is only joined or contiguous to the seed or fruit; and *pistil* when it contains the seed or fruit within it; as the ovary does the egg.

STYLE, in matters of language, is a particular manner of delivering a man's thoughts in writing, agreeably to the rules of syntax; or, as F. Buffier more accurately defines it, the manner wherein the words constructed according to the laws of syntax, are arranged among themselves, suitably to the genius of the language.

This definition fixes the notion of *style*, to something determinate, which before was very vague and arbitrary; whence many authors, even of note, confounded it with syntax itself.

From the definition, it appears, that *style* supposes or includes the syntax; and that syntax does not extend so far as *style*; for the syntax may be very just, where the *style* is wretched, were it only in this example: "God always rewards with great fidelity, and greater liberality, the just;" or this, "There is no body, who more than I honour you."

The regimens and terminations of every word, are perfectly just in each of these phrases: there is no fault then, in the syntax; but there is something wanting in the arrangement of the words, to suit them to the genius of the language; there is a fault then, in the *style*.

Indeed, against what particular rule of grammar the fault is committed, it is scarce possible to determine precisely; the taste and use of a language being so exceedingly delicate and precarious. It is true, a fault in *style*, is not less a fault as faulty grammar, than is a fault in syntax; only the former is less precise and palpable than the latter.

A very common error in grammarians, F. Buffier adds, is to confound two kinds of *styles* in one: the *grammatical style*, or that directed by the rules of grammar; and the *personal style*, which depends less on the grammar, than on the person that writes; whether with regard to his particular taste and genius, or with regard to his matter, or the kind or character of his work.

There are a great many differences between the two: the most essential is, that the one may be diversified an infinite number of ways, and the other cannot. — In effect, the personal *style* is naturally variable, according to the different genius's, humours, and complexions.

It is the imagination that acts, that conceives, that proposes, and that expresses things, according to its character, which is different in all men, and which is to be varied, according to the particular kind of the work.

Hence arises the gay, the grave, the florid, the jejune, the copious, the concise, the poetical, the epistolary, and the burlesque *styles*.

These personal *styles* are all independant on the grammatical; and we have authors, who excel in the one, yet are miserably defective in the other. The personal *style* is not under the direction of grammar; but of the imagination, or rather of rhetoric, that art having to do directly with our thoughts, as grammar with our words.

This, however, may be said, that grammar is far from being able to vary the same words of a phrase with equal perfection; and that generally there is but one way of delivering them in the taste and genius of the language. Thus, the grammatical *style* is invariable in the following phrase, and proportionably in others. "Death is a law, which all men are to undergo." For you cannot well range the words otherwise than they here are, without going out of the bounds of grammar. Would you say, "A law is death, which all men," &c. or "law is a death, which," &c. But in the personal *style*, where the imagination comes to be concerned, this sentence might be varied infinite ways, according to the kind of the writing, whether oratorical, poetical, &c. As, "Death neither spares the prince nor the peasant. Death knocks equally at the monarch's palace and the beggar's hut," &c.

STYLE, in oratory and poetry, is restrained wholly to what F. Buffier calls the *personal style*.

Language refers principally to the matter of the discourse,

and the words; elevation to the particular members or parts thereof; and *style* to the whole composition.

The masters of the art, reduce the kinds of *style* to three; the *sublime*, the *low*, and the *intermediate*, or *equable style*.

Sublime STYLE, is that consisting in magnificent words and sentences; which by its noble boldness, ravishes the hearers, and extorts admiration even from the unwilling. See **SUBLIME**.

Low or simple STYLE, is that ordinarily used in smaller and humbler works; as epistles, dialogues and common discourse. The chief virtues hereof are perspicuity, smoothness, easiness, and clearness; it must be very sparing in the use of tropes and figures, especially the more violent ones, as the prolepocopia, apostrophe, &c.

Intermediate, or equable STYLE, partakes of the magnificence of the *sublime*, and the simplicity of the *low*. It neither rises to the majesty of the one in words and sentences; nor yet is faintly pointed like the other: but, as Tully excellently expresses it, *Est stylus quidam interjectus, intermedius, & quasi temperatus; nec acuminis inferioris, nec sublimis utens superioris, vicinus amorum, in neutro excellens, utriusque participans*.

The same author calls it the *florid* and *polish'd style*; it being in this that all the graces and beauties of language are principally to be used.

As to the choice of *style*, in the general, the nature of the subject is to determine it. Such *style*, says Cicero, is to be chosen, as expresses great things magnificently, middle things moderately, and low things subtly: but more particularly, as there are three branches of the duty of an orator, to teach, to delight, and to move; the simple *style* is used to teach, the middle to delight, and the sublime to move.

Again, the simple or low *style* is fit for comedy, the sublime for tragedy; and the middle for history.—Cæsar, it is true, rather used the simple than the intermediate *style*; but then he wrote commentaries, not a history, as is observed by Tully.

Again, the simple *style* is fit for bucolics, and eclogues; the intermediate *style* for georgics; and the sublime for epics: which triple difference we easily descry in Virgil, though he sometimes mixes them all in the *Æneid* itself, using the simple *style* in the fifth book, where he describes games, and the intermediate in the beginning of the poem. Care is still to be taken, that the *style* be not flat and dull, on pretence of being simple.

M. Boileau observes, that in all languages a mean thought expressed in noble terms, is better liked than the noblest thought expressed in mean terms: the reason he gives, is, that every body cannot judge of the force and justness of a thought: but scarce any body but perceives the meanness of words. The latter we find by our senses, the former only by our reason.

He adds, that the words in different languages do not always answer justly to one another; and that a noble Greek term cannot frequently be expressed in another language, but by a very mean one.

This we see in the words *afinus* in Latin, *ane* in French, and *as* in English, which are the meanest imaginable, in those three languages; yet the word expressing that animal, has nothing mean in it, either in Greek or Hebrew, but is used in the finest and noblest passages.

Add to this, that languages are exceedingly capricious on this head: a bull, a heifer, a goat, a boar, &c. may be used in the sublimest passages, without debasing the *style*; but a cow, a sheep, a hog, a fow, &c. would be intolerable. Shepherd and herdsman, are fine words; hog-keeper and cow-ward, which carry the same ideas, vicious to the last degree. The chief faults in *style* are, its being *turnid* and *swollen*; or *cold* and *puerile*, or *stiff*, or *loose*, or *dry* and *jejune*.

A turnid STYLE is that immoderately stuffed with big words and sentences; such are those verses of the emperor Nero, ridiculed by Petrus.

Tercæ micalloneis implemunt cornua bombis

Et raptum vitulo caput ablatura superbo

Bassaris, & lyncem mœnas flexura corymbis, &c.

Frigid, or puerile STYLE, is that which affects certain trifling ornaments, insipid jests, remote and strained allusions, redundant descriptions, &c.—Such, *e. gr.* as, a centaur's riding himself: more golden than gold, &c.—Of this vice, that passage of Virgil seems guilty,

Num capti pueri capiti? Num incensa cremavit

Troja viros?

And that in Plutarch, and Dion Cassius; “It was no wonder Diana's temple should be burnt the night Alexander was born; as that goddess, attending at so great a birth, could not be in the way to extinguish the flames.”—And that in Plautus, where a person is represented to exceedingly covetous, that he would invoke heaven and earth, if he saw but a grain of smoke escape out of his cottage.

Loose STYLE, is that which wanting articles, numbers, &c. fluctuates here and there, not connected or joined together.

This is a fault so frequent, especially in young writers, that we shall spare giving instances of it.

Dry jejune STYLE, is that which is destitute of ornament,

spirit, &c. The ancients made a notable distinction of *style*, into *Laconic*, and *Asiatic*.

Asiatic STYLE, is that which is very diffusive and prolix; or where abundance of words are used to express a little matter: thus called, by the Greeks, from the people of Asia, who affected such redundancies, in opposition to the

Laconic STYLE, which is distinguished by its exceeding conciseness; and by comprehending a deal of matter under a few words.

Such, *e. gr.* is that answer returned by the Lacedæmonians, to a long epistle of an enemy, threatening to destroy them with fire and sword; “*u, si, it*; that is, do if you can: or, that returned by the same people to king Philip, demanding some extravagant thing of them, “*u, non*, no. Or that of Cleomenes, the Spartan general, to the ambassador of Samos; “As to what you have said, the first part I do not remember; the middle I do not understand; the last I do not approve.” Or that epistle of Archidamus to the Eleians: “It is good to be quiet.” Or that of Cæsar to the Roman senate, after his conquering Pharnaces, king of Pontus: *veni, vidi, vici*; I came, I saw, I conquered.

Mareotic STYLE. See the article **MAREOTIC**.

STYLE, in jurisprudence, the particular form, or manner of proceeding in each court or jurisdiction, agreeable to the rules and orders established therein.—Thus we say, the *style* of the court of Rome, of the court of chancery, of parliament, of the privy council.

STYLE, in music, denotes a peculiar manner of composing, or singing.

The *style* is, properly, the manner that each person has, either of composing, of performing, or teaching; which is very different, both in respect of the different genius's of countries and nations, and of the different matters, places, times, subjects, expressions, &c.

Thus we say, the *style* of the Charissimi, of Lully, of Lambert; the *style* of the Italians, the French, the Spaniards, &c. The *style* of gay pieces of music, is very different from that of serious pieces: the *style* of church music very different from theatrical music. The *style* of the Italian compositions, is poignant, florid, expressive; that of the French compositions, natural, flowing, tender, &c.

Hence, the various epithets, given to distinguish these various characters; as, the ancient and modern *style*, the Italian and German *style*, the ecclesiastical and dramatic *style*, the gay, grave, majestic, natural, soft, familiar, gallant, low, sublime *style*, &c.

STYLE recitativo, or dramatic, in the Italian music, is a *style* fit to express the passions.

STYLE ecclesiastico is full of majesty, very grave, and fit to inspire devotion.

STYLE metelico, is a various, rich, florid *style*, capable of all kinds of ornaments, and of consequence, fit to express various passions, particularly admiration, grief, &c.

STYLE madrigalesco, is a *style* proper for love, and the other softer passions.

STYLE hyperbematico, is a *style* proper to excite mirth, joy, dancing, &c. and of consequence, full of brisk, gay motions.

STYLE symphonico, is a *style* fit for instrumental music: but as each instrument has its particular effect, there are as many different symphonical *styles*.—The *style* of violins, for instance, is usually gay; that of flutes, melancholy and languishing, and that of trumpets, sprightly, and animated.

STYLE melismatico, is a natural, artless *style*, which almost any body may sing.

STYLE phantastico, is a free, easy, humorous manner of composition, far from all constraint, &c.

STYLE choreico, is the *style* proper for dancing; and is divided into as many different kinds, as there are dances; as the *style* of farabands, of minnets, of gavots, rigadoons, &c.

STYLE, in chronology, denotes a particular manner of accounting time, with regard to the retrenchment of ten days from the calendar, in the reformation made thereof under pope Gregory XIII.

Style is either *old* or *new*.

Old STYLE, is the Julian manner of computing, which obtains in England, and some other protestant states, who refuse to admit of the reformation.

New STYLE, is the Gregorian manner, followed by the catholics, and others, in consequence of that reformation.

Hence, there has arisen a difference of ten days, between the *old style* and the *new*, the latter being so much beforehand with the former: so that when the catholics, *e. gr.* reckon the 21st of May, we only reckon the 11th.

This difference of ten days, was increased in the year 1707, to eleven days, by reason that year was not the Bissextile in the *old style*, but was in the *new*: so that the 10th day of the one, corresponded to the 21st of the other.

There are several places, however, where the *new style* has begun to obtain, even among protestants; and it is not unlikely, that the *old style* may, in time, dwindle quite away.

—At the Diet of Ratisbon in 1700, it was decreed, by the

body of protestants of the empire, that eleven days should be retrenched from the old *style*, to accommodate it for the future to the new. And the same regulation has since passed into Sweden and Denmark. England holds out, almost alone, for the old *style*.

STYLES of *bunting*. See the article **HUNTING**.

STYLET, **STYLETTO**, a small, dangerous kind of poniard, which may be concealed in the hand; chiefly used in treacherous assassinations.

The blade is usually triangular, and so slender, that the wound it makes, is almost imperceptible. — The *styletto* is strictly prohibited in all well disciplined states.

STYLOIDES, **ΣΤΥΛΙΔΗΣ**, an appellation given to a kind of solitaries, who spend their life seated on the tops of columns, to be the better disposed for meditation, &c.

Of these, we find several mentioned in ancient writers, and even as low as the eleventh century. The founder of the order was St. Simeon *Stylites*, a famous anchorite in the fifth century; who first took up his abode on a column six cubits high; then on a second of twelve cubits; a third of twenty two; and at last on another of thirty six, where he lived several years.

The extremities of these columns were only three foot in diameter, with a kind of rail or ledge about, that reached almost to the girdle, somewhat resembling a pulpit. There was no lying down in it. — The fakirs, or devout people of the east, imitate this extraordinary kind of life to this day.

STYLOIDES, in anatomy, an apophysis of the os petrosum, thus called from its resembling a style or styler. — See *Tab. Anat. (Osteol.) fig. 13. lit. e.*

STYLOGLOSSI, in anatomy, a pair of muscles, running off sharp and fleshy, from the processus styloides; whence descending obliquely forwards, they are inserted into the root of the tongue. — They serve to pull the tongue up in the action of deglutition.

STYLOHYOIDEI, in anatomy, a pair of muscles springing from the processus styloides, and inserted into the basis and horns of the os hyoides; which they draw laterally upward.

STYLOPHARYNGEI, in anatomy, a pair of muscles arising round and fleshy, from the processus styloides; and which, in their oblique descent become thicker, and are afterwards expanded on the back parts of the fauces. — They serve to draw up, and dilate the pharynx.

STYPTIC, **ΣΤΥΠΤΙΚΟΝ**, in medicine, *astringent*; a remedy that has the virtue of stopping blood, or of binding up the aperture of a wounded vessel.

The service, nettle, Solomon's seal, &c. are *styptics*. — There are various *styptic* waters, and powders of great efficacy, in most of which, vitriol is the principal ingredient.

The usual *styptic* water is made of colcothar calcined, or vitriol dissolved with burnt alum, sugar-candy, the urine of a young man, &c.

Dr. Colbatch's *styptic* powder has been famed; though Mr. Cowper, in the *Philosophical Transactions*, gives us a number of instances, wherein it was applied with very little or ill success in human subjects: but he gives us others made in dogs, where it answered well.

M. Tournefort observes, from the analysis he has made of *styptic* and astringent plants, that acids and earths always prevail therein; though some of them yield an urinous spirit.

On this principle, he asserts, that their salt is analogous to alum, and that there is somewhat of sal ammoniac in their texture. — But Chomel notes, that this does not hold universally.

STYRAX, **ΣΤΥΡΑΞ**, in medicine. See **STORAX**.

SUB, a Latin preposition signifying *under*, or *below*; frequently used, in composition, in our language. — *E. gr.*

SUB-BRIGADIER, an officer in the cavalry, who commands under the brigadier; assisting him in the discharge of his functions.

SUB-CHANTOR, an officer in the choir, who officiates in the absence of the chantor, &c. See **CHANTOR**.

SUB-DEAN, a dignity in certain chapters beneath the dean. See **DEAN**.

SUB-PRIOR, a claustral officer, who assists the prior, &c. See **PRIOR**.

SUB-DEACON, an inferior minister, who antiently attended at the altar, prepared the sacred vessels, &c. and was invested with the first of the holy orders.

According to the canons, a person must be twenty two years of age, to be promoted to the order of *sub-deacon*.

It is disputed among the Romanists, whether the *sub-deacon* hood be a sacrament or not; in regard *sub-deacons* are ordained without imposition of hands, and that there is no mention made of them in scripture. Yet Bellarmin holds the affirmative side of the question.

By the papal canons, a married man may be ordained *sub-deacon*; upon condition his wife consent to it, make a vow

of continence, and shut herself up in a monastery.

SUBALTERN*, a subordinate officer, or one who discharges his post under the command, and subject to the direction of another.

* The word is formed from the Latin *sub*, and *alter*, another. Such are lieutenants, sub lieutenants, cornets and ensigns, who serve under the captain: but the custom of the world, has now appropriated the term to those of much lower rank, as serjeants and the like.

We also say, *subaltern* courts, jurisdictions, &c. — Such are those of inferior lords, with regard to the lord paramount; hundred courts, with regard to county courts, &c.

For the *subaltern* persons in an epic poem, F. Boffin observes, there is no necessity to be very strict in preserving every one's character.

The patriarchs, M. St. Evremont tells us, had several wives, who did not all hold the same rank; but there were several *subaltern* to the principal wife.

SUBALTERN genus. See the article **GENUS**.

SUBCLAVIAN, **SUBCLAVIUS**, is applied to any thing under the arm-pit, or shoulder; whether artery, nerve, vein, or muscle.

SUBCLAVIUS, more particularly denotes a muscle which arises from the lower side of the clavicle, near the acromium; and descends obliquely to be inserted into the upper part of the first rib, near the sternum. — See *Tab. Anat. (Myol.) fig. 2. n. 9.*

SUBCONTRARY position, in geometry, is when two similar triangles are so placed, as to have one common angle, V, (*Tab. Geom. fig. 44.*) at the vertex, and yet their bases not parallel.

If the scalenous cone BVD be so cut by the plane CA, as that the angle at C=D; the cone is then said to be cut *subcontrarily* to its base BD.

SUBCUTANEUS, in anatomy, a thin membranous muscle, running under the skin, called also *quadratus genae*, and *platysma myoides*.

It arises with a pretty broad origin, from the hind part of the neck, and from the pectoral muscle below the clavicle.

It adheres firmly to the panniculus carnosus; from which it is not separated without difficulty, and therefore it was not antiently distinguished from it; and is inserted, obliquely, on each side, into the lower jaw-bone near the skin, lips, and sometimes the bottom of the nose; all which parts it draws downwards and a-wry.

A convulsion herein is called a *spasmus cynicus*. — In some persons, it reaches to the ears, and in others not; which is the reason some folks have a faculty of moving their ears, which others want.

SUBDUCTION, in arithmetic, the same as subtraction. See **SUBTRACTION**.

SUBDUPLICATE ratio, is when any number or quantity is contained in another, twice. — Thus 3 is said to be *subduplicate* of 6, as 6 is duple of 3.

SUBJECT, **SUBDITUS**, a person under the rule and dominion of a sovereign prince, or state.

Of *subjects*, some are so by birth, others become so by acts of naturalization.

Antiently the lords called, abusively, those who held lands or fees of them, or owed them any homage, their *subjects*.

SUBJECT, **SUBJECTUM**, is also used for the matter of an art, or science; or that which it considers, or whereon it is employed. — Thus the human body is the *subject* of medicine.

In this sense, anatomists call the body they are dissecting, and whereon they read lectures, their *subject*. See **BODY**, &c.

The *subject* of logic, is thinking, or reasoning; but more particularly, in a syllogism, one of the terms of a proposition is called the *subject*, and the other the *attribute*.

In poetry, the *subject* is the matter treated of; or the event related, or set to view, and enriched with ornaments.

SUBJECT also denotes the substance or matter to which an accident is added.

It is a maxim, that two contraries can never subsist in the same *subject*.

SUBJECTIVE part. See the article **PART**.

SUBJUNCTIVE, in grammar, the fourth mood, or manner of conjugating verbs; thus called, because usually subjoined to some other verb, or at least to some other particle, as, *If I loved: though this were true*, &c.

The Greek is almost the only language that properly has any *subjunctive* mood; though the French, Spanish, and Italian, have some shew thereof. — In all other languages, the same inflexions serve for the optative, and the *subjunctive* moods: for which reason, the *subjunctive* mood might be retrenched from the Latin, and those other grammars; it not being the different ways of signifying, which may be very much multiplied, but the different inflexions, that constitute the different moods.

SUBBLASPATORY, or *Infralaspary*, in theology, a term applied to such as hold, that God having foreseen the fall of

Adam, and in consequence thereof, the loss of mankind; resolved to give a grace sufficient for salvation to some, and to refuse it to others.

Sublapsary is used as synonymous with *infralapsary*; in opposition to *supralapsary*. See *INFRALAPSARY*, and *SUPRALAPSARY*.

SUBLIMATE, a chymical preparation, the basis whereof is mercury, or quicksilver.

There are two kinds of *sublimate*, *corrosive* and *sweet*; which see under the article *MERCURY*.

Refining of gold by SUBLIMATE. See *REFINING*.

SUBLIMATION, *SUBLIMATIO*, in chymistry, an operation which differs little from distillation, excepting, that in distillation, only the fluid parts of bodies are raised; but in *sublimation*, the solid and dry: and that the matter to be distilled may be either solid or fluid; but *sublimation* is concerned only about solid substances.

There is also another difference, namely, that rarefaction, which is of very great use in distillation, has hardly any room in *sublimation*; for the substances which are to be sublimed, being solid, are incapable of rarefaction; and so it is only impulsive that can raise them.

However, it may not be improper to inquire a little more nicely into the reason of such a diversity in the elevation of bodies; why some do ascend with a gentle heat, and others are not to be raised by the most vehement fire: and such an enquiry will more properly come in here, because this head contains all the business of volatility and fixation.

The cause of this elevation, and ascent in the particles of bodies, is to be ascribed to the fire; not only on account of impulse, but of another property the fire has; namely, to insinuate itself into all the interstices of these bodies, and thereby break the cohesion of their parts, so that at last they become divided into very small parts, if not into the smallest that art can reduce them into.

Particles thus separated and divided, lose much of their gravity. For the gravity of the same particle decreases in the same proportion as the cube of the diameter is lessened. Suppose, therefore, a body, whose diameter is 12: if, then, its diameter be made less by 1, viz. 11, the gravity of that body will be only $9\frac{1}{3}$, or thereabouts: a body, therefore, by being divided into very minute corpuscles, becomes easy to be sublimed.

Add, that the surface of a body decreases in a very different manner from gravity, only as the square of the diameter is lessened. Where the gravity decreases, in such a series, as is expressed by the numbers 1728, 1331, 1000, the diminution of the surface will observe this proportion, viz. 144, 121, 100; and when, upon reducing the diameter to 6, the gravity becomes less than 2, the surface will still amount to 36.

How much this contributes to a quick ascent, will appear from the *sublimation* of camphire, benzoin, and arsenic; whose particles, as they cohere but loosely, are, for that reason, diffused into a larger surface; upon which account they are the easiest to be sublimed of any: nay, these solid particles, upon account of their surface, will sooner ascend than many fluids.

So flowers of sulphur rises sooner than oil, not only than that of vitriol, but any other, though ever so light.

By this contrivance of nature, viz. that the gravity of bodies decreases in a triplicate, but their surface in a duplicate proportion of their diameters; it comes to pass, that bodies, which have a very different gravity, may be raised with the same force. Thus the salts of animals, as of hartshorn, human blood, that of vipers, &c. being composed of very minute corpuscles, as is found by experience, in distilling them, do easily ascend; because the surface in them is not lessened so much as the gravity is; and the salts of vegetables, as of tartar, balsams, &c. which are of a more close texture, by reason of their larger surfaces, are also without much difficulty raised.

The corpuscles also of minerals and metals, though very compact and heavy, do, in some measure, give way to the fire, and are capable of being sublimed. In all these instances, the breadth of the surface, which exposes the particles more to the impetus of the fire, is the reason why they are raised with as much ease, as if their gravity had been lessened, by diminishing their surface: so that particles, though ever so different in weight, may be equally raised by the same degree of heat, if the proportion of their gravity be reciprocal to that of their surfaces.

SUBLIME, in discourse, something extraordinary, and surprising, which strikes the soul, and makes a sentiment or composition ravish and transport.

This is what Longinus, who has wrote expressly on the subject, means by *sublime*.—The definition, indeed, is not his, but M. Boileau's; for the author writing his book after another of Cecilius on the same subject, employed himself almost wholly in shewing what the *sublime* is, declined defining it, as supposing it well known.

By the definition, it may appear, that the *sublime* is a very different thing from what the orators call the *sublime style*. The *sublime style* necessarily requires big and magnificent words; but the *sublime* may be found in a single thought, a single figure, a single turn of words. A thing may be in the *sublime style*, and yet not be *sublime*, i. e. it may have nothing extraordinary and surprizing.

For instance: "The almighty Author of the universe, with a single word, created light." This, now, is in the *sublime style*, yet it is not *sublime*, there being nothing extraordinary in it, which another person might not easily hit on. But in "God said, let there be light, and there was light;" so extraordinary a turn of expression, which shews the obedience of the creature to the orders of his creator, is truly *sublime*, and has something more in it than human.

Longinus makes five sources of the *sublime*. The first, a certain elevation of mind, which makes us think happily. The second, is the pathetic, or that natural vehemence and enthusiasm, which strikes and moves us: these two are owing almost wholly to nature, and must be born with us; whereas the rest depend, partly, on art. The third is, the turning of figures in a certain manner, both those of thoughts and of speech. The fourth, nobleness of expression, which consists of two parts, the choice of words, and the elegant, figurative diction. The fifth, which includes all the rest, is the composition and arrangement of the words in all their magnificence and dignity.

SUBLIME geometry. See the article *GEOMETRY*.

SUBLIMING pots. See the article *ALUDELS*.

SUBLINGUAL glands, in anatomy, two glands under the tongue, placed one on each side thereof.

These, called also *hypoglossides*, filtrate a ferous humour, of the nature of saliva, which they discharge by little ducts near the gums, into the mouth.

SUBMULTIPLE, in geometry, &c.—A *submultiple* number or quantity, is that which is contained a certain number of times in another; and which therefore repeated a certain number of times, becomes exactly equal thereto.

Thus 3 is a *submultiple* of 21.—In which sense, a *submultiple* coincides with an aliquot part.

SUBMULTIPLE ratio, is that between the quantity contained, and the quantity containing.—Thus the ratio of 3 to 21 is *submultiple*.

In both cases, *submultiple* is the reverse of multiple: 21, e. gr. being a multiple of 3, and the ratio of 21 to 3 a multiple ratio. See *MULTIPLE*.

SUBMULTIPLE subsuperparticular. See *RATIO*.

SUBMULTIPLE subsuperpartiens. See *RATIO*.

SUBNORMAL, in geometry, a line which determines the point in the axis of a curve, where a normal or perpendicular, raised from the point of contact of a tangent to the curve, cuts the axis.

Or, the *subnormal* is a line, which determines the point wherein the axis is cut by a line falling perpendicularly on the tangent in the point of the contact.

Thus T M (*Tab. Conicæ*, fig. 19.) being a tangent to a curve in M; and M R a normal or perpendicular to the tangent; the line P R intercepted between the semiordinate P M and the normal M R, is called the *subnormal*.

Hence, 1^o . In a parabola, as A M, &c. the *subnormal* P R is to the semiordinate P M, as P M is to P T, and M R to T M. 2^o . In the parabola, the *subnormal* P R is subduplex the parameter; and, consequently, it is an invariable quantity.

SUBORDINATED, and **SUBORDINATING affections**. See *AFFECTIONS*.

SUBORDINATION, a relative term, expressing the degree of inferiority between one thing and another.

There is a series of *subordinations* running throughout all nature. In the church there are several degrees of *subordination*, as of deacons to priests; priests to prelates, &c.—The like are observable in the secular state; in offices of war, justice, &c. and even

In the sciences, trigonometry is *subordinate* to geometry; and in the virtues, abstinence and chastity are *subordinate* to temperance: in music, some call the plagal tones, *subordinate tones*.

SUBORNATION, *SUBORNATIO*, a secret or underhand preparing, instructing or bringing in, a false witness; or corrupting or alluring a person to do such a false act.

Hence, the *subornation* of perjury, mentioned in the act of general pardon, 12 Car. II. c. 8. is the alluring or disposing to perjury. See *PERJURY*.

SUBPENA*, a writ, whereby any person under the degree of peerage, is called to appear in chancery, in cases where the common law hath made no provision.

* The name is taken from the words in the writ, which charge the party summoned to appear at the day and place assigned, *sub pena centum librarum*, on the penalty of an hundred pounds.

The peers, in the like cases, are called by the lord chancellor's letter, giving notice of the suit intended against them, and requiring them to appear.

There

SUB

There is also a *subpœna ad testificandum*, for summoning of witnesses in other courts, as well as in chancery.

There is also a *subpœna* in the exchequer, as well in the court of equity there, as in the office of pleas.

SUBPOPLITÆUS, in anatomy. See **POPLITÆUS**.

SUBREPTION*, **SUBREPTIO**, the act of obtaining a favour, from a superior by surprize, or a false representation.

* The word is formed from the Latin, *sub*, under, and *repto*, I creep.

Subreption differs from *obreption*, in that the latter denotes a false expression of the quality of a thing, or fact, &c. And *subreption*, a want of expression, or a fraudulent reticency or concealment of a thing, which would have rendered the obtaining of the favour more difficult. See **OBREPTITIUS**.

SUBREPTITIUS, or **SURREPTITIUS**, a term applied to a letter, licence, patent, or other act, fraudulently obtained of a superior, by concealing some truth, which had it been known, would have prevented the concession or grant.

The benefit of letters, licences, &c. is forfeited, when they are found contrary to the informations given; they being then reputed *subreptitious*.

Papal bulls and signatures are null and *subreptitious*, when the true state of the benefice, the manner of the vacancy, and other necessary matters, are not justly, and properly, signified to the pope.

SUBROGATION, or **SURROGATION**, in the civil law, the act of substituting a person in the place, and intitling him to the rights of another.

In its general sense, *subrogation* implies a succession of any kind; whether of a person to a person, or of a person to a thing.

There are two kinds of *subrogation*; the one *conventional*, the other *legal*.

Conventional SUBROGATION, is a contract, whereby a creditor transfers his debt, with all appurtenances thereof, to the profit of a third person.

Legal SUBROGATION, is that which the law makes in favour of a person, who discharges an antecedent creditor; in which case there is a legal translation of all rights of the ancient creditor to the person of the new one.

This the civilians more usually call *succession*, as being wholly the work of the law, and to distinguish it from the conventional *subrogation*, which they also call *cession*.

—The word is formed from the Latin, *subrogatio*, of the verb *rogare*, which, among the ancient Romans, signified to ask, to interrogate; whence it was, that they called the laws themselves *rogationes*, in regard the people made them, upon being asked by the magistrates.—And as laws made by the people could not be changed without their consent, and without being asked a-new; if they thought good to have the law wholly abolished, *lex abrogabatur*; if only a part of it were to be abolished, *lex derogabatur*; and if any clause or amendment were added to it, *lex subrogabatur*.

The new magistrates were also *subrogated* in the place of the old ones; for during the time of the republic, no magistrate could be, but by consent of the people, nor, of consequence, but by law; since whatever the people thought good, was law.—This is what occasioned Salmastius to say, that *subrogare* and *substitutio per legem*, were reciprocals.

SUBSCAPULARIS, in anatomy, a muscle arising from the basis and side of the scapula; and, spreading itself under the whole convex, or under side of it, is inserted by a femicircular tendon, into the neck of the os humeri, and draws it down to the side of the trunk.—See *Tab. Anat. (Myol.)* fig. r. n. 16.

SUBSCRIPTION, the signature put at the bottom of a letter, writing, or instrument.

In church history, we meet with instances of *subscriptions* wrote in the blood of Jesus Christ. Nicetas, in the life of Ignatius, speaking of the *subscriptions* made at the council, wherein that patriarch was deposed, says, they *subscribed*, not with common ink, but what strikes a man with horror, with a pen dipped in the blood of Christ. The historian Theophanes, tells us, that pope Theodore mixed the blood of Christ with the ink, wherein he wrote the deposition of Pyrrhus.

SUBSCRIPTION, in the English commerce, is used for the share, or interest, which particular persons take in a public stock, or a trading company, by writing their names, and the shares they require, in the books or register thereof.

The French have likewise adopted the word *subscription*; using it in speaking of the actions of their India company.

A *subscription* differs from an *action*; in that the first is properly only an action begun, or an engagement, by making the first payment, to acquit the rest in the time limited; and that the other is the whole action, performed in all its parts.

SUBSCRIPTION, in the commerce of books, signifies an engagement to take a certain number of copies of a book

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going to be printed; and a reciprocal obligation of the book-seller or publisher, to deliver the said copies on certain terms. The usual conditions of these *subscriptions* are, on the part of the book-seller, to afford the books cheaper to a subscriber than to another, by one third or one fourth of the price; and on the part of the latter, to advance half the money in hand, and to pay the rest on the delivery of the copies: an agreement equally advantageous to the one and the other; as the book-seller is hereby furnished with money to carry on works, which would otherwise be above his stock; and the subscriber, receives, as it were, interest for his money, by the moderate price the book stands him in.

Subscriptions had their rise in England, and it is but very lately that they are got into other countries. They were first set on foot, in the middle of the last century, for the printing of Walton's *Polyglott bibles*, which is the first book ever printed by way of *subscription*.

From England, they passed a few years ago into Holland, and they have been since introduced into France. F. Montfaucon's *collection of antiquities*, is the first book there published by *subscriptions*, which were so very numerous, that great numbers were refused. The same method has been since proposed, for the publication of S. Chrysostom by the Benedictines; but not with equal success.

All the other books since printed in France by *subscription*, are M. Dacier's *Translation of Plutarch's lives*; the *Description of Versailles*, and F. Daniel's *History*.

In England, they are become exceedingly frequent; and their frequency has rendered them liable to some abuses, which begin to discredit them.

SUBSEQUENT, something that comes after another, particularly with regard to the order of time. See **POSTERIOR**.

When two festivals happen on the same day, the principal one is celebrated; and the other transferred to the *subsequent* day, i. e. to the morrow.

SUBSESQUIALTERATE. See the article **RATIO**.

SUBSIDY, **SUBSIDIUM**, in law, any aid, tax or tribute granted, by authority of parliament, to the king, on pressing occasions of the state; levied on the subjects, according to their several abilities, or the yearly produce of their lands, goods, &c.

Such is the land tax, or royal aid, as it is called; which is usually at the rate of two, three, or four shillings in the pound, for lands; and of two shillings and eight pence for goods, and personal estate, when of four shillings for lands.

The ancient Saxon kings had no *subsidies* collected after the manner of ours; but in lieu thereof, had several customs, whereby they levied money or personal service on the people, for the repairing of cities, castles, bridges, military expeditions, &c. which they called *burgbote*, *brigbote*, *beresfare*, *heresgeld*, &c.

But upon the land's becoming oppressed by the Danes, king Ethelred in the year 1007, agreed to pay them yearly 10000*l.* for redemption of peace; which sum was afterwards increased to 36000*l.* and at length to 48000*l.* which was called *Danegeld*, and was levied on land; each hide, or plough-land, that of the church only excepted, being celled 12*d.*

Hence the tribute came to be called *hidage*, a name that afterwards became common to all taxes and *subsidies* imposed on lands; as those on cattle were called *horns-geld*.

Both these the Normans sometimes called *taxes*, from the Greek *τάξις*, order; sometimes from their own language, *tailage*; and sometimes, according to the custom beyond-sea, *subsidia*, and *auxilia*. See **AUXILIUM**.

After the conquest, these *subsidies* seem to have been granted differently from what they now are; as every ninth lamb, every ninth fleece, every ninth sheep, &c. Sometimes the rate was every tenth, and sometimes every fifteenth, &c.

In France, the king alone, by his own authority, imposes *subsidies* on his people, at his own discretion. What Grotius says, that those who pay *subsidies* to their sovereigns, to engage them in their defence against powerful enemies, by so doing, acknowledge their own weakness, and that such an acknowledgment diminishes somewhat of their dignity; must be understood of such states as are too weak to defend themselves, and who, in respect hereof, render themselves in some measure, tributary; not of such as subsisting by their own strength, give *subsidies* to their weaker neighbours, to prevent their being over-run by others.

Such, e. gr. as the kings of England and France, are with regard to Sweden and several other princes; to whom they generally grant *subsidies* in the treaties they conclude with them. In the list of English duties, or impositions, are divers kinds of *subsidies*: old *subsidy*, additional imposition to the old *subsidy*, new *subsidy*, third *subsidy*, two-thirds *subsidy*.

SUBSTANCE, **SUBSTANTIA**, something that we conceive to subsist of itself, independently of any created being, or any particular mode or accident.

Thus

Thus a piece of wax is a *substance*; because we can conceive it as subsisting of itself, and of its own nature, without any dependence on any other created nature, or without any particular mode, form, colour, &c. See *MODE*.

Spinoza maintains, that there is but one only *substance* in nature, whereof all created things are so many different modifications; and thus he makes the soul of the same *substance* with the body. The whole universe, according to him, is but one *substance*; which *substance*, he holds endowed with an infinity of attributes, in the number of which are thinking and extension. All bodies are modifications of this *substance*, considered as extended; and all spirits modifications of the same *substance*, considered as thinking.

Mr. Locke's philosophy of *substances*, is more orthodox: our ideas of *substances*, that great author observes, are only such combinations of simple ideas, as are taken to represent distinct things, subsisting by themselves; in which the confused idea of *substance*, is always the chief. Thus the combination of the ideas of a certain figure, with the powers of motion, thought, and reasoning, joined to *substance*, make the ordinary idea of man; and thus the mind observing several simple ideas to go constantly together, which being presumed to belong to one thing, or to be united in one subject, are called by one name; which we are apt, afterwards, to talk of, and consider as one simple idea. See *IDEA*.

We imagine these simple ideas do not subsist by themselves: but suppose some substratum, wherein they subsist, which we call *substance*.

The idea of pure *substances*, is nothing but the supposed, yet unknown support of those qualities which are capable of producing simple ideas in us.

The ideas of particular *substances* are composed out of this obscure and general idea of *substance*, together with such combinations of simple ideas, as are observed to exist together, and are supposed to flow from the internal constitution, and unknown essence of that *substance*.

Thus we come by the ideas of man, horse, gold, &c. Thus the sensible qualities of iron, or a diamond, make the complex idea of those *substances*, which a smith, or a jeweller, commonly knows better than a philosopher.

The same happens concerning the operations of the mind, viz. thinking, reasoning, &c. which we concluding not to subsist by themselves, nor apprehending how they can belong to body, or be produced by it, we think them the actions of some other *substance*, which we call *spirit*; of whose *substance* or nature we have as clear a notion, as of that of body; the one being but the supposed substratum of the simple ideas we have from without; as the other of those operations, which we experiment in ourselves within: so that the idea of corporeal *substance* in matter, is as remote from our conceptions, as that of spiritual *substance*.

Hence we may conclude, that he has the most perfect idea of any particular *substance*, who has collected most of those simple ideas which exist in it; among which, we are to reckon its active powers and passive capacities, though not strictly simple ideas.

Substances are generally distinguished by secondary qualities; for our senses tell us in the discovery of primary ones, as the bulk, figure, texture, &c. of the minute parts of bodies, on which their real constitutions and differences depend. And secondary qualities are nothing but powers, with relation to our senses.

The ideas that make our complex ones of corporeal *substances*, are of three sorts: First, the ideas of primary qualities of things, which are discovered by our senses; such as bulk, figure, motion, &c. Secondly, the sensible secondary qualities, which are nothing but powers to produce several ideas in us, by our senses. Thirdly, the aptness we consider in any *substance*, to cause or receive such alterations in its primary qualities, as that the *substance* so altered, should produce in us different ideas from what it did before.

Besides the complex ideas we have of material *substances*, by the simple ideas taken from the operations of our own minds, which we experiment in ourselves, as thinking, understanding, willing, knowing, &c. co-existing in the same *substance*; we are able to frame the complex idea of a spirit: and this idea of an immaterial *substance*, is as clear, as that we have of a material one.

By joining these with *substance*, of which we have no distinct idea, we have the idea of spirit: and by putting together the ideas of coherent solid parts, and a power of being moved, joined with *substance*, of which likewise we have no positive idea, we have the idea matter.

Further, there are other ideas of *substances*, which may be called *collective*, which are made up of any particular *substances*, considered as united into one idea; as a troop, army, &c. which the mind does by its power of composition. These collective ideas, are but the artificial draughts of the mind, bringing things remote, and independant, into one view, the better to contemplate and discourse of them united into one conception, and signified by one name. For there are no things so remote, which the mind cannot, by this

art of composition, bring into one idea; as is visible in that signified by the name *universe*.

Such is the generally received doctrine of *substance*: but Bp. Berkeley, in his *Principles of human knowledge*, and Mr. Collier, in his *Clavis Universalis*, have made great refinements thereon.

SUBSTANTIAL, or **SUBSTANCIAL**, in the schools, something belonging to the nature of *substance*.

It is generally disputed, whether or no there be such things as *substantial forms*; i. e. forms independant of all matter; or forms that are substances themselves.

SUBSTANTIAL is also used in the same sense with *essential*; in opposition to *accidental*: in which relation it gives room for abundance of distinctions.

SUBSTANTIVE, in grammar, is a quality ascribed to a noun or name, when the object it denotes is considered simply, and in itself, without any regard to its qualities.

When the object is considered, as clothed with certain qualities, the noun is said to be *adjective*.

For a more palpable criterion; all nouns, to which one cannot add the word *thing*, are *substantives*; and all those to which *thing* may be added, are *adjectives*.

F. Buffier observes, it is a common mistake in grammarians, to define a noun *substantive*, to be that which denotes a *substance*.—The mistake arises hence, that finding all substances expressed by *substantives*, they have called all kinds of nouns *substantives*. But it does not follow, that all nouns design substances; witness the nouns *accident*, *lightness*, &c. which are far from expressing substances, and yet are true nouns *substantives*.—Perhaps grammarians mean nothing here by *substance*, but the subject spoke of: if so, the definition is not amiss.

Nouns *substantives* sometimes become *adjectives*; and nouns *adjectives* also sometimes become *substantives*. In effect, the nature of the adjective being to express the quality of an object; if that quality be the object itself spoke of, then, on the foot of our definition, it becomes a *substantive*.—If, I say, a *good prince*, the word *good* is apparently an adjective, because it represents the prince as clothed with the quality of goodness. But if I say, the *good* ought to be preferred to the bad; it is evident, *good* is the subject spoke of, and, consequently, it is a *substantive*. Indeed, custom does not allow us to use all adjectives indifferently, as *substantives*; nor all *substantives*, as *adjectives*. The laws observed herein are as follow:

All nouns either signify an individual, as Socrates, Alexander, &c. or a species; as man, horse, &c. or an essential quality, as rational, material, &c. or an accidental one, as black, white, good, fair, &c. or a dignity, office, art, &c. as king, president, philosopher, &c.

Thus have we four kinds of nouns; whereof the first is very rarely taken *adjectively*; for as they signify individuals or particular beings, they can scarce be applied to any thing but the thing they properly signify: yet we have sometimes known the name of Cato taken *adjectively*; as, "this is to be Cato, indeed." Nor does Malherbe scruple to say in French "plus Mars que le Mars de la Thrace." Add that proper names are sometimes converted into the name of dignities, &c. as Caesar, Augustus, &c. In which case, they may be considered, in the same light, as nouns of the fourth kind.—Nouns of the second kind, are also sometimes taken *adjectively*, as "he is much a man." &c. The third kind are *adjectives* of themselves. For the fourth kind, all grammarians rank them among *substantives*; excepting F. Buffier, who will have them to be *adjectives*; or, to use his own term, *modificatives*. Be that as it will, they are frequently used *adjectively*, "he is more a king, and more a philosopher, than any of his predecessors."

Now for *adjectives* taken *substantively*, 1^o Participles passive, are very rarely thus taken; though we sometimes say, "the loved are less happy than the lovers; the taught have the advantage of the untaught: the blessed made a fallcy," &c. And, 2^o Participles active are taken still more rarely for *substantives*. We scarce ever, e. gr. say "the loving, the reading;" but "the lover, the reader:" yet we say "the student, the protestant, the tenant, the appellant, the opponent," &c.—3^o For nouns *adjectives*, those applied to men are not only used *substantively*, but are even become *substantives* by use; whether they be such as regard religion; as "christian, pagan, mahometan," &c. or opinion; as "stoic, peripatetic, cartesian," &c. or country; as "the English, French, Italians;" or temperament; as, "the melancholic, phlegmatic, choleric," &c. Under the same rule, are likewise comprehended abundances of *adjectives*, signifying a number of people agreeing in some common attribute; as, "the learned, the great, the devout, the brave, the dissolute," &c. But use is here to be regarded; for we do not say "the elegant," as we say "the learned;" but "elegant writers," &c. It is custom, and the ear alone, that are to decide about these differences. Again, *adjectives* taken *substantively*, for other things beside men, are either so used, to signify a number or set of things that

that have some common quality; or to express an abstract quality. In both which, as in those of men, there are some authorized by custom, and others formed every day on their model.

With regard to which last, use, again, and the ear, are to decide. Here all the adjectives of colours, are used *substantively*; as "the white, black, green," &c. Some of those of qualities; as "the cold," &c. those of time; as "the past, present, future;" and many of other matters; as "the agreeable, the sublime, the principal," &c. Nor is it only in the positive, but also in the comparative and superlative degrees, that adjectives are used *substantively*; as "the better of the two: the best of it," &c.

SUBSTANTIVE verb. See the article **VERB**.

SUBSTITUTE *, **SUBSTITUTES**, a person appointed to officiate for another, in case of absence, or other legal impediment.

* The word is formed from the Latin, *sub*, under, and *statuo*, I appoint, establish.

In the French law, the procureurs, or proctors, are obliged to name two of their brethren for *substitutes*, whose names are wrote after theirs in the list; to receive significations and summons's made in their absence.

SUBSTITUTE, in medicine, denotes a drug, or remedy that may be used in lieu of another; or that supplies the place of another of like virtue, which is not to be had: called also *succedaneum*.

The root of the great centaury, and sometimes rhaponticum, have been used as *substitutes* to rhubarb.

SUBSTITUTION, in grammar, the using of one word for another; or one mode, state, person or number of a word for another. — This the grammarians otherwise call *symplesis*.

SUBSTITUTION, in the civil law, a disposition of a testator, whereby he substitutes one heir to another, who has only the usufruct, and not the property of the thing left him.

Substitution is a kind of fiduciary inheritance, called also *fidei commissio*, in regard the immediate inheritor has only the use or produce of the thing; the body thereof being substituted and appropriated to certain persons, who are likewise to have the usufruct in their turns, out are never to have the property.

In some countries, *substitution* is perpetual; in France, it only holds to the fourth generation. — *Substitution* answers to *remainder*, in common law.

Among the Romans, there were abundance of these fiduciary heirs; who enjoyed inheritances, till they returned them into the hands of the right heir: and the reason why they did not likewise restore the fruits, or that the fruits were not deemed to make a part of the inheritance, but only of the thing, was, that the fiduciary or trustee was obliged to run the risk, and to stand the charge of the culture of the land.

SUBSTITUTION, in algebra, &c. is the putting in the room of any quantity in an equation, some other quantity, which is equal to it, but expressed after another manner.

SUBTRACTION, or **SUBTRACTION**, in arithmetic, the second rule, or rather operation, in arithmetic; whereby we deduct a less number from a greater, to learn the precise difference.

Or, more justly, *subtraction* is the finding a certain number from two homogeneous ones given; which, with one of the given numbers, is equal to the other.

The doctrine of *subtraction* is reducible to what follows:

To **SUBTRACT** a less number from a greater. — 1°. Write the less number under the greater, in such manner, as that homogeneous figures answer to homogeneous, i. e. unites to unites, tens to tens, &c. as directed under **ADDITION**. 2°. Under the two numbers, draw a line. 3°. *Subtract*, severally, the unites from unites, tens from tens, hundreds from hundreds; beginning at the right-hand, and proceeding to the left; and write the several remainders in their correspondent places, under the line. 4°. If a greater figure come to be *subtracted* from a less; borrow an unite from the next left-hand place; this is equivalent to 10, and added to the less number, the *subtraction* is to be made from the sum: or if a cypher chance to be in the next left-hand place, borrow the unite from the next further place.

By these rules, any number may be *subtracted* out of another greater. For example;

If it be required, from 9800403459
To *subtract* 4743865263

The remainder will be found 5056538196

For, beginning with the right-hand figure, and taking 3 from 9, there remains 6 unites, to be wrote underneath the line, going then to the next place, 6 I find, cannot be taken from 5; wherefore, from the place of hundreds 4, I borrow 1, which is equivalent to 10, in the place of tens; and from the sum of this 10 and 5, viz. 15, *subtracting* 6, I find 9 tens remaining, to be put down under the line. Proceeding to the place of hundreds, 2 with the 1 borrowed

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at the last, make 3, which *subtracted* from 4, leave 1. Again, 5 in the place of thousands, cannot be *subtracted* from 3; for which reason, taking 1 from 4, in the place of hundreds of thousands, into the empty place of tens of thousands, the cypher is converted into 10 tens of thousands, whence one 10 being borrowed, and added to the 3, and from the sum 13 thousand, 5 thousand being *subtracted*, we shall have 8 thousand to enter under the line: then *subtracting* 6 tens of thousands from 9, there remain 3. Coming now to take 8 from 4; from the 8 further on the left, I borrow 1; by means whereof, the two cyphers will be turned each into 9. And after the like manner is the rest of the *subtraction* easily performed.

If heterogeneous numbers be to be *subtracted* from each other; the unites borrowed are not to be equal to ten; but to 60 m. by as there 60 of unites of the less kind, to constitute an unite of the greater: for example;

l.	s.	d.
45	16	6
27	10	9
17	16	9

For since 9 pence cannot be *subtracted* from 6 pence; of the 16 shillings, one is converted into 12 pence; by which means, for 6 we have 18 pence; whence 9 being *subtracted*, there remain 9. In like manner, as 19 shillings cannot be *subtracted* from the remaining 15; one of the 45 pounds is converted into 20 shillings, from which, added to the 15, 19 being *subtracted*, the remainder is 16 shillings. Lastly, 27 pounds *subtracted* from 44 pounds, there remains 17.

If a greater number be required to be *subtracted* from a less, it is evident the thing is impossible. — The less number, therefore, in that case, is to be *subtracted* from the greater; and the defect to be noted by the negative character. *E. gr.* If I am required to pay 8 pounds, and am only master of 3; when the 3 are paid, there will still remain 5 behind; which are to be noted, — 5.

Subtraction is to be proved, by adding the remainder to the *subtrahend*, or number to be *subtracted*: for if the sum be equal to the number whence the other is to be *subtracted*, the *subtraction* is justly performed. — For example;

	l.	s.	d.
9800403459	156	11	3½
4743865263 subtrahend	21	17	2½
5056538196 remainder	134	14	0½
9800403459	156	11	3½

SUBTRACTION, in algebra, is performed by connecting the quantities with all the signs of the *subtrahend* changed; and at the same time uniting such as may be united; as is done in addition. See **ALGEBRA**, **QUANTITY**, **CHARACTER**, and **ADDITION**.

Thus + 7 a *subtracted* from + 9 a, makes + 9 a — 7 a, or 2 a.

In the *subtraction* of compound algebraic quantities; the characters of the *subtrahend*, are to be changed into the contrary ones, viz. + into —; and — into +. See **QUANTITY**.

To **SUBTRACT** species numbers, or quantities from one another; both those affected with the same, and those with contrary characters. — 1°. If the quantities designed by the same letter have the same signs; and the less to be *subtracted* from the greater; the *subtraction* is performed as in common arithmetic, *e. gr.*

$$\begin{array}{r} 5b + 4d - f = 5b + 4d - f \\ 2b + d - f = 2b + 1d - f \\ \hline 3b \quad 3d - o \end{array}$$

2°. If a greater quantity be to be *subtracted* out of a less; the less must be *subtracted* out of the greater, and to the remainder must be prefixed the sign —, if the quantities be affected with the sign +; or the sign +, if they be affected with —.

$$\begin{array}{r} 16a + 2b - 9d = 16 \text{ lib.} + 2 \text{ lb.} - 9 \text{ d.} \\ 19a + 3b - 11d \quad 19 \quad + 3 \quad - 11 \\ \hline - 3a - 1b + 2 \quad - 3 \quad - 1 \quad + 2 \end{array}$$

3°. If the quantities have different signs; the *subtraction* is converted into addition, and to the aggregate is prefixed the sign of the quantity, whence the *subtraction* is to be made: for example;

$$\begin{array}{r} 8a - 5c + 9d = 8 \text{ lib.} - 5 \text{ g.} + 9 \text{ d.} \\ 6a - 8c - 7d = 6 \quad - 8 \quad - 7 \end{array}$$

$$2a + 3c + 16d = 2 \text{ lib.} + 3 \text{ g.} + 16 \text{ d.}$$

4°. If the quantities be expressed in different letters, they must be connected; only the characters of the *subtrahend* must be changed into the contrary ones: for example;

$$\begin{array}{r} a + b - c \quad a + d \\ d - e + f \quad e - e - g \\ \hline a + b - c - d + e - f \quad a + a - c + e + g \end{array}$$

LOGARITHM.
 SECTION.
 LINE.
 RATIO.

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the minute pores of glass, and other solid bodies; and from
 this they account for most of the phenomena of nature.

Yet they do not pretend to prove the existence of this mat-
 ter, otherwise than by consequence.

SUBTILIZATION, SUBTILITATIO, the act of subtilizing,
 or rendering any thing smaller and subtiler; particularly,
 the dissolving or changing a mixt body into a pure liquor,
 or a fine powder, by separating the grosser parts therefrom.

SUBTRIPLE ratio, is when one number or quantity is con-
 tained in another three times.

Thus, 2 is said to be *subtriple* of 6; as 6 is triple of 2.

SUBURBICARY *, **SUBURBICARIUS**, an epithet given to
 those provinces of Italy, &c. which composed the ancient
 diocese, or patriarchate of Rome.

* The term is formed from the Latin, *sub*, under, and *urbis*,
 city.—They were also sometimes called *suburbani* provinces.

Authors usually reckon ten of these *suburbicary* provinces;
 whereof Italy, from the Po to the heel made seven, and the
 isles of Sicily, Sardinia, and Corsica, the other three.

Yet Salmassius will have the *suburbicary* provinces confined to
 those four in the neighbourhood of Rome, to which the
 authority of the prefect of Rome extended; and these he
 makes the limits of the diocese of ancient Rome. See **DIO-
 CESE**.

F. Simond takes the other extreme, and comprehends all
 the west under the name of *suburbicary* provinces.—Rufinus,
 who lived in the age of the council of Nice, explains the
 power ascribed to the pope, in the sixth canon of that coun-
 cil, by saying, that he had the care and superintendence of
 the *suburbicary* provinces. Hence the different sentiments
 of authors, with regard to the *suburbicary* provinces; some
 only considering the pope as bishop of Rome; others, as
 patriarch of the west, &c.

SUCCEDANEUM *, in pharmacy, a remedy substituted in
 the place of another first preferred, when the ingredients are
 wanting, necessary for the composition of that other.

* The word is formed from the Latin *succedo*, to succeed, to
 come after.

Substituta and *succedaneum*, are of equal import; unless, with
 some authors, we chuse to use *substituta*, where a simple
 like virtue is put for another; and *succedaneum*, where a
 compound is used with the same intention for another com-
 pound.

SUCCENTURIATI *renes*, in anatomy. See **RENES** *succen-
 turiati*.

SUCCENTURIATION, the act of substituting. See **SUB-
 STITUTION**.

SUCCENTURIATUS, in anatomy, a muscle, called also
pyramidalis. See **PYRAMIDALIS**.

SUCCESSION, **SUCCESSIO**, in philosophy, an idea which
 we get by reflecting on that train of ideas constantly follow-
 ing one another in our minds when awake.

The distance between any parts of this *succession*, is what we
 call *duration*. When this *succession* of ideas ceases, we have
 no perception of time, or of the duration thereof; but the
 moment we fall asleep, and that wherein we awake, seem
 connected.

They, who think we get the idea of *succession* from our ob-
 servation of motion by our senses, will come into Mr. Locke's
 sentiment, above, when they consider that motion produces
 an idea of *succession* no otherwise, than by producing a con-
 tinued train of distinguishable ideas.

A man that looks on a body moving, perceives no motion,
 unless that motion produces a constant train of successive ideas.
 But where-ever a man is, though all things be at rest about
 him, if he thinks, he will be conscious of *succession*.

SUCCESSION, in astronomy. The *SUCCESSION of the signs*,
 is the order wherein they follow each other, and according
 to which, the sun enters, successively, into one, then into
 another, called, also, *consequentia*.

This order is expressed in the two following technical verses:
*Sunt Ariet, Taurus, Gemini, Cancer, Leo, Virgo,
 Libraque, Scorpius, Arcitenens, Capre, Amphora, Pisces.*
 When a planet is direct, it is said to go according to the or-
 der and *succession of the signs*, or in *consequentia*; that is,
 from Aries to Taurus, &c. When retrograde, it is said to go
 contrary to the *succession of the signs*, or in *antecedentia*;
viz. from Gemini to Taurus, then to Aries, &c.

SUCCESSION, in the civil law, implies a right to the whole
 effects left by a defunct.

Of this there are several kinds, *ab-intestate*, *intestate*, &c.
SUCCESSION ab-intestate, is that which a person has a right to
 by being next of kin, which is, what we call, being next
 heir at law.

Testamentary SUCCESSION, is that which a person comes to by
 virtue of a will.

SUCCESSION in the direct line, is that coming from ascen-
 dents or descendants.

Collateral Succession, is that coming by uncles, aunts, or other collaterals.

A jaunt, or a jaunted Succession, is a burthenfome or vexatious one, which no body will accept of.

There is no real *succession* in benches; for here, nobody inherits.

In effects that cannot be divided, as kingdoms, &c. the *succession* falls on a single head; which is usually the eldest son or the deceased, as being supposed the indivisible representative of his father.

In effects that are divided, all the children represent their father. It was on this principle, M. Courtin observes, that each of the sons of Jacob had his share assigned him in the Land of Promise. It is true, Manasseh and Ephraim, the two sons of Joseph, had likewise their shares; but this was because a double portion had been allotted their father, wherein he was treated as elder brother, in consideration of the great services he had done his father and brethren.

SUCCESSIVE action. See the article ACTION.

SUCCESSOR, a person who holds the place which another held before him; whether he arrived at it by election, collation, inheritance, or otherwise.

Our historians tell us, that queen Elizabeth could never bear to hear of a *successor*. The king of the Romans is presumptively *successor* to the empire.

The canonists say, a coadjutor is a necessary *successor* to a prelature; a resigner to the resignant.

Civilians say, a titular usufructuary can do nothing to the prejudice of his *successor*.

SUCINUM, in pharmacy, *Sarsaparilla*, or *amber*; a bituminous juice, which from a thin gross hard and brittle.

The white, and is transparent, are accounted best: it is of no great use in medicine, per se, as its texture seems too compact to open and yield to the natural concoctions; though some have a great opinion of it, as a balsamic, and give it in gonorrhea's particularly. But it is certain, that what pharmacy extorts from it, is of great efficacy; especially in nervous cases. See Supplement, article SUCINUM.

SUCISA, a medicinal alkali herb; called also *manfus diaboli*, or the devil's bit.

It is a powerful stomatic, inasmuch that Sir Theodore Mayerne observes, in the *Philosophical Transactions*, laying a person sick of a plague, or other malignant fever, on a bed thereof, moderately hot, he shall sweat till they take him off; and much more, if he drink of the decoction or juice of the same herb. But withal these supposed virtues the *sucisa* is now little used.

SUCCOTRINE alder. See the article ALDER.

SUCCUBUS, or **SUCCUBA**, a term used by some visionary writers, to signify a demon, or spirit, who assumes the shape of a woman, and, as such, lies with a man.

Some authors use *incubus* and *succubus*, indifferently; but they ought to be distinguished; *incubus* being only properly used, where the demon is supposed to be in form of a man, and, as such, lies with a woman.

SUCULUS, in mechanics, a bare axis, or cylinder, with flaves in it to move it round; but without any tympanum, or perithecium.

SUCCUS pancreaticus, } See PANCREATIC JUICE.

SUCCUS nervus, } See NERVOUS JUICE.

SUCKERS, *offsets*, in agriculture, and gardening, young shoots proceeding from the root of a tree; being of the same kind with the tree from which they spring: for that such as grow from trees raised by grafting or inoculation, follow the nature of the stock.

They sometimes spring forth near the body of the mother-plant; but other *suckers* at a greater distance from it are better; yet the former removed when there is least sap in the top, and preserving what fibrous roots are upon them, often prosper.

When they are taken up, the ground is to be well opened, and if they grow from the body of the tree, or great roots, they must be cut off close to the stem, and set presently. See STOCK.

It forwards much the springing out of *suckers*, to bare the roots of trees, and stop them in some places.

SUCKING pump. See the article PUMP.

SUCTION, *SUCTIO*, the act of sucking, or of drawing up a fluid, as air, water, or the like, by the mouth and lungs. Air is sucked in at the mouth, by the muscles of the thorax and abdomen distending the cavity of the lungs and abdomen, by which means the air included therein is raried, and ceases to be a counterbalance to the external air, which of consequence, is driven in by the pressure of the atmosphere through the mouth and nostrils.

Air is sucked through a pipe, in the same manner as with the naked mouth: it being here all one as if the mouth were extended the length of the pipe.

A suction of heavier liquors is performed after the same manner, e.g. in lying prone to drink out of a spring, &c. the lips are applied close to the surface of the water, so as to

prevent any passage of the air between them; then the cavity of the mouth, &c. being distended as before, the pressure of the air incumbent on the surface of the water without the circumference of the mouth, prevailing over that upon the water within the same, the fluid is raised, from the same principle as water in a pump.

In sucking a heavy liquor, as water, through a pipe, the longer the pipe is, the greater difficulty is found in the *suction*; and the bigness or diameter of the pipe, makes a further alteration therein. The reason of this arises from that great principle in hydrostatics, that fluids press in the compound ratio of the bases and perpendicular altitudes.

From what we have said, it evidently ensues, that what we call *suction*, is not performed by the mouth without the pulse and pressure of the atmosphere.

A very curious and intelligent person distinguishing several different sorts of *suction*, performed after two quite different manners; a distinction which however hitherto overlooked by authors, seems absolutely necessary in order, I think, to give a just account of the nature of this phenomenon.

Suction, then, according to him, is performed either, 1^o, By the dilatation of the thorax; or, 2^o, By that of the cavity of the mouth.

In the former case the lungs are kept continually distended; for if the breath be let go, ever so little, the liquor in the tube will begin to subside.

On the contrary, when *suction* is performed by enlarging the cavity of the mouth, we may suck with our utmost force, and yet breathe freely through the nostrils at the same time. This is the true and proper *suction*; the other ought rather to be called supping, than sucking through a tube.

Note, The cavity of the mouth is enlarged by being a little opened, while the lips are close that the tongue being at the same time contracted, and drawn backwards towards the throat.

SUCULA, in mechanics. See the article ACQUA.

SUDAMINA, little h at pimples in the skin, like millet grains, frequent in youth; especially those of a hot temperament, and that the same extent.

SUDATOPY, *SUDORIFORUM*, a name given by the ancient Romans to their hot or sweating bathing; sometimes also called *laconica*.

The *sudatopy* was a species of their hypocausta or stoves.

SUDOR, in medicine. See the article SWEAT.

SUDOR Anglicanus, the *English sweat*, or *febrile sickness*; is the name of an epidemic disease, first perceived in England, in 1485. It was properly, a sort of plague; thus called, because attended with an extraordinary kind of sweat. It made its return four times in the space of sixty six years, viz. in 1506, 1517, 1528, and 1551.

It began with a sweat, which never ended, but either with the death of the patient, or his recovery. If he survived twenty-four hours he was safe. Few people escaped of it at first; too much care, and too little, were found equally destructive.

The patient was to continue without stirring, either in his bed, or in his cloaths, according to the condition nature was surprised in; without bathing him either with remedies or with locks without cloaths either too much or too little; and, if possible, without either eating or drinking. The sweat to be kept up, without either promoting it, by any extraordinary heat, or checking it by the least cold.

This was what was found by experience; and which was at length practised with happy success. The disease was first felt on the 21st of September, and in the same day spread itself all over England; where, after a great mortality, it stopped all at once, towards the end of October.

Its ravages were so great, that in some parts it took off a third part of the people in a very little time.

At its return under Henry VIII. in 1506, it was as general, and as dangerous as before, and again disappeared all at once. At the third attack, in 1528, it was less fatal; inasmuch that Bellay, bishop of Bayonne, then ambassador in England, who sweated like the rest, tells us, that of forty thousand souls, seized with it in London, only two thousand died. In 1534, it passed over into Ireland, where it killed great numbers.

SUDORIFIC, in medicine, a remedy that causes or promotes sweat.

Sudorifics only differ from *antiseptics* in the degree of their action; the one promoting sensible perspiration, the other insensible.

To the class of *sudorifics* belong, 1. All things that moving violently through the body, attenuate the humours, and accelerate their motion.

2^o. Such things, as at the same time diminish the resistance in the sudatory vessels about the cutis.

To which some add a third kind, viz. such as absorb the acridities of the blood, and convert at last the matter of the sweat.

The first intention is chiefly effected by a copious drinking of very hot waters; by acids drawn from vegetables by fermentation and distillation; or those of fossils, attenuated by repeated distillations, especially if these be drunk mixed with hot water; by alkalis both volatile and fixt, diluted with hot water; by all compound salts, dissolved in water; by sapa's, metallic crystals, or the attenuated parts of metals themselves, as stibium diaphoreticum, fixt sulphur of Tachernius, bezoardic mineral, diaphoretic mercury, diaphoretic gold, &c. by sharp, subtil, acrimonious aromatics: as ablynthium, abrotanum, opium, asparagus, anise, asclepias, aristolochia, gum ammoniac, cardus benedictus, caraways, cinnamon, camomile, saffron, capillus veneris, china, dittany, eupatorium, gentian, hyssop, laurel, mint, leeks, rosemary, sage, favin, salafra, scordium, thyme, veronica, nettle, and other medicines compounded of these and the like, as Venice-treacle, mithridate, dialcordium, orvietan, &c. The second is chiefly effected by cleansing the skin, by vaporous lotions, baths, and frictions; by relaxing the cutaneous and subcutaneous vessels, which is best done by hot water sprinkled all over the body, the head excepted; by increasing the external heat about the naked body, as by the warmth of a bed, a vapour bath, &c.

The third is effected by absorbents; as corals, crabs-eyes, diaphoretic antimony, bezoar, &c. See each under its proper article.

SUET*, **SEBUM**, a kind of fat, found in deer, sheep, oxen, hogs, &c. which melted down and clarified, makes what we call *tallow*, used in the making of candles.

* The word is formed from the Latin, *suetum*, *sebum*, or *sebum*, which signify the same; and *sebum*, by reason of the fatness of that beast.

Anatomists, &c. distinguish four kinds of fat in the body of an animal. The first, which fixes itself, and after melting, cools into a very firm consistence, they call *suet*.

It is found in greatest abundance in the lower belly, and about the kidneys.

Pliny Comte mentions a tree in China, that bears a kind of *suet*, or *tallow*. See **TALLOW-TREE**.

SUFFERANCE, in ancient customs, a delay, or respite of time, which the lord granted his vassal, for the performance of fealty and homage; so as to secure him from any feudal seizure.

Sufferance, say the customs, is equivalent to fealty and homage, while it holds. See **FEALTY** and **HOMAGE**.

The word is also used for a delay which the lord grants his vassals, to quit their hands of fees or inheritances they have acquired, till they have paid the due of indemnity, &c.

BILL OF SUFFERANCE. See the article **BILL**.

SUFFICIENT, in the school theology.—**SUFFICIENT** *grace*, denotes a help or assistance which God gives to man, to enable him to act and perform his duty.

It is allowed an article of faith, that grace is necessary; and that without grace, nothing that is good, or that can any way intitle us to heaven, can be done: it is allowed too, that God does not refuse the necessary assistances; and it is allowed, that man, frequently, either does not act when he should, or acts what he should not.

From these principles, which are generally admitted by all sects however different in other respects, it follows, that there is some assistance of God which man resists; some wherewith man does not act, wherewith yet he might act; or some wherewith he does evil, by which he might do good. It is this assistance that is called *sufficient grace*: because sufficing to make us act, though we do not act with it.

SUFFITUS, **SUFFIMENT**, or **SUFFUMIGATION**, in medicine, a thickish powder, prepared of odoriferous plants, gums, &c. which being thrown on coals, the vapours or steam thereof, are received by smelling.

SUFFOCATION, **SUFFOCATIO**, in medicine, a privation, or obstruction of respiration.

Suffocation sometimes arises from a too great abundance of blood thrown on the lungs, or the muscles of the larynx, and preventing the ingress of the air; as is the case in quinzies, suffocating catarrhs, peripneumonies, &c.

The fumes of wines, or strong beers, when boiling, cause *suffocation*, by interrupting the circulation of the blood. And the same may be observed of the fumes of lime, wherewith walls are whitened; and those of charcoal, antimony, sulphur, vitriol, and spirit of nitre.

The *suffocation* under water, is owing partly to the passage of the air being stopped up, and partly to the irruption of the water into the breast.

In France they dispatch their people that are raving mad by *suffocating* them between two pillows: the same is also sometimes practised here in cases of hydrophobia's, &c.

SUFFOCATION of the womb, or *matrix*, is a disease pretty frequent in women, called also *fits of the mother*. In this, the patient imagines a malignant vapour rising from the matrix, and so pressing against the lungs and the diaphragm, as to prevent the free motion necessary to respiration.

Its true cause is a convulsion of the muscles of the larynx, which it tightens the wind-pipe, and prevent the air's passing into the lungs. Hence it is, that hysterical women feel contractions in the throat, as if one were strangling them with a cord.

SUFFOCATIVE catarrh. See the article **CATARRH**.

SUFFRAGAN, **SUFFRAGANEUS**, in the ecclesiastical polity, a term applied to a bishop, with respect to his archbishop on whom he depends, and to whom he appeals from the bishop's official.

In this sense, the archbishop of Canterbury has twenty-one *suffragans*; and the archbishop of York four.

The term was never heard of before the eighth century.—Some derive it hence, that the bishops are to help and assist the archbishop; *quia archiepiscopo suffragani & assistere tenentur*.

Others say, it is because ecclesiastical matters are determined by their votes, or suffrages; *Suffraganei dicuntur quia eorum suffragis causae ecclesiasticae judicantur*. Others hold, they are called *suffragans*, because when called by the metropolitan to a synod, they have a right of suffrage, or of voting; or because they could not be consecrated without his suffrage or consent.

SUFFRAGAN is also used for a chorepiscopus, or an assistant bishop, or co-adjutor, who has a title in *partibus infidelium*, and assists another in the discharge of his function, or discharges it himself in the absence of that other.

These are by some also called *suffragani*, *episcopi*. See **BISHOP**.

By statute 26 Henry VIII. every bishop and archbishop is allowed to appoint some one, some two, and some three bishops *suffragans*, under them; the seats, or residences whereof, are fixed by the same statute. The *suffragan* bishop for the diocese of Canterbury, to be at Dover only; for York, at Nottingham and Hull; for London, at Colchester; for Winchester, at Guilford, Southampton, and in the isle of Wight, &c.

Du Cange observes, that the title *suffragan* has also been given to such priests as are subject to the visitation of the arch-deacon: and *suffragans of the pope*, to the bishops of such dioceses, as are immediately subject to the pope.

SUFFRAGE*, **SUFFRAGIUM**, a voice or vote, given in an assembly, where something is deliberated on, or where a person is elected to an office or benefice.

* The word is formed from the Latin, *suffragium*, which anciently signified money, as appears in the eighth novel of Justinian: *ut jussum sine suffragio fieret*; and the sixth novel: *qui emittit praesentatum per suffragium, est caput & ordine ecclesiastico excludit*.

Suffrages are sometimes given by word of mouth; and sometimes in writing, as at elections liable to a scrutiny. See **SCRUTINY**. The president or chairman of the assembly usually collects the *suffrages*.

SUFFRAGES of the saints, in the Romish church, denote the prayers and intercessions which the saints are supposed to make to God, in behalf of the faithful.

SUFFRUTEX, *suffrutex*, among botanists, a name given to the lowest sort of woody, perennial plants: sending no leaves from their root, and beginning to be branched from the bottom of the stalk. Such are lavender, rue, fige, &c.

SUFFUMIGATION*, **SUFFUMIGATIO**, in medicine, a term applied to all remedies that are received into the body in form of fumes, i. e. of smoke, vapour, or perfume.

* The word is formed from the Latin, *suff*, under, and *fumus*, smoke.

Suffumigations are composed of different matters, according to the nature of the disease. Their intentions are to soften sharp, serous humours, to provoke or check the course of the menses, to raise a salivation in venereal evils, &c.

SUFFUSION, **SUFFUSIO**, in medicine, an overflowing of some humour, shewing itself in the skin; particularly that of the blood or bile.

That reuneth ordinarily arising from shame, is only a *suffusion* of blood appearing in the cheeks. See **BLUSHING**.

The jaundice is a *suffusion* of bile over the whole body. See **JAUNDICE**.

SUFFUSION is also used for a little film or pellicle, formed in the aqueous humour of the eye, before the pupil; called, also, *cataract*.

SUGAR, **SACCHARUM**, a very sweet, agreeable juice, expressed from a kind of canes, or reeds, growing in great plenty in the East and West-Indies; particularly in Madeira, Brazil, and the Caribbee islands.

It is a question not yet decided among botanists, &c. whether the ancients were acquainted with this cane, and whether they knew how to express the juice from the same? What we can gather from the arguments advanced on either side, is, that if they knew the cane and the juice, they did not know the art of condensing, hardening and whitening it, and, of consequence, they knew nothing of our *sugar*. Some ancient authors, indeed, seem to mention *sugary*, under the name of *Indian salt*; but they add, that it cozed out of

the cane of itself; and there hardened like a gum; and was even friable between the teeth, like our common salt: where-as *sugar* is expressed by a machine on purpose, and coagulated by the fire.

Theirs, Salmalius tells us, was cooling and loosening, whereas ours, the same writer asserts, is hot, and excites thirst. Hence, some have imagined, that the ancient and modern *sugar* plants were different: but Matthiolus, on Dioscorides, c. 75. makes no doubt they were the same; and others are even of opinion, that ours has a laxative virtue, as well as that of the ancients, and that it purges pitiuita.

The generality of authors, however, agree, that the ancient *sugar* was greatly better than the modern; as consisting of only the finest and maturest parts, which made themselves a passage, and were condensed in the air.—The interpreters of Avicenna and Serapion, call *sugar*, *spodium*; the Persians, *tabixir*; and the Indians, *manbu*.

Salmalius assures us, that the Arabs have used the art of making *sugar*, such as we now have it, above 800 years. Others produce the following verses of P. Terrentius Varro Atacinius, to prove that it was known before Jesus Christ.

Indica non magna nimis arbor crevit arundo,

Illius extensis premitur rotulebus humor,

Dulcia cui nequeunt succo contendere mella.

Another question among naturalists is, whether the *sugar* canes be originally of the West-Indies; or whether they have been translated rather from the East.

The learned of these last ages, have been much divided on the point: but since the dissertation of F. Labat, a dominican missionary, published in 1722, there is no longer room to doubt, but that the *sugar* cane is as natural to America as India: all that can be said in favour of the latter, is, that the Spaniards and Portuguese first learnt from the orientals, the art of expressing its juice, boiling it, and reducing it into *sugar*.

Culture of the *SUGAR* cane.—The reed or cane, whence this useful juice is drawn, resembles those others we see in morasses, and on the edges of lakes; excepting that the skin of these latter is hard and dry, and their pulp void of juice; whereas the skin of the *sugar* reed is soft, and the spongy matter or pith it contains, very juicy, though that in a greater or less degree, according to the goodness of the soil, its exposure to the sun, the season it is cut in, and its age; which four circumstances contribute equally to its goodness and to its bulk.

The *sugar* cane usually grows five or six foot high, and about half an inch in diameter; though F. Labat mentions some extraordinary ones in the isle of Tabago, twenty-four foot high. The stem or stalk is divided by knots, a foot and half a-part. At the top it puts forth a number of long, green tufted leaves, from the middle whereof, arise the flower and the seed. There are likewise leaves springing out from each knot; but these usually fall as the cane rises; and it is a sign either that the cane is naught, or that it is far from its maturity, when the knots are seen beset with leaves.

The ground fit for *sugar* canes, is that which is light, soft, and spongy, lying on a descent proper to carry off the water, and well turned to the sun. They usually plant them in pieces, cut a foot and half below the top of the flower. These are ordinarily ripe in ten months, though sometimes not till fifteen; at which time, they are found quite full of a white succulent marrow, whence is expressed the liquor whereof *sugar* is made. When ripe, they are cut, their leaves cleared off, and they are carried in bundles to the mills. The mills consist of three wooden rollers, covered with steel plates; and have their motion either from the water, the wind, cattle, or even the hands of slaves.

Two rules belonging hereto are, that no canes above four foot, or under two foot and a half long be sent to the mills; and, that no more canes be cut than can be conveniently pressed in twenty-four hours; in regard they will heat, ferment and turn sour.

Preparation of *SUGAR*.—The juice coming out of the canes, when pressed and broke between the rollers, runs through a little canal into the *sugar*-house; which is near the mill; where it falls into a vessel, whence it is conveyed into the first copper or cauldron, to receive its first preparation, only heated by a slow fire to make it simmer. With the liquor, is here mixed a quantity of ashes, and quick-lime; the effect of which mixture, assisted by the action of the fire; is, that the unctuous parts are separated from the rest, and raised to the top, in form of a thick foam, which is kept constantly scumming off; and serves to feed the poultry, &c. withal.

The juice, in the next place, is purified in a second copper; where a brisker fire makes it boil; and all the time the casting up of its foam is promoted by means of a strong lye, composed of lime-water and other ingredients.

This done, it is purified and scummed in a third boiler, wherein is cast a kind of lye, that all its purging it, collects together its impurities, and makes them rise to the surface, whence they are taken with a skimmer.

From the third, it is removed to a fourth boiler, where the juice is twice, poured by a more violent fire, and hence to

a fifth; where it is brought to the consistence of a syrop.

In a sixth boiler, the syrop receives its full coction; and here all the impurities left from the former lyes, are taken away by a new lye, and a water of lime and allom cast into it. In this last copper, there is scarce found one third of what was in the first; the rest being wasted in steam.

By thus passing successively, a number of coppers, the *sugar* juice is purified, thickened, and rendered fit to be converted into any of the kinds of *sugar* hereafter mentioned. The size of the several coppers always diminishes, from the first to the last; each being furnished with a furnace, to give a heat proportionable to the degree of coction the juice has received. In some large *sugar* works, there are also particular coppers, for the boiling and preparing the scums.

F. Labat mentions several different kinds of *SUGARS*, prepared in the Caribbees, viz. *Crude sugar*, or *moscovado*; *strained* or *brown sugar*; *earthed* or *white sugar*, in powder; *refined sugar*, either in powder or loaves; *royal sugar*; *candied sugar*; *sugar of fine syrop*; *sugar of coarse syrop*; *sugar of the steam*.

Crude *SUGAR*, or *moscovado*, is that first drawn from the juice of the cane, and whereof all the rest are composed.

The method of making it, is that already described as for *sugar* in the general.—We need only add, that when taken out of the sixth copper, it is put in a cooler, where stirring it briskly together, it is let stand to settle, till a crust of the thickness of a crown piece, be formed thereon. The crust being formed, they stir it up again, then put it into vessels, where it stands to settle, till it be fit to barrel.

Strained or brown *SUGAR*, though somewhat whiter and harder, does not differ much from the crude *sugar*: though it is held a medium between this last and the earthed *sugar*; which is, the white powder *sugar*.

The preparation of this, is the same as that of the *moscovado*, with this difference, that to whiten it, they strain the liquor through blankets, as it comes out of the first copper. The invention of strained *sugar* is owing to the English, who are more careful than their neighbours, in the preparation hereof; for they not only strain it, but when boiled, put it in square wooden forms, or moulds, of a pyramidal figure; and when it has purified itself well, they cut it in pieces, dry it in the sun, and barrel it up.

Earthed *SUGAR*, is that which is whitened by means of earth laid on the top of the forms it is put in, to purge itself.

The making of this *sugar*, is begun after the same manner as that of crude *sugar*; except that they only use the best canes in it; that they work with more care and nicety; that when the liquor is in the first copper, the ashes they put in, are little or nothing mixt with lime, for fear of reddening it; and that they strain it through a blanket, from the first to the second copper.

When it has passed all the six coppers, it is laden out into a cooler; whence it is put into conical moulds or forms, the tips whereof are perforated, but now stopped with linen or other stuff; and these ranged evenly before the furnace. When it has been a quarter of an hour in the forms, it is cut with a *sugar* knife, that is, it is stirred briskly this way, and that, for half an hour.

This serves, not only to promote the forming of the grain, and the diffusing it equally throughout; but also to determine the unctuous parts of the *sugar* to mount up to the top, that they may be scummed off.

The forms being left to stand fifteen hours in this state, the holes at the bottom are then unstopped, to give a passage to the syrop, and to determine it to take that way. When enough of these forms are filled, to fill a stove, which usually contains five or six hundred forms; they visit the *sugar* in all the forms to examine the quality thereof, and to see if it quit the form easily; that it may either have the earth given it, as the reliner, who visits it, judges proper; or be melted over again, if it do not prove well.

This done, the forms are planted, each on its pot, with the tip of the cone downwards; the top is taken off, and in lieu thereof, they put in some *sugar* in grain, to within an inch of the edge; which space is left for the earth prepared for it.

The earths here used are of various kinds; the good qualities of each whereof, are, that they do not tinge the water, that they let it filtrate easily through, and that they do not imbibe the fatty part of the *sugar*. Before put in the forms, the earth is steeped in water twenty-four hours; and at length applied, in the consistence of a pulp.

As soon as the earth is on the *sugar*, all the windows of the refining room are shut, that the air and heat may not dry the earth. When it is quite dry, which usually happens in nine or ten days time, it is taken off; and after cleaning the surface of the *sugar* with brushes, and raking it up an inch deep, and again laying it level as before, they give it a second earth.

The whiteness of the *sugar* of each form, is seen from the first earth; experience shewing, that a second or third earth do not make the *sugar* any whiter, but only wash the head of the loaf. When the second earth is taken on, they cleanse the surface of the *sugar*, with a brush, and with a

knife loosen the edge of it, where it sticks to the form; that neither the form nor the *sugar-loaf* be damaged in taking out the latter. The windows are now opened, and the forms left to stand eight or ten days to dry. While the *sugar* is draining in its forms, a stove is prepared to receive them.

The stove being sufficiently heated, by means of the furnace therein, loaves are taken out of the forms one after another; and such as are white from one end to the other, are carried to the stove, as are, also, the rest, after cutting off what is not white, to be farther refined.

When the loaves are all ranged in the stove, a moderate fire is made for about two days, during which time, they visit every part of the stove very carefully, to see that every thing is in good order, and to repair any thing that may go amiss.

After these two days, they shut the trap-door a-top of the building, and increase the fire. Eight or ten days and nights continued violent fire usually suffice to dry a stove of *sugar*.

When they judge it sufficiently done, they open the trap-door, and chuse a hot dry day to pound the *sugar*, which is performed with huge, hard, heavy wooden pestles; when pounded, it is put up in barrels, and well trdden down as it is put in, that the barrels may hold the more.

SUGAR of the feum.—This is all made of the feum of the two last coppers, those of the former being reserved for the making of rum.

The feum destined to make *sugar*, is kept in a vessel for that purpose, and is boiled every morning in a copper set apart for that use. With the feum, is put into the copper a fourth part of water, to retard the boiling, and give time for its purging: when it begins to boil, the usual lye is put in, and it is carefully scummed: when almost enough boiled, lime and allom-water are thrown in; and when it is ready to be taken out, they sprinkle it with a little powdered allom.

SUGAR of syrop, or treacle.—There are three kinds of syrops that run from *sugar*. The first from the barrels of raw *sugar*, which is the coarsest of all: the second, from the forms or moulds, after they are perforated, and before they receive their earth: the third, that coming from the forms after they had their earth; which last is the best.

The coarse syrops should only be used for rum; but *sugar* being grown dear, endeavours have been used to make some hereof, and that with tolerable success. They are first clarified with lime-water, and, when boiled, are put up in barrels, with a *sugar* cane in the middle, to make them purify themselves. After twenty days, a quantity of coarse earth is thrown in, to make them cast the remainder of their syrop, and fit them to be returned into a crude *sugar*. The Dutch and German refiners first taught the islanders how to turn their treacle into *sugar*.

The second syrop is wrought somewhat differently: after the copper, it is to be boiled in, is half full, eight or ten quarts of lime-water are cast in: It is then boiled with a brisk fire, and carefully scummed: some add a lye, and others none. F. Labat takes the former method to be the better, though it requires more trouble and attention. This *sugar* may be earthed alone, or at least, with the heads of loaves, the dried tops, and such other kinds of *sugars* as may not be met with the true earthed *sugar*, nor yet with the crude *sugar*.

For the third syrop, after boiling and scumming it as the former, they put it instantly into coolers, the bottoms whereof are covered half an inch thick with white *sugar* very dry, and well pounded; and the whole is well stirred, to incorporate the two together. This done, they strew the surface over with the same pounded *sugar*, to the thickness of one fifth of an inch; this assisting the *sugar* in forming its grain. When settled, and the crust gathered at the top, a hole is made in the crust five or six inches diameter.

By this aperture, they fill the cooler with a new syrop, poured gently in, which insensibly raises up the former crust. When all the syrops are boiled, and the cooler is full, they break all the crusts; and after mixing them well, put it up in forms or moulds.

The rest is performed in the same manner as for the earthed *sugar*, from which it only differs in that it falls short of its gold and brightness; being, in reality, sometimes whiter and finer, though of a flatter and duller white.

Refined SUGAR.—Crude *sugar*, strained *sugar*, and the heads or tops of loaves that have not whitened well, are the basis or ground of this *sugar*.

In a refinery there are usually two coppers, the one serving to clarify the matter to boil the clarified liquor; tho' they sometimes do it, in both, and boil afterwards. For the clarification, the same weight of lime-water and of *sugar* are put in the copper; and as the scum is raised by the heat, it is taken off, and when it ceases to rise any more, the syrop is strained through a cloth.

After this, it is clarified; that is, a dozen of eggs are thrown in, whites, yolks, shell and all; after having first broke and beaten them well in lime-water. When the fat, and other

impurities of the *sugar*, which this composition gathers together on the surface of the syrop, have been skimmed off; a few more eggs are thrown in, and it is scummed afresh. This they repeat till the *sugar* be sufficiently clarified; which done, it is again strained through the cloth.

When taken out of this copper, it is boiled in the second; which done, it is put out into ciders, the bottoms whereof are first covered with an inch thick with fine white powdered *sugar*. As soon as it is there, it is highly stirred and so, and the surface is strewed over with more of the same. The rest is performed as in *sugars* of fine *sugars*, or in earthed *sugar*; only more care and exactness is used.

Refined SUGAR.—The basis of this sort ought to be the purest refined *sugar* to be found. This they melt with a weak lime water; and sometimes, to make it the whiter, and prevent the lime from reddening it, they use allom-water. This they clarify three times, and put as much on a high a close cloth, using the very best earth. When put on with these precautions, it is whiter than snow, and so transparent that we fee a finger touching it, even through the thickest part of the loaf.

SUGAR-candy, saccharum candum, or crystallinum,—is *sugar* depurated and crystallized. See CANDY. This is better made of earthed *sugar*, than refined *sugar*, in regard the former is sweeter.

The *sugar* to be used herein, is first dissolved in a weak lime-water, then clarified, scummed, strained through a cloth, and boiled, and put in forms or moulds that are traversed with little rods, to retain the *sugar* as it crystallizes. These forms are suspended in a hot stove, with a pot underneath, to receive the syrop that drops out at the hole in the bottom, which is half stopped, that the filtration may be the gentler. When the forms are full, the stove is shut up, and the fire made very vehement.

Upon this the *sugar* fastens to the sticks that cross the forms, and there hangs in little splinters of crystal. When the *sugar* is quite dry, the forms are broke and the *sugar* taken out, candied. Red *sugar*-candy they make, by cutting into the vessel, where the *sugar* is boiling, a little juice of the Indian fig; and if it is desired to have it perfumed, they cast a drop of some essence in, when the *sugar* is putting into the forms.

This method of making *sugar*-candy is that of F. Labat, practised in the Caribbees: the method in Europe, described by Pomet, is somewhat different.

White SUGAR-candy they make of white refined *sugar*, boiled with water into a thick syrop, in a large pan. It is candied in a stove, whither it is carried, inclosed in brafs peels, crossed with little rods, about which the crystals fasten as they are formed.

The fire of the stove is kept equable for fifteen days; after which the *sugar* is taken out of the peels to be dried. Red or brown *sugar*-candy is made like the white, except that they only use brown *sugars* and earthen pots.

Barley SUGAR, saccharum hordeatum, is a *sugar* boiled till it be brittle, and then cast on a stone anointed with oil of sweet almonds, and formed into twined sticks, about the length of the hand, and the thickness of a finger.

It should be boiled up with a decoction of barley, whence it takes its name; but in lieu thereof they now generally use common water, to make the *sugar* the finer.—To give it the brighter amber colour, they sometimes cast allom into it.—It is found very good for the cure of colds and rheums.

SUGAR of roses, saccharum rosatum, is white *sugar* clarified, and boiled into a consistence in rose-water: when boiled, they form it into lozenges, sometimes into little grains, of the size of peas, by keeping it stirring till it be cold, and dry.—It is reputed good to soften and allay acrimonies, &c. of the breast.

Cask of SUGAR, } See the articles } CASK.
Chest of SUGAR, } CHEST.

SUGAR of saturn, } See the article LEAD.
SUGAR of lead, }

SUGGESTION, SUGGESTIO, the act of hinting, or furnishing another with a thought, or design, or of insinuating it artfully into his mind.

In the French law, a testament is said to be made by *suggestion*, when it is made by surprize, and contrary to the intention of the testator.

If *suggestion* be proved, the testament becomes null. Articles of *suggestion* are not admissible against a testament wrote with the testator's own hand, which is never suspected.

SUIT, SUTE, SECTA in law, (from the French *suite*, a following another) is used in divers senses.—As, *SUIT in law*; which is of two kinds, *real* and *personal*: the fame with what we call *real* and *personal* actions.

SUIT of court, or suit of service; an attendance which the tenant owes the court of his lord.

SUIT covenant; when your ancestor hath covenanted with mine to sue to his court.

SUIT custom; when I and my ancessors owe suit time out of mind.

SUIT *real, or regal*; when men come to the sheriff's turn or lect.

SUIT also signifies the following one in chafe; as *fresh suit*. See **FRESH-SUIT**.

SUIT, again, signifies a petition made to the king, or any great person. See **PETITION**.

SULPHUR, in natural history, a fat, unctuous sort of mineral substance, fusible and inflammable by fire, and not at all soluble or miscible in water.

This is particularly called *foetid, or mineral sulphur*, to distinguish it from the *sulphur of metals, or of the philosophers*. Sulphurs make a particular class of fossils, divided into *solid and fluid*.

The *solid* SULPHURS, are common sulphur, or sulphur properly so called, arsenic and amber.

The *liquid* SULPHURS, are asphaltum, pissasphaltum, bitumen, petroleum, naphtha, and oleum terræ, &c. See **SUPPLEMENT**, articles **SULPHUR** and **BITUMEN**.

SULPHUR, properly so called, or *brimstone*, is of two kinds, viz. *sulphur vivum, and common sulphur*.

SULPHUR vivum, native, or virgin sulphur, is that which is dug in this form out of the earth; being usually of a yellow or ash-colour; it easily takes fire, and, in burning, calls a strong sulphurous smell.

It is chiefly brought from Sicily; and is but little used, except in some galenic compositions, and to sulphur wine, in order to make it keep in carriage.

It is found in great quantities in the neighbourhood of volcanos or burning mountains, as Vesuvius, Aetna, &c. yet sulphur has also its particular mines; and we have very good from several parts of Italy and Switzerland, though the best is that of Quitto and Nicaragua in America.

Common SULPHUR, or that used in gunpowder, and on divers other occasions, is melted from the common pyrites, and cast into cylindrical pieces. — Though others assure us, it is procured from the native sulphur by means of fire and train oil, which dissolving it, it is poured into moulds; and thus formed into those cylinders we find it in. Savary.

This common sulphur is either better or worse, according to the refinery it comes from. That of Holland has a long time had the best credit; the second place has been given to that of Venice; and the third to that of Marseilles: but the order seems to have been since changed, and that from Marseilles is now in the first place.

It is to be chosen in large thick cylinders, of a golden yellow colour, very brittle, and when broke, appearing all brilliant, as if crystallized.

Beside the use of sulphur in the composition of gunpowder, whereof it is one of the three ingredients, and that which makes it take fire so readily, it is of some use in medicine, and more in chymistry. It is also used in whitening silken and woollen stuffs; to which end, the vapour thereof is contrived to be received by them.

Its vapour also whiten red roses; and even young rooks, taken out of the nest, and exposed thereto, are said to become perfectly white. It has the same effect on gold; which is to be restored to its colour by boiling it in water with tartar.

The chymical analysis of sulphur is very difficult; its principles being so volatile, and withal so fast bound together, that they either rise all together, or are dissipated and lost in the separation.

M. Homberg, however, has at length found the secret of separating the principles, and of saving them at the same time. He finds it to consist of an acid salt, an earth, an oily bituminous and inflammable matter, and usually a little metal.

The three first he finds, by a long series of operations, are in pretty equal quantities; but the last, which proves to be copper, is very inconsiderable. The acid, he adds, is exactly the same with that of vitriol; the oil, which is thick and red as blood, appears to be the inflammable part, and that which constitutes the chymical principle sulphur, only that it retains some heterogeneous matter in the operation. The earth is extremely fixt, and unalterable by the strongest fire. M. Geoffroy tried the re-composition of sulphur, on M. Homberg's principles, and with success. The pure acid salt of sulphur being mixed with an equal quantity of the oily matter, and earthy alcali, and a little oil of tartar, and the operation conducted according to the rules of art, the mixture was converted into a pure burning sulphur.

This done, he attempted the composition of sulphur, not by recombining it out of the same matters it had been resolved into, but by using matters judged of the same nature. Thus, by substituting oil of vitriol for the acid salt, and oil of turpentine for the inflammable part, he succeeded as before.

Again, he found that fixt salts, as they are acids absorbed in earth, serve for two principles at once, and need nothing but an inflammable oil to make sulphur; and even in lieu of this

oil, M. Geoffroy employed, with equal success, charcoal, pit-coal, and other solids.

Indeed Mr. Boyle and Glauber had before made common sulphur, and that by mixtures, such as M. Geoffroy describes; but they were both mistaken as to the reason thereof; the one concluding, that the sulphur he thus got, had been contained in the fixed salts, and the other in the oil; neither of them dreamed, that it was the mixture of these principles that produced the mixt.

Flowers of SULPHUR, are the purest and finest part of common sulphur, gained by evaporating sulphur, by sublimation, or burning it in pots made for that purpose, and gathered in the capital of the cucurbit, where the vapour flicks.

This preparation, as, indeed, sulphur, in most of its forms, is found excellent for the lungs. The best flower of sulphur is in cakes, or pieces, light, soft, fusible, and rather white than yellow. If it be in powder it must be very fine, of a yellow colour, that is, both whitish and yellow at the same time.

Instead of this, we have frequently put upon us a vile sulphur, mixed with starch, or wheat flour; and sometimes only sulphur-dust well sifted.

By adding fixed nitre, or sal polychrest, to the flowers of sulphur, we have the *white flowers of sulphur*.

Magistery, balin, or milk of SULPHUR, is sulphur dissolved in a sufficient quantity of water, with salt of tartar; and precipitated by means of spirit of vinegar, or some other acid.

It is called *milk of sulphur* from its whiteness; and *balin of sulphur*, or of the lungs, from its excellent use in diseases of the lungs and breast.

Salt of SULPHUR, is a chymical preparation, very improperly thus called: as being no other than the sal polyphorum, impregnated with spirit of sulphur, and reduced to an acid salt, by evaporating the humidity thereof. Some have it a powerful febrifuge.

Spirit of SULPHUR. See the article **SPIRIT**.

SULPHUR of antimony, is a diaphoretic tincture drawn from antimony and salt of tartar or nitre by divers operations.

That drawn from the feces of crocus metallicum, is by some called *golden sulphur*.

SULPHUR metalorum, or sulphur of metals, called also, *sulphur signis*, is used among chymists and alchemists for a peculiar matter, which enters the composition of all metals.

Metals are supposed to consist of two essential parts, or principles; mercury, as the basis, or metallic matter; and sulphur, as the binder, or cement, which fixes the fluid mercury into a coherent malleable mass.

Some of the latest and best chymists, particularly Messrs. Homberg, will have this sulphur to be no other than fire.

SULPHURATED wine. See the article **WINE**.

SULTAN, or SOLDAN, a title, or appellation given the emperor of the Turks.

It had its rise under Mahmoud, son of Sebecleghin, the first emperor of the dynasty of the Gaznevies, towards the close of the fourth century of the era of the Hegira: when that prince going to restrain to reduce Kalaf, governor of that province, who affected the sovereignty; Kalaf was no sooner advertised of his coming, then he went out to meet him, delivered the keys of his fortress, and owned him his *sultan**, that is, his lord or commander. The title pleased Mahmoud so well, that he assumed it ever afterwards; and from him it passed to his descendants, and to other Mahometan princes.

* Vattier will have the word Turkish, and to signify king of kings; adding that it was first given the Turkish princes Angrolipex and Masgud, about the year 1055; others will have it originally Persian, alledging, in proof thereof, an ancient medal of Cosroe; others derive it from *salutari*, quasi *salus dominus*; others from the Hebrew שלטן, *shulatan*, to rule, reign.

In the Roman ceremonial, we also find mention made of a **SOLDAN, or marshal**, who is to attend the pope when he marches in state. He is also to apprehend malefactors.

SULTANA, the wife of a sultan. The favourite *sultana* is called *Hafski-sultana*, i. e. private *sultana*.

The *sultana* queen is the emperor's chief wife. The old *sultana*, mother of the emperor reigning, is called *sultana valide*.

SULTANA also denotes a strong Turkish vessel of war.

SULTZ, or SULZ. See the article **SALZ**.

SUM, SUMMA, in mathematics, signifies the quantity that arises from the addition of two or more magnitudes, numbers, or quantities together.

This is sometimes called the *aggregate*; and, in algebra, it is sometimes denoted by the letter *Z*, which stands for *suma*, or *suma*; and sometimes by the letter *S*.

SUM of an equation, is when the absolute number being brought over to the other side, with a contrary sign, the whole becomes

comes equal to 0: this Des Cartes calls the *sum of the equation* propagated.

SUMACIL, a dye used to dye in green; as also in the preparation of black morocco, and other leather. See *MORCCO*.

It consists of the leaves and young branches of a shrub, not unlike the little service-tree: the leaves are longish, pinnated and hairy: the flowers grow in clusters, and are red, like our roses. Its fruit is produced in clusters, of a very astringent quality; and its seed almost oval, and inclosed in capsule of the like figure.

The ancients used *sumach*, instead of salt, to season their meat withal; whence the Latins call the tree, *rhus albaniorum*: from its use in the dressing of leather, it is also called *rhus coriaria*.

SUMMARY, an abridgement, containing the sum and substance of a thing in a few words.

The *summary* placed at the head of a book, a chapter, a law, or the like, is very useful to the reader, to facilitate the understanding thereof.

A recapitulation, is to contain a *summary* of the whole preceding discourse.

SUMMATORIUS calculus, the method of summing differential quantities; that is, from any differential given, to find the quantity from whole differencing the given differential results.

This method we more usually call the *inverse method of fluxions*; and foreigners, *integralis calculus*. See *CALCULUS*, and *FLUXIONS*.

SUMMER, one of the seasons of the year, commencing in these northern regions, on the day the sun enters cancer; and ending when he quits virgo.

Or, more strictly and universally, the *summer* begins on the day when the sun's meridian distance from the zenith is the least. It ends on the day when his distance is a mean between the greatest and smallest.

The end of *summer* coincides with the beginning of winter. See *WINTER*.

SUMMER flowers, } See the articles } **FLOWERS**.
SUMMER solstice, } **SOLITICE**.

SUMMER *, in architecture, is a large stone, the first that is laid over columns and pilasters, in beginning to make a cross vault; or it is the stone which being laid over a piedroit or column, is hollowed, to receive the first haunch of a plat band.

* The word is formed from the French, *summer*, which signifies the same thing.

SUMMER, in carpentry, is a large piece of timber, which being supported on two stone peers, or posts, serves as a lintel to a door, window, &c.

There are also *summers* used in various engines, &c. sewing to sustain the weight, &c.

SUMMER *, denotes a term into which the ends of joists are fastened, and to which the girders are framed. See *RAFTERS*, *SUMMER*, and *GIRDER*.

SUMMER of an organ. See the article *SOUND-board*.

SUMMET *, the vertex, or point of any body, or figure; as of a triangle, a pyramid, a pediment, &c.

* The word is formed from the French, *summet*, which signifies the same.

SUMMONER, **SUMMONITOR**, an apparitor, or petty officer who is to cite persons to appear at a certain time and place, to answer to the charge exhibited against them. See *APPARITOR*, and *SUMMONS*.

SUMMONS, **SUMMONITIO**, in law, a citing or calling a person to any court, to answer a complaint, or even to give in his evidence.

This is the same with the *vocatio in jus*, or the *citatio* of the civilians: hence also our old word *summer*, or *summerer*.

SUMMONS in terra petita, is that made on the land which the party, at whose suit the summons is sent out, seeks to have.

SUMMONS ad warrantandum, is a process, whereby the vouches in a common recovery is called.

SUMMONS, in war.—To *summons* a place, is to send a drum, or trumpet, to command the governor to surrender; or, in direct threat to protest to make an assault, and to lay all in fire and blood.

SUMMUM bonum, in ethics, the chief good of human nature; or that, which, by its enjoyment, renders men truly and completely happy.

The schools distinguish this chief good of man, into that which is simply and adequately so, and beyond which there can be no other; and an inferior and subordinate fort, which is in some measure attainable in this imperfect state.

This last they call *felicitas viatorum*; and the former, *felicitas comprehensum*.

SUMMUM genus. See the article *GENUS*.

SUMPTER horse, is an horse that carries provisions, and necessities for a journey. Rust.

SUMPTUARY laws, *leges SUMPTUARIÆ*, are laws made to restrain excess in apparel, cell's furniture, eating, &c. Most ages and nations have had their *sumptuary* laws, and

some retain them still, as the Venetians, French, &c. But it is observed, that no laws are worse executed than *sumptuary* laws.

The *sumptuary* laws of that ancient Locrian legislator Zaleucus, are famous: by these it was ordained, that no woman should go attended with more than one maid in the street, except the were drunk: that she should not go out of the city in the night, unless she went to commit fornication: that she should not wear any gold or embroidered apparel, unless she proposed to be a common strumpet. And that men should not wear rings, or tiffues, except when they went a whoring, &c.

The English have had their share of *sumptuary* laws, though all repealed by a statute 1^o Jac. I. or obsolete.

Under king Henry IV. Camden tells us, pride was got so much into the foot, that it was proclaimed, That no man should wear shoes above six inches broad at the toes. And their other garments were so short, that it was enacted, 25 Ed. IV. That no person under the condition of a lord, should, from that time, wear any mantle or gown, unless of such length, that, standing upright, it might cover his privy members and buttocks.

Among the Romans, the *sumptuary* and *cibary* laws were very numerous: by the lex Orchia, the number of guests at feasts was limited, though without limitation of the charges thereof. By the Fannian law, made twenty-two years afterwards, it was enacted, That more than ten as's should not be spent at any ordinary feast: for the solemn feasts, as the saturnalia, &c. an hundred as's were allowed; ten of which, Gellius informs us, was the price of a sheep, and an hundred of an ox.

By the Didian law, which was preferred eighteen years after, it was decreed, that the former *sumptuary* laws should be of force, not only in Rome, but throughout all Italy: and that for every transgression, not only the matter of the feast, but all the guests too, should be liable to the penalty.

SUN, *SOL*, in astronomy, the great luminary which enlightens the world, and by his presence constitutes day.

The *sun* is usually reckoned among the number of planets; but that he ought rather to be numbered among the fixed stars, will be shown in its place.

According to the Copernican hypothesis, which is now generally received, and which has even demonstration on its side, the *sun* is the centre of the planetary and cometary system; round which all the planets and comets, and our earth among the rest, revolve, in different periods, according to their different distances from the *sun*. See this motion illustrated and demonstrated under the article *PLANET*. But the *sun*, though thus called of that prodigious motion, whereby the ancients imagined him to revolve daily round our earth; yet is not a perfectly quiescent body.

From the phenomena of his macule or spots, it evidently appears, that he has a rotation round his axis; like that of the earth whereby the natural day is measured; only slower. —Some of these spots have made their first appearance near the edge or margin of the *sun*, and have been seen some time after on the opposite edge; whence, after a stay of about fourteen days, they have re-appeared in their first place, and taken the same course over again; finishing their entire circuit in twenty-seven days time: which is hence deduced to be the period of the *sun's* rotation round his axis. This motion of the spots, is from west to east, whence we conclude that of the *sun*, to which the other is owing, to be from east to west. —For the various appearance of the solar spots, their cause, &c. see *MACULÆ*.

For the apparent annual motion of the *SUN* round the earth; it is easily shown by astronomers, that the annual motion of the earth will occasion such an appearance, though it be demonstrated that there is no such thing.

A spectator in the *sun*, would see the earth move from west to east, for the same reason as we see the *sun* move from east to west. And all the phenomena resulting from this annual motion, in which soever of the bodies it be, will appear the same from either.

Let S, for instance (*Tab. Astron. fig. 39*) represent the *sun*, ABCD the earth's orbit, which it passes through from west to east, in the space of a year. —Now, a spectator in S, viewing the earth at A, will refer it to the point of the sphere of the stars, Υ : when arrived in B, the spectator will see it, as in the point Θ : when in C, as in the point Ξ , &c. till after its whole circuit, it will be again seen in Υ . Thus will the earth appear to describe the whole ecliptic, and to pass, successively, from sign to sign.

Suppose, now, the spectator removed from the *sun* to the earth, which imagine in C; the distance of the fixed stars, we have shewn, is so vast, that that of the *sun* is but a point to it. The spectator, therefore, now situate on the earth, will see the same face of the heavens, the same stars, &c. as before; the only difference will be, that as before he imagined the earth in the heavens, and the *sun* in the centre; he will now suppose the *sun* in the heavens, and the earth in the centre.

The earth, therefore, being in C, the spectator will see the sun in γ ; and the spectator being carried along with the earth, and partaking of his annual motion, will not perceive either his own motion, or that of the earth; but observing the sun when the earth is arrived at D, the sun will be seen at ϕ . Again, while the earth proceeds to A, the sun will seem to have moved through the signs ϕ , ψ , and ω ; and while the earth describes the semi-circle ABC, the sun will appear to have moved in the concave surface of the heavens, through the six signs, α , β , γ , δ , ϵ , ζ . So that an inhabitant of the earth will see the sun go through the same orbit or circle in the heavens, and in the same space of time, as a spectator in the sun would see the earth describe the same.

Hence arises that apparent motion of the sun, whereby he is seen to advance, insensibly, towards the eastern stars: inasmuch, that it may star near the ecliptic, rise any time with the sun; after a few days, the sun will be got more to the east of the star, and the star will rise and set before him.

For the several phenomena resulting from the sun's apparent motion, or the earth's real motion, as the diversity of day and night, of seasons, &c. see EARTH.

Nature, properties, figure, &c. of the SUN.—1°. As the solar spots are sometimes found to stay three days longer behind the sun, than they spend in passing over the hemisphere visible to us; we easily deduce, that they do not adhere to the surface of the sun, but are at some distance therefrom.

2°. As the spots frequently rise and vanish, even in the midst of the sun's disk; and undergo several changes, both with regard to bulk, and figure, and density; it follows, that they frequently rise de novo, about the sun, and are again dissipated.

3°. Hence it should follow, that they are formed out of the exhalations of the sun, and are no other than solar clouds.

4°. Since, then, exhalations proceeding from the sun, rise above him, and stop at a certain altitude; it is evident there is some fluid incomparably the sun, to urge the exhalations to rise: and this fluid must be denser at bottom, and rarer at top, like our atmosphere.

5°. Since the spots frequently dissolve and disappear in the middle of the sun's disk; the matter of the spots, that is, the solar exhalations, fall back again to the sun: whence it follows, that there must arise various alterations in the sun's atmosphere, and the sun himself.

6°. Since the revolution of the spots round the sun is found very regular, and the spots very near the sun; it follows, that the spots do not revolve round the sun, but that the sun, together with his atmosphere, wherein the maculae are, move round their common axis, in an interval of about twenty-seven days: and hence it is, that the spots near the limb, being viewed obliquely, appear narrow and oblong.

7°. Since the sun, in every situation, appears like a circular disk; its figure, as to sense, must be spherical; though we shall hereafter shew, that it is really spheroidal.

Besides the maculae or dark spots, several authors make mention of faculae, or spots brighter than the rest of the sun's disk; and those generally larger, and very different from the maculae, both in figure, duration, &c.

The faculae, Kircher, Scheiner, &c. suppose to be eruptions of flames; and hence take occasion to represent the face of the sun as full of volcanos, &c. But Huygens, using the best telescopes, could never find any such things, though he has sometimes spied certain places in the maculae themselves, more lucid than the rest. But these do not seem owing to any kindled matter, which were scarce consistent with their duration, and their frequent change into maculae; but to the refraction of the sun's rays, through the thinner exhalations, while the grosser, in their neighbourhood, intercept the same.

8°. That the substance of the sun is fire, we thus prove: the sun shines, and his rays, collected by concave mirrors, or convex lens's, burn, consume, and melt the most solid bodies, or else convert them into ashes, or glass. Wherefore, as the force of the solar rays is diminished by their divergency, in a duplicate ratio of the distances reciprocally taken: it is evident, their force and effect is the same, when collected by a burning lens or mirror, as if we were at such distance from the sun, where they were equally dense. The sun's rays, therefore, in the neighbourhood of the sun, produce the same effects, as might be expected from the most vehement fire; consequently, the sun is of a fiery substance.

Hence it follows, that its surface is every where fluid; that being the condition of flame.

In fact, whether the whole body of the sun be fluid, as some think, or solid, as others; we do not determine: but as there are no other marks, whereby to distinguish fire from other bodies, but light, heat, a power of burning, consuming, melting, calcining, and vitrifying; we do not see what should hinder, but that the sun may be a globe of fire, like ours, invested with flame.

9°. Since the maculae are formed out of the solar exhalations, it appears, that the sun is not pure fire, but that there are heterogeneous particles mixed along with it.

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10°. The figure of the sun is a spheroid, higher under its equator than about the poles. This we prove thus: the sun has a motion about its own axis, and therefore the solar matter will have an endeavour to recede from the centres of the circles wherein it moves; and that, with the greater force, as the peripheries of the circles are greater. But the equator is the greatest circle, and the rest, towards the poles, continually decrease; therefore the solar matter, though at first in a spherical form, will endeavour to recede from the centre of the equator, further than from the centres of the parallels.

Consequently, since the gravity whereby it is retained in its place, is supposed to be uniform throughout the whole sun; it will really recede from the centre, more under the equator than under any of the parallels. And hence the sun's diameter, drawn through the equator, will be greater than that passing through the poles, i. e. the sun's figure is not perfectly spherical, but spheroidal.

For the parallax of the SUN, see PARALLAX.

For the SUN's distance; as the determination thereof depends on that of the parallax, and as the sun's parallax is not found without a long operation of calculus; so astronomers do not agree much about either of them.

The mean distance of the sun from the earth, some make 7490 diameters of the earth; others 10000, others 12000, others 15000; but allowing M. de la Hire's parallax of $6''$, the sun's mean distance will be 17188 diameters of the earth; and allowing that of Cassini, only 14182. See DISTANCE.

The apparent diameter of the sun, is not always the same.

Ptolemy makes it, when greatest, $33' 20''$; Tycho $32'$; Kepler, $31' 4''$; Ricciolus, $32' 8''$; Cassini, $32' 20''$; de la Hire, $32' 43''$. Its mean, or apparent diameter, according to Ptolemy, is $32' 18''$; according to Tycho, $31'$; according to Kepler, $30' 30''$; according to Ricciolus, $31' 40''$; according to Cassini, $31' 40''$; according to de la Hire, $32' 10''$. Its least diameter, Ptolemy makes, $31' 20''$; Tycho, $30'$; Kepler, $30'$; Ricciolus, $31'$; Cassini, $31' 8''$; de la Hire, $31' 38''$.

The true diameter of the sun to that of the earth, is computed to be, as 10000 to 208.

For the eclipses of the SUN, see the article ECLIPSE.

Cycle of the SUN. See the article CYCLE.

Meridian altitude of the SUN. See the article MERIDIAN.

Angle at the SUN,	}	See	ANGLE.
Diurnal arch of the SUN,			ARCH.
Height of the SUN,	HEIGHT.		
Nadir of the SUN,	NADIR.		
Nocturnal arch of the SUN,	ARCH.		
Place of the SUN,	PLACE.		
Retrogradation of the SUN,	RETROGRADATION.		
Vertical of the SUN,	VERTICAL.		
Raisins of the SUN,	RAISIN.		

SUNDAY, the first day of the week; thus called by our idolatrous ancestors, because let apart for the worship of the sun.

It is now more properly called the Lord's-day, *dominicus*, because kept as a feast in memory of our Lord's resurrection on this day; and *sabbath-day*, because substituted under the new law, in the place of the sabbath, in the old law.

In the Breviary, and other offices, we meet with *fundays* of the first and second class.—Those of the first class, are *Palm, Easter, Ascension and Whitsonday*; those of *quasimodo* and *triduum*; each whereof see under its proper article.—Those of the second class, are the common *fundays*.

Anciently, each *funday* in the year had its particular name, which was taken from the introit of the day; which custom has only been continued to some few in Lent: as, *remisere, oculi, letare, judica*.

It was Constantine the Great, who first made a law for the proper observation of *funday*; and who, according to Eusebius, appointed it should be regularly celebrated throughout the Roman empire.

Before him, and even in his time, they observed the Jewish sabbath as well as *funday*; both to satisfy the law of Moses, and to imitate the apostles, who used to meet together on the first day.

Indeed, some are of opinion that the Lord's-day, mentioned in the Apocalypse, is our *funday*; which they will have to have been so early instituted by the apostles.—Be this as it will, it is certain, a regard was had to this day, even in the earliest ages of the church; as appears from the first apology of Justin Martyr, where he describes the exercise of the day, not much unlike to ours.

By Constantine's laws, made in 321; it was decreed, that for the future, the *funday* should be kept a day of rest in all cities and towns; but he allowed the country people to follow their work.—In 538, the council of Orleans prohibited this country-labour; but in regard there were still abundance of Jews in the Gauls, and that the people gave into a good many superstitious usages in the celebration of the new sabbath, like those of the Jews among that of the old; the council declares, that to hold it unlawful to travel with

horses, cattle, and carriages, to prepare foods, or to do any thing necessary to the cleanliness and decency of houses or persons, favours more of Judaism than Christianity.

Quinquagesima SUNDAY, { See { *QUINQUAGESIMA*.

Trinity SUNDAY, { See { *TRINITY*.

SUNDAY letter. See the article *DOMINICAL letter*.

SUN-flower. See the article *TURNIP*.

SUNATA. See the article *SONATA*.

SUOVETAURILIA, or *SOLITAURILIA*, a solemn sacrifice among the ancient Romans; wherein they offered three victims, of three different kinds, viz. a bull, a ram, and a boar.

Livy describing it, calls it *suovetaurilia*, as composed of *sus*, or *is*, and *taurus*, the names of the three victims sacrificed. Dion. Halicarnassensis describing the same, calls it *silitaurilia*, in regard it was required, that the victims were perfect, and without any defect; *silus*, or *silus*, in the language of the Oen. *Epiphany*, integer, entire.

SUPERBIPARTILIS. See the article *RATIO*.

SUPERCARGO, a person employed by merchants to go a voyage, and oversee their cargo or lading, and dispose of it to the best advantage.

SUPERCILII cornuator. See the article *CORRUGATOR*.

SUPERCILIUM, in anatomy, the eye-brow. See *EYE*.

SUPERCILIUM, in the ancient architecture, denotes the uppermost member of the cornice, called by the moderns, *cornice*, *cornice*, or *larnier*.

Mr. Evelyn conceives, it should rather have been called *siltedium*, or *drift*, to denote its office of sheltering the order from rain, &c.

SUPERCILIUM, is also used for a square member under the upper tote in some pedestal.

Some authors command it with the torse itself. See *TORSE*.

SUPEREROGATION, in theology, what a man does beyond his duty, or more than he was commanded to do.

The Romanists stand up strenuously for works of *supererogation*; and maintain, that the observance of evangelical counsils is such. By means hereof, a flock of merit is laid up; which the church has the disposal of, and which she distributes in indulgences to such as need.

The reformed church do not allow of any work of *supererogation*; but held with the apostles, That when we have done our best, we are but unprofitable servants. See *MERIT*.

*SUPERFETATION**, *SUPERFOETATIO*, in medicine, an after or second conception; happening when the mother, already pregnant, conceives, of a later coition; so that she bears at once two foetus of unequal age and bulk, and is delivered of them at different times.

* The word is formed from the Latin, *super*, over, and *foetus*, embryo.

We meet with instances of *superfetations* of women in Hippocrates, Aristotle, Pliny, La Laurens, &c.—But they are much more frequent in hares and fows.

An instance of an extraordinary kind of *superfetation*, we have in Bartholine; who tells us, that a Danish girl was born big with child.

Mentzelius, a German physician, adds, that in 1672, the wife of a physician, in Thuringia, was delivered of a girl big with another; whereof she was delivered in eight days time; and which was baptized, and died a day after her mother.

The naturalists hold, that female rats are frequently born with young rats in their wombs.—In the king of Denmark's cabinet, is seen an egg, in the middle whereof is another egg perfectly formed. See *EGG*.

We meet with something like a *superfetation* in plants too; there being a kind of lemon found to grow inclosed in the body of another.

In the *Histroy of the royal academy of sciences*, for the year 1709, mention is made of a letter from a very considerable magistrate, to the academy, containing a very remarkable instance of a *superfetation*; a butcher's wife of Aix being delivered in that year of nine children, each about two days after other, all well termed and alive.

SUPERFICIAL *colant*. See *SUPERFICIES*, *AREA* and *MEASURING*.

SUPERFICIES, or *SURFACE*, in geometry, a magnitude, considered as having two dimensions; or extended in length and breadth; but without thickness or depth.

In bodies, the *superficies* is all that presents itself to the eye.—A *superficies* is chiefly considered, as the external part of a solid: when we speak of a surface simply, and without any regard to body, we usually call it figure.

Rectilinear SUPERFICIES, is that comprehended between right lines.

Curvilinear SUPERFICIES, that comprehended between curve lines.

Plane SUPERFICIES, is that which has no inequality, but lies evenly between its boundary lines.

Convex SUPERFICIES, is the exterior part of a spherical or spheroidal body.

Concave SUPERFICIES, is the internal part of an orbicular or

spheroidal body.

The measure or quantity of a surface, is called the *area* thereof. See *AREA* and *MEASURING*.

The finding of this measure or area, is called the *quadrature* thereof. See *QUADRATURE*.

To measure the surfaces of the several kinds of bodies, as spheres, cubes, parallelepipeds, pyramids, prisms, cones, &c. see *AREA*.

Line of SUPERFICIES, a line usually found on the sector, and Gunter's scale.—The description and use hereof, see under the articles *SECTOR* and *GUNTER'S scale*.

SUPERFINE, in the manufactories, a term used to express the superlative fineness of a stuff.

Thus a cloth, a camelot, &c. are said to be *superfine*, when made of the finest wool, &c. or when they are the finest that can be made.

The term is particularly used among gold wiew-drawers, for the gold or silver wiew which after being drawn through an infinite number of holes, each less and less, is, at length, brought to be no bigger than a hair.

SUPERINCESSUS radens, { See { *SLIDING*.

SUPERINCESSUS volvens, { See { *ROLLING*.

SUPERINSTITUTION, *SUPERINSTITUTIO*, denotes one institution upon another.—As, if A be admitted and instituted to a benefice upon one title, and B be admitted, instituted, &c. by the presentation of another.

SUPERINTENDENT, in the French customs, an officer who has the prime management and direction of the finances or revenues of the king.

The term is also used for the first officer in the queen's household, who has the chief administration thereof.

They have also a *superintendent* of the buildings, answering to the surveyor of the works among us. See *SURVEYOR*.

The cardinal de Richelieu made himself *superintendent* of commerce.

SUPERINDEPENDENT, also denotes an ecclesiastical superior in several reformed churches where episcopacy is not admitted; particularly among the Lutherans in Germany, and the Calvinists in some other places.

The *superintendent* is, in effect, little other than a bishop; only his power is somewhat more restrained than that of our diocesan bishops.

He is the chief pastor, and has the direction of all the inferior pastors within his district, or diocese.

In Germany they had formerly *SUPERINTENDENTS general*, who were superior to the ordinary *superintendents*.—These, in reality, were archbishops; but the dignity is sunk into disuse; and at present, none but the *superintendent* of Wirtemberg assumes the quality of *superintendent general*.

SUPERIOR, or *SUPERIOUR*, something raised above another, or that has a right to command another.—Thus an abbot is called the *superior* of an abbey; and a prior the *superior* of a convent.

The canonists hold, that a perpetual superiority constitutes a title: but a *superior* may be continued by those who constituted him such, yet without the superiority's being rendered, by that means, perpetual.

The church of France allow the superiority and primacy of the pope, not his infallibility, as all the other Romish churches do. See *POPE*, *ABBOT*, and *PRIOR*.

SUPERIOR capitis obliquus,

SUPERIOR maxilla,

SUPERIOR oculi obliquus,

SUPERIOR planetis,

SUPERIOR pectus serratus,

SUPERIOR respondent,

SUPERIOR scapularis,

SUPERIORIS labii elevator,

SUPERJURARE.—Anciently, when a criminal endeavoured to excuse himself by his own oath, or by that of one or more witnesses; and yet the crime was so notorious, that he was convicted by the oaths of many more witnesses; this was called *superjurare*.

SUPERLATIVE, in grammar, an inflexion of nouns adjectival, serving to augment and heighten their signification, and shew the quality of the thing denoted to be in the highest degree.

In English, the *superlative* is usually formed by the addition of *est*; as *richest*, *huligst*, &c. rarely by the addition of *issimo*, as *generalissimo*; more frequently by the prefixing of *most*; as *most honourable*, *most amiable*, &c.

The French are generally forced to form their *superlatives*, by prefixing of *le plus*, sometimes of *tres*, and sometimes of *fort*. The Italians and Spaniards have great advantages over them in this respect; their language abounding with magnificent words to exaggerate things without, without auxiliary particles: yet the Hebrews are more poor than the French in this respect, as having neither comparatives nor *superlatives*. They use to express these degrees by the particles *joter* and *meod*, sometimes by the preposition *min*, and sometimes by re-doubling the words; of which we find frequent instances in the bible. SUPER

SUPERNATURAL, *græc.* See the article **GRACE**.

SUPERNATURAL, *theology.* See the article **THEOLOGY**.

SUPERNUMERARY, *latinet.* $\frac{2}{3}$ over and above a fixed number.—In several of the offices, *supernumerary* clerks, to be ready on extraordinary occasions.

There are also *supernumerary* surveyors of the excise, to be ready to supply vacancies when they fall: these have but half pay.

In music, the *supernumerary*, called by the Greeks *ψαλμωφανομενος*, is the lowest of the chords of their system; answering to a, mi, la, of the lowest octave of the moderns.

See **DIAGRAM**.

SUPERPARTICULARIS, } See **RATIO**.

SUPERPARTIENS,

SUPER-PURGATION, *hypercathartis*, in medicine, an excessive, over-violent purging.

A man who had taken powder of diacathamum inwardly, was sent by it to stool an hundred times; and was cured of the *super-purgation* by a pound of capon-broth, an ounce of saccharum rosatum, five grains of laudanum, and the yolk of an egg.—In lieu of laudanum, they sometimes use a drachm and a half of new venice-treacle. Burnet.

SUPERQUADRIPARTIENS. See the article **RATIO**.

SUPERSCAPULARIS inferior, called also *infraspinatus*; a muscle that helps to draw the arm backwards. It covers all the space that is between the spine, and the teres minor; and is inserted into the neck of the humerus.

SUPERSCAPULARIS superior, in anatomy, a muscle, called also *supraspinatus*. See **SUPRASPINATUS**.

SUPERSEDEAS, a writ issued in divers cases, importing, in general, a command to stay, or forbear some ordinary proceedings at law, which, in appearance, ought to be done, or pursued, were it not for the cause, whereon this writ is granted.

Thus, a man, regularly, is to have a surety of peace, against him of whom he will swear he is afraid; and the justice required hereunto cannot deny it him: yet if the party be formerly bound to the peace, either in chancery, or elsewhere, this writ lies, to stay the justice from doing that, which otherwise he ought not to deny.

Clerk of the SUPERSEDEAS. See the article **CLERK**.

SUPERSTITIO, extravagant devotion, or religion wrong directed, or conducted.

It was a piece of *superstition* in the ancient Romans, to observe the flight of birds, the entrails of victims, &c.

The Romish priests make a fine penny of the *superstition* of the people: Monsi. Thiers has an express treatise *des superstitions populaires*. Women, he observes, are naturally more inclined to *superstition* than impiety. Plutarch has endeavoured to shew, that *superstition* is worse than atheism. The punishment allotted by several councils for the superstitious, is, to fast a month in prison.

SUPERSTITIOUS magic. See **MAGIC**.

SUPERVISOR, signifies a surveyor, or overseer. See **SURVEYOR**, &c.

It was formerly, and still remains a custom among some, especially of the better sort, to make *supervisor* of wills; to overlook the executors, and see their wills truly performed: but it is to little purpose; as being now so carelessly executed.

SUPINATION, **SUPINATIO**, in anatomy, the action of a supinator muscle; or the motion whereby it turns the hand, so as that the palm is lifted upwards towards heaven. See **SUPINATOR**.

SUPINATOR, in anatomy, a denomination given to two muscles of the arm; the one called *supinator longus*, the other *supinator brevis*: both serving to turn the palm of the hand upwards.

The first arises by a fleshy beginning, three or four fingers breadth above the external protuberance of the humerus. It lies along all the radius, to whose inferior and external part it is inserted by a pretty broad tendon.—See *Tab. Anat. (Myol.)* fig. 1. n. 20. fig. 2. n. 19. fig. 6. n. 16. fig. 7. n. 44.

The second comes from the external and upper part of the ulna, and passing round the radius, is inserted into its upper and fore part, below the tendon of the biceps.—See *Tab. Anat. (Myol.)* fig. 7. n. 10, 10. and 45.

SUPINE, in the Latin grammar, a part of the conjugation of a verb, of like effect with the infinitive mood.

There are two kinds of *supines*, the one in *um*, whose signification is active, and marks a motion, as *dare nuptum*; the other in *u*, having a passive signification, as *torrendum auditu*, &c.—The *supines* have neither number nor person. They have their name, says Probus, and after him Vossius, *quod ad inflar supinorum & etiam hominum omnia habent consuetudo*. Or, according to Plinian, *quod nascantur a participiis passivis, quæ si pna copulata sunt, quia in infimo loco sita, etiam conjugationis nomen suscipiunt*.

SUPLANTALIA, or **NOPEPDANEÆ**, among physicians, plasters, or other medicaments applied to the soles of the

feet; generally made of leaven, mustard, horse-radish, salt, soap, gunpowder, &c.

SUPPLEMENT of an arch, in geometry or trigonometry, is the number of degrees that it wants of being an entire semicircle: as *supplement* signifies what an arch wants of being a quadrant.

SUPPLEMENT, in matters of literature, an appendage to a book, to supply what is wanting therein.

Frenschimius has wrote divers *supplements*, to restore the books of several ancient authors, part whereof had been lost.

The French have also used the word *supplement* for a kind of tax, or after-payment charged on lands, offices, &c. that are pretended to have been sold beneath their value.

SUPPLICAVIT, a writ issuing out of chancery, for taking surety of the peace when one is in danger of being hurt in his body by another.

It is directed to the justices of the peace, and sheriff of the county; and is grounded on the statute 1 Ed. III. which appoints, that certain persons shall be assigned by the lord chancellor to take care of the peace.

SUPPORTED, in heraldry, a term applied to the uppermost quarters of a shield, when divided into several quarters; these seemings, as it were, *supported*, or sustained, by those below.

The chief is also said to be *supported* when it is of two colours, and the upper colour takes up two thirds of it: in this case it is *supported* by the colour underneath.

SUPPORTERS, in heraldry, figures in an achievement, placed by the side of the shield, and seeming to support, or hold up the same.

Supporters are chiefly figures of beasts; figures of human creatures used for the like purpose are more properly called *tenants*.

Some make another difference between *tenant* and *supporter*: when the shield is bore by a single animal, it is called *tenant*; when by two, they are called *supporters*.

The figures of things inanimate, sometimes placed aside of escutcheons, but not touching, or seeming to bear them; though sometimes called *supporters*, are more properly called *costives*.

The *supporters* of the English arms are a lion and a unicorn; some of the former kings have had a leopard and an unicorn; others griffons, others eagles. See **ARMS**.

The *supporters* of the French arms are angels; which are said to have been first introduced by Philip VI. his device being an angel over-throwing a dragon: the dragon being at that time the device of the kings of England.

Those of the prince of Monaco, are Augustine monks: Those of the family of the Ursini, Bears, in allusion to their names.

In England, none below the degree of a banneret are allowed *supporters*, which are restrained to those called *high nobility*. The Germans permit none but princes and noblemen of rank to bear them. Among the French the use of them is more promiscuous.

SUPPOSITI medium. See the article **MEDIUM**.

SUPPOSITION, in music, is when one of the parts dwells on a note, while another part makes two or more lesser notes equivalent to it, by conjoint degrees.

Supposition is defined by a late author the using of two successive notes, of the same value, as to time; the one whereof being a discord, *supposes* the other a concord.

The harmony, Mr. Malcolm observes, is always to be full on the accented parts of the bar, or measure, but on the unaccented, discords may transiently pass, without any offence to the ear. This transient use of discords, followed by concords, make what we, after the French, call *supposition*.

There are several kinds of *supposition*: the first is, when the parts proceed gradually from concord to discord, and discord to concord; the intervening discord serving only as a transition to the following concord.

Another kind is, when the parts do not proceed gradually from the discord to the concord, but descend to it by the interval of a third.

A third kind, like the second, is, when the rising to the discord is gradual; but the descending from it to the following concord, is by the distance of a fourth.

A fourth kind, very different from all the rest, is, when the discord falls on the accented parts of the measure, and the rising to it is by the distance of a fourth. In which case it is absolutely necessary to follow it immediately, by a gradual descent into a concord, that has just been heard before the harmony; to make the preceding discord pass without offence, and only seem a transition to the concord.

SUPPOSITION, in arithmetic. See **POSITION**.

SUPPOSITORY*, **SUPPOSITORIUM**, in pharmacy, a solid medicine thrust up the fundament, in lieu of a liquid one, or clyster, where that would not be so convenient.

* The Latins call it *balanus*, because anciently made in figure of an acorn.

It is usually composed of common honey, mixed up with either saffron, or rose, and formed into pieces of the length and thickness of the middle finger, only pyramidal.—To the composition is sometimes also added powder of scammony, euphorbium, collymbitis, &c.

On some occasions *suppositories* are only a cut of bacon, the flesh of a leek, or the like matter, thrust, like a tent, up the anus, to irritate the sphincter muscle, and oblige it to extend the excrescences.

The *fifty fifty* was invented for the convenience of such as have an aversion to the taking of clysters; or to be used where the disease does not allow thereof.

SUPPRESSION *, in law, the extinction, or annihilation of an office, right, rent, or the like.

* The word is formed from the Latin *sub*, under, and *premo*, I press under.

SUPPRESSION, in grammar, denotes an omission of certain words in a sentence, which yet are necessary to a full and perfect construction.—As, “I come from my father’s;” that is, “from my father’s house.”

Suppression is a figure of speech very frequent in our language; chiefly used for brevity and elegance. Some rules relating hereto, are as follow:

1°. Whenever a word comes to be repeated in a sentence oftener than once, it is to be suppressed: thus we say, “this is my master’s horse;” not, “this horse is my master’s horse.”

2°. Words that are necessarily implied may be suppressed. And, 3°. All words that use and custom suppress in other languages, are to be suppressed in English; unless there be particular reasons for the contrary.

SUPPRESSION, in medicine, is applied to the humours that are retained in the body by some obstruction or stoppage of the usual out let.

We say, a *suppression* of urine, of the menses, &c. See *ICHURIA*, *URINE*, *MENSES*, &c.

Fire of SUPPRESSION, in chymistry. See *FIRE*.

SUPPURATION *, in medicine, the action whereby extraneous blood, or other humours in the body are ripened, or changed into pus.

* The word is formed from the Latin, *sub*, under, and *pus*, pus.

The change is begun by a dissipation of the most subtle and spirituous parts of the blood: what is left behind, thickens and purifies by little and little; that is, its salts and sulphurs disengage themselves from the grosser parts wherein they were enmeshed. The parts thus disengaged, and acting on one another, bruise and break each other, and thus excite a fermentation, which increases the heat of the part; whereby the matter is further digested, and a pain and tension produced. At length the blood loses its natural colour, and becomes quite white, by the mixture of its acid, sulphurous and acrimonious particles; as we see happens to sulphurous alkalies, when mixed with acids.

SUPPURATIVES, or **SUPPURATING** medicines, are ripeners, or medicines that promote suppuration.

Suppuratives are all hot; by which means increasing the warmth of the part, they resolve the humour into a pus.

Such are mallows, melilot, lily-roots, diachylon, pellitory, figs, aromatic gums, meals, &c.

SUPPUTATION. See the article *COMPUTATION*.

SUPRALAPSARY, in theology, a person who holds that God, without any regard to the good or evil works of men, has resolved, by an eternal decree, to save some, and damn others.

These are also called *antelapsaries*; and are opposed to *sublapsaries* and *infralapsaries*.

According to the *supralapsaries*, the object of predestination, is *homo creabilis & labilis*; and according to the *sublapsaries*, *homo creatus & lapsus*.

The *supralapsaries* seem, in one single absolute decree, to confound two several ones which ought to be distinguished: the one, the conditional decree preceding the fore-sight of man’s obedience, or disobedience to the grace of God; the other, the absolute decree following this fore-sight.

The predestinants also, admit an absolute decree prior to the fore-sight of original sin, in common with the *supralapsaries*; but distinguish themselves from these, as also from the *infralapsaries* and *jansenists*, in that their absolute decree includes the offering a sufficient means of salvation to the reprobate; so that, as to the point of power, nothing hinders but that they might be saved.

SUPRASPINATUS, in anatomy, a muscle thus called from its fleshy origination at the upper end of the basis of the scapula above the spine, to the upper part whereof it is connected, as also to the superior edge of the scapula; whence marching along the upper intercapulum, or thin part of the scapula, which it fills, it passes under the acromion and articulation of the humerus.—It helps to lift the arm up-

wards. See *Tal. Anat.* (Myol.) fig. 7. n. 32.

SUPREMACY, in the English polity, the superiority or sovereignty of the king over the church as well as state of England, whereof he is established head. See *KING*.

The king’s *supremacy* was first established, or, as others say, recovered by king Henry VIII. in 1534, after breaking with the pope.—It is since confirmed by several canons, as well as by the articles of the church of England; and is passed into an oath, which is required as a necessary qualification for all offices and employments both in church and state, from persons to be ordained, from the members of both houses of parliament, &c.

This right of *supremacy* consists chiefly in the following articles, 1°. That the archbishops of either province cannot summon the bishops and clergy to convocation, nor enact any canons without the king’s express consent, by 25 Hen. VIII. c. 19. Whereas before that act the convocation was often called, and laws made by it for governing the church, without any authority from the crown.

2°. In that there lies now an appeal from the archbishop to the king in chancery; and on such an appeal, a commission under the great seal is to be directed to certain persons, whereof commonly half are laymen, and half clergymen, which is called the *court of delegates*, and which finally determine all ecclesiastical causes, by 25 Hen. VIII. c. 19. though sometimes a review is granted. Before this statute, the appeal from the archbishop’s court lay to the pope only.

3°. The king can grant commissions for visiting such places as are exempt from the jurisdiction of bishops, or archbishops; and appeals lie from thence to the king in chancery: whereas before 25 Hen. VIII. the pope only could visit them, and receive appeals from those courts.

4°. Persons in holy orders are not, as formerly, exempt from the king’s temporal laws, any more than laymen.

5°. The bishops and clergy do not swear, or pay any obedience to the pope; but must take the oaths of allegiance and supremacy to the king.

SURA, in anatomy, the calf, or fleshy part of the leg.

The word is also used for some for the fibula. See *FIBULA*.

SURALIS. See the article *MUSCLE*.

SURBATING, among farriers, is when the sole of a horse’s foot is wore, bruised, or spoiled, by beating the hoof against the ground in travelling without shoes, or going in hot sandy lands, or with a shoe that hurts the sole, lies too flat to it, or the like.

Sometimes also it happens by over-riding a horse while young, before his feet are hardened; and sometimes by the hardness of the ground, and high lifting his feet.

The signs hereof, are his halting on both fore-legs, and going stiffly, and creeping as if half foundered.

In the general, there is nothing better for *surbated* feet than tar melted into the foot; or vinegar boiled with foot to the consistence of a broth, and put into the foot boiling hot, with hards over it, and splints to keep it in.

SURCHARGE of the forest, is when a commoner puts more beasts in the forest than he has a right to. See *FOREST*.

SURCINGLE, a girdle, wherewith the clergy of the church of England usually tie their cassocks. See *GIRDLE*.

SURCOAT, a coat of arms, to be wore over body armour. See *COAT of arms*.

The *surcoat* is properly a loose thin taffaty coat, with arms embroidered, or painted on it.—Such as is worn by heralds, anciently also used by military men over their armour, to distinguish themselves by.

SURD, in arithmetic, denotes a number that cannot be expressed; or a number that is incommensurate to unity.

This is otherwise called an *irrational*, or *incommensurable number*.

When any number or quantity hath its root proposed to be extracted, and yet is not a true figurate number of that kind; that is, if its square root be demanded, and it is not a true figure: if its cube root be required, and itself be not a true cube, &c. then it is impossible to assign, either in whole numbers or in fractions, any exact root of such number proposed.

And whenever this happens, it is usual in mathematics to mark the required root of such numbers or quantities, by prefixing before it the proper mark of radicality, which is $\sqrt{}$: thus $\sqrt{2}$ signifies the square root of 2, and

$\sqrt[3]{16}$, or $\sqrt[3]{(3) 16}$, signifies the cubic root of 16: which roots, because they are impossible to be expressed in numbers exactly, (for no effable number, either integer, or fraction, multiplied into itself, can ever produce 2; or being multiplied cubically, can ever produce 16) are properly called *surd roots*.

There is also another way of notation now much in use, whereby roots are expressed without the radical sign, by their indexes:

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indexes: thus, as x^2 , x^3 , x^4 , &c. signify the square, cube, and fifth power of x ; so $x^{\frac{1}{2}}$, $x^{\frac{1}{3}}$, $x^{\frac{1}{4}}$, signify the square root, cube, &c. of x .

The reason of which is plain enough; for since \sqrt{x} is a geometrical mean proportional between 1 and x , so $x^{\frac{1}{2}}$ is an arithmetical mean proportional between 0 and 1; and therefore as 2 is the index of the square of x , $\frac{1}{2}$ will be the proper index of its square root, &c.

Observe also, that for convenience, or brevity's sake, quantities or numbers, which are not *furd*s, are often expressed in the form of *furd* roots. Thus, $\sqrt{4}$; $\sqrt{9}$; $\sqrt[3]{27}$, &c. signify, 2, 3, 3, &c.

But though these *furd* roots (when truly such) are inexpressible in numbers, they are yet capable of arithmetical operations, (such as addition, subtraction, multiplication, division, &c.) how readily to perform which, the algebraist ought not to be ignorant.

*Furd*s are either *simple* or *compound*.

Simple *SURDS* are those which are expressed by one single term,

—As \sqrt{c} .

Compound *SURDS* are those formed by the addition or subtraction of simple *furd*s: as $\sqrt{5} + \sqrt{2}$; $\sqrt{5} - \sqrt{2}$; or $\sqrt{7} + \sqrt{2}$: which last is called an *universal* *furd*, and signifies the cubic root of that number, which is the result of adding 7 to the square root of 2.

To reduce rational quantities to the form of any *SURD* roots assigned.—Involve the rational quantity according to the index of the power of the *furd*, and then prefix before it the radical sign of the *furd* proposed. Thus to reduce $a = 10$, to the form of $\sqrt{15} = b$, you must square $a = 10$; and prefixing the sign, it will stand thus, $\sqrt{a} = \sqrt{100}$, which is the form of the *furd* desired.

So also, if 3 were to be brought to the form of $\sqrt[4]{12}$, you must raise 3 up to its fourth power, and then prefixing the note of radicality to it, it will be $\sqrt[4]{81}$, or $81^{\frac{1}{4}}$, which is the same form with $\sqrt[4]{12}$.

And this way may a simple *furd* fraction, whose radical sign refers only to one of its terms, be changed into another, which shall respect both numerator and denominator. Thus $\frac{\sqrt{2}}{25}$ is reduced to $\frac{\sqrt{2}}{25}$ and $\frac{5}{\sqrt{4}}$, to $\frac{125}{\sqrt{4}}$; where the radical sign affects both numerator and denominator.

To reduce simple *SURDS*, having different radical signs, (which are called heterogeneous *furd*s) to others that may have one common radical sign, or which are homogeneous.—Divide the indexes of the powers by their greatest common divisor, and set the quotients under the dividends; then multiply those indexes cross-ways by each other's quotients, and before the product set the common radical sign $\sqrt{}$: with its proper index: then involve the powers of the given roots alternately, according to the index of each other's quotient; and before those products, prefix the common radical sign before found.

To reduce $\sqrt{a} + a$ and $\sqrt[4]{b} + b$

$$2) \sqrt{a a a} \quad 4) \sqrt[4]{b b b}$$

$$1 \times 2$$

$$\sqrt[4]{b b} \quad \sqrt[4]{a a a a}$$

To reduce *SURDS* to the lowest terms possible.—Divide the *furd* by the greatest square, cube, biquadrate, &c. or any other higher power, which you can discover is contained in it, and will measure it without any remainder; and then prefix the root of that power before the quotient, or *furd*, so divided; this will produce a new *furd* of the same value with the former, but in more simple terms. Thus, $\sqrt{16 a a b}$, by dividing by $16 a a$, and prefixing the root $4 a$, will be reduced to this, $4 a \sqrt{b}$; and $\sqrt{12}$ will be depressed to $2 \sqrt{3}$. Also $\sqrt[3]{c b^3 r}$ will be brought down to $b \sqrt[3]{c r}$.

This reduction is of great use whenever it can be performed: but if no such square, cube, biquadrate, &c. can be found for a divisor, find out all the divisors of the power of the *furd* proposed; and then see whether any of them be a square, cube, &c. or such a power as the radical sign denotes: and if any such can be found, let that be used in the same manner as above, to reduce the *furd* quantity in part

from the radical sign. Thus, if $\sqrt{288}$ be proposed; among its divisors will be found the squares, 4, 9, 16, 36, and 144; by which, if 288 be divided, there will arise the quotients 72, 32, 18, 8, and 2; wherefore instead of $\sqrt{288}$, you may put $2 \sqrt{72}$, or $3 \sqrt{32}$, or $4 \sqrt{18}$, or $6 \sqrt{8}$; or lastly, $12 \sqrt{2}$, and the same may be done in species.—But for the entire arithmetic of *furd*s, see Kersey's *Algebra*, and others on the same subject.

COMMENSURABLE *SURDS*.

HETEROGENEOUS *SURDS*.

HOMOGENEOUS *SURDS*.

SURDESOLID. See the article *SURD*.

SURETY of the peace, an act whereby a person in danger of hurt from another, is secured by a bond, or recognizance, acknowledged by the other to the king, and bail bound with him, for keeping the peace.

This security, a justice of the peace may command, either as a minister, when commanded thereto by higher authority; or as a judge, when he doth it of his own power, derived from his commission.

It differs from *surety of good behaving*, in that whereas the peace is not broken without an affray, or such like; the *surety de bono gestu* may be broken by the number of a man's company, or by his or their weapon, or harness.

SURFACE, in geometry, &c. See *SUPERFICIES*.

SURFEIT, an indisposition caused by excess in eating or drinking, that is, by over-charging the stomach: and usually attended with eruptions, and sometimes with a fever.

SURFEIT water, is a water distilled from peppies, and other herbs, proper to cure indigestions.

SURGE. The sailors call a wave, or billow of the sea, a *surge*.

Also, when they are heaving at the capstan, if the cable happen to slip back a little, they say, the cable *surges*.

SURGERY. See the article *CHIRURGERY*.

SURMOUNTED, in heraldry, is when one figure is laid over another. As the pile surmounted of a chevron, in *Tab. Herald*, fig. 84.

SURNAME, or *SIRNAME*, a name added to the proper or baptismal name, to denominate the person of such a family.

It was the Romans who first introduced the use of hereditary names; and that on occasion of their league with the Sabines; for the confirmation whereof, it was agreed, that the Romans should prefix Sabine names, and the Sabines, Roman names, to their own.

These new names became family names, or *surnames*, and the old ones continued personal names. The former they called *cognomina*, and *gentilitia nomina*; and the latter *praenomina*.

When the former came to be used among the French and English, they were called *surnames*, or *sirnames*, not because they are the names of the sire, or father; but, according to Camden, because they are super-added to the personal name; or, rather, with Du Cange, because at first, this family name was wrote over (*Sur*) the other name, thus: de Bourbon

Louis.

In lieu of *surnames*, the Hebrews, to keep up the memory of their tribes, used the name of their father, with the addition of *Ben*, son; as *Melchizedek*, son of *Abraham*, &c. to the Greek, *πατρις* or *πατρων*; Icarus, the son of *Daedalus*; *Dædalus*, the son of *Eupalmus*, &c.

So, also, the ancient Saxons, *Ceorlred*, *Ceorlwalding*, *Ceorlwald* *Cuthing*, that is, *Ceorlred*, son of *Ceorlwald*, son of *Cuth*: and in the same sense, the Welsh use *ap* for *mat*, son; as *ap Owen*, *Owen ap Harry*, *Harry ap Idris*; and the Irish, *Mac*, as *Donald Mac Neal*, *Neal Mac Gao*, &c. and the old Normans, *Fitz*, as, *John Fitz Robert*, *Robert Fitz Ralph*, &c.

Scaliger adds, that the Arabs used their father's name, or *surname*, without their personal name; as, *Aven-Pace*, *Aven-Zoar*, &c. *g. d.* son of *Pace*, son of *Zoar*, &c. As, if *Pace* had a son at his circumcision called *Haly*, he would be called *Aven-Pace*, concealing *Haly*; but his son, however he were named, would be called *Aven-Haly*, &c.

The Romans, in time, multiplied their *surnames*: besides the general name of the race, or family, called *gentilium*; they took a particular one, to distinguish the branch of the family, called also *cognomen*; and sometimes a third, on account of some personal distinction; as that of *Africanus*, by *Scipio*; of *Torquatus*, by *Manlius*.

These three different kinds of *surnames* had also their different names, *viz.* *nomen*, *cognomen*, and *agnomen*: but these last were not hereditary; being, in effect, a kind of sobriquets, or nick-names, if that word be indifferent with respect to good and evil. See the subject of the Roman names and *surnames* accurately treated of by Spanheim, *de Praest. & usu Nominum*, Diff. 10.

In time, too, they have been imitated by later times: thus, in our English history, we find that *Edgar* was called the *Peaceable*; *Ethelred*, the *Unready*; *Edmond*, the *Ironside*; *Harold*, the *God-son*; *William*, the *Bastard*; *Henry I.* the *Beauclerk*; &c.

John, Lackland, &c.—But as these names were never bore by the sons, Camden, and others, think it strange, that *Plantagenet* should be accounted the *surname* of the royal family of England, till Henry VII.; or *Tydur*, or *Tudor*, that from Henry VII. to king James I. or that of *Steward* from king James I. to king George; or, that *Valois* should be esteemed the *surname* of the late family of French kings; or *Bourbon* of the present; or *Oldenburg* of the kings of Denmark; or *Hapsburg* of the emperors. See *PLANTAGENET*. Du Chesne observes, that *surnames* were unknown in France before the year 987; when the lords began to assume the names of their demesnes.—Camden relates, that they were first taken up in England, a little before the conquest, under king Edward the confessor; but he adds, they were never fully established among the common people, till the time of Edward II. till then they varied with the father's name; if the father, *e. gr.* was called *Richard*, or *Roger*, the son was called *Richardson*, or *Hodgson*; but from that time they were settled, some say, by act of parliament.

The oldest *surnames*, are those we find in *Domesday-Book*, most of them taken from places, with the addition of *de*: as *Godefridus de Mannevilla*, *Walterus de Vernon*, *Robert de Oyly*, &c. others from their fathers, with *filius*, as *Gulielmus filius Otherni*; others from their offices, as *Eudo Dapifer*, *Gulielmus Camerarius*, *Gislebertus Cocus*, &c. But the inferior people are named, simply, by their christian names; without any *surnames* at all.

In Sweden, till the year 1514, no body ever took *surnames*; and the common people there, have none to this day; nor have even the native Irish, Poles, and Bohemians, &c.—It is very late that the Welsh have had any; and those they have, are generally only formed, by leaving out the *a* in *ap*, and annexing the *p* to their father's name; as in lieu of *Evan ap Rice*, they now say, *Evan Pric*; for *ap Howell*, *Periel*, &c. Du Tillet maintains, that all *surnames* were originally given by way of sobriquets, or nick-names; and adds, that they are all significant and intelligible to those who understand the ancient dialects of the several countries.—The greatest part of our *surnames*, and those of greatest account, Camden shews, are local, and borrowed from the places in Normandy, &c. where the respective persons, who came over with the conqueror, and first bore them, had their possessions, or their births: such as *Mortimer*, *Warren*, *Albigny*, *Piercy*, *Devereux*, *Tankerville*, *Nail*, *Tracy*, *Montfort*, &c. He adds, that there is not a village in Normandy, but gives name to some family in England.—Others were taken from places in England, as *Ayton*, *Button*, *Watson*, &c.

The Saxon common people generally took their father's or their mother's christian name, with the addition of *son*: though many were *surnamed* from their trade, as *Smith*, *Carpenter*, *Taylor*, *Weaver*, *Fuller*, &c. others from their offices, as, *Porter*, *Shepherd*, *Carter*, *Cook*, *Butler*, &c. others from their complexions, as *Fairfax*, i. e. fair hair; *Blunt* or *Blond*, i. e. flaxen, or yellow; others from birds, as *Wren*, *Finch*, &c. others from beasts, as *Lamb*, *Hare*, *Hart*, &c. others from the winds; others from taints, &c.

SURPLUSAGE, in common law, signifies a superfluity, or addition of more than needeth; which sometimes is the cause that a writ abateth.—But in pleading it is frequently set aside; the rest remaining good.

SURPLUSAGE is sometimes also applied to matters of accounts, and denotes a greater disbursement than the charge of the accountant amounteth to.

SURREBUTTER, in law, a second rebutter; or the replication of the plaintiff to the defendant's rebutter. See *REBUTTER*.

SURREJOYNDER, is a second defence of the plaintiff's declaration; by way of answer to the defendant's rejoinder. See *REJOINDER*.

SURRENDER, in common law, an instrument in writing, testifying, that the particular tenant of lands and tenements for life or years, doth sufficiently consent and agree, that he, who has the next or immediate remainder or reversion thereof, shall have the present estate of the same in possession; and that he hereby yields and gives up the same to him.

There may also be a *surrender* without writing: whence, *surrender* is usually divided into that in *deed*, and that in *law*.

SURRENDER in deed, is that which is really made by express words in writing.

SURRENDER in law, is that wrought by operation of the law, and which is not actual.—As if a man have a lease of a farm for life, or years; and during the term, he accepts of a new lease: this act is in law, a *surrender* of the former. There is also a customary *surrender* of the copy-hold, as may be seen in Coke sup. Littlet. sect. 74.

SURREPTITIOUS. See the article *SUBREPTITIOUS*.

SURROGATE, *SURROGATUS*, a person substituted or appointed in room of another; most commonly of a bishop, or bishop's chancellor.

SURROGATION. See the article *SUBROGATION*.

SURSOLID, or *SURDESOLID*, in arithmetic, the fifth

power of a number, or the fourth multiplication of any number, considered as a root.

Thus, under 2, for instance, considered as a root, and multiplied by itself, produces 4, which is the square, or second power of 2; and 4 multiplied by 2, produces 8, the third power, or cube, or third number of 2; 8, again, multiplied by 2, produces 16, the fourth power, or quadrato-quadratum of 2; and 16 multiplied once more by 2, produces 32, the fifth power, or *quinto-quadrato*, or *quinto-quadratum* number of 2.

SURSOLID problem, is that which cannot be resolved, but by curves of an higher kind than the conic sections.

Thus, *e. gr.* to describe a regular endecagon, or figure of eleven sides in a circle, it is required to describe an isosceles triangle on a right line given, whose angles at the base, shall be quadruple to that at the vertex; which may easily be done by the intersection of a quadratrix, or any other curve of the second power, as they are by some called, but not by any lower power.

SURVEYING, the art or act of measuring lands; i. e. of taking the dimensions of any tract of ground, then laying down the same in a map or draught: and finding the content or area thereof.

Surveying, called also *geodesia*, is a very ancient art; it is even held to have been the first, or primitive part of geometry, and that which gave occasion to, and laid the foundation of all the rest.

Surveying consists of three parts or members; the first, is the taking of the necessary measures, and making the necessary observations on the ground itself: the second, is the laying down of these measures and observations on paper: and the third, the finding the area or quantity of the ground thus laid down.

The first is what we properly call *surveying*: the second we call *plotting* or *protracting*, or *mapping*: and the third *casting up*.

The first, again, consists of two parts, viz. the making of observations for the angles, and the taking of measures for the distances.

The former of these is performed by some one or other of the following instruments, viz. the theodolite, circumferentor, semi-circle, plain-table, or compass: the description and manner of using each whereof, see under its respective article. *THEODOLITE*, *CIRCUMFERENTOR*, *PLAIN-TABLE*, *COMPASS*, &c.

The latter is performed by means either of the chain or the perambulator: the description and manner of applying each whereof, see under its respective article, *CHAIN*, and *PERAMBULATOR*.

The second branch of *surveying* is performed by means of the protractor, and plotting scale: the use of which, see under *PROTRACTOR*, *PLOTTING scale*, &c. See also *MAP*.

The third is performed by reducing the several divisions, inclosures, &c. into triangles, squares, trapeziums, parallelograms, &c. but especially triangles; and finding the areas or contents of these several figures, by the rules contained under the articles *AREA*, *TRIANGLE*, *SQUARE*, &c.

SURVEYING cross, is an instrument little known, and little used in England; though in France, &c. it serves in lieu of a theodolite or the like instrument: it consists of a brass circle, or rather a circular limb, graduated, and again divided into four equal parts, by two right lines cutting each other at right angles in the centre. At each of the four extremities of the lines, and in the centre are fixed sights. The whole is mounted on a staff.

SURVEYING quadrant. See the article *QUADRANT*.

SURVEYING wheel. See the article *PERAMBULATOR*.

SURVEYOR, one that hath the oversight and care of considerable works, lands, or the like. See *SUPERVISOR*.

Such are the *surveyors* general of the king's manors; *surveyors* of the king's exchange; *surveyors* general of the works; *surveyors* general of the crown lands, &c.

SURVEYOR of the mints, is an officer of the mint, whose business is to see the bullion cast out; and that it be not altered after the delivery of it to the melter.

SURVEYOR of the navy, is an officer, whose business is to know the state of all stores, and see the wants supplied; to survey the hulls, masts and various of ships; to audit the boat-swains and carpenters accounts, &c.

SURVEYOR of the ordnance, is an officer, whose charge is to survey all the king's ordnance, stores, and provisions of war, in the custody of the store-keeper of the tower of London; to allow all bills of debts, to keep checks on labourers and artificers works, &c.

SURVEYOR is also used for a gauger.—And also for a person who measures and makes maps of lands. See *SURVEYING*, and *GAUGING*.

SURVIVOR, in law, signifies the longer liver of two joint tenants; or of any two persons joined in the right of any thing.

SUSPENSE, *SUSPENSIO*, in common law, denotes a temporary

TAB. SURVEYING

Fig. 1 Chain

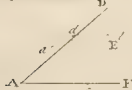


Fig. 2 Chain

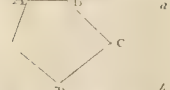


Fig. 3 Gunter's level

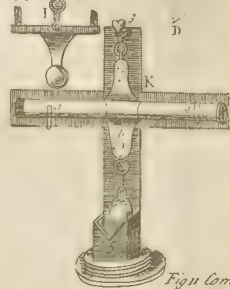


Fig. 4 Air Level

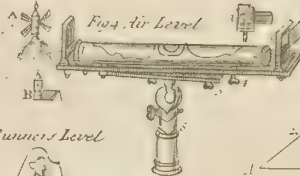


Fig. 5 to level

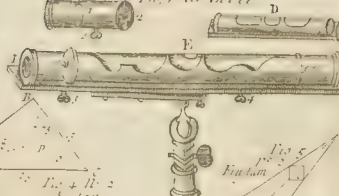


Fig. 6 Plum Level

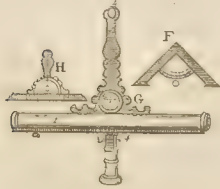


Fig. 7 Gunter's level

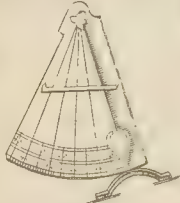


Fig. 8 Levelling

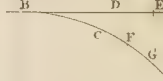


Fig. 9 Levelling

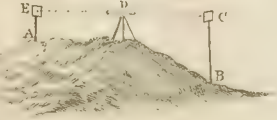


Fig. 10 Levelling

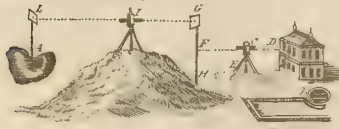


Fig. 11 Compass

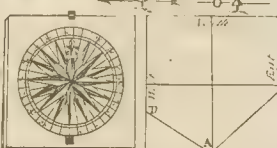


Fig. 12 Compass Surveying



Fig. 13 Semi circle

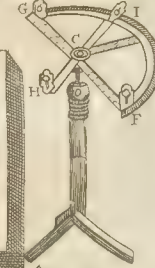


Fig. 14 Everard's Sliding Rule

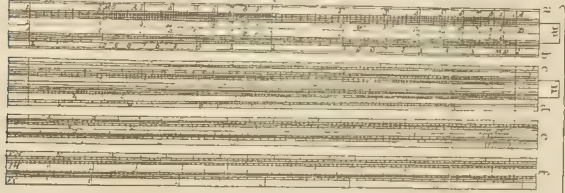


Fig. 15 Coggehall's Sliding Rule

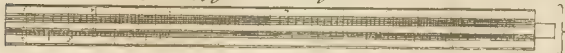


Fig. 16 No. 2

Fig. 17 Foot Gauging Rod

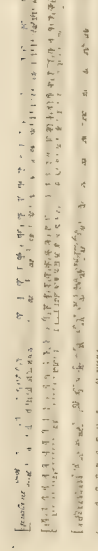


Fig. 18 Circumferenter



Fig. 19 Theodolite

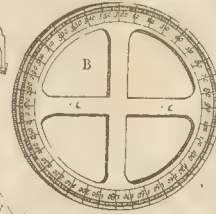


Fig. 20 Theodolite



Fig. 21 Gauging



Fig. 22 Gauging



Fig. 23 Perambulator

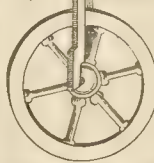


Fig. 24 Cross

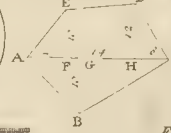


Fig. 25 Quadrant

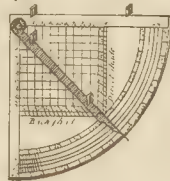


Fig. 26 Protractor

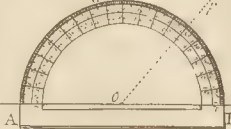


Fig. 27 Plotting Scale



Fig. 28 Plain Table

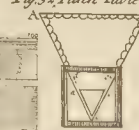


Fig. 29 Plain Table

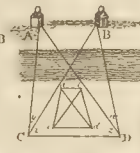


Fig. 30 Plain Table



Fig. 31 Plain Table

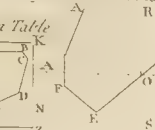
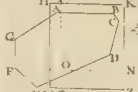


Fig. 32 Plain Table



temporary stop or cessation of a man's right for a time. As, when the rent, or other profits of land, by reason of the unity of possession of the rent, and the land out of which it issues, is not in effect for a certain time, but *tunc dormit*, or remains asleep: but so as it may be revived or awakened. — By which, *suspension* differs from *extinguishment*, where the right dies for ever.

SUSPENSION, *SUSPENSIO*, the act of preventing the effect, or course of any thing, for a certain time.

The principal point urged in the philosophy of the Scepticks and Pyrrhonians, is a *suspension* of mind.

SUSPENSION of arms, in war, is a short truce which the contending parties agree on, for the burial of their dead, the waiting for succours, or the order of their masters, &c.

In rhetoric, *suspension* is a keeping the hearer attentive and doubtful, in expectation of what the speaker will conclude in: as, "O God! darkness is not more opposite to light, 'tempets to calms, pain to pleasure, or death to life, than 'fin to thee."

SUSPENSION, in mechanics. — *Points of SUSPENSION* in a balance, are those points in the axis or beam wherein the weights are applied; or from which they are suspended.

SUSPENSION, in the common law, is what we otherwise call the *minor excommunication*, viz. a censure inflicted by way of punishment, on an ecclesiastic, for some considerable fault.

It is of two kinds, viz. *ab officio*, and *à beneficio*.

SUSPENSION ab officio, is that whereby a minister is, for a time, forbidden to execute the office of a minister.

SUSPENSION à beneficio, is when a minister is, for a time, deprived of the profits of his benefice.

Where the fault is more notorious, the two kinds of *suspensions* are sometimes joined; and the person both *suspended ab officio* and *à beneficio*.

SUSPENSOR *Tegmen*, in anatomy, a muscle called also *cremaster*. See *CREMASTER*.

SUSPIRAL, a spring of water, passing under ground towards a conduit or cistern. — Also a breathing hole, or ventiduct. See *VENTIDUCT*.

SUTE, *SUYTE*, or *suite*. See the article *SUITE*.

SUTH-DURE, in ancient customs, denotes the fourth door of a church; mentioned in old authors, as the usual place where canonical purgation was performed. — That is, when a fact could not be proved by sufficient evidence, the party accused, came to the fourth door of the church; and there, in the presence of the people, made oath that he was innocent.

This was called *judicium dei*. — And it is for this reason that large porches were anciently built at the fourth doors of churches.

SUTTON's quadrant. See the article *QUADRANT*.

SUTURE, *SUTURA*, in anatomy, a peculiar kind of juncture, or articulation, of certain bones in the animal body; thus called, as resembling a seam.

There are two kinds of *suture*; one called the *true* or *genuine suture*: wherein bones are indented like saws, and reciprocally received into each other.

The other, called *false*, *spurious*, or *squamous suture*; wherein the bones are laid over each other, like the scales of fishes.

The bones of the cranium are usually joined by three genuine *utures*: the *coronal*, reaching across from one temple to the other. See *Tab. Anat. (Osteol.) fig. 1. lit. g. fig. 2. lit. h.* and the article *CORONAL*. — The *sagittal*, joining the ossa parietalia. See *Tab. Anat. (Osteol.) fig. 1. lit. f. fig. 2. lit. i.* and the article *SAGITTAL*. — And the *lambdoidal*; thus called from its resembling the Greek Λ , lambda.

Besides these, there is a fourth *suture*, of the spurious or squamous kind, supposed, though falsely, to have no indentures: it joins the ossa temporum to the os sphenoides, occipitis, &c. and is also called the *temporal suture*. — See *Tab. Anat. (Osteol.) fig. 2. lit. k.* See also *SQUAMOUS*.

Natural historians tell us, that in Persia it is frequent to have people without any *utures* at all in the skull; but the whole one solid bone; yet without any apparent inconvenience: and M. Flechier, in his life of cardinal Ximenes, affirms the same of that cardinal: yet it should seem that great disorders must arise therefrom; as the perspiration can be but very imperfectly effected; whence heaviness and swimming in the head. See *CRANIUM*.

Sphenoidal SUTURE. See the article *SPHENOIDAL*.

SUTURE, in chirurgery, denotes a seam made to close the lips of a wound, in order to its healing.

The ancients invented a great variety of *utures*, which they reduced to three kinds; *incarnative*, *interrupted*, and *conservative*.

Incarnative SUTURE, is thus called, because, by rejoining the edges of a wound, and keeping them together by means of a thread run across them with a needle, they grow together, and incarnate as before.

This they subdivided into five kinds, viz. the *interrupted*, *interrupted*, *penned* or *feathered*, *with claps*, and the *dry suture*.

Of these five, two are perfectly disused, viz. the *feathered suture*, and the *suture with claps*, as being too barbarous, and at the same time unnecessary. The first was called *penned*, when little pins were made use of; and *feathered* when the barrels of feathers or quills.

To perform it, two or three needles threaded with a double thread, were pushed through the lips of the wound, at a finger's breadth from each other, and a pin or feather put in the flitch; and another pin or feather bound with the ends of the same thread, that the feathers might keep the lips of the wound close together.

To perform the second, they had large, crooked claps, pointed at each end; one of which they thrust into the upper part of the wound, the other into the lower, to bring the lips together.

These *utures*, cruel as they were, are yet known to be useless; for in the only cases where they should seem serviceable, viz. in deep wounds, where the contraction of the fleshy parts keeps the lips far asunder, and in wounds of tendons; they expose the patient to terrible convulsions and shudderings, which are avoided, by diminishing the dilatation of the wounds, by moderate compressions, and patiently waiting till the fibres relax.

Restrictive SUTURES, were those wherewith they endeavoured to stop the flux of blood from large wounds, where any considerable vessels were cut.

To this end, they invented several kinds, in the number whereof, were the *flap-makers*, *taylor's*, *flappers*, and other *seams*, each more impertinent than other. It is evident, the very design of such a *suture* is blameable: for suppling the wound so exactly sewed up, that no blood could escape through the lips thereof; yet will it still flow out of the vessels; and will thus be forced to make its way between the laminae of the muscles, by which means the part will swell, rot, and gangrene. Yet the *flapper suture*, *sutura pectinacea*, is still in use for wounds of the intestines: it is thus called, because the flappers, like the like, in sewing up the holes made by the butchers, in flapping off the skin.

Conservative SUTURE, is that kind of ancient *suture*, whereby the lips of large wounds, wherein there was a loss of substance, were prevented from receding too far. But a bandage, now, suffices.

Intertwisted SUTURE, is thus called, because the needles being left sticking in the wound, the thread is wound around them; much after the same manner as the taylor's do the thread, when they keep up their sleeves, &c. This *suture* is performed two ways; for either the needles are passed across the wound, or they are stuck on the sides thereof.

All the *utures* hitherto mentioned, are made with needle and thread: but beside these, there is another kind called *dry suture*, which are performed with plates; or other proper viscous matter.

The *dry SUTURE* is ordinarily made with small pieces of leather, on linnen cloth, indented like a saw, so that the teeth may fall between each other, and the whole row may be closed. The cloth, before it is cut into this form, is spread with some proper plaster, in order to its firm adhesion.

The plasters thus prepared, being cut into the form, are applied on the firm flesh, according to the length of the wound, reaching from it to the distance of some inches; and after they are dried, or well fastened to the part, the lips of the wound being approached, they may conveniently be held together by the *suture* in that posture.

This kind of *suture* is principally used for wounds in the face, to prevent ugly scars: it is likewise convenient when the fibres of the muscles are cut across; and where it is difficult or impossible to apply a bandage.

In the other kinds of *utures*, the flitches ought always to be taken of a depth proportionable to that of the wound; care being had to avoid the nerves as much as possible. In long wounds they are best begun at the ends; but in short ones at the middle.

SWABBER, the title of an inferior officer on board a man of war, whose office is to take care the ship be kept neat and clean.

In order to this, he is to see her washed well once or twice a week at least; especially about the gun-wales and chains. He ought also to burn pitch, or some resin thing, now and then between decks, to prevent infection; and to acquaint the captain with such of the men as are mady and of service.

SWAIN, } See } **BOATSWAIN** and **COCKSWAIN**.
SWAINMOTE, }
SWALLOWING. See the article *DEGLUTITION*.

Among the rarities in the anatomy hall at Leyden, is preserved a knife ten inches long, which was *swallowed* by a peasant, and cut out of his stomach; after which he lived eight years.

A lady, mentioned by Mr. Greenhill in the *Philosophical Transactions*, got a large and painful tumour in the umbilicus, with *swallowing* prune-stones; which, upon the tumour's breaking of itself, came out there in great quantities: yet, notwithstanding all imaginable care, she died of it. — A lad, 16 years of age, near Hall in Saxony, playing with a knife

six inches and half long, accidentally *swallowed* it. The curiosity of the case led Wolfgang Christ, Wefenon, physician of the elector of Brandenburg, to take care of him. The knife was felt to have changed its position several times, and in a few months ceased to be very troublesome; and in a year was so much diminished, as scarce to be felt from without. At length it was drawn out (exceedingly diminished every way) through an abscess which its point occasioned, three finger's breadth below the pit of the stomach, and the boy was perfectly cur'd; *Philosophical Transactions*, 11^o 219.

"Some people, (says Dr. Sloan, from an instance of an unhappy person who had *swallowed* great quantities of pebbles to ease him of the wind, and which remaining in his stomach to the number of two hundred, had brought him into a very bad condition) "from their seeing birds swallow, unless they swallow gravel, or small stones, take up an opinion, that the *swallowing* of stones helps the stomach to digest its food; but I have been always against that practice: for though the stomachs, or gizzards of birds (they wanting teeth to grind their food) are made very strong, muscular, and defended on the inside with a coat, by the help whereof, and of these stones, their victuals are ground; yet the stomachs of men being very different, it is not reasonable to think they should be of use (or even inoffensive) to them.

"I knew, adds he, one Mr. K——, who for many years *swallowed* nine or ten stones every day, and these nearly as large as walnuts, and without any apparent harm, as they always pass'd; but he afterwards died suddenly."

SWALLOW-TAIL, in fortification, a kind of out-work only differing from a single *tenaille*, in that its sides are not parallel as those of the *tenaille*, but narrower towards the fortified place than towards the country.

SWALLOW-TAIL, in joinery and carpentry, denotes a particular way of fastening together two pieces of timber, so strongly as that they cannot fall asunder.

SWANIMOTE, or **SWAINMOTE**, a court touching matters of the forest, kept, by the charter of the forest, thrice in every year, before the verderers, as judges. This court is as incident to a forest, as a court of pie-powder to a fair.

SWATH, *fascia*, among surgeons, a long and broad band to bind up any diseased member, or part. See **BANDAGE**.

SWEAT, a sensible moisture issuing out of the pores of the skins of animals, through too much heat, exercise, or weakness; or through the action of certain medicines called *sudorifics*.

Sweat is either the consequence of an acceleration of the blood's motion, by stimuli, or exercise; or of a relaxation of the pores of the cutis; by means of either whereof, the matter which before perspired insensibly, is now rendered sensible. The former is the case in natural and medicinal *sweats*, and the latter in morbid, fainting and cold *sweats*.

The principal organs of *sweat* are the milky glands; which are spread over the whole ambit of the body; and furnished, each, with a vein, artery, and nerve, besides an excretory duct, through the orifice whereof the *sweat* is cast out under the cuticle. This duct is covered with a little round valve, lying immediately under the cuticle, whereby the *sweat* is occasionally either retained or transmitted.

The *sweat* thus secreted, is various, according to the variety of the weather, soil, sex, age, temperament, emunctory, diet, time of digestion, &c. as in the urine.

In a sound body, *sweat* is scarce ever found, but from a fault in some of the six non-naturals: its immediate effect is always hurtful; by accident sometimes it does good.

The physicians order *sweats* in cold and inveterate diseases, as the palsy, rheumatism, sciatica, and many other diseases. Diseases also frequently have their crises in *sweats*.

Sweating is indicated by the beginning of a critical *sweat*, to carry off the disease; by the tenuity of the morbid matter dispersed through all the vessels, as in the plague, a venomous bite, or the French disease, before yet fixed; by the particular temperature of the patient, and by various obstructions to be removed in the several parts of the body; particularly in subcutaneous diseases, the itch, psora, leprosy, &c.

Matthioli tells us, that the *sweat* of all quadrupedes, as horses, asses, &c. is venomous; and that that of other beasts is unwholesome.—Tachenius adds, that the *sweat* of horses, particularly, is so acid, that it pierces the strongest and firmest boots, which are proof against all water.—Some naturalists affirm, that dogs and cats never *sweat*, how hot soever they be, because they are not found to have any pores in the cuticle. See **PORE**.

English SWEAT, or the **SWEATING sickness**. See **SUDOR Anglicanus**.

SWEDISH allum,
SWEDISH coins,
SWEDISH measures } See the articles { **ALLUM**.
 } { **COIN**.
 } { **MEASURE**.

SWEDISH money. See the article **MONEY**.

SWEET, among refiners, the almond furnace. See **ALMOND** and **FURNACE**.

SWEET, among goldsmiths, monies, &c. See **WASHING**.

SWEET, in the sea-language.—The seamen call the mould of a ship, when the begins to compass in at the rung-heads, the *sweet* of her, or the *sweet* of the futtock.

SWEEPING at sea, signifies dragging along the ground, at the bottom of the sea or channel, with a three fluked grapnel, to find some hawser or cable which is slipped from an anchor.

SWEET almonds,
SWEET sublimate of mercury,
SWELLED columns,
SWELLED hoof, } See { **ALMOND**.
 } { **MERCURY**.
 } { **COLUMN**.
 } { **HOOF**.

SWELLING.—*Diameter of the swelling*. See **DIAMETER**.

SWIFTEST.—*Line of the swiftest descent*. See **LINE**.

SWIMMING, the act or art of sustaining the body in water, and of advancing therein by the motion of the arms, legs, &c.

Man alone learns to *swim*; all other perfect animals seem to take it naturally; though several of the imperfect *swim* not at all.

Among the ancient Greeks and Romans, *swimming* made so essential a part of the discipline of their youth, that to represent a man perfectly rude and uneducated, they used to say proverbially, he had neither learned to read nor to *swim*.

In fishes, it is the tail that is the grand instrument of *swimming*, not the fins, as has been generally imagined: for this reason fishes are more strong and muscular in that part than in all the rest of their body; according as we find it in all other animals; the motive parts whereof are fill the strongest, as the thighs of men for walking, the pectoral muscles of birds for flight, &c.

The manner wherein fishes row themselves forwards by the tail, is well explained by Borelli de *Motu Animal*, part 1. cap. 23.—The fins of fishes serve only to keep the body well poised and balanced, and to prevent vacillation.

M. Thevenot has published a curious piece in French, called *L'Art de Nager*, the art of *swimming* demonstrated by figures. Before him, Everard Digby, an Englishman, and Nicholas Winman, a Dutchman, had also laid down the rules of this art: Thevenot has done little more than copy from them.—Had he but read, with half that application, Borelli's treatise de *Motu Animalium*, he would scarce have maintained, as he has done, that men would *swim* naturally, like other animals, were they not prevented by fear, which magnifies their danger.

We have abundant experience against this: Throw any brute, newly born, into a river and it *swims*: throw an infant in, before it is yet capable of fear, and it *swims* not, but is drowned. The reason is, that the human machine differs very notably in its structure and configuration from that of brutes; and particularly, which is very extraordinary, in the situation of its center of gravity. In man, the head is exceedingly heavy, with regard to the rest of the body; by reason the head is furnished with a very great quantity of brain, and has, besides a deal of flesh and bones, and no cavities only filled with air: so that the head immersing under water by its own gravity, the nose and ears are soon filled: thus the heavy carrying down the light, the man soon drowns, and is lost.

But in brutes it is otherwise: for the head, here, having but little brain, and there being abundance of sinus therein; its weight, with regard to the rest of the body, is much less considerable; so that they are easily able to keep their nose above water, and thus respiring freely, are out of danger of drowning, on the principles of statics.

In effect, the art of *swimming*, which is no otherwise to be acquired but by exercise, consists principally in keeping the head above water, so, that the nose and mouth being at liberty, respiration may be carried on: for as to the feet and hands, it is enough to stir them, and to use them as oars to conduct the vessel.

SWIMMING-bladder, popularly called **SWIM**, a vesicle of air inclosed in the bodies of fishes, by means whereof they are enabled to sustain themselves at any depth of water.

For the air in that bladder being more or less compressed, according to the depth the fish *swims* at, takes up more or less space; and consequently the body of the fish, part of whose bulk this bladder is, is greater or lesser, according to the several depths; and yet retains the same absolute weight. Now the Rule de *insidentibus humidis*, is, that a body heavier than so much water as is equal in quantity to the bulk of it, will necessarily sink; a body that is lighter will *swim*; and a body of equal weight will rest in any part of the water.

By this rule, if the fish in the middle region of the water be of equal weight with water, bulk for bulk; the fish will rest there without any natural tendency either upwards or downwards.

And if the fish be deeper in the water, its bulk becoming less

less by the greater compression of the bladder; it will still remain commensurate to the gravity of the water in that part.

If the fish be higher than the middle region; the air dilating itself, and the bulk of the fish consequently increasing, but not the weight; the fish will rise upwards, and rest a-top of the water.

It is probable the fish, by some action, can emit air out of its bladder, and take fresh in. Mr. Ray observes, that in most fishes, there is a manifest channel leading from the gullet to the swimming bladder, which doubtless serves for this conveyance; and that there is a muscular power in the coat of the bladder, whereby the fish can contract it when it hith. The same author adds, in confirmation of this doctrine, that it is found, if the *swim bag* bladder of any fish be pricked or broke, the fish immediately sinks to the bottom, and can neither support nor raise itself. And that in *flat fishes*, as soles, plaice, &c. which he always groveling at the bottom, there is no *swimming* bladder at all.

SWINE-Pox. See the article POX.

SWOONING, a kind of lipothymia, or fainting, wherein the patient loses all his strength, as well as sense, and understanding.

Swooning may be occasioned by any thing that alters, corrupts, or dissipates the vital spirits; as, long watching, violent pains, great and sudden evacuations, putrid vapours arising from abscesses in the noble parts, &c.

SWORD, an offensive weapon, worn at the side, serving either to prick, or cut, or both.

Its parts are the blade, guard, hand, or grasp, and pommel; to which may be added, the bow, scabbard, hook and chape.

—The masters of defence divide the *sword* into the *upper, middle, and lower* part; or the *forts, middle, and foible* or small and weak part.

Anciently, there were a kind of two-handed *swords*, called *spado's*, which were to be managed with both hands; and which in those days they accustomed themselves to brandish so nimbly, as to cover the whole body therewith.

The savages of Mexico, when first visited by the Spaniards, had a kind of wooden swords: which would do as much execution as ours.—In Spain, *swords* are only allowed of such a length, determined by authority.—The ancient cavaliers gave names to their *swords*; *joyeuse* was that of Charlemaign; *durandal* that of Orlando, &c.

SWORD-BEARER, }
Mills for SWORD blades, }
PLAS of the SWORD, } See { PORTEGLAIVE.
S. JAMES of the SWORD, } { MILL.
JAMES. { PLRA.

SYCOPHANT*, ΣΥΚΟΦΑΝΤΗΣ, a Greek term, originally used at Athens, for persons who made it their business to inform against those who stole figs, to the owners; or against those who, contrary to the law which prohibited the exportation of figs, practised the thing, and deceived the officers, the inspectors of the ports, &c.

* The word is formed from *συκον*, a fig, and *καυω*, *indico*, I show, discover.

At length, the term became used in the general for all informers, tale-bearers, parasites, flatterers, &c. especially those in the courts of princes: and at last, for lyer, impostor, &c.

SYCOPHANTIC plants. See the article PARASITES.

SYLLABIC, in the Greek grammar.—There are two kinds of augments; the first called *syllabic*, which is when the word is increased by a *syllable*; the other *temporal*, which is when a short *syllable* becomes long.

SYLLABLE*, SYLLABA, in grammar, a part of a word, consisting of one or more letters which are pronounced together.

* The word is derived from the Greek, συλλαβη, which literally denotes comprehension, or assemblage.

Or, a *syllable* is a complete sound, uttered in one breath, consisting either of a vowel alone, or of a vowel and one or more consonants, not exceeding seven.

Scaliger defines a *syllable* to be an element under one tone or accent, that is, which can be pronounced at once.

Priscian, more intelligibly, calls it a comprehension of several letters falling under one accent, and produced at one motion of the breath.—But some grammarians reject this definition, as excluding all *syllables* of one letter.

Another defines *syllable*, a literal or articulate voice, of an individual sound.

In every word, therefore, there are as many *syllables* as there are vocal sounds; and as many vocal sounds, as there are simple or compound vowels; each whereof requires a distinct motion of the pectoral muscles.—Thus, *a, a, a*, make three *syllables*, formed by so many motions, distinguished by small stops betwix each expiration.

In the Hebrew, all the *syllables* begin with consonants; allowing aleph to be one; nor has any *syllable* more than a single vowel.

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From the number of *syllables* in words they become denominated *monosyllables*, *bisyllables*, *trisyllables*, and *polysyllables*, q. d. words of one *syllable*, two *syllables*, three *syllables*, and many *syllables*.

As it is the number of *syllables* that constitutes the measure of English verse; it were to be wished, we had fixed and settled rules to determine the precise number of *syllables* in each word: for we have words very dubious in that respect; and there are even some which have more *syllables* in verse, than in prose. Many of the words ending in *iou*, give a deal of embarrass to such as pique themselves on exactness; as *odious*, *precious*, &c.

SYLLABUB, a kind of compound drink, most affected in the summer-season; ordinarily made of white-wine, and sugar, into which is squirted new milk with a syringe, or wooden cow.

Sometimes it is made of canary, in lieu of white-wine; in which case the sugar is spared, and a little lemon and nutmeg are added in lieu of it.

To prepare it the best way, the wine and other ingredients, excepting the milk, are to be mixed over night, and the milk or cream added in the morning. The proportion is, a pint of wine to three of milk. For

Whipt SYLLABUS, to half a pint of white-wine or rhenish, is put a pint of cream, with the whites of three eggs. This they season with sugar, and beat with birchen roas. The froth is taken out as it rises, and put into a pils where, after dancing to settle two or three hours, it is fit to eat.

SYLLEPSIS, in grammar, *concepsis*, a figure whereby we conceive the sense of words otherwise than the words import; and thus make our construction, not according to the words, but the intention of the author.

The *syllipsis*, says an ingenious author, is a figurative construction, which agrees rather with our ideas, than with the words; and expresses rather the sense of our mind, than the sense of the terms themselves.

SYLLEPSIS is also used for the agreement of a verb, or adjective, not with that word next it, but with the most worthy in the sentence: as, *rex & regina beati*.

Some authors call the *syllipsis*, *synthesis*; others *substitution*. It is a figure of considerable use for the well understanding of authors.—Scopius divides it into two kinds, *simple* and *relative*.

Simple SYLLEPSIS, is when the words of a discourse either disagree in gender, or number, or both.

Relative SYLLEPSIS, is when the relative is referred to an antecedent which is not expressed; but which we conceive by the sense of the whole period.

SYLLOGISM, ΣΥΛΛΟΓΙΣΜΟΣ, in logic, an argument, or form of reasoning, consisting of three propositions; having this property, that the conclusion necessarily follows from the two premises: so that if the first and second propositions be granted, the conclusion must be granted in like manner; and the whole allowed for a demonstration.

If the premises be only probable, or contingent, the *syllogism* is said to be *unethical*; if they be certain, *ethical*; if false, under an appearance of truth, *psuedo* or *psuedo* *logical*.

As often as the mind observes any two notions to agree to a third, which is done in two propositions; it immediately concludes that they agree to each other: or if it find that one of them agrees, and the other disagrees, which is likewise done in two propositions; it immediately pronounces that they disagree to each other.—And such is a *syllogism*; which, it hence appears, is nothing but a mental discourse, or reasoning, whereby, from any two propositions granted, a third is necessarily deduced.

Hence, as the Greeks call it *syllogism*, the Latins call it *collectio*, or *ratiocinatio*, as being a kind of computation, which, either by adding, or subtracting, gathers either the sum or the remainder: for, as if we add two to three, we thence collect five; so if to this proposition, "man is an animal," you add this, "every animal thinks," you thence deduce this, "therefore man thinks."

Of the three propositions whereof a *syllogism* consists; the first is by way of eminence, called the *premissio*, as being proposed for the basis of the whole argument; the second is called the *assumptio*, as being assumed to assist in inferring the third: though they are both called *sumptiones*, because assumed for the sake of the third; and both *premisses*, as being premised to it; and for the same reason both are called *antecedents*, only the first the *major*, and the latter the *minor*.

The third is called the *conclusio*, as being the close of the whole argumentation; and sometimes *complexio*, as including the two notions, before separately compared; and *suppositio*, because it follows from the antecedents; and lastly, *assertio*, because inferred from the premises by means of the relative particle *ergo*, therefore, &c.

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As the conclusion is the principal part of a *sylogism*, it hence arises, that though both the proposition and assumption consist each of its subject and attribute; yet the subject and attribute of a *sylogism*, are properly understood of those of the conclusion.

Again, in the instance above-mentioned, *animal* being used both as subject and attribute, it is held a kind of intermediate between the two, and frequently called *medium*; in respect to which, both the subject and attribute, *man* and *thinks* are called *extremes* or *terms*; only the subject the *greater extreme*, and the attribute the *less*.

A *sylogism*, whether simple, or compound, may either be *categorical*: as that already instanced, wherein both premises are positive.

Or, *hypothetical*, wherein one or both of the premises are only supposed: as, "if the sun shines, it is day: but the sun does shine, therefore it is day."

Or, *analogical*: as, "as the base is to the column; so is justice to the commonwealth: but if the base be withdrawn, the column is overturned; therefore if justice be taken away, the commonwealth is overturned."

Or, *disjunctive* or *disjunctive*; as, "either they mean to please or to profit: but they do not aim to please; therefore they aim to profit."

The most convenient form of a perfect *sylogism*, is to have the medium in the middle, placed between the subject and the attribute; as in the instance above-mentioned.

Of this form there are two figures,—the one *coherent*, or *consonant* and *affirmative*; founded on this canon, "that what agrees with any thing, likewise agrees with that wherewith this necessarily agrees."

The other *incoherent* or *disjunct*, and *negative*; founded on this canon, "that what agrees with any thing, disagrees with that wherewith this disagrees."

Of each of these figures there are three modes, *viz.* *general*, *particular* and *mixed*.

A *sylogism*, wherein one of the premises is suppressed, but so as to be understood; is called an *enthymeme*; e. g. "every animal thinks, therefore man thinks;" wherein the proposition, "man is an animal," is understood.

The demonstrations of mathematicians, it is observed, are only series of enthymemes: so that every thing in mathematics is concluded or proved by *sylogism*; only omitting such premises, as occur of their own accord, or as are referred to by the citations.

For the use SYLLOGISM is of to reason, Mr. Locke observes, that of four things, which reason is employed about, *viz.* the finding out of proofs, the regular disposition of them so as their connexion may appear, the perceiving their connexion and the making a right conclusion; *sylogism* only assists in one, *viz.* shewing the connexion of the proofs in any instance. Nor is it of any great use even here; since the mind can perceive such connexion, where it really is, as easily, nay, perhaps, better, without it. We see men reason very strongly, who do not know how to make a *sylogism*.

Indeed, *sylogism*, the same author adds, may serve to discover a fallacy in a rhetorical flourish, or by stripping an absurdity of the cover of wit and good language, shew it in its natural deformity. But it only shews the weakness or fallacy of such a discourse by the artificial form it is put into, to those who have thoroughly studied mood, and figure, and have so examined the many ways three propositions may be put together in, as to know which of them does certainly conclude right, and which not, and upon what grounds they do so.

The mind is not taught to reason by these rules; it has a native faculty of perceiving the coherence or incoherence of its ideas, and can range them right, without such perplexing repetitions.—Add, that to shew the weakness of an argument, there needs no more, than to strip it of the superfluous ideas, which, blended and confounded with those on which the inference depends, seem to shew a connexion where there is none; or at least hinder the discovery of the want of it: and then to lay the naked ideas, on which the force of the argumentation depends, in their due order. In this position, the mind taking a view of them, sees what connexion they have, and so is able to judge of their inference, without any need of *sylogism* at all.

Nor must it be omitted, that *sylogisms* are as liable to fallacies, as the plainer ways of argumentation; for which one might appeal to common observation, which has always esteemed these artificial methods of reasoning, more adapted to catch and entangle the mind, than to instruct and inform the understanding. And if it be certain that fallacy can be couched in a *sylogism*, as no body will deny but it may; it must be something else, and not a *sylogism*, that must discover it.

The same author proceeds to shew, that this way of reasoning discovers no new proofs, nor makes any discoveries; but is wholly conversant in the marshalling and ranging those we already have: a man must know, before he be able to prove

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sylogistically; so that the *sylogism* comes after knowledge, when we have but little need of it. See REASON and LOGIC.

Reduction of SYLLOGISMS. See the article REDUCTION. SYLLOGISTIC form. See the article FORM.

SYLVA, or SILVA, in poetry, a poetical piece composed, as it were, at a start; or in a kind of rapture or transport, and without much thought or meditation.—Such are the *sylva* of Statius, which, he assures us, were all composed after this manner.

Quintilian extends the use of the word *sylva* to any writing done in haste, and on the spot.

The word is Latin, and literally signifies *forest*; whence its chief use, in our language is, metaphorically, to express certain collections of poetical pieces, of various kinds, and on various subjects; as a forest is an assemblage of trees of different sorts.

SYMBOL*, SYMBOLUM, a sign or representation of any moral thing, by the images or properties of natural things.

* The word is formed from the Greek, *συμβολον*, a mark, sign, or bridge, and that from the verb *συμβολιζειν*, *coferre*, to compare.

Thus we say, the lion is the *symbol* of courage; the pelican of paternal love, &c.—*Symbols* were in very great repute among the ancient Hebrews, and especially among the Egyptians; and served to cover a great part of their moral mysteries; being used not only to represent moral things by natural; but even natural by natural.

Symbols are of various kinds; as types, *zenigma's*, parables, fables, allegories, emblems, hieroglyphics, &c. each whereof, see under its respective article, TYPE, ENIGMA, PARABLE, FABLE, &c.

The Chinese letters are most of them absolute *symbols*, or significative. The *symbols* in algebra, &c. are arbitrary.

Medalists also apply the term *SYMBOL* to certain marks or attributes peculiar to certain persons or deities.—The thunder-bolt, for instance, accompanying the heads of certain emperors, is a sign or *symbol* of the sovereign authority, and of a power equal to that of the gods: the trident is the *symbol* of Neptune; the peacocks of Juno; a figure seated on an urn, of a river, &c.

SYMBOL, among christians, is particularly used for the creed, or the articles of religion, which every christian is to know, and believe.

Fleury observes, that till the time of St. Gregory, the *symbol* was never used to be rehearsed in the office of the Roman church; in regard that church, having never been infected with any heresy, did not need to make any profession of faith. Saucer notes, that several words and clauses have been occasionally added to the *symbol*, upon the rising of new heresies.

Though it be a common opinion, that the *symbol* is the work of the apostles; and though, on the footing of such an opinion we call it the *apostles' creed*; yet, du Pin observes, there are several very cogent arguments to render that opinion highly improbable.

In the emperor's library is a Greek MS of the *symbol* of the apostles, divided into twelve articles, with the names of the respective apostles, who are said to have composed each article. The first is attributed to St. Peter, and the rest successively to Andrew, James major, John, Ithomas, James minor, Philip, Bartholomew, Matthew, Simon, Thaddæus, and Matthias.

But the testimony of that MS does not much confirm the opinion, that each apostle composed an article of the *symbol*; yet the opinion is, at least, as old as St. Leo, who seems to have believed it.

Authors are in doubt why the name *symbol* should be given to this compendium of the articles of the christian faith: some say, it is thus called, as being the mark or characteristic of a christian.—Others derive it from an assembly or conference of the apostles, where each expressing his sense of the faith, and what each had chiefly preached, the creed was framed, and called by the Greek word *συμβολον*, which signifies *collation* or *conference*.—It is added, that St. Cyprian is the first who appears to have used the word *symbol* in this sense.

SYMBOLICAL characters, }
SYMBOLICAL column, } See CHARACTER.
SYMBOLICAL fountain, } COLUMN.
SYMBOLICAL freezer, } FOUNTAIN.
SYMBOLICAL philology, } FREEZE.
SYMBOLICAL physics, } PHYSICS.

Clemens Alexandrinus, Eusebius, &c. observe, that the Egyptians had two ways of representing their *symbolical* mysteries: one by the virtues of animals, herbs, &c. the other by geometrical figures.—Thus, the sun and moon were represented, in the first manner, by the beetle and ibis; and in the latter, by their own figures.—Again, the four elements they represented, after the first manner, by four animals which have qualities corresponding thereto; and after the second manner by +.

SYMMETRY*, SYMMETRIA, the relation of parity, both in

in respect of height, length, and breadth of the parts necessary to compose a beautiful whole.

* The word is formed from the Greek, *συ*, with, and *μετρον*, measure.

Symmetry, according to Vitruvius, consists in the union and conformity of the several members of a work, to their whole, and of the beauty of each of the separate parts to that of the entire work; regard being had to some certain measure: so that the body is framed with *symmetry*, by the due relation which the arm, elbow, hand, fingers, &c. have to each other, and to their whole.

Symmetry arises from that proportion which the Greeks call *analogia*, which is the relation of conformity of all the parts of a building, and of their whole, to some certain measure; whereupon depends the nature of *symmetry*.

Uniform SYMMETRY, in architecture, is that where the same ordonnance reigns throughout the whole.

Refective SYMMETRY, is that where only the opposite sides are equal to each other.

SYMPATHETIC, ΣΥΜΠΑΘΗΤΙΚΟΣ, something that has a sympathy; or that acts, or is acted on by sympathy.

SYMPATHETIC, is particularly applied to all diseases which have two causes; the one remote, the other near.

In which sense, the word is opposed to *idiopathic*.

Thus, an epilepsy is said to be *sympathetic* when produced by a remote cause; i. e. when the disorder in the brain, embarrassed with blood, is preceded and produced by some other disease.

There is a *sympathetic* palpitation of the heart, and an *idiopathic* one.—There is but one *idiopathic* cause of the palpitation; but there are several *sympathetic* ones.

Among chymists and alchymists, the term *sympathetic* is principally applied to a kind of powder, and of ink.

SYMPATHETIC inks, are such as can be made to appear and disappear very suddenly, by the application of something which seems to work by sympathy.

Of these we have some very curious instances and experiments, given us by Lemery and Mr. Boyle; to the following effect.

1°. To two or three parts of unslaked lime put one of yellow orpiment; powder and mix the two, adding fifteen or sixteen times as much water as there was orpiment; stop up the vial with a cork and bladder, and let it in warm embers. Shake the vial now and then for five hours, and warily decant the clear part, or rather filtrate it. In the mean time, burn a piece of cork thoroughly, and when well inflamed, quench it in common water, or rather in brandy. Being thus reduced into a friable coal, grind it with fair water, wherein gum arabic has been dissolved; and it will make a liquor as black as the common ink.

While these are doing, dissolve in three times as much distilled or strong vinegar, over warm embers, a quantity of red lead; or of saccharum saturni, in thrice the quantity of water; for three or four hours, or till the liquor have a sweet taste. This liquor will be as clear as common water.

The liquors thus prepared: write any thing on paper with this last sort, dry it, and nothing will appear. Over the place, write what you please with the second liquor; it will appear as if written with common ink: when dry, dip a small piece of rag or sponge in the first liquor, rub it over the written place, and the black writing will vanish; and that wrote with the invisible ink, will appear black and legible. Again, take a book four or five inches thick, and on the first leaf write any thing with the last liquor: turn to the other end of the book, and rub there with a rag, dipt in the first liquor, on that part, as near as you can guess, opposite to the writing; and leave also the rag there, clapping a paper over it; then nimble shutting the book, strike four or five smart strokes thereon with your hand, and turning the other side uppermost, clap it into a press, or lay it under a good weight for a quarter of an hour, or even half that time: then will the writing done with the invisible ink be found legible there.

2°. Dissolve white or green vitriol in water, and writing with the solution, nothing will appear. Boil galls in water, and dip a luen rag in the decoction, and with it rub the place before writ, and it will appear black and legible. Rub it over again with spirit of vitriol, or its oil, and the writing will disappear again: rub it over again with oil of tartar per deliquium, the letters will appear again, but of a yellow colour. See *Supplement*, article *INKS SYMPATHETIC*.

SYMPATHETIC powder, a powder once very much famed; supposed to have this wonderful property, that if spread on a cloth dipt in the blood of a wound, the wound would be cured, though the patient be any number of miles off.

This powder, M. Lemery tells us, is nothing but Roman vitriol, opened by the sun-beams penetrating it, and imperfectly calcining it, in the middle of summer.

But it is now generally allowed a mere piece of charlatanery,

whatever Sir Kenelm Digby, and others before him, and after, plead in its favour.

Sir Kenelm, in an express treatise on the subject, where he gives instances of cures performed by it, accounts for the manner of its operation thus: the sun's rays, says he, attract and draw the spirits of the blood at a great distance; by which means the atoms thereof are driven and dispersed far and near in the air. Now, the spirits of the vitriol, incorporated with the blood, fly along with them, and the two together form a kind of train of corpuscles. On the other side there is continually issuing and exhaling from the wound abundance of fiery spirits, which attract the neighbouring air; and this air, by a continued concatenation, attracting still the next air, at length, meets the atoms, with the spirits of the blood and vitriol. Thus the spirits of the blood finding their source again, re-enter into their primitive seat, and being joined with the vitriolic spirits, the wound is comforted and healed, imperceptibly.

But, to the confusion of all this fine reasoning, it is found by experience, that the powder is so far from this effect at a great distance, that it is scarce perceived, if done in the same room with the patient. Though it is possible, as the parts of the vitriol are in continual motion, if the cloth be applied close by the patient, some of the effluvia thereof may enter the wound, and there help to stop the bleeding.

SYMPATHY *, ΣΥΜΠΑΘΕΙΑ, an agreement of affections and inclinations; or a conformity of natural qualities, humours, temperaments, &c. which make two persons pleased and delighted with each other.

* The word is formed from the Greek, *συ*, with, and *παθος*, passion, *q. d.* compassion, fellow-feeling.

SYMPATHY is also used with regard to inanimate things; intimating some propension they have to unite, or to act on one another.

In this sense, naturalists say, there is a *sympathy* between the vine and the elm; between the loadstone and iron; the two poles of a loadstone, &c.

Several authors have wrote on the *sympathies* and antipathies between animals; but the greatest part of what they say is fabulous: Such, *e. gr.* is that antipathy between chords made of sheeps and wolfs guts; a lute, they say, being strung with these two kinds of chords, they can never be brought into tune with each other: such also is that of eagles feathers, which mixed with those of other birds, are said to devour and consume them. See *Supplement*, article *SYMPATHY*.

The alchymists talk much of the powder of *sympathy*. See *SYMPATHETIC powder*.

SYMPATHY, in medicine, an indisposition befalling one part of the body, through the defect or disorder of another; whether it be from the affluence of some humour, or vapour sent from elsewhere; or from the want of the influence of some matter necessary to its action.

—For the force and effect of *sympathy*, in the production of monsters, see *MONSTER*.

SYMPHONIACO *Hylo.* See the article *STYLE*.

SYMPHONY *, ΣΥΜΦΩΝΙΑ, in music, properly denotes a consonance, or concert of several sounds agreeable to the ear; whether they be vocal or instrumental, or both; called also *harmony*.

* The word is formed from the Greek, *συ*, with, and *φωνη*, sound.

Some authors restrain *sympathy* to the sole music of instruments: in this sense, say they, the recitativo's in such an opera were intolerable, but the *symphonies* excellent.

The *sympathy* of the ancients went no further than to two or more voices or instruments set to union; for they had no such thing as music in parts; as is very well proved by M. Perrault: at least, if ever they knew such a thing, it must be allowed to have been early lost.

It is to Guido Aretine we owe the invention of composition: it was he first joined in one harmony several distinct melodies; and brought it even the length of four parts, *viz.* bass, tenor, counter-tenor and treble.

SYMPHYSIS *, in medicine, one of the manners of articulating, or joining the bones.

* The word is Greek, *συμφυσις*, and signifies a natural coherence or connexion.

Symphysis is a natural union, whereby two separate bones coalesce, and grow together; so, as neither retains any proper, distinct motion.

Such are most of the junctures of the epiphyfes, and many others of bones, which in children are separate, but with age grow together; as the os ethmoides, the bones of the cranium, os sacrum, &c.

The *sympysis*, or natural union of bones, is of two kinds; either with a medium, or without.

SYMPHYSIS without a medium, is where two bones unite, and grow together of themselves without the intervention of any third thing.—Such are the *sympyses* of the epiphyfes with the principal bones; such also are those of the lower jaw.

This union is effected much after the same manner as that of a graft and a tree.

The *SYMPHYSIS* with a *medium*, is of three kinds, called *symphe-
sis*, *symphe-
sis*, and *symphe-
sis*; each whereof see under its proper article, *SYMPHYSIS*, &c.

SYMPOSIAC *, *SYMPOSIACON*, a conference or conversation of philosophers at a banquet.

* The word is formed from the Greek, *συμποιεω*, *convivium*, feast.

Plutarch has nine books which he calls *sympesi-
ac* questions, *q. d.* disputations at table.

SYMPTOM, *ΣΥΜΠΤΩΜΑ*, in medicine, is ordinarily con-
founded with *sign*, and defined an appearance, or assemblage
of appearances, in a disease, which shew or indicate its na-
ture and quality; and from which one may judge of the
event thereof.

In this sense, a delirium is held a *symptom* of a fever. —
Pain, waking, drowiness, convulsions, suppression of urine,
difficulties of breathing and swallowing, coughs, distastes,
nausea, thirst, swoonings, faintings, looseness, costiveness,
drinels, and blackness of the tongue, are the principal *sym-
ptoms* of diseases.

Boerhaave gives a more just notion of *symptom*: every pra-
ternatural thing arising from a disease, as its cause, in such
manner, however, as that it may be distinguished from the
disease itself, and from its next cause, is properly a *symptom*
of that disease.

If it arise, after the same manner, from the cause of the dis-
ease, it is called a *symptom* of the cause.

If it arise from some former *symptom* as its cause, it is pro-
perly called a *symptom* of a *symptom*.

Whatever happens to a disease, from any other causes than
those mentioned, is more properly called an *epigenomenon*.
Hence it appears, that the *symptoms* above-recited are really
diseases themselves. — They are various as to number, effect,
&c. Though, after the ancients, they may be conveniently
enough reduced to faults in the functions, excretions, and
retentions.

Under the first come all diminutions, abolitions, increas-
es, and depravations of animal actions, particularly with regard
to hunger and thirst, sleeping and waking.

Under the second come nausea's, vomitings, henteries, co-
luc affections, diarrhoeas, dysenteries, iliac passions, &c.

Under the third come the jaundice, stone, dropsy, fever,
itchuria, strangury, asthma, catarrh, &c. Each whereof see
under its respective article, HUNGER, NAUSEA, LIEN-
TERY, DIARRHOEA, JAUNDICE, DROPSY, STONE,
FEVER, &c.

Critical SYMPTOMS. See the article CRITICAL.

SYMPTOMATIC, in medicine, is a term often used to
denote the difference between the primary and secondary
diseases. — Thus a fever from pain is said to be *symptomatic*,
because it rises from pain only; and therefore the ordi-
nary means in fevers are not, in such cases, to be had re-
course to; but to what will remove the pain; for when that
ceases, the fever will cease, without any direct means taken
for it.

SYNAERESIS, *ΣΥΝΑΨΙΣ*, contraction; in grammar, a
figure, whereby two syllables are united in one. — As, *vemens*
for *vemens*. See CONTRACTION.

SYNAGOGUE *, *ΣΥΝΑΓΩΓΗ*, a particular assembly of
Jews, met to perform the offices of their religion. — Also,
the place wherein they meet. See JUDAISM.

* The word is Greek, *συναγωγη*, which literally imports assem-
bly, congregation.

Some authors take the use of *synagogues* to be of no old stand-
ing among the Jews; and maintain, that it was not till af-
ter their return from the Babylonish captivity, that the opi-
nion first got footing, that the worship of God was not to
be restrained to the temple at Jerusalem, that it could not be
held any where else. The consequence of which new opi-
nion was, that the Jews began to build them *synagogues* in
all their cities.

Others hold, that there were *synagogues* even in the time of
David. — But be this as it will, no assemblies of the Jews ap-
pear to have been called *synagogues* till a little before the
coming of Jesus Christ; who is said to have preached in the
middle of the *synagogue*.

There were reckoned four hundred and eighty *synagogues* in
the single city of Jerusalem. — There are still *synagogues*
subsisting at London, Amsterdam, Rotterdam, Avignon,
Metz, &c.

SYNALCEPHA, *ΣΥΝΑΛΩΦΗ*, in grammar, a contraction of
syllables, performed principally, by suppressing some vowel
or diphthong at the end of a word, on account of another
vowel or diphthong at the beginning of the next. — As, *ill*
ego, for *ille ego*, &c.

SYNANCHE *, *ΣΥΝΑΧΗ*, in medicine, a kind of quincy,
wherein the internal muscles of the fauces, or pharynx, are
attacked. See ANGINA.

* The word is formed from the Greek, *συν*, with, and *αγχω*,
constricting, suffocate.

When the external muscles of the same part are seized, it is
called a *paralytic*.

SYNARTHROIDALIS diarthrosis. See the article DIAR-
THROSIS.

SYNARTHROSIS *, *ΣΥΝΑΡΘΡΩΣΙΣ*, in anatomy, a kind of
articulation, or jointure of the bones of the body; where-
in they remain without any, at least apparent motion.

* The word is formed from the Greek, *συν*, with, and *αρθρον*,
articulus, joint.

The *synarthrosis* is when the bones are bound so fast to-
gether, that they are rendered immovable with regard to each
other. — In which view it stands opposed to *diarthrosis*.

It is divided into three kinds: the first, *sutura*; which is
sometimes in form of two combs or saws, the teeth whereof
enter into one another; and sometimes in form of scales,
one ledge lapping over the other.

The second kind is called *harmonia*; which is when the bones
meet in an even line, whether it be right or circular.

The third, called *gomphosis*, is when one bone is fixed into
another, like a nail or peg into a hole.

To these three kinds of *synarthrosis*, some add several others,
as *symphysis*, *syntesis*, and *synuresis*. See *SYMPHYSIS*, &c.

SYNAULIA, *ΣΥΝΑΥΛΙΑ*, in the ancient music, a concert of
several pipes, or flutes, performing alternately, without
voices.

Mr. Malcolm, who doubts whether the ancients had prop-
erly any such thing as instrumental music, that is, music com-
posed wholly for instruments, without any singing; yet
quotes the practice of the *synaulia* from Athenæus.

SYNCATEGOREMA, *ΣΥΝΚΑΤΗΓΟΡΗΜΑ*, in logic, denotes
a word, which signifying little or nothing of itself, yet when
joined with others, adds force thereto: as, *all*, *none*, *cer-
tain*, &c.

SYNCELLUS *, or *SINCELLUS*, an ancient officer in the
family of the patriarchs, and other prelates of the eastern
church.

* The word, in the corrupt Greek, *συναλλα*, signifies a per-
son who lies in the chamber with another; a chamber-fel-
low, or chum.

The *syncellus* was an ecclesiastic, who lived with the patri-
arch of Constantinople, to be a witness of his conduct;
whence it is, that the *syncellus* was also called the patriarch's
eye, because his business was to observe and watch.

The other prelates had also their *syncelli*, who were clerks
living in the house with them, and even lying in the same
chamber, to be witnesses of the purity of their manners.

Afterwards the office degenerated into a mere dignity; and
there were made *syncelli* of churches. — At last it became a
title of honour, and was bestowed by the emperor on the
prelates themselves; whom they called *pontifical syncelli*, and
syncelli augustinæ.

There were also *syncelli* in the western church, particularly in
France. The sixth council of Paris speaks with a great deal of
indignation of some bishops who abolished the office of *syn-
celli*, and lay alone; and strictly enjoins them, that, for the
future, to take away all occasion of scandal, they made the
office of *syncelli* inseparable from that of bishops.

SYNCHONDROSIS *, *ΣΥΝΧΩΝΔΡΩΣΙΣ*, in anatomy, a kind
of articulation of the bones of the body; being a species of
symphysis.

* The word is formed from the Greek, *συν*, with, and *χωνδρος*,
cartilage.

The *synchondrosis* signifies the union of two bones by means
of a cartilage: in which manner the ribs are joined to the
sternum, and the parts of the os pubis to one another.

SYNCHRONISM *, *ΣΥΓΧΡΟΝΙΣΜΟΣ*, the being or happen-
ing of several things together, at or in the same time.

* The word is formed from the Greek, *συν*, with, and *χρονος*, time.

The happening or performing of several things in equal
times, as, the vibrations of pendulums, &c. is more properly
called *isochronism*: though some authors confound the two.

SYNCOPATION, in music, denotes a striking or breaking
of the time; whereby the distinction of the several times or
parts of the measure is interrupted. See TIME and MEAS-
URE.

SYNCOPATION, or *SYNCOPE*, is more particularly used for
the connecting the last note of one measure or bar with the
first of the following measure; so as only to make one note
of both.

A *syncope* is sometimes also made in the middle of a mea-
sure.

SYNCOPATION, is also used when a note of one part ends or
terminates on the middle of a note of the other part.

This is otherwise denominated *binding*.

SYNCOPATION is also used for *driving a note*; that is, when
some shorter note at the beginning of a measure or half
measure is followed by two, three, or more longer notes,
before another short note occurs, equal to that which occa-
sioned the driving, to make the number even—*e. gr.* when
an odd crotchet comes before two or three minims, or an
odd quaver before two, three, or more crotchets.

SYN

SYN

In *syncope* or driving notes, the hand or foot is taken up, or put down while the note is sounding.

SYNCOPE*, *σύνκοπη*, in medicine, a deep, and sudden swooning, wherein the patient continues without any sensible heat, motion, sense, or respiration; and is seized with a cold sweat over the whole body, and all the parts turn pale, and cold, as if dead.

* The word is formed from the Greek, *σύν*, and *κόπτω*, to cut, or strike.

There are several causes of *syncope*: 1°. Too great an exhaustion of spirits; as after long diets, excessive evacuations, violent exercises, long bathings, &c.---2°. The irregular motion of the spirits preventing their due influx into the parts; as sometimes happens in fear, wrath, and other violent passions.---3°. Immoderate hemorrhages.---4°. An ill constitution of blood; as in cacochymias, or in persons who have taken something that either dissolves or coagulates the blood.---5°. Secret diseases, as abscesses, or polypus's of the heart, worms, &c.

In very numerous, crowded assemblies, people sometimes fall into *syncope*, merely through the hot, thick, impure air, they breathe.---Some women are also liable to them upon the smell of musk, civet, &c.

For *syncope*s, many give volatile spirits, and aromatics. Heurnius recommends treacle water, and cinnamon-water; and Etmuller the volatile salt of viers, spirit of sal ammoniac, oil of amber, and sometimes bleeding.

SYNCOPE, in grammar, denotes an elision, or retrenchment of one or more letters, or syllables from a word.

As when we say *virum* for *virorum*; and *mauet alta mente repositum* for *repositum*.

SYNDESMUS*, in anatomy, is sometimes used for a ligament.

* The word in the original Greek, *σύνδεσμος*, which signifies a joining together.

In grammar, *syndesmus* is used for a conjunction.

SYNDIC*, in government and commerce, an officer in divers countries, intrusted with the affairs of a city, or other community; who calls meetings, makes representations and solicitations to the ministry, magistracy, &c. according to the exigency of the cause.

* The word is formed from the Latin, *syndicus*, and that from the Greek, *σύνδικος*, which signifies the same.

The *syndic* is appointed to answer and account for the conduct of the body; he makes and receives proposals for the advantage thereof; controls and corrects the failings of particular persons of the body, or, at least, procures their correction at a public meeting.---In effect, the *syndic* is, at the same time, both the agent and censor of the community. Almost all the companies in Paris, &c. as the university, companies of arts and trades, have their *syndics*; and so have most of the cities of Provence and Languedoc.

SYNDIC is also used for a person appointed to solicit some common affair, wherein he himself has a share; as happens particularly among the several creditors of the same debtor, who fails, or dies insolvent.

The chief magistrate of Geneva is also called *syndic*. There are four *syndics* chose every year; the eldest of whom presides in the council of twenty-five, which is the chief council of the city, wherein all affairs are dispatched both civil and political: thus the other three elect cannot all come at the office till the four years end; so that the syndicate rolls among sixteen persons, all chosen out of the council of twenty-five.

SYNDROME, *σύνδρομη*, the concurrence or combination of symptoms in any disease. See **SYMPTOM**.

SYNECDOCHE*, *συνεκδοχή*, in rhetoric, a kind of figure, or rather trope, frequent among orators, and poets.

* The word is Greek, formed of *σύνδεξις*, I take together.

There are three kinds of *synecdoches*: by the first, a part is taken for the whole; as the point for the sword; the roof for the house; the sails for the ship, &c.

By the second, the whole is used for a part.---By the third, the matter whereof the thing is made, is used for the thing itself; as steel for sword, silver for money, &c.

To which may be added another kind, where the species is used for the genus, or the genus for the species.---As, he bore the sin of many, i.e. of all.

SYNECPHONESIS, or **SYMPHONESIS**, in grammar, a co-alition, whereby two syllables are pronounced as one.

It is much the same thing as the *synalapha*, or *synæresis*. See **SYNALOPHA** and **SYNÆRESIS**.

SYNEDRIN, or **SYNEDRION**. See **SANHEDRIN**.

SYNEMMENON *nota*. See the article **NOTE**.

SYNNEUROSIS*, in anatomy, a kind of articulation, or jointure of the bones.

* The word is formed from the Greek, *σύν*, with, and *νεῦρον*, nerve.

The *synneurosis* is reckoned a branch of the symphysis; and is when the bones are connected together by a ligament: as Vol. II. N°. 149.

is the os femoris, to the os ischium; and the patella to the tibia. See **SYMPHYSIS**.

SYNOCHA, a name given by some to a continual fever, which admits of intentions and remissions. See **FEVER**.

SYNOCHUS, *σύνοχος*, denotes a continent fever, which proceeds without any remission to the end. See **FEVER**.

SYNOD*, in astronomy, a conjunction, or concurrence of two or more stars, or planets in the same optical place of the heavens.

* The word is formed from the Greek, *συνάγω*, convention, assembly; compounded of *σύν*, with, and *ἀγω*, via, way.

SYNOD, **SYNODUS**, in church history, a council; or a meeting, or assembly of ecclesiastics, to consult on matters of religion.

Of these there are four kinds, viz.

General or *œcumenical*, where bishops, &c. meet from all nations.

National; where those of one nation only come together.

Provincial; where they of one only province meet. And

Diocesan; where those of but one diocese meet. See **CONVOCA-TION**.

SYNODALS, or **SYNODIES**, were pecuniary rents (commonly of two shillings) paid to the bishop, or archdeacon, at the time of their Easter visitation, by every parish priest.

They were thus called because usually paid in synods: for that anciently bishops used to visit and hold their diocesan synods at once.---For the same reason, they are sometimes also denominated *synodalia*, but more usually *procurations*.

SYNODALES testes, was an appellation anciently given to the urban and rural deans; from their informing against, and attesting the disorders of the clergy and people in the episcopal synod.

When these sunk in their authority, in their stead rose another sort of *synodical* witnesses, who were a kind of impanelled jury, consisting of a priest, and two or three laymen for every parish: though at length two for every diocese were annually chosen; till at last the office came to be devolved on the churchwardens.

Some think our quest men, who are assistants to the churchwardens, were called *fidefmen*, quasi, *synodfmen*. See **SIDESMEN**, and **QUESTMEN**.

SYNOdale instrumentum, a solemn oath or engagement that these synodical witnesses took; as our churchwardens now are sworn to make just preferments.

SYNODICAL, *συνδικος*, something belonging to a synod. See **SYNOD**.

SYNODICAL epistles, are circular letters wrote by synods to the absent prelates and churches; or even those general ones directed to all the faithful, to inform them of what had passed in the synod.

In the collection of councils an abundance of these *synodical* epistles.

SYNODICAL month, is the period or interval of time, wherein the moon, departing from the sun at a synod or conjunction returns to him again.

Kepler found the quantity of the mean *synodical* month, twenty-nine days, twelve hours, forty-four minutes, three seconds, eleven thirds.

This period is also called a *lunation*; in regard, in the course hereof, the moon puts on all her phases or appearances. See **LUNATION**.

SYNODIES. See the article **SYNODALS**.

SYNOD's-men, *testes synodales*. See **SYNODALES**, and **SIDESMEN**.

SYNOECIA, *συνοικία*, in antiquity, a feast celebrated at Athens, in memory of Theseus's having united all the petty communities of Attica, into one single commonwealth; the seat whereof was Athens; where all the assemblies were to be held.

The feast was dedicated to Minerva; and, according to the scholiast of Thucydides, it was held in the month Metagition.

SYNONYMOUS, **SYNONYMUS**, is applied to a word or term that has the same import, or signification with another. Some severe critics condemn all use of *synonymous* terms in the same period; but this is to condemn all antiquity: so far is the use thereof from being vicious, that it is frequently necessary; as synonyma's contribute both to the force and clearness of the expression. If the first word sketch out the resemblance of the thing it represents, the synonym that follows, is, as it were, a second touch of the pencil, and finishes the image.

Indeed they must be used with a deal of discretion and economy. The stile must be raised and brightened, not stuffed or loaded with *synonymous* terms. They must be used as ornaments, and to render the expression the more forcible, without making a shew of the riches thereof, or heaping synonyma's on synonyma's.

But, though *synonymous* words be laudable; *synonymous* phrases

are hence false: the reason is, that two *synonymus* phrases have not the same effect, and let it be so said and let it be so.

SYNONYMY, or **SYNONYMIA**, in logic, a name where by synonyms, or synonymous terms, that is, various words of the same signification, are made use of, to amplify the effect of a term.

* The word is formed from the Greek, *syn*, with, and *onyma*, name.

Such is that passage in Cicero, *abijt, evasit, effugit, erupit*, he went off, he escaped, he run away, &c.

SYNOVIA, or **SINOVIA**, in medicine, a term used by Paracelsus and his school, for the nutritious juice proper and peculiar to each part.

Thus they talk of the *synovia* of the joints, of the brain, &c. Others use *synovia* for the gout, and other diseases in the joints, arising from a vice in the nutritious juice.

Others restrain the term to the oozing out of the nutritious juice through a wounded part; especially at a joint.

Van Helmont defines *synovia*, a kind of transparent mucilage, like feed, such as illues from the legs of a calf upon cutting off the feet.

SYNTAGMA, **SYNTAGMA**, the disposing, or placing of things in an orderly manner.

SYNTAX, **SYNTAXIS**, in grammar, the construction or connexion of the words of a language into sentences, or phrases.

F. Buffier more accurately defines *syntax*, the manner of constructing one word with another, with regard to the different terminations thereof, prescribed by the rules of grammar.

Some authors, as M. Vaugelas, &c. confound *syntax* with style; but there is a real difference.

The office of *syntax*, is to consider the natural suitableness of words with respect to one another; in order to make them agree in gender, number, person, mood, &c.

To offend in any of these points, is called to offend against *syntax*; and such kind of offence, when gross, is called a *solecism*; and when more slight, a *barbarism*.

The several parts of speech, are, with regard to language, what materials are with regard to a building. How well prepared soever they may be, they will never make a house, unless they be placed conformably to the rules of architecture. It is properly the *syntax* that gives the form to language; and it is that on which turns the most essential part of grammar.

There are two kinds of *syntax*; the one of *concord*, wherein the words are to agree in gender, number, case, and person. The other, of *regimen* or *government*, wherein one word governs another, and occasions some variation therein.

The first kind of *syntax*, generally speaking, is the same in all languages, as being the natural series of what is used almost every where, the better to distinguish discourse. Thus, the distinction of two numbers, singular and plural, has rendered it necessary to make the adjective agree with the substantive in number; that is, to make the one singular or plural, when the other is so: for, as the substantive is the subject confusedly, though directly, marked by the adjective; if the substantive express several, there must be several subjects expressed in that form by the adjective; and by consequence it ought to be in the plural: as *homines docti*, learned men: but there being no variety of termination in the adjective in English to distinguish the number, it is only implied.

The distinction of masculine and feminine gender, obliges the languages which have distinct terminations, to have a concordance or agreement between the substantive and adjective, in gender as well as number: and for the same reason, the verbs are to agree with the nouns and pronouns in number and person. If at any time we meet with any thing that seems to contradict these rules, it is by a figure of speech, *i. e.* by having some word understood, or by considering the thoughts rather than the words themselves.

The *syntax* of government, on the contrary, is generally arbitrary; and on that account, it differs in most languages. One language, for instance, forms their regimen by cases; as the Latin and Greek: others use particles in lieu thereof; as the English, French, Italian, Spanish, &c.

One or two general rules, however, may be here noted, which obtain in all languages. 1^o. That there is no nominative case, but has a relation to some verb, either expressed or understood; since we do not only speak to express what we perceive, but to express what we think of what we perceive, which is done by the verb.

2^o. That there is no verb but has its nominative case either expressed or understood; for the office of the verb being to affirm, there must be something to affirm of; which is the subject or nominative case of the verb; except before an infinitive, where it is an accusative; as *scio Petrum esse doctum*, I know Peter to be learned.

3^o. That there is no adjective but has a relation to some substantive; in regard the adjective marks confusedly the sub-

stantive, which is the subject of the form or quality distinctly marked by the adjective.

4^o. That there never comes any genitive case but what is governed by some other noun.

5^o. The government of verbs is frequently taken from various sorts of references, included in the cases, according to the caprice of custom or usage; which yet does not change the specific relation of each case, but only shews that custom has made choice of this or that.—Thus, the Latins say, *juvare aliquem & epulari alicui*; the French, *servir quelqu'un & servir a quelque chose*; and in the Spanish, the generality of verbs governs indifferently a dative and an accusative case.

SYNTEXIS, **SYNTEXIS**, in medicine, an attenuation or colligation of the solids of the body; such as frequently happens in atrophies, inflammations of the bowels, collicative fevers, &c. wherein a fatty and uliginous matter is voided with the excrements by stool. See **COLLIQUATION**.

SYNTHESIS*, **SYNTHESIS**, composition, or the putting of several things together: as in making a compound medicine of several simple ingredients, &c. See **COMPOSITION**.

* The word is formed from the Greek, *syn*, with, and *thesis*, positio.

SYNTHESIS, in logic, denotes a branch of method, opposite to analysis.

In the *synthesis*, or *synthetic method*, we pursue the truth by reasons drawn from principles before established, or assumed, and propositions formerly proved; thus proceeding by a regular chain, till we come to the conclusion.

Such is the method in Euclid's *Elements*, and most demonstrations of the ancient mathematicians, which proceed from definitions and axioms, to prove propositions, &c. and from those propositions proved, to prove others.

This method we also call *composition*, in opposition to *analysis* or *resolution*. See **COMPOSITION**.

SYNTHESIS, in grammar. See **SYLLEPSIS**.

SYNTHESIS, in chirurgery, an operation, whereby divided parts are re-united; as in wounds, fractures, &c.

SYNTHETIC method. See **SYNTHESIS** and **METHOD**.

SYNUSIASTS*, **SYNUSIASTE**, **SYNOUSIASTAI**, a sect of heretics, who maintained, that there was but one nature, and one single substance in Jesus Christ.

* The word is formed from the Greek, *syn*, with, and *usia*, substance.

The *Synusists* denied, that the word assumed a body in the womb of the virgin; but held, that a part of the divine word being detached from the rest, was there changed into flesh and blood.—Thus they taught, that Jesus Christ was consubstantial to the Father, not only as to his divinity, but even as to his humanity and very body.

SYPHILIS*, is a term used by some writers for the lues venerea, or pox.

* Some derive it from *syn*, cum, with, and *philia*, amor, or amicitia, love, or friendship; because it proceeds from the infectious intercourse of lovers in coition. Others will have it come from the name of a shepherd so called, who was remarkably afflicted with this disease.—However, divers authors of note use the term; particularly Fracastorius, a famous Italian physician, who uses it for the title of a fine poem, which he wrote upon that distemper.

SYPHON, or **SIPHON**. See the article **SIPHON**.

SYRENS, **SIRENES**, in antiquity. See **SIREN**.

SYRIAC bibles. See the article **BIBLE**.

SYRIAN year. See the article **YEAR**.

SYRINGE*, an instrument serving to imbibe, or suck in a quantity of any fluid, and to squirt or expel the same with violence.

* The word is formed from the Greek, *συνεργη*, or Latin, *syrix*, pipe.

The *syringe* is made of a hollow cylinder, as ABCD (*Tab. Hydrostaticæ*, fig. 26.) furnished with a little tube at the bottom, EF. In this cylinder, is an embolus, K, made, or at least covered with leather, or some other matter that easily imbibes moisture; and so filling the cavity of the cylinder, as that no air or water may pass between the one and the other.

If, then, the little end of the tube F be put in water, and the embolus drawn up; the water will ascend into the cavity left by the embolus: and upon thrusting back the embolus, it will be violently expelled again through the same tube EF: and still, the greater impetus will the water be expelled withal, and to the greater distance, as the embolus is thrust down with the greater force, or the greater velocity.

This ascent of the water, the ancients, who supposed a plenum, attributed to nature's abhorrence of a vacuum: but the moderns, more reasonably, as well as more intelligibly, attribute it to the pressure of the atmosphere on the surface of the fluid.

For, by drawing up the embolus, the air left in the cavity of the cylinder must be exceedingly rarified; so that being no longer a counterbalance to the air incumbent on the sur-

face of the fluid; that pressure forces the water through the little tube, up into the *syringe*.

In effect, a *syringe* is only a single pump, and the water ascends in it on the same principle, as in the common sucking pump; whence it follows, that water will not be raised in a *syringe*, to a height exceeding thirty-one feet.

Syringes are of considerable use in medicine and surgery. By them clysters are administered: injections of medicinal waters, &c. made into wounds, &c. They also serve to inject coloured liquors, melted wax, &c. into the vessels of the parts of animals, to shew the disposition, texture, ramifications, &c. thereof.

SYROP*, **SYRUPUS**, or **SIRUPUS**, in pharmacy, an agreeable liquor, or composition of a thick consistence, made of juices, tinctures, or waters of fruits, flowers, or herbs boiled up, in order to preserve it from spoiling, by fermentation, or otherwise, with sugar, or honey.

* *Ménage* derives the word from the Arabic, *elshorab*, potion, formed from the root *sharaba*, to drink.—Others derive it from the Greek, *syros*, I draw, and *syros*, juice. *Ethius*, from *syros*, *syros*, in regard these kind of liquors were much in use among the Syrians, a very delicate people. According to *d'Herbelot*, the words *syrup*, and *syros*, come both from the Arabic, *sharab*, which signifies any kind of drink in the general.

There are various kinds of *syrups*, denominated from the various fruits, &c. they are extracted from, or from their virtues; as *syrup* of violets, of elder, of wormwood, of poppies, &c. emetic *syrup*, lenticle, and antinephritic *syrups*, and chologogue, phlegmagogue *syrups*, &c.

SYROP of *Sapor*, is an ancient medication, the base whereof is apples, with juices of bugloss, anise, fassion, &c. thus called from *Sapor* king of Persia, who overcame the emperor Valerian, and who was supposed to be the inventor thereof.

SYROP of *sugar*. See the article **SUGAR**.

SYSSARCOSIS*, in anatomy, a particular species of the kind of articulation called also *symphysis*.

* The word is Greek, compounded of *syn*, with, and *sark*, flesh.

The *syssarcosis* is a natural union of two bones, by means of flesh or muscles: such is that of the os hyoides, and omoplate.

SYSTEM*, **SYSTEMA**, in the general, denotes an assemblage, or chain of principles, and conclusions: or the whole of any doctrine, the several parts whereof are bound together, and follow or depend on each other.

* The word is formed from the Greek, *synthesis*, composition, compage.

In this sense, we say, a *system* of philosophy; a *system* of motion; a *system* of fevers, &c.—Divines have framed a bundance of *systems* of grace: the *systems* of intermediate science, and predetermination, are invented to explain that of grace.

Among physicians, some follow the *system* of alkali and acid; others that of the four qualities, &c.—Dr. Woodward accounts for most things on his *system* of the bile.

Des Cartes's *system* is held destructive to religion. Gassendus renewed the ancient *system* of atoms; which was that of Democritus, followed by Epicurus, Lucretius, &c.—Sir Isaac Newton's doctrine of colours, M. Leibnitz's *protogaea*, and some discourses of M. Jussieu, in the academy of sciences, to shew that there are bodies whose parts are not to be destroyed by any natural agents; are very favourable to the *system* of Gassendus.

Experiments and observations are the materials of *systems*: an infinity are required to build one.

SYSTEM, in astronomy, denotes an hypothesis or supposition of a certain order, and arrangement of the several parts of the universe; whereby astronomers explain all the phenomena or appearances of the heavenly bodies, their motions, changes, &c.

This is more peculiarly called the *system* of the world, and sometimes the *solar system*. See **WORLD**, **SOLAR**, &c. *System* and *hypothesis* have much the same signification; unless, perhaps, hypothesis be a more particular *system*; and *system* a more general hypothesis. See **HYPOTHESIS**.

Some late authors, indeed, furnish a freer distinction: an hypothesis, say they, is a mere supposition, or fiction; founded rather on imagination, than reason: a *system* is only built on the firmest ground, and raised by the severest rules: it is founded on astronomical observations, and physical causes, and confirmed by geometrical demonstrations.

The most celebrated *systems* of the world, are the *Ptolemaic*, and the *Copernican*; to which may be added, the *Tychonic*: the economy of each whereof, is as follows.

Ptolemaic SYSTEM places the earth at rest, in the centre of the universe; and makes the heavens revolve round the same from east to west, and carry all the heavenly bodies, stars and planets, along with them. See **PTOLEMAIC**.

For the order, distances, &c. of the several bodies in this *system*, see **Tab. Astron. fig. 43**.

The principal asserters of this *system* are Aristotle, Hipparchus, Ptolemy, and many of the old philosophers, followed by the whole world, for a great number of ages; and still adhered to in divers universities, and other places, where free philosophizing is excluded: but the late improvements have put it out of all countenance; and we do not even want demonstration against it.

Copernican SYSTEM places the sun at rest, nearly in the centre of the *system*; excepting for a vertiginous motion about his own axis.

Around him move, from west to east, in several orbits, *Mercury*, then *Venus*, the *Earth*, *Mars*, *Jupiter*, and *Saturn*.

About the earth, in a peculiar orbit, moves the moon; accompanying the earth, in its whole progress, round the sun. And after the same manner do four satellites move round *Jupiter*; and five round *Saturn*.

A-thwart the planetary space do the comets move round the sun; only in very excentric orbits, probably in parabolas, in one of whose foci is the sun.

At an immense distance beyond the planetary and cometary spaces, are the fixed stars, which have all a proper motion from west to east.

The *solar*, or *planetary SYSTEM*, is usually confined to narrower bounds: the stars, by their immense distance, and the little relation they appear to bear to us, being reputed no part thereof. It is highly probable, that each fixed star, is, itself, a sun; and the centre of a particular *system*, surrounded with a company of planets, &c. which, in different periods, and at different distances, perform their courses round their respective suns; and are enlightened, warmed, and cherished thereby: hence we have a very magnificent idea of the world, and the immensity thereof: hence also arises a kind of *system* of *systems*.

The planetary *system*, here described, is the most ancient in the world. It was the first that we know of, introduced into Greece and Italy by Pythagoras; whence, for many ages, it was called the *Pythagorean system*. It was followed by *Philolaus*, *Plato*, *Archimedes*, &c. but lost under the reign of the peripatetic philosophy; till happily retrieved above two hundred years ago by *Nic. Copernicus*; whence its new appellation of *Copernican system*.—For the economy of this *system*, see the scheme thereof, **Tab. Astron. fig. 44**.

Tychonic SYSTEM, in most respects, coincides with the *Copernican*; except in this, that, supposing the earth to be fixed, its orbit is omitted, and in lieu thereof, the sun's orbit is drawn round the earth, and made to intersect the orbit of *Mars*; that *Mars* may be nearer the earth than the sun.—But as there is not any reason, or foundation in nature, for such a manifest shift; and as the author was only led thereto from a superstitious persuasion, that to suppose the sun at rest, and the earth to move, is contrary to scripture; the true *system* is not much prejudiced hereby.—For the order and economy of the *Tychonic system*, see the scheme in **Tab. Astron. fig. 45**.

SYSTEM, in poetry, denotes a certain hypothesis, or scheme of religion, from which the poet is never to recede.—*E. gr.* Having made his choice either in the heathen mythology, or in christianity, he must keep the two apart; and never mix such different ideas in the said poem.

Thus, after invoking *Apollo* and the *Muses*, he must bid adieu to the language of christianity, and not confound the two *systems*.—The fabulous stile, indeed, is the richer and more figurative; but a pagan god makes but a miserable figure in a christian poem.—The *system* of poetry, *Bouhours* observes, is itself wholly fabulous and pagan.

SYSTEM, in music, denotes a compound interval; or an interval composed, or conceived to be composed of several lesser intervals.—Such as is the *diatonic*, &c.

The word is borrowed from the ancients; who call a simple interval, *diastem*, and a compound one *system*. See **DIATEM**. As there is not any interval in the nature of things; so we can conceive any given interval, as composed of, or equal to, the sum of several others. This division of intervals, therefore, only relates to practice; so that a *system* is properly an interval which is actually divided in practice, and where along with the extremes, we conceive always some intermediate terms.

The nature of a *system* will appear plain, by conceiving it as an interval whose terms are in practice, taken either in immediate succession; or the found is made to rise and fall, from the one to the other, by touching some intermediate degrees: so that the whole is a *system* or composition of all the intervals between one extreme and the other.

Systems of the same magnitude, and consequently of the same degree of concord and discord, may yet differ in respect of their composition; as containing and being actually divided into more, or fewer intervals: and when they are equal in that

that respect, the parts may differ in magnitude. Lastly, when they consist of the same parts, or lesser intervals, they may differ as to the order and disposition thereof between the two extremes.

There are several distinctions of *systems*; the most remarkable, is into *concinnous* and *inconcinuous*.

Concinnous SYSTEMS, are those consisting of such parts as are fit for music; and those parts placed in such an order between the extremes, as that the succession of sounds, from one extreme to the other, may have a good effect. See **CONCINNOUS**.

Inconcinuous SYSTEMS, are those, where the simple intervals are inconcinuous, or ill disposed betwixt the extremes.

Systems, again, are either *particular* or *universal*.

Universal SYSTEM, is that which contains all the particular *systems* belonging to music; and makes what the ancients call the *diagramma*, and we the *scale of music*.

The ancients also distinguish *systems* into *perfect* and *imperfect*.

—The *disdiapason*, or double octave, was reckoned the perfect *system*, because within its extremes are contained examples of all the simple and original concords, and in all the variety of order wherein their concinnous part ought to be taken; which variety constitutes what they call the *species*, or *figures of consonances*. — All the *systems*, less than the *disdiapason*, were reckoned imperfect.

The double octave was also called *systema maximum*, and *immutable*; because they took it to be the greatest extent or difference of time that we could go in making melody; though some added a fifth to it, for the greatest *system*: but the *diapason*, or simple octave, was reckoned the most perfect, with respect to the agreement of its extremes; so that how many octaves soever were put into the greatest *system*, they were all to be constituted or sub-divided the same way as the first: so that when we know how the octave is divided, we know the nature of the *diagramma* or *scale*: the varieties whereof, constituted the genera *melodiarum*, which were sub-divided into species.

SYSTOLE, *ΣΥΣΤΟΛΗ*, in medicine, the contraction of the heart of an animal; whereby the blood is driven out of its ventricles into the arteries, to be distributed throughout the body.

The *syssole* of the heart is well accounted for by Dr. Lower, who shews, that the heart is a true muscle, the fibres whereof are acted on like those of other muscles, by means of certain branches of the eighth pair of nerves inserted into it, which bring the animal spirits from the brain hither. By a flux of these spirits, the muscular fibres of the heart are inflated, and thus are shortened; the length of the heart diminished, its breadth or thickness increased, the capacity of the ventricles closed, the tendinous mouths of the arteries dilated, those of the veins shut up by means of their valves, and the contained juice forcibly expressed into the orifices of the arteries.

And this we call *συστολή*, or the contraction of the heart; the opposite state to which is called the *diastole*, or dilatation of the heart.

Dr. Drake adds to Dr. Lower's account, that the intercostal muscles and diaphragm, contribute to the *syssole*, by opening the blood a passage from the right ventricle of the heart to

the left through the lungs, to which it could not otherwise pass: by which means, the opposition the blood contained in that ventricle must necessarily have made to its contraction, is taken off.

Lower and Drake make the *syssole* the natural state or action of the heart, and the *diastole* the violent one: Boerhaave, on the contrary, makes the *syssole* the violent, and the *diastole* the natural state.

SYXHINDEMENTN, or **ΣΙΧΗΝΔΕΜΕΝ**, a term purely raxon, literally signifying six-hundred-men, or men worth six hundred shillings a-piece.

In the time of our ancestors, all men were ranked into three classes; the *lowest*, the *middle*, and the *highest*; and were valued according to their class: that if any injury were done, satisfaction might be made to the value, or worth of the man it was done to.

The *lowest* were called *ταχινομένοις*, *q. d.* valued at two hundred shillings; the *middle*, *σιχομένοις*, *q. d.* valued at six hundred shillings; and the *highest*, *τετατοιμένοις*, *i. e.* valued at twelve hundred shillings.

SYZYGY*, **ΣΥΖΥΓΙΑ**, in astronomy, a term equally used for the conjunction and opposition of a planet with the sun.

* The word is formed from the Greek, *σύνζυγος*, which properly signifies *conjunction*.

On the phenomena and circumstances of the *syzygies*, a great part of the lunar theory depends. See **MOON**.

For, 1^o. It is shewn in the physical astronomy, that the force which diminishes the gravity of the moon in the *syzygies*, is double that which increases it in the quadratures: so that in the *syzygies*, the gravity of the moon from the action of the sun is diminished by a part, which is to the whole gravity as 1 to 89,36; for in the quadratures, the addition of gravity is to the whole gravity as 1 to 178,73.

2^o. In the *syzygies*, the disturbing force is directly as the distance of the moon from the earth, and inversely as the cube of the distance of the earth from the sun. And at the *syzygies*, the gravity of the moon towards the earth receding from its centre, is more diminished, than according to the inverse ratio of the square of the distance from that centre. Hence, in the motion of the moon from the *syzygies* to the quadratures, the gravity of the moon towards the earth is continually increased, and the moon is continually retarded in its motion; and in the motion from the quadratures to the *syzygies*, the moon's gravity is continually diminished, and its motion in its orbit is accelerated.

3^o. Further, in the *syzygies* the moon's orbit or circle round the earth is more convex than in the quadratures; for which reason the moon is less distant from the earth at the former than the latter. When the moon is in the *syzygies*, her apsidal points go backwards, or are retrograde.

When the moon is in the *syzygies*, the nodes move in antecedentia fastest; then slower and slower, till they become at rest when the moon is in the quadratures.

Lastly, when the nodes are come to the *syzygies*, the inclination of the plane of the orbit is the least of all.

Add, that these several irregularities are not equal in each *syzygy*, but are all somewhat greater in the conjunction than in the opposition.



TAB

Camden

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Camden also observes, that the *Table* at Winchester is of a structure much more modern than the VIth century. It is to be added, that Arthur himself is no more than a fabulous prince. In effect, the *Round Table* does not appear to have been any military order, but rather a kind of just, or military exercise, between two persons armed with lances. Several authors say, that Arthur, duke of Bretagne, renewed it. See Matthew Paris, the Abot Justiniani, and F. Helyot. Paulus Jovius says, it was under the empire of Frederic Barbarossa, that the knights of the *Round Table* first began to be talked of: others attribute their origins to the factions of the Guelphs and Gibeilins.—K. Edward the first built a house called the *Round Table*, the court whereof was 200 foot in diameter.

TABLE, in architecture, a smooth, simple member, or ornament, of various forms; but most usually in that of a long square. See the article **PLATBAND**.

Projecting TABLE, is such a one as stands out from the naked of the wall, pedestal, or other matter which it adorns.

Raked TABLE, is that which is hollowed in the die of a pedestal, or elsewhere, and which is usually encompassed with a moulding.

Raised TABLE, an embossment in a frontispiece, for the putting an inscription or other ornament in sculpture. This is what M. Perrault understands by *Abacus* in Vitruvius.

Crowned TABLE, that covered with a cornice, and wherein is cut a bas-relievo, or a piece of black marble incrustated for an inscription.

Reflicated TABLE, that which is picked, and whose surface seems rough, as in grotto's, &c.

Water TABLE. See the article **WATER**.

Plain TABLE, a surveying instrument. See **PLAIN TABLE**.

TABLE, in perspective, denotes a plain surface, supposed to be transparent, and perpendicular to the horizon.

It is always imagined to be placed at a certain distance between the eye and objects, for the objects to be represented thereon by means of visual rays passing from every point thereof through the *Table* to the eye.

Whence it is also called *Perspective Plane*.

TABLET, in anatomy.—The cranium is said to be composed of two *Tablet*, or laminae, i. e. it is double, as if it consisted of two bones laid one over another.

TABLE of Pythagoras, called also *Multiplication Table*, is a square, formed of an hundred lesser squares, or cells, containing the products of the several digits, or simple numbers, multiplied by each other.

As it is absolutely necessary, those who learn arithmetic have the several multiplications contained in this *Table* off by heart, we have thought fit to subjoin it here; with an example, to shew the manner of using it.

Table of Pythagoras, or Multiplication Table.

1	2	3	4	5	6	7	8	9	10
2	4	6	8	10	12	14	16	18	20
3	6	9	12	15	18	21	24	27	30
4	8	12	16	20	24	28	32	36	40
5	10	15	20	25	30	35	40	45	50
6	12	18	24	30	36	42	48	54	60
7	14	21	28	35	42	49	56	63	70
8	16	24	32	40	48	56	64	72	80
9	18	27	36	45	54	63	72	81	90
10	20	30	40	50	60	70	80	90	100

Example: Suppose it were required to know the product of 6, multiplied by 8, look for 6 in the first horizontal column, beginning with 1; then look for 8 in the first perpendicular column, beginning likewise with 1; the square or cell wherein the perpendicular column from 6, meets with the horizontal one from 8, contains the product required, viz. 48.

Laws of the Twelve TABLES, were the first set of laws of the Romans; thus called, either by reason the Romans then wrote with a style on thin wooden *Tablets*, covered with wax; or rather, because they were engraven on *Tables*, or plates of copper, to be exposed in the most noted part of the public forum.

After the expulsion of the kings, as the Romans were then without any fixed, or certain system of law; at least had none ample enough to take in the various cases that might fall between particular persons; it was resolved to adopt the best and wisest laws of the Greeks.

One Hermodorus was first appointed to translate them; and the Decemviri afterwards compiled and reduced them into ten *Tables*. After a world of care and application, they were at length enacted and confirmed by the senate, and an assembly of the people, in the year of Rome 303.

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The following year they found some things wanting therein, which they supplied from the laws of the former kings of Rome, and from certain customs, which long after were authorized; all these being engraven on two other *Tables*, made the *Laws of the Twelve Tables*, so famous in the Roman Jurisprudence; the source and foundation of the civil or Roman law.

The laws of the twelve *Tables* were also called *Decemviral Laws*, from the officers entrusted with the compiling them.

It is a great pity, this system of law should have perished through the injuries of time: we have now nothing of it, but a few fragments dispersed in divers authors. J. G. Heineccius has collected them together, and we have them in Rotanus, and some other authors.—The Latin is very old and barbarous, and remarkably obscure.

NEW TABLES, *TABULÆ NOVÆ*, an edict occasionally published in the Roman commonwealth, for the abolishing all kind of debts, and annulling all obligations.

It was thus called, in regard that all antecedent acts being destroyed, there were nothing but new ones to take place.

TABLE, among jewellers. A *TABLE Diamond*, or other precious stone, is that whose upper surface is quite flat, and only the sides cut in angles; in which sense a diamond cut *Tablewise* is used in opposition to a rose-diamond. See **DIAMOND**.

TABLE GLASS. See the article **GLASS**.

TABLE is also used for an index or repertory, put at the beginning or end of a book, to direct the reader to any passage he may have occasion for.

Thus we say, *Table of Matters*; *Table of Authors quoted*; *Table of Chapters*, &c.—*Tables*, of themselves, sometimes make large Volumes; as that of *Dravitz* on the civil and canon laws.

TABLES of the Bible, are called *Concordances*. See **CONCORDANCE**.

TABLE Rents. See the article **BORD LANDS**.

TABLE of Houses, among astrologers, are certain *Tables* ready drawn up for the assistance of practitioners in that art, for the erecting or drawing of figures or schemes. See **HOUSE**.

TABLES, in mathematics, are systems of numbers, calculated to be ready at hand for the expediting astronomical, geometrical, and other operations. See **CANON**.

Astronomical TABLES, are computations of the motions, places, and other phenomena of the planets, both primary and secondary.

The oldest *Astronomical Tables* are the Ptolemaic, found in Ptolemy's *Almagest*; but these now no longer agree with the heavens.

In 1252, Alphonso XI. king of Castile, undertook the correcting them, chiefly by the assistance of Isaac Hazen, a Jew; and spent 400 thousand crowns therein. Thus arose the *Alphonfine Tables*, to which that prince himself prefixed a preface. But the deficiency of these also was soon perceived by Rheticus and Regiomontanus; upon which Regiomontanus, and after him Waltherus and Warnerus, applied themselves to celestial observations, for the further amending them: but death prevented any progress therein.

Copernicus, in his books of the celestial revolutions, instead of the *Alphonfine Tables*, gives others of his own calculation, from the latter, and partly from his own observations. From Copernicus's observations and theories, Erasmus Reinholdus afterwards compiled the *Prutenic Tables*, which have been printed several times, and in several places.

Tycho de Brahe, even in his youth, became sensible of the deficiency of the *Prutenic Tables*; which was what determined him to apply himself with so much vigour to celestial observation. Yet all he did thereby, was to adjust the motions of the sun and moon; though Longomontanus, from the same, to the theories of the several planets published in his *Astronomia Danica*, added *Tables* of their motions, now called the *Danish Tables*; and Kepler likewise, from the same, in 1627, published the *Rudolphine Tables*, which are now much esteemed.

These were afterwards, Anno 1650, turned into another form, by Maria Cunitia, whose astronomical *Tables*, comprehending the effect of Kepler's physical hypothesis, are exceedingly easy, and satisfy all the phenomena, without any trouble of calculation, or any mention of logarithms; so that the *Rudolphine* calculus is here greatly improved.

Mercator made a like attempt in his *Astronomical institution*, published in 1676; and the like did J. Bap. Morini, whose abridgement of the *Rudolphine Tables* was prefixed to a Latin version of Street's *Astronomia Carolina*, published in 1705.

Lambertius, indeed, endeavoured to discredit the *Rudolphine Tables*, and framed *Perpetual Tables*, as he calls them, of the heavenly motions; but his attempt was never much regarded by the astronomers; and our countryman Horrox gave an abundant check to his arrogance, in his defence of the Keplerian astronomy.

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Nor was the authority of the *Rudolphine Tables* impaired by the *Philolaic Tables* of Bullialdus, the *Britannic Tables* of Vincent Wing, calculated on Bullialdus's hypothesis; or the *Britannic Tables* of Newton; or the French ones of the count de Pagan, or the *Caroline Tables* of Street, all calculated on Dr. Ward's hypothesis, or the *Naturalistic Tables* of Riccioli. Among these, however, the *Philolaic* and *Caroline Tables* are esteemed the best; inasmuch, that Mr. Whiston, by the advice of Mr. Flamsteed (a person of undoubted authority in such cases) thought fit to join the *Caroline Tables* to his astronomical lectures.

Among the latest *Tables* are the *Ludovician*, published in 1702, by M. de la Hire, wholly from his own observations, and without the assistance of any hypothesis; which, before the invention of the micrometer, telescope, and the pendulum-clock, was held impossible.

Another set of *Tables*, Dr. Halley, late astronomer royal, long laboured to perfect.

SEXAGENARY TABLE. See the article SEXAGENARY.

For TABLES of the Stars, see CATALOGUE.

TABLES of Sines, Tangents, and Secants, of every degree and minute of a quadrant, used in trigonometrical operations, are usually called *Canons*. See CANON.

TABLE of Logarithms, Rhumbs, &c. used in geometry, navigation, &c. See LOGARITHM and RHUMB.

Lexidromick TABLES, are *Tables* wherein the difference of longitude and quantity of the way run in any rhumb, are exhibited to every ten minutes of every degree of the quadrant variation of the latitude. See RHUMB.

TABLE, in heraldry. Coats, or escutcheons, containing nothing but the mere colour of the field, and not charged with any bearing, figure, or moveable, are called *Tables d'Armes*, *Tables of Expectation*, or *Tabulae Rosae*.

TABLET, in pharmacy, &c. See TABLET.

TABLING of Fines, is the making a table for every county, where his majesty's writs run; containing the contents of every fine passed in a term.

It is to be done by the chirographer of fines of the common-pleas, who every day or the next term, after engrossing any such fine, fixes one of the said *Tables* in some open place of the said court, during its sitting; and likewise delivers to the sheriff of each county, a content of the said *Tables* made for that respective county, the term before the assizes, to be affixed in some place in the open court, while the justices sit.

TABOR, TABOURIN, a small Drum. See DRUM.

Privilege of the TABOURET, in France, is a privilege some great ladies enjoy, to sit or have a stool in the queen's presence.

TABORITES, or THABORITES, a branch or sect of the ancient Hussites.

The Hussites, towards the close of the XVth century, dividing into several parties, one of them retired to a little mountain or rocky, situate in B. hemia, 15 leagues from Prague, and there put themselves under the conduct of Zisca; building themselves a fort or castle, which they called *Tabor*, or *Thabor*, either from the general word *Thabor*, which in the Slavonic language signifies castle; or from the mountain *Tabor*, mentioned in scripture: and hence they became denominated *Thaborites*.

They carried the point of reformation farther than Huss had done; they rejected purgatory, auricular confession, the union at baptism, transubstantiation, &c.

They reduced the seven sacraments of the Romanists to four, viz. baptism, the eucharist, marriage, and ordination.

They maintained a stout war with the emperor Sigismund. Pope Martin V. was obliged to publish a croisade against them. Nor did this succeed: at length, however, in 1544, their castle of *Thabor* was taken, and they were dispersed. See HUSSITES.

TABULARIUS. See the article TABELLIO.

TABULARUM Apertura, See the articles { APERTURA.

TABULATUM, See the articles { TABELLA.

TACAMAHACA, or TACAMACHA, a kind of refinous gum, distilling from the trunk of a very large tree, growing in New Spain; but, in greatest abundance, in the island of Madagascar.

The tree is not unlike our poplar-tree, only bigger and taller, its leaves long and green, its fruit red, of the size of our wall-nuts, exceedingly refinous, and containing a stone like our peaches.

The wood of the tree makes good timber for ships, and the gum it yields serves there for their caulking; though its chief use with us is in medicine.

There are three kinds of *Tacamahaca*; the *Sublime*, called also *Tacamacha* in the gourd; *Tacamacha* in the masts, and *Tacamacha* in tears.

The first is a natural resin, as it oozes of itself, without any incision made in the tree: the good is dry, reddish, transparent, of a bitter taste, and a strong smell resembling that of

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lavender. The islanders gather it in little gourds divided in two, and covered with a palm leaf.

The *Tacamachas* in tears, and in the masts, are those which flow from the tree by incisions: they must be chosen dry and clear, and their smell resembling that of the first kind.

Gum *Tacamacha* is found good for digesting and resolving tumours, and alluaging pains.—Burnt upon coals, it is reckoned good for hysterical fits in women, and likewise applied to the belly in form of a plaister. Some apply it to the ten plus in the same manner, and to the nape of the neck, for pains in the head, defluxions of rheum upon the throat, and inflammation of the eyes, as also in the tooth-ach. It is said to penetrate and penetrating a nature, that it is greatly used in external applications, to suppurate and disperse tumours; and is accounted effectual, even in those which are scirrhous.

It is likewise used externally in arthritical pains, with forcees; and the Indians use it for all kinds of pains. Schroder affirms, that he has seen intolerable pains in the leg removed by it.

TACHYGRAPHY, * the art of fast, or short writing.

* The word is formed from the Greek ταχης, swift, and γραφη, writing.

There have been various kinds of *Tachygraphy* invented: among the Romans, there were certain notes used, each whereof signified a word.

The Rabbins have a kind of *Tachygraphy* formed by abbreviations, which make a kind of technical words; wherein each consonant stands for a whole word, as רמבם, Rambam; which expresses Rabbi Moshe, Son of Maimon; רש"י, Reshi; which stands for Rabbi Simeon, and so forth.

In France, &c. the only *Tachygraphy* used, is the retrenching of letters, or even whole syllables of words; as in *finis* for *secundum*, aut for *autem*, *d* for *sed*, *o* for *non*, *participium* for *participation*, &c.

The first printers imitated these abbreviations: but at present they are almost laid aside, except among scrivener's, &c.

In England, we have great variety of methods of *Tachygraphy*, or short hand; more by far, and those too, much better, easier, speedier, and more commodious than what are known in any other part of the world: witness Shelton's, Wallis's, Webster's, and Weston's, and several other short-hands. See PRACHYGRAPHY.

TACIT Acceptance, See the Articles { ACCEPTANCE.

TACIT Community, See the Articles { COMMUNITY.

TACK about, in navigation, a term used at sea when a ship's head is brought about, so as to lie the contrary way.

To effect this, they first make them *stay*, which done, she is said to be *paid*.—They then let *rise*, and *hale*, i. e. let the lee-tack rise, and hale aft the sheats, and so trim all the sails by a wind as they were before.

TACKLE, or TACKLING, in navigation, includes all the ropes or cordage of a ship, with their furniture, whereby the sails are managed.—See *Tab Ship*, fig. 1.

TACKLES, are more particularly used for small ropes running in three parts, having at one end a pendant with a block fastened to them, or else a jannier; and at the other end, a block and hook, to hang goods upon, and are to be heaved into the ship, or out of it.

There are several kinds of these *Tackles*: as, the *Boat Tackles*, serving to hoist the boat, &c. in and out: the *Tackles* belonging to the masts, serving as shrouds to keep the masts from straining; and the *Gunner's Tackles*, with which the ordnance are hoisted in and out.—See *Tab. Ship*, fig. 1. n. 39, 40, 59, 61, 82, 93, and 103.

Grand TACKLE, See the Articles { GROUND.

Wind TACKLE Block, See the Articles { WIND.

TACTICKS, * the art of disposing forces in form of battle, and of performing the military motions and evolutions.

* The word is Greek, τακτικα, formed from ταξι, order.

The Greeks were very skilful in this part of the military art, having public professors of it, called *Tactici*, who taught and instructed their youth therein. Aelian hath a particular book on this subject; and there is a great deal of it in Arian, in his history of Alex. M. and in Mauritius, and Leo Imperator. Vossius de scient. Mathemat. mentions 24 ancient authors on the subject of *Tacticks*.

TACTICKS is also used for the art of inventing, and making machines for throwing of darts, arrows, stones, fire-balls, &c. by means of slings, bows, and counter-poles. Vegetius, Hero, &c. have wrote on these machines; and we have them described, and figured by Lippius.

TACTILE, or TANGIBLE, in the schools, something that may fall under the sense of feeling.

Though atoms be corporeal, yet are they not either *tactile* or visible, by reason of their smallness.

The principal *tangible* qualities are heat, cold, dryness, hardness, and humidity. See each under its proper article.

TACTION, in the schools. See FEELING.

TACTION,

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TACTION, in geometry. See **TOUCHING**, and **TANGENT**.
TÆNIA, or **TENIA**, * in architecture, a member of the Doric architrave, resembling a square fillet, or reglet; and serving in lieu of a cymatium.

* The word is Greek, *τανια*, which literally denotes, a *fourth bandage, fillet*, or the like.—Barbaro renders it by *listel*; but Palladio uses the old Name *Tœnia*.

Leon Baptift. Alberti calls the *Tœnia*, *Regule* and *Fasciolar*; and Daviler, *Bandelettes*. Philander fays, there are two kinds, *viz.* that above-mentioned, which he calls the *lower*; and an *upper*, which ferves for a capital to the triglyphs.

TAFFARAL, or **TAFEREL**, in a fhip, the uppermoft part, frame, or rail, abait, over the poop.—See *Tab. Ship. fig. 2. n. 97. fig. 1. lit.*

TAFFETY, or **TAFFATY**, in commerce, a kind of a fine, fmoth, filken ftuff; having, ufually, a remarkable luftre, or glofs.

ALAMODE, } the *Taffetas Noirs* of Lyons.

LUSTRING, }
TAFFETAS noir luftre of the French, is our *Alamode*.—Non luftre is our *Luftring*.

There are *Taffeties* of all colours, fome plain, others ftriped with gold, filver, filk, &c. others chequered, others flowered, others in the Chinefe point, others the Hungarian; with various others, to which the mode, or the caprice of the workmen give fuch whimfical names, that it would be as difficult, as it is ufelefs, to rehearfe them; befides that, they feldom hold beyond the year wherein they firft rofe. The old names of *Taffeties*, and which ftill fubfift, are *Taffeties* of Lyons, of Spain, of England, of Florence, of Avignon, &c. The chief confumption of *Taffeties* is in the fummer-dreffes for women, in gowns, linings, window-curtains, &c. There are three things which contribute chiefly to the perfection of *Taffeties*, *viz.* the filk, the water, and the fire. The filk is not only to be of the fineft kind, but it muft be worked a long time, and very much, before it be ufed. The watering, is only to be given very lightly, and feems only intended to give that fine luftre, by a peculiar property not found in all water. Laftly, the fire, which is paffed under it to dry the water, has its particular manner of application, whereon the perfection of the ftuff depends very much.

Octavio May, of Lyons, is held the firft author of the manufacture of glosfy *Taffeties*; and tradition tells us the occafion of it.—Octavio, it feems, going backwards in the world, and not able to retrieve himfelf by the manufacture of *Taffeties*, fuch as were then made, was one day mufing on his miffortunes, and, in mufing, chanced to chew a few hairs of filk which he had in his mouth. His reverie being over the filk he fput out feemed to fhine, and on that account engaged his attention. He was foon led to reflect on the reafon; and, after a good deal of thought, concluded, that the luftre of that filk muft come, *1st*, From his having preffed it between his teeth. *2^{dly}*, From his having wetted it with his faliva, which had fomething glutinous in it; and, *3^{dly}*, From its having been heated by the natural warmth of his mouth. All this he executed upon the next *Taffeties* he made; and immediately acquired immenfe riches to himfelf, and to the city of Lyons the reputation it ftill maintains, of giving the glofs to *Taffeties*, better than any other city in the world.

It will not, we conceive, be lefs ufeul than curious, to give here the defcription of the engine contrived by Octavio to give the glofs to *Taffety*; and to add the manner of applying it, and the compofition of the water ufed therein.

The machine is much like a filk loom, except that inftead of iron points, here are ufed a kind of crooked needles, to prevent the *Taffety* from flipping: at the two extremities, are two beams; on one of which is rolled the *Taffety*, to take the glofs; and on the other, the fame *Taffety* as faft as it had received it. The firft beam is kept firm by a weight of about 200 pounds; and the other turned by means of a little lever paffing through mortifes at each end. The more the *Taffety* is ftreched, the greater luftre it takes; care, however, is to be ufed it be not weakened by over-ftretching.

Befides this inftrument for keeping the ftuff ftreched, there is another to give it the fire: this is a kind of carriage, in form of a long fquare, and of the breadth of the *Taffeties*. It moves on trundles, and carries a charcoal fire under the *Taffety*, at the diftance of about half a foot.

Thefe two machines prepared, and the *Taffety* mounted, the luftre is given it by rubbing it gently with a ball, or a handful of lifts of fine cloth, as it rolls from one beam to the other; the fire, at the fame time, being carried underneath it to dry it. As foon as the piece has its luftre, it is put on new beams to be ftreched, a day or two; and the oftner this laft preparation is repeated, the more it increafes the glofs.

For black *Taffeties*, the glofs is given with double beef, and orange or lemon juice; but this laft is the leaft proper, as being apt to whiten them. The proportion of the two liquors is a

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gallon of orange juice to a pint of beer, to be boiled together to the confiftence of a rich broth. For coloured *Taffeties* they ufe gourd-water, diftilled in an alembic.

TAIL, *Cauda*, that part of an animal which terminates its body behind.

The *Tail* is different both in figure and ufe, in the various fpecies: in land-animals, it ferves to rid them of flies, and is ufually covered with hair, and ftrengthened with bones: in fifhes it is cartilaginous, and ferves them as a helm to fteer their courfe withal in fwimming.

In birds it is covered with feathers, and greatly affifts in all afcents and defcents in the air; as alfo to render their flight fteady, by keeping the body upright in that fubtle and yielding medium, by its readily turning and anfwering to every vacillation of the body.

TAIL, in anatomy, is ufed for that tendon of a mufcle which is fixed to the moveable part.—In oppofition to which the tendon fixed to the immoveable part is called the *Head*.

Dove-Tail, or *Swallow's-Tail*, among carpenters, is one of the ftrongeft manners of joining; wherein a piece of wood that grows larger towards the end is inferted into another piece; fo that it cannot fir out, by reafon that the hole in the one is narrower than the lower end of the other: as in the figure of a *Dove's-Tail*.

Peacock's Tail, a term applied to all circular compartments, which go enlarging from the centre to the circumference; imitating, in fome meafure, the feathers of a peacock's *Tail*, when fpread.

Dragon's Tail, *Cauda Draconis*, in aftronomy, the defcending node of a planet; thus characterized &c. See **NODE**. The aftronomers take care to put this in all their horofcopes.

Horf's Tail, among the Tartars and Chinefe, is the enfign or flag under which they make war.

Among the Turks it is the ftandard bore before the grand vifir, the bafhaws, and fangiacs; in order to which, it is fited on the end of a half-pike, with a gold button, and is called *Touq*.

There are bafhaws of *one*, others of *two*, others of *three Horf's Tails*.—The *Horf's-Tail* placed on the general's ftent, is a fignal of battle. For the original of this cuftom, it is related, that in a certain battle, the ftandard being taken by the enemy, the general of the army, or, as others fay, a private horfeman, cut off the *Tail* of his horfe, and faftening it to the end of a half-pike, encouraged the troops, and gained the victory. In memory of which noble action, the grand fignior appointed that ftandard to be bore for the future, as a fymbol of honour.

TAIL, in heraldry, &c. is particularly ufed for the *Tail* of an hart; thofe of feveral other creatures having peculiar and diftinct names.

As, that of a buck, roe, or any other kind of deer, is called the *Single*; that of a boar, the *Wreath*; of a fox, the *Bush*; of a wolf, the *Stern*; and of a hare and rabbit, the *Scut*.

TAIL of a Comet. When a comet darts its rays forwards, or towards that part of the heavens, whither its proper motion feems to be carrying it, thofe rays are called its *Beard*: on the contrary, when the rays are fhut behind, towards that part from whence it appears to move, the rays are called the *Tail of the Comet*. The various phenomena whereof, with their physical caufes, fee under the article **COMET**.

TAIL of the Trenches, in the military art, is the poft or place where the befiegers begin to break ground, to cover themfelves from the fire of the town.

The *Tail* of the trench is the firft work which the befiegers make at the opening of the trenches; as the head of the attack is that carried on toward the place.

TAIL, or **TAILE**, in common law, fignifies a limited fee; as oppofite to fee-fimple.

It is thus called from the French *tailler*, to cut, by reafon fuch fee is fo minced, or parted, as it were, that it is not in the owner's free power to difpofe of; but is by the firft giver cut, *taill*ed, and divided from all others, and tied to the ifue of the donee.

The limitation of *Tail* is either *general* or *fpécial*.

TAIL General, is that whereby lands and tenements are limited to a man, and to the heirs of his body begotten, or to be begotten.

This is called *general*, becaufe how many wives foever the tenant holding by this title fhall have, one after another, in lawful marriage, his ifue by them all have a poffibility to inherit one after another.

TAIL Spécial, is when lands or tenements are limited to a man and his wife, and the heirs of their two bodies together.

It is called *fpécial*, becaufe if the man bury his wife before ifue, and take another; the ifue by his fecond wife cannot inherit the land, &c. See **FINE**.

Alfo, if the land be given to a man and his wife, and their fon R. for ever, this is called *Tail Spécial*.

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pieces of iron, formed into certain images, and set in rings, &c.
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They were held prefervatives againſt all kinds of evils.—There were other *Taliſmans* taken from vegetables, and others from minerals.

In the general, we uſe to diſtinguiſh three kinds of *Taliſmans*: *Aſtronomical*, which are known by the ſigns, or conſtellations of the heavens engraven thereon, with other figures, and ſome unintelligible characters.—*Magical*, which bear very extraordinary figures, with ſuperſtitious words and names of angels unheard-of.—And *Mixt*, which conſiſt of ſigns and barbarous words, but have no ſuperſtitious ones, or names of angels. Some rabbins maintain, that the brazen ſerpent, raiſed by Moſes in the wilderneſs, for the deſtruction of the ſerpents that annoyed the Iſraelites, was properly a *Taliſman*.

All the miraculous things wrought by Apollonius Tyanæus are attributed to the virtue and influence of *Taliſmans*: and that wizard is even ſaid by ſome to have been the inventor of *Taliſmans*.

Some authors take ſeveral Runic medals, at leaſt medals whoſe inſcriptions are in Runic characters, for *Taliſmans*; it being notorious, that the northern nations, in their heathen ſtate, were much devoted thereto. M. Keder, however, has ſhewn, that the medals here ſpoke of are quite other things than *Taliſmans*.

TALK. See the article **TALC.**

TALKING. See **SPEAKING.**

TALLAGE, TALLAGIUM, a certain rate, according to which barons and knights were anciently taxed by the king towards the expences of the ſtate, and inferior tenants by their lords, on certain occaſions.

This latter *Tallage* of the cuſtomary tenants was ſometimes fixed and certain, and ſometimes at the pleaſure of the lord; and was alſo ſometimes compounded for.

Tallages were anciently called *Cuttings*; which name is ſtill retained in Ireland, though in a different ſignification.

Tallage, ſays Sir Ed. Coke, is a general name including all taxes. See **TAX.**

TALLOW, a ſort of animal fat, melted down, and clarified. There are ſcarce any animals but a ſort of *Tallow* may be prepared from; but thoſe which yield the moſt, and whereof the moſt uſe is made, are the horſe, bullock, ſheep, hog, goat, deer, bear, and viper.—Some of which *Tallows*, or fats, are uſed in medicine, and called **AXUNGIE**.

Moſt of the reſt are uſed in the making of ſoap, and the dreſſing of leather; but chiefly in making of candles.

For candles, the beſt compoſition is half ſheeps *Tallow*, and half cows or bullocks *Tallow*, without any mixture of other kinds of fat, which only ſerve to turn the candles yellow, make them run, and ſpoil the clearneſs of their light. See **CANDLE.**

TALLOW-TREE, in China, is a tree growing in great plenty in that country, which produces a ſubſtance like our *Tallow*, and ſerving for the ſame purpoſe.

It is about the height of a cherry-tree; its leaves in form of a heart, of a deep, ſhining, red colour, and its bark very ſmooth. Its fruit is incloſed in a kind of pod, or cover, like a cheſnut, and conſiſts of three round white grains, of the ſize and form of a ſmall nut, each having its peculiar capſula, and within that a little ſtone.

This ſtone is encompassed with a white pulp, which has all the properties of true *Tallow*, as to conſiſtence, colour, and even ſmell: and accordingly the Chineſe make their candles of it; which would, doubtleſs, be as good as thoſe in Europe, if they knew how to purify their vegetable *Tallow* as well as we do our animal kind, and to make their wicks as well.

All the preparation they give it, is to melt it down and mix a little oil with it, to make it ſofter, and more pliant.—It is true, their candles made of it yield a thicker ſmoak, and a dimmer light, than ours; but thoſe defects are owing, in a great meaſure, to the wicks, which are not of cotton, but only a little rod, or ſwitch of dry light wood, covered with the pith of a ruſh, wound round it; which being very porous, ſerves to filtrate the minute parts of the *Tallow*, attracted by the burning ſtick, which by this means is kept burning.

TALLY, or TAILE, TAILLE, a piece of wood, whereon retail traders uſe to ſcore or mark, by notches or incifions, the ſeveral quantities of goods they deliver out on credit, to ſave the trouble of writing down ſo many little articles in books.

Each ſcore conſiſts of two pieces of wood, or rather of a ſingle piece cleft length-ways, the parts whereof falling in with one another, the things delivered are ſcored on both at the ſame time; the ſeller keeping one, and the buyer the other.

Tallies are taken as evidences in courts of juſtice, as much as books. The ancient way of keeping all accounts was by *Tallies*; the debtor keeping one part, and the creditor the other.

There are three kinds of *Tallies* mentioned in our ſtatutes, and long uſed in the Exchequer—viz.

TALLIES of Loans, one part whereof is kept in the Exchequer, and the other part given to particular perſons, in lieu of an obligation for the monies they have lent to the government on

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aids of parliament.—This laſt part is called the *Stock*, and the former the *Counter-ſtock*, or the counter-tail.

The *Tallies* are numbered, and bear the perſon's name, and the ſum lent: this we ſay, the *Tallies*. No. have been paid, or diſcharged: *Tallies* are riſen, fallen 4, 5, &c.

TALLIES, or TAILES of Debt, are a kind of acquittances for debts paid the king.

E. gr. the univerſity of Cambridge pays yearly 10 l. for ſuch things as are by charter granted them in fee-farm. He that pays this, receives a *Taille* or *Taily* for his diſcharge, with which, or a note of it, he repairs to the clerk of the pipe, and there for the *Taily* receives a full diſcharge on parcelment.

TALLIES of Reward, or allowance, theſe are made to theriffs, for ſuch matters as (to their charge) they have performed in their office, or ſuch money as is by courſe caſt on them in their accounts, but which they cannot levy.

Counter-TALLY,	} See the articles	COUNTER.
Cutter of the TALLIES,		CUTTER.
Petty TALLY,		PETTY.
Writer of TALLIES,		WRITER.

TALMUD, of THALMUD, a Jewiſh book, wherein is collected all that relates to the explication of their law.

The *Talmud* is the body of the Hebrew law; a compilation of expoſitions of the duties impoſed on that people, either in ſcripture, or by tradition, or by authority of their doctors, or by cuſtom, or even by ſuperſtition: to ſpeak more plainly ſtill, it is the courſe of caſes of conſcience, or of moral theology, wherein the duties are explained, and the doubts cleared, not by reaſoning, but generally by authority, by the cuſtom of the nation, and by the deciſions of the moſt approved of the ancient doctors.

The *Talmud* conſiſts of two general parts: the one called the *Mifchna*, the other the *Gemara*; which firſt part is alſo frequently called abſolutely the *Talmud*, the general name of the whole work.

The Jews divide their law into *written*, which is that contained in the books of Moſes; and *unwritten*, which is that conveyed by tradition.—This latter is, in effect, no other than a gloſs or interpretation of the former, given by the ancient Rabbins.

The *Talmud* then contains the traditions of the Jews, their polity, doctrine and ceremonies, which they obſerve as religiously as the law of God itſelf: they would never put them in writing till they are compelled to it by the diſtinction of Jeruſalem, and till they ſaw themſelves diſperſed throughout the world.

They had two famous ſchools; the one at Babylon, and the other at Jeruſalem: in theſe they made two ſeveral collections of thoſe traditions: the firſt at Jeruſalem, the other at Babylon; but both called *Talmud*, and both exceedingly revered, eſpecially the Babylonian, though full of extravagancies. It was compiled by the Jews of Meſopotamia, about 500 years after Chriſt.

The *Talmud* of Jeruſalem is the leaſt eſteemed.—It was compiled by the Jews of that City 300 years after Chriſt.

The Babylonian *Talmud* conſiſts of two parts: the one the text, the other the gloſs or comment; the comment, called the *Gemara*, contains the deciſions of the Jewiſh doctors, and their expoſitions of the text.—This we find ſtuffed with dreams and chimeras; a deal of ignorance, and a world of impertinent queſtions and diſputations: the ſtyle is alſo very coarſe.—On the contrary: the text, called the *Mifchna* is wrote in a tolerably pure ſtyle, and the reaſonings generally much more ſolid.

The Jews pretend that this was compoſed by Rabbi Juda, furnamed the *Saint*; and that God revealed to him the doctrine and the chief myſteries thereof.—But this is only to be underſtood of the *Mifchna*, not of the *Gemara*, the compilation whereof was not begun till the VIth century after the deſtruction of the ſecond temple.

Rabbi Juda is ſaid to have compoſed the *Mifchna* under the empire of Antoninus, in the IIIrd century; but they do not all agree about this antiquity, ſome carrying it back much further.

It is the *Talmud* of Babylon that is uſually read, and moſt frequently conſulted among the Jews; ſo that when they ſay ſimply the *Talmud*, they always mean this: never quoting the other without the addition of Jeruſalem.

Rabbi Moſes, ſon of Maiemon, has made an abridgment of the *Talmud*, which Scaliger prefers to the *Talmud* itſelf; as being purged of many of the fables wherewith the other is full. It is a ſyſtem of the laws and cuſtoms of the Jews, both of their civil and their canon law, and the beſt of their traditions.

About the year 1236, a Jew of Rochel, well verſed in the Hebrew, becoming Chriſtian, made a journey to pope Gregory IX. and diſcovered to him a number of errors in the *Talmud*: theſe the pope ſent, in 39 articles, to the archbiſhops of France, with a letter, appointing them to ſeize the books of the Jews, and to burn all ſuch as ſhould contain thoſe errors; in conſequence of which order, about 20 cart-loads of

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Hebrew books were burnt. He wrote to the same effect to the kings of England, France, Arragon, Castile, &c. His successor, Innocent IV. giving commission to his legate Eudes de Chateauxroux to examine the *Talmud*, and other Jewish books more carefully, and to tolerate such errors as were not contrary to the Christian religion; the legate wrote to the pope, that to tolerate them was to approve them; and the 15th of May, 1248, he also condemned them juridically to the flames.

TALON, * in architecture, a kind of moulding, consisting of a cymium, crowned with a square fillet; frequently found to terminate ornaments of joiners-work, as those of doors, &c.

* The word is French, and literally signifies *heel*.

The *Talon*, more properly so called, is a moulding concave at the bottom, and convex a-top; having an effect just opposite to the *doucine*.—See *Tab. Archit. fig. 26. lit. p. fig. 28. lit. c. g. n. fig. 32. lit. l. n. fig. 40. lit. d.* See also *DOUCINE*.

When the concave part is a-top, it is called an *Inverted Talon*. See *Tab. Archit. fig. 7*.

The *Talon* is usually called by our English workmen *Ogee*, or *O. G.* and by authors an *upright or inverted Cymatium*. See *Ogee*.

TALPA, in medicine and chirurgery, a tumor of the oedematous kind, called also *Tistudo*.

The *Talpa*, and *Nata*, chiefly arise about the head in consequence of some venereal disorder.

The *Talpe* elevate the skin from the pericranium, and generally denote a foulness in the subjacent bone of the skull.

TALUS, in anatomy, a bone of the foot, called also *Astragalus*.

The *Talus* in its upper part, has a convex head, which is articulated with the two fossils of the leg by ginglymus, it being divided by a little sinus, which receives the small protuberance in the middle of the sinus of the tibia.—Without this articulation, we must always, in going, have trod on the heel with our fore-foot, and our toes with the hind-foot.

The fore-part of the *Talus*, which is also convex, is received into the sinus of the os naviculare.

Below, towards the hind-part of its under-side, it has a pretty large sinus, which receives the upper and hind-part of the os calcis: and towards the fore-part of the same side it has a protuberance, which is received into the upper and fore-part of the same bone.—Betwixt the sinus, and the protuberance, there is a cavity, which answers to another in the os calcis; in which is contained an oily and mucous sort of substance, for moistening the ligaments, and facilitating the obscure motion of the bones when we go.

TALUS, or **TALUT**, in architecture, the inclination or slope of a work; as of the outside of a wall, when its thickness is diminished by degrees, as it rises in height, to make it the firmer.

TALUS, in fortification.—*Talus* of a *Bastion*, or *Rampart*, is the slope or diminution allowed to such a work; whether it be of earth, or stone; the better to support its weight.

The exterior *Talus* of a work, is its slope on the side towards the country; which is always made as little as possible, to prevent the enemies scalado; unless the earth be bad, and then it is absolutely necessary to allow a considerable *Talus* for its parapet.

The interior *Talus* of a work, is its slope on the inside, towards the place.

TAMARINDS, **TAMARINDI**, a kind of medicinal fruit, of a tart agreeable taste, brought from the East as well as West-Indies, and called by some *Indian Dates*, and by others the *Indian Acacia*.

The tree which yields them, called by the Indians *Tamarindi*, and by the Portuguese *Tamarindos*, is not unlike our Ash, or walnut-tree; its leaves resemble those of female fern: its flowers are joined eight or ten together, like those of the orange-tree. Its fruit is in a pod of the length of a finger, and the thickness of the thumb, covered at first with a green rind, which afterwards becomes brown, and contains a blackish acid pulp, among which are found seeds resembling lupines.

—It is this pulp alone that is used in medicine.

Tamarinds must be chosen large, of a blackish colour, a brisk taste, not too dry, and such as have not been laid in a cellar, nor sullied with molasses or with sugar and vinegar.

They are laxative, cooling, and good to quench thirst. In burning fevers they are prescribed to moisten, and cool the hot mouth. See supplement article **TAMARINDUS**.

TAMBAC, or **TAMBAQUA**, a mixture of gold and copper which the people of Siam hold more beautiful, and set a greater value on, than gold itself.

Some travellers speak of it as a metal found in its peculiar mines; but upon what authority we do not know. The abbe de Chably, in his *Journal of Siam*, doubts whether this may not be the *electrum*, or amber, of Solomon.

The ambassadors of Siam brought several works in *Tambac* to Paris, in the reign of Louis XIV. but they were not found so beautiful as was expected.

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TAMBOUR, in architecture a term applied to the Corinthian and composite capitals, as bearing some resemblance to a drum, which the French call *Tambour*.—See *Tab. Archit. fig. 22. lit. a*.

Some chuse to call it the *Vase*, and others *Campana*, or the bell. See *VASE*, &c.

TAMBOUR is also used for a little box of timber-work, covered with a cieling, within-side the porch of certain Churches; both to prevent the view of persons passing by, and to keep off the wind, &c. by means of folding-doors, &c.

TAMBOUR also denotes a round course of stone, several whereof form the shaft of a column, not so high as a diameter.

TAMPION, **TOMPION**, **TAMKIN**, or **TOMKIN**, * a kind of plug or stopple, serving to close a vessel; particularly to keep down the powder in a fire-arm, &c.

* The word is formed from the French, *tampon*, a bang, scapple, &c. Some derive it from the English, *tap*.

In charging a mortar, or the like, over the Powder is usually put a thin round piece of wood to keep the shot, ball, shell, or the like, from the gun-powder. This piece is called a *Tampion*, and by means hereof the shot is exploded with the greater vehemence.

TAN, the bark of the oak, chopped, and ground by a tanning-mill, into a coarse powder; to be used in the *tanning* or dressing of skins.

New Tan is the most esteemed; when old and stale, it loses a great deal of its effect, which consists in condensing or closing the pores of the skins; so that the longer the skins are kept in *Tan*, the greater strength and firmness they acquire.

In effect, not only the bark, but every part of the oak-tree, of what age or growth forever, and all oaken coppice, &c. cut in barking-time, make good *Tan*; as good, at least, as the best bark.

This, when got, is to be well dried in the sun, hoisted dry, and kept so. To use it, the greater wood may be shaved small, or cleft, fit to be cut small by a *tanning* engine for the purpose; which done, it is to be well dried again on a kiln, and then ground by the mill. See *MILL*.—Where oak is scarce, the black-thorn or sloe-tree may supply the defect.

TANGENT, in geometry, a right line, which touches a circle, that is, meets it in such manner, as that though infinitely produced, it would never cut the same; that is, never come within the circumference.

Thus the line AD (*Tab. Geom. fig. 50.*) is a *Tangent* to the circle, in D.

It is demonstrated in geometry; 1. That if a *Tangent* AD, and a secant AB, be both drawn from the same point A; the square of the *Tangent* will be equal to the rectangle, under the whole secant AB, and that portion thereof AC, which falls without the circle.

2. That if two *Tangents* AD, AE, be drawn to the same circle from the same point A, they will be equal to each other.

TANGENT, in trigonometry.—A *Tangent* of an *Arch*, is a right line, raised perpendicularly on the extreme of the diameter, and continued to a point, where it is cut by a secant, that is by a line, drawn from the centre through the extremity of the arch whereof it is a *Tangent*.

A *Tangent* of an *Arch* EA (*Tab. Trigon. fig. 1.*) is a part of a *Tangent* of a circle (that is, of a right line which touches a circle without cutting it) intercepted between two right lines, drawn from the centre C, through the extremes of the arch E and A.

Hence, the *Tangent* FE is perpendicular to the radius EC.

And hence the *Tangent* FE is the *Tangent* of the *Angle* ACE, as also of that *ACI*; so that two adjacent angles have only the same common *Tangent*.

Co-TANGENT, or **TANGENT** of the *Complement*, is the *Tangent* of an arch which is the complement of another arch to a quadrant.

Thus, a *Tangent* of the arch AH, is the *Co-Tangent* of the arch AE, or the *Tangent* of the complement of the arch AE.

To find the Length of the *TANGENT* of any *Arch*; the sine of the arch being given: suppose the arch, AE; the given sine, AD; and the *Tangent* required, EF. Since both the sine and *Tangent* are perpendicular to the radius EC, they are parallel to each other. Wherefore as the cosine DC is to the sine AD, so is the whole sine to the *Tangent* EF. See *SINE*.

Hence, a canon of sines being had, a Canon of *Tangents* is easily constructed therefrom.

Artificial TANGENTS, are the logarithms of the *Tangents* of arches.

Line of *TANGENTS*, is a line usually placed on the sector and Gunter's scale; the description and uses whereof, see under the article *SECTOR*.

TANGENT of a *Conic Section*, as of a parabola, is a right line, which only touches or meets the curve in one point, and does not cut or enter within the curve. See *CONIC SECTION*.

Method of *TANGENTS*, a method of determining the quantity of the *Tangent* of any algebraic curve; the equation defining that curve being given.

This method is one of the great results of the *Calculus Differential*.

It is a way that in geometry; because in determining the *Tangent* of a curve, we determine at the same time a perpendicular to the curve, upon which account it will determine the *Sub-tangent* immediately.

2. *Find the Tangent to an Algebraic Curve.* — Let the point P be infinitely near another P (Fig. 15). Let PM be the differential of the abscissa; and MR the perpendicular $MR = Pp$; Rm will be the differential of the semiordinate. Draw, therefore, the *Tangent* TM ; an infinitely little arch Mm , will not differ from a right line; and therefore MmR will be a right-lined, right-angled triangle, usually called the *Characteristical Triangle of the Curve*, in regard curve lines are distinguished from each other hereby.

Now, by reason of the parallelism of the right lines PM and pm ; the angle $MPm = TmP$. Wherefore the triangle MmR is similar to the Triangle TmP . Let therefore $AP = x$, $PM = y$, then will $Pp = MR = dx$, and $Rm = dy$. Consequently,

$$\begin{aligned} Rm : MR :: PM : PT \\ dy : dx :: y : \frac{y dx}{dy} \end{aligned}$$

If, then, from the given equation of any curve, you substitute the value of dx to $y dx$; dy , in the general expression of the *Sub-tangent*, PT ; the differential quantities will vanish, and the value of the *Sub-tangent* will come out in common quantities; whence the *Tangent* itself is easily determined. Thus we shall illustrate in a few examples:

1. The equation defining the common parabola, is,

$$\begin{aligned} \text{Hence, } \frac{ax - y^2}{dx - 2y dy} \\ \frac{dx - 2y dy}{dx - 2y dy} = \frac{a - 2y}{1} \end{aligned}$$

$PT = dyx : dx = 2y^2 dy : a - 2y = 2y^2 : a - 2y$. That is, the *Sub-tangent* is double the abscissa.

2. The equation defining a circle is,

$$\begin{aligned} \frac{ax - x^2}{dx - 2x dx} = \frac{a - 2x}{1} \\ \frac{dx - 2x dx}{dx - 2x dx} = \frac{a - 2x}{1} \\ PT = dx : dy = 2y^2 dy : (a - 2x) = 2y^2 : (a - 2x) = (2ax - 2x^2) : (a - 2x) = (2x(a - x)) : (a - 2x) \text{ that is, } \\ PC : PB : AP : PT. \end{aligned}$$

Therefore $AT = (a - x) : (\frac{1}{2} a - x) = (a - x) : (\frac{1}{2} a - x) = (a - x) : (\frac{1}{2} a - x) = (a - x) : (\frac{1}{2} a - x)$ that is, $PC : PA :: CA : AT$.

3. The equation defining an ellipsis, is;

$$\begin{aligned} \text{Hence, } \frac{2ay dy}{2ay dy} = \frac{abx - 2bx dx}{(ab - 2bx) dx} \\ PT = y dx : dy = 2ay^2 : (ab - 2bx) = (2abx - 2bx^2) : (ab - 2bx) \text{ that is, as the distance of the semiordinate from the centre, is to the half axis, so is the abscissa to the proportion of the } \textit{Sub-tangent} \text{ intercepted between the vertex of the ellipsis and the } \textit{Tangent}. \end{aligned}$$

Lastly, for all algebraic curves, the equation being,

$$\begin{aligned} \frac{2ay dy}{2ay dy} = \frac{abx - 2bx dx}{(ab - 2bx) dx} \\ PT = y dx : dy = 2ay^2 : (ab - 2bx) = (2abx - 2bx^2) : (ab - 2bx) \text{ that is, as the distance of the semiordinate from the centre, is to the half axis, so is the abscissa to the proportion of the } \textit{Sub-tangent} \text{ intercepted between the vertex of the ellipsis and the } \textit{Tangent}. \end{aligned}$$

Suppose, e. g. $y^2 - ax = 0$; then, by comparing with the general formula,

$$\begin{aligned} \frac{ay^2}{ay^2} = \frac{bx^2}{bx^2} \\ \frac{ay^2}{ay^2} = \frac{bx^2}{bx^2} \\ \frac{ay^2}{ay^2} = \frac{bx^2}{bx^2} \end{aligned}$$

These values being substituted in the most general formula of the *Sub-tangent*, we have the *Sub-tangent* of the parabola of the first kind, $(-2 \cdot 1 y^2 - 0 \cdot 0 y^0 x^0) : (1 - ax \cdot 1 - 1 + 0 \cdot 0 y^0 x^0) = -2y^2 : a - 2y^2$.

Suppose $y^3 - axy = 0$, then will

$$\begin{aligned} \frac{ay^3}{ay^3} = \frac{bx^2}{bx^2} \\ \frac{ay^3}{ay^3} = \frac{bx^2}{bx^2} \\ \frac{ay^3}{ay^3} = \frac{bx^2}{bx^2} \end{aligned}$$

These values being substituted in the general formula of the *Sub-tangent*, we have the *Sub-tangent* of the curve, whose equation is given, $PT = (-3 \cdot 1 y^3 - 1 \cdot 0 y^1 x^2) : (3 \cdot 1 y^3 - 1 \cdot 0 y^1 x^2)$.

— $1 y^3 - 1 \cdot 0 y^1 x^2 = (-3 y^3 + 0 y^1 x^2) : (-3 y^3 + 0 y^1 x^2) = (-3 y^3 + 0 y^1 x^2) : (-3 y^3 + 0 y^1 x^2)$. The value of $y^3 - axy$, that is, $ay^3 - 2axy$, being substituted from the equation to the curve.

In the *Philosophical Transactions*, we have the following method of drawing *Tangents* to all conical curves, without any labour, or calculation, by M. Sluiss.

Suppose a curve, as DQ (Fig. 14) whose points are all referable to any right line given, as EA , whether the line be the diameter or not; or whether there be more given right lines than one, provided their powers do but come into the equation. In all his equations he puts v for the line DA , y for BA ; and for EB , and the other given lines, he puts $b, d, \&c.$ that is, always consonants only.

Then, supposing DC to be drawn touching the curve in D , and meeting with EA produced in C ; he calls the sought line CA , by the name of a .

To find which, he gives this general method: 1. Reject out of the equation all members, which have not either v or y in them; then put all these that have v , on one side; and all those which have v , on the other; with their signs $+$ or $-$; and the latter, for distinction and sake sake, he calls the right, the former, the left side. 2. On the right side, let there be prefixed to each member, the exponent of the power, which v hath there; or, which is all one, let that exponent be multiplied into all the members. 3. Let the same be done also on the left side, multiplying each member there by the power of the exponent of y . Adding this moreover, that one y must, in each part, be changed into a . This done, the equation thus reformed, will show the method of drawing the required *Tangent* to the point D ; for, that being given; as also y, v , and the other quantities expressed by consonants, a cannot be unknown. Suppose an equation $by^2 - y = v$, in which EA is called b ; $BA = y$, $DA = v$, and let a , or AC be required so as to find the point C , from whence CD being drawn, shall be a true *Tangent* to that curve DQ in D . In this example, nothing is to be rejected out of the equation, because v or y are in each member. It will also appear, as required by the rule 1; to each part therefore, there must be prefixed the exponent of the powers of y or v , as in rule 2; and on the left side, let one y be changed into a , and then the equation will be in this form, $ba^2 - 2ya = 2v$, which equation reduced, gives easily the value of $a = \frac{2v}{b - y} = AC$.

And so the point C is found, from whence the *Tangent* DC may be drawn.

To determine which way the *Tangent* is to be drawn, whether towards B or E , he directs to consider the numerator and denominator of the fraction. For, 1. If in both parts of the fraction, all the signs are affirmative; or if the affirmative ones are more in number; then the *Tangent* is to run towards B . 2. If the affirmative quantities are greater than the negative in the numerator, but equal to them in the denominator, the right line drawn through D , touching the curve in that point will be parallel to AB ; for in this case, a is of an infinite length. 3. If in both parts of the fraction, the affirmative quantities are less than the negative, changing all the signs, the *Tangent* must be drawn now also towards B ; for this case, after the change, comes to be the same as the first. 4. If the affirmative quantities are greater than the negative in the denominator, but in the numerator are less, or vice versa, then change the signs in that part of the fraction where they are less; the *Tangent* must be drawn a contrary way; that is, AC must be taken towards E . 5. But whenever the affirmative and negative quantities are equal in the numerator, let them be how they will in the denominator, a will vanish into nothing; and, consequently, the *Tangent* is either AD itself, or EA , or parallel thereto; as will easily be found by the data. This he gives plain examples of, in reference to the circle; thus: let there be a semicircle, whose diameter is AB ; in which there is given any point; as D . (Fig. 15) from which the perpendicular DA is let fall to the diameter. Let $DA = v$, $BA = y$, $EB = b$; then the equation will be $by^2 - y = v$, and drawing the *Tangent* DC , we have AC , or $a = \frac{2v}{b - y}$. Now, if b be greater than $2y$, the *Tangent* must be drawn towards B ; if less, towards E ; if it be equal to it, it will be parallel to EB , as was said in the first, second, and fourth rules.

Let there be another semicircle inverted; as NDD , (Fig. 16) the points of whose periphery are referred to the right line BE , parallel and $=$ to the diameter. Let NB be called d ; and all things else as before; then the equation will be $by^2 - y = d$, or $by^2 - y = d$; which being managed according to his rules, you have $a = \frac{2v}{b - y}$. Now, since v here is supposed to be always less than d ; if b be greater than $2y$, than the *Tangent* must be drawn towards E ; if equal, it will be parallel to BE ; if less, changing all the signs, the *Tangent* must be drawn towards B , as by rules fourth, fifth, and third. But

There could be no *Tangent* drawn, or at least E B would be it, if N B had been taken equal to the diameter. Let there be another semicircle, whose diameter N B (fig. 17.) is perpendicular to E B, and to which its points are supposed to be referred. Let N B be called *b*, and all things else as above; the

equation will be $y = bv - v^2$, and $a = \frac{bv - 2vv}{2v}$. If,

now, *b* be greater than $2v$, the *Tangent* must be drawn towards B, if lesser, towards E, if equal, D A will be the *Tangent*, as by rules 4, and 5, appears.

Inverse Methods of TANGENTS, is a method of finding the equation, or the construction of any curve; from the *Tangent* or any other line whose determination depends on the *Tangent*, given.

This method is also one of the great results of the new *Calculus Integralis*. See CALCULUS.

Its application we shall give in what follows.—The differential expressions of the *Tangent*, *Sub-tangent*, &c. being delivered under the last article: if you make the given value equal to the differential expression, and either sum up the differential equation, or, if that cannot be, construct it, the curve required is had.—For example:

1° To find the curve line, whose Sub-tangent $= 2yy : a$

Since the Sub-tangent of an algebraic line is $xy : dy$ we have

$$y dx : dy = 2yy : a$$

$$\frac{ay dx = 2y^2 dy}{a dx = 2y dy}$$

$$a xy = y^2$$

$$a xy = y^2$$

The curve sought, therefore, is a parabola; whose construction is shewn under the article PARABOLA.

3° To find the curve, whose Sub-tangent is a third proportional to x and y .

Since $x - x : y = y : y dx$

We have $x - x : y = dy : dx$

$$\frac{r dx - x dx = y dy}{r x - \frac{1}{2} x^2 = \frac{1}{2} y^2}$$

$$2 r x - x x = y^2$$

The curve sought therefore, is a circle.

3° To find a line wherein the Sub-tangent is equal to the semi-ordinate.

Since $y dx : dy = y$

$$\frac{y dx = y dy}{dx = dy}$$

$$x = y$$

Hence it appears, that the line sought, is a right line, which respects the cathetus of an equilateral triangle, as an axis or the hypotenuse of an equilateral, rectangled triangle. If x had been taken for the arch of a circle, the sought line had been a cycloid. See CYCLOID.

TANGERE—Noli me TANGERE. See NOLI.

TANGIBLE. See the article TACTILE.

TANISTRY, TANISTRIA, an ancient municipal law, or tenure, which allotted the inheritance of lands, castles, &c. held by this tenure, to the oldest and most worthy and capable person of the deceased's name and blood; without any regard to proximity.*—This, in reality, was giving it to the strongest; and this naturally occasioned bloody wars in families: for which reason it was abolished under K. James I.

* Sir John Davis describes it thus: *Quint asiam person moru? fuisse det alicui castles, manors, terres ou tenements del nature & tenure de tanistry; que donques meismes le castles, &c. doient de fender, & de temps dont memory ne court out use de delivender, Seniors & dignissimo viro sanguinis & cognominis de tiel po. son, &c.*

TANNED Hide. See the article HIDE.

TANNING, the preparing of skins or hides in a pit, with *Tan* and water, after having first taken off the hair, by steeping them in lime-water.

Method of TANNING oxes hides.—The skin being flead off the carcass, if it is intended to be kept, it is salted with sea-salt and alum, or with a coarse kind of salt-petre; if it is not for keeping, the salting is saved, as being of no use, but to prevent the hide from corrupting before it can be conveniently carried to the *Tan-house*.

Whether the hide have been salted or not, the *Tanner* begins with taking off the horns, the ears, and the tail; after which it is thrown into a running water for about 30 hours, to wash off the blood, and other impurities adhering to the inside.

This done, it is laid over-night in a lime-pit, already used; whence it is taken, and left to drain three or four days on the edge of the pit.

This first and slightest preparation over, it is returned into a strong lime-pit for two days, then taken out for four days more; Vol. II.

and thus for 6 weeks alternately, it is taken out and put in twice a week. At the six weeks end, it is put into a fresh pit, where it continues eight days, and is then taken out for 10 many; and this alternately for a year or eighteen months, according to the strength of the leather, and the weather: for in great heats, they put in fresh lime twice a week; and in frost they sometimes do not touch them for three months. Every fresh lime-pit they throw them into, is stronger and stronger.

At the end of four, five, or six weeks the *Tanner* scrapes off the hair on a wooden leg, or horie, with a kind of knife made for that purpose. And after a year or eighteen months, when the hair is perfectly gone, he carries it to a river to wash, pares off the flesh on the leg with a kind of cutting knife, and rubs it briskly with a kind of whetstone, to take off any remains of flesh or of filth on the side of the hair.

The skin is now put into *Tan*; that is, it is covered over with *Tan*, as it is stretched in the pit, and water is let in upon it: if the skin be strong, five coverings of *Tan* will be required; for weaker, three or four may suffice. When the skin has not been kept long enough in lime, or in the *Tan-pit*, upon cutting it in the middle, there is seen a whitish streak, called the *horn*, or crudity of the skin; and it is this crudity that is the reason why the soles of shoes, boots, &c. stretch so easily, and take water.

When the hides are sufficiently tanned, they are taken out of the pit, to be dried, by hanging in the air: then the *tan* is cleaned off them, and they are put in a place neither too dry, nor too moist; they are there well stretched over one another, with weights a top, to keep them tight and straight; and in this condition are sold under the denomination of *hind leather*. This is the method of *tanning* bullocks or oxes hides.

Cows, calves, and horses skins are *tanned* much after the same manner as those of oxen, except that they are only kept four months in the lime pit; and that before they be put in the *tan*, there is a preparation required, thus: cold water is poured into a wooden vat or tub, wherein the skins are put, which are kept stirring while some other water is warming in a kettle; and as soon as that water is a little more than luke warm, it is poured gently into the vat, and upon this is cast a basket of *tan*; during which time, the skins are still kept turning, that the water and *tan* may not seorch them.

After an hour, they are taken out, and cast for a day into cold water, then returned into the former vat, and the same water they had been in before; and here they are left eight days; which expired they are put in the *tan-pit*, and three coverings of *tan* given them, the first of which lasts five weeks, the second six, and the third two months.

The rest of the process is in all respects the same as that above delivered. In some countries, as in Champagne, &c. the *Tanners* give the first preparation with a le, instead of lime. TANTAMOUNT, something that amounts to, or is equivalent to some other.

TANTUM decies. See the article DECIES.

TAP, among hunters:—a hare is said to *tap*, or beat, when she makes a particular noise at rutting time.

TAPASSANT, among hunters, denotes *lurking* or *sneaking*.

Hence also, to *tappy*, is to lie hid, as a deer may do.

TAPER, TAPERING, is understood of a piece of timber, or the like, when broad at one end, and gradually diminishing to the other;—as is the case in pyramids, cones, &c.

To measure *taper* Timber, &c. See the article SLIDING-Rule.

TAPER-BORED, is applied to a piece of ordnance, when it is wider at the mouth than towards the breech.

TAPER, also denotes a kind of tall wax candle, placed in a candlestick, and burnt at funeral processions, and in other church-solemnities.

Tapers are made of different sizes: in some places, as Italy, &c. they are cylindrical; but in most other countries, as England, France, &c. they are conical or *taper*, whence, possibly, the name: unless we rather chuse to derive *Taper* in the adjective sense from the substantivative *taper*, in the Saxon, *Tapsen*, or *Tapon*, *ceruus*, a wax candle.

Both kinds are pierced at bottom, for a pin in the candlestick to enter.

The use of lights in religious ceremonies, is of a long standing: the ancients, we know, used flambeaux in their sacrifices, and particularly in the mysteries of Ceres; and they had *Tapers* placed before the statues of their Gods.

Some suppose, that it was in imitation of this heathen ceremony, that lights were first introduced into the Christian church; others take it that the Christians borrowed the practice from the Jews: but recourse need not be had to the one or the other.

Doubtless, as in the first days of Christianity they had their meetings in obscure subterraneous vaults, there was a necessity for *Tapers*, &c. and there was even occasion for them after they had the liberty of building churches; time being contrived in such manner, as only to receive very little light, that they might inspire the greater awe and respect by the obscurity.

This original of *Tapers* in churches is the most natural; but it is now a long time since the use of *Tapers*, which necessitate at first introduced, is become a mere ceremony. St. Paulinus, who lived at the beginning of the fifth century, observes that the Christians of his days were so fond of *Tapers*, that they even painted them in their churches.

There are two ways of making *TAPERS*: the first with the *ladle*, the second by *hand*.

In the first, after the wicks (which are usually half cotton half flax) have been well twisted and cut of the due length; a dozen of them are hung, at equal distances, around an iron hoop, directly over a large copper basin full of melted wax.

Then taking on iron ladle-full of the wax, they pour it gently over the wicks, a little below the tops thereof, one after another; so that the wax running down them, they become soaked and covered therewith, and the surplus returns into the basin, under which is a pan of coals to keep it in fusion.

Thus they continue to cast on more and more wax for ten or twelve times, till the *Tapers* be brought to the required dimensions. The first cast only soaks the wick, the second begins to cover it, and the rest give it the form and thickness; in order to which, they take care that every cast, after the fourth, be made lower and lower below the wicks, to make them taper. The *Tapers* thus formed, are laid, while yet hot, one against another, in a feather-bed folded double to preserve them soft; and afterwards taken out thence, one after another, to be rolled on a long smooth table, with an oblong instrument of box, polished at the bottom, and furnished with a handle above.

The *Taper* thus rolled and polished, a piece of its larger end is cut off, and a conical hole bored therein, with a boxen instrument, into which the pin, or point of the candlestick is to be received.

While the broach is yet in the hole, they use to stamp the maker's name, and the weight of the *Taper*, with a boxen ruler, whereon proper characters are cut. The *Taper* is then hung up to harden; after which it is fit for use.

Making of TAPERS by hand. The wicks being disposed, as in the former manner, they begin to soften the wax by working it in hot water, in a narrow, deep copper vessel. They then take a quantity of this wax out with the hand, and apply it gradually on the wick, which is fastened to a hook in the wall at the end opposite to the collet: so that they begin to form the *Taper* by the large end; and proceed, still lessening the thickness, to the neck or collet.

The rest is performed after the same manner as in *Tapers* made with the *ladle*, except that they do not lay them in the feather-bed, but roll them on the table as fast as they are formed.

Two things there are to be observed in the two kinds of *Tapers*: the first, that in the whole process of *Tapers* with the *ladle*, they use water to moisten the table, and other instruments used therein, that the wax may not stick; and that in the other, they use oil of olives or lard for the same end.

Paschal TAPER, among the Romanists, is a large *Taper*, whereon the deacon applies five bits of frankincense, in holes made for the purpose, in form of a cross; and which he lights with new fire in the ceremony of Easter Saturday.

The Pontifical makes pope Zosimus the author of this usage; but Baronius will have it more ancient, and quotes a hymn of Prudentius to prove it. That Pope he supposes to have only established the use thereof in parish churches; which, till then, had been restrained to the greater churches.

F. Papebroch explains the origin of the paschal *Taper* more distinctly in his *Conatus Chronico-Historicus*, &c. It seems, though the council of Nice regulated the day whereon Easter was to be celebrated, it laid it on the patriarch of Alexandria to make a yearly canon thereof, and to send it to the pope. As all the other moveable feasts were to be regulated by that of Easter, a catalogue of them was made every year, and this was wrote on a *Taper*, *Cereus*, which was blessed in the church with much solemnity.

This *Taper*, according to the abbot Chastelain, was not a wax candle, made to be burnt: it had no wick: nor was it any thing more than a kind of column of wax, made on purpose to write the list of moveable feasts on, and which would suffice to last that list for the space of a year.

For among the ancients, when any thing was to be wrote to last for ever, they engraved it on marble or steel; when it was to last a long while, they wrote it on Egyptian paper; and when it was only to last a short time, they contented themselves to write it on wax. In process of time, they came to write the list of moveable feasts on paper, but they still fastened it to the paschal *Taper*; which practice is observed to this day at Notre Dame in Rouen, and throughout the order of Cluny.—Such is the original of the benediction of the paschal *Taper*.

TAPESTRY, or *TAPISTRY*, a curious kind of manufacture, serving to adorn a chamber, or other apartment, by hanging, or lining the walls thereof.

Some use *Tapestry* as a general name for all kinds of hangings, whether woven, or wrought with the needle; and whether silken, woollen, linnen, leathern or of paper; (in which they are countenanced by the etymology of the word, formed from

the French *tapisser*, to line, of the Latin *tapes*, a cover of a wall or bed, &c.) But in the common use of our language, the term is now appropriated to a kind of woven hangings, of wool and silk, frequently raised and enriched with gold and silver, representing figures of men, animals, landscapes, &c.

The invention of *Tapestry* seems to have come from the Levant; and what makes this the more probable is, that formerly the workmen concerned herein, were called, at least in France, *Sarrazins*, or *Sarrazinois*.

It is supposed that the English and Flemish, who were the first that excelled therein, might bring the art with them from some of the croisades, or expeditions against the Sarazens.

Be this as it will, it is certain that those two nations, particularly the English, were the first who set on foot this noble and rich manufacture in Europe; now one of the finest ornaments of palaces, churches, &c.

Hence, if they be not allowed the inventors, they have, at least, the glory of being the restorers of so curious and admirable an art, which gives a kind of life to wools and silks, in some respects not inferior to the paintings of the best masters.

It was late before the French applied themselves to *Tapestry*: the first establishment of that kind, was under Henry IV. in the year 1607, in the Faubourg, S. Michael. But this fell with the death of that prince. Under Lewis XIV. the manufacture was retrieved by the care and address of the great M. Colbert, to whom is owing the establishment of the Gobelins, a royal *Tapestry* manufacture, which has produced works in this kind scarce inferior to the finest English or Flemish *Tapestry*, either with regard to the design, the colours, or the strength.

The *Tapestry-men* distinguish two kinds of work, viz. *Tapestry of the high*, and the *low warp*; though the difference is rather in the manner of working, than in the work itself, which is, in effect, the same in both; only the looms, and consequently the warps, are differently situated: those of the *low warp* being placed flat, and parallel to the horizon; and those, on the contrary, of the *high warp*, erected perpendicularly.

The English anciently excelled all the world in their *Tapestry of the high warp*; and they still retain their former reputation, though with some little change: their *low warps* having been since greatly admired.

The French have three considerable *Tapestry* manufactures besides that of the Gobelins; the first at Aubusson in Auvergne, the second at Felletin in the Upper Marche, and the third at Beauvais: they were all equally established for the *high* and the *low warp*, but have all aside the former, excepting the Gobelins.

There are admirable *low warps* in Flanders, generally exceeding those of France; the chief, and almost only Flemish manufactures, are at Brussels, Antwerp, Oudenard, Lille, Tournay, Bruges, and Valenciennes.

At Brussels and Antwerp they succeed both in human figures, and animals, and in landscapes; and that both with respect of the designing, and the workmanship. At Oudenard their landscapes and animals are good, but their human figures naught. Lille, and the other cities named, come behind Oudenard. The French manufacture of Felletin does tolerably well in landscapes, Aubusson in figures, and Beauvais in both. The usual widths of *Tapestries*, are from two ells to three ells and half, Paris measure.

The manufacture of *Tapestry* of each kind, is too curious to be here passed over, without a short description.—We shall give each under its separate article.

Manufacture of TAPESTRY of the high Warp.—The loom whereon this is wrought, is placed perpendicularly: it consists of four principal pieces; two long planks or cheeks of wood, and two thick rollers or beams. The planks are set upright, and the beams across them, one a-top, and the other at bottom, a foot distance from the ground. They have each their trunnions, by which they are suspended on the planks, and are turned with bars. In each roller is a groove, from one end to the other, capable of containing a long round piece of wood, fastened therein with hooks. Its use is to tie the ends of the warp to. The warp, which is a kind of worsted, or twisted woollen thread, is wound on the upper roller; and the work, as fast as wove, is wound on the lower.

Within-side the planks, which are seven or eight foot high, fourteen or fifteen inches broad, and three or four thick, are holes pierced from top to bottom, in which are put thick pieces of iron, with hooks at one end, serving to sustain the coat-flave: these pieces, of iron have also holes pierced in them, by putting a pin in which, the flave is drawn nearer, or set farther off; and thus the coats, or threads are stretched or loosened at pleasure. The coat-flave is about three inches diameter, and runs all the length of the loom; on this are fixed the coats, or threads, which make the threads of the warp cross each other. It has much the same effect here, as the spring flave and treadles have in the common looms. The coats are little threads fastened to each thread of the warp, with a kind of sliding knot, which forms a sort of marsh, or rim. They serve to keep the warp open, for the passage of broads wove with silks, woollens, or other matters used in the piece of *Tapestry*.

TAP

Lastly, there are a number of little sticks, of different lengths, but all about an inch diameter, which the workman keeps by him in baskets, to serve to make the threads of the warp cross each other, by passing them across: and that the threads thus crossed may retain their proper situation, a packthread is run among the threads, above the flack.

The loom thus formed, and mounted with its warp, the first thing the workman does, is to draw, on the threads of this warp, the principal lines and strokes of the design to be represented on the piece of *Tapestry*; which is done by applying cartoons made from the painting he intends to copy, to the side that it is to be the wrong side of the piece; and then with a black-lead pencil following and tracing out the contours thereof on the thread of the right side; so that the strokes appear equally both before and behind. As to the original design the work is to be finished by, it is hung up behind the workman, and wound on a long staff from which a piece is unrolled from time to time, as the work proceeds.

Besides the loom, &c. here described, there are three other principal instruments required for working the silk, or wool of the wool within the threads of the warp. These are a broach, a reed, and an iron needle.

The broach is of hard wood, 7 or 8 inches long, and two thirds of an inch thick, ending in a point, with a little handle. It serves as a shuttle, the silks, woollens, gold or silver, to be used in the work, being wound on it. The reed or comb is also of wood, eight or nine inches long, and an inch thick at the back; whence it usually grows less and less, to the extremity of the teeth, which are more or less apart, according to the greater or less degree of fineness of the intended work.

Lastly, the needle is in form of a common needle, only bigger and longer. Its use is to press close the wool and silks, when there is any line or colour that does not fit well. All things being prepared for the work, and the workman ready to begin, he places himself on the wrong side the piece, with his back towards the design; so that he works, as it were, blind-fold, seeing nothing of what he does, and being obliged to quit his post, and go to the other side the loom, whenever he would view and examine the piece, to correct it with his pressing-needle.

To put any silk, &c. in the warp, he first turns, and looks at his design: then taking a broach full of the proper colour, he places it among the threads of the warp, which he brings across each other with his fingers, by means of the coats or threads fastened to the staff: this he repeats every time he is to change his colour.

The silk or wool being placed, he beats it with his reed or comb, and when he has thus wrought in several rows over each other, he goes to see the effect they have; in order to reform the contours with his needle, if there be occasion.

As the work advances they roll it up on the lower beam, and unroll as much warp from the upper beam, as suffices them to continue the piece: the like they do of the design behind them. When the pieces are wide, several workmen may be employed at once.

We have but two things to add: the first, that this *high warp Tapestry* goes on much more slowly than the *low warp*, and takes almost double the time and trouble. The second, that all the difference the eye can observe between the two kinds consists in this, that in the *low warp* there is a red fillet, about one twelfth of an inch broad, running on each side from top to bottom; which is wanting in the *high warp*.

Manufacture of TAPESTRY of the low warp.—The loom or frame whereon the *low warp* is wrought, is much like that of the weavers: the principal parts thereof are two strong pieces of wood forming the sides of the loom, and bearing a beam or roller at each end: they are sustained at bottom with other strong pieces of wood, in manner of trestles; and, to keep them the firmer, they are likewise fastened to the floor with a kind of buttresses, which prevent any shaking, though there are sometimes four or five workmen leaning on the fore-beam at once.

The rollers have each their trunnions, by which they are sustained: they are turned by large iron pins, three foot long. Along each beam runs a groove, wherein is placed the wick, a piece of wood of above 2 inches diameter, and almost of the length of the roller: this piece fills the groove entirely, and is fastened therein, from space to space, by wooden pins. To the two wicks are fastened the two extremities of the warp, which is wound on the further roller; and the work, as it advances, on the nearer.

A-cross the two sides, almost in the middle of the loom, passes a wooden bar, which sustains little pieces of wood, not unlike the beam of a balance: to these pieces are fastened strings, which bear certain spring slaves, wherewith the workman, by means of two trestles under the loom whereon he sets his feet, gives a motion to the coats, and makes the threads of the warp rise and fall alternately. Each loom has more or fewer of these spring-slaves, and each staff more or fewer coats, as the *Tapestry*, consists of more or fewer threads.

The design, or painting the *Tapestry-man* is to follow, is placed underneath the warp; where it is sustained from space to space

TAR

with strings, by means of which the design is brought nearer the warp.

The loom being mounted, there are two instruments used in working of it, viz. the reed, and the flute. The flute does the office of the weavers shuttle: it is made of a hard polished wood, three or four lines thick at the ends, and somewhat more in the middle, and three or four inches long. On it are wound the silks, or other matters to be used as the wool of the *Tapestry*. The comb or reed is of wood, or ivory; it has usually teeth on both sides; it is about an inch thick in the middle, but diminishes each way to the extremity of the teeth: it serves to beat the threads of the wool close to each other, as fast as the workman has piled and placed them with his flute among the threads of the warp.

The workman is seated on a bench before the loom, with his breast against the beam, only a cushion or pillow between them; and in this posture, separating, with his fingers, the threads of the warp, that he may see the design underneath, and taking a flute mounted with the proper colour, he passes it among the threads, after having raised or lowered them, by means of the trestles moving the spring-slaves and coats.

Lastly, to press and close the threads of the silk or yarn, &c. thus placed, he strikes each course (i. e. what the flute leaves in its passing and coming back again) with the reed.

What is very remarkable in the manufacture of the *low warp*, is, that it is all wrought on the wrong side; so that the workman cannot see the right side of his *Tapestry*, till the piece be finished and taken out of the loom.

TAPIS. See **TUNICA**.

TAPPING, the act of piercing a hole in a vessel, and applying a tube, or cannula in the aperture, for the commodious drawing off the liquors contained therein.

TAPPING, in agriculture, is the making an incision in the bark of a tree, and letting out the juice.

To tap a tree at the root, is to open it round about the root. Ratray, the learned Scot, affirms that he was taught by experiment, that the liquor which may be drawn from a birch tree in the spring-time, is equal to a whole weight of the tree, branches, roots, and all together.

In the tapping of trees, the juice, taken in from the earth, ascends from the root, and after it is concocted and assimilated in the branches, &c. It descends like a liquor in an alembic, to the orifice or incision where it issues out.

One of the most effectual ways of tapping, so as to obtain the greatest quantity of sap, and that in the shortest time, is, not only to pierce the bark, or to cut the body of the tree almost to the pith, with a chisel (as some have directed) but to bore it quite through all the circles, on both sides the pith; leaving only the outermost circle, and the bark on the north-east side unpierced.

This hole is to be bored sloping upwards, as large as the largest augre will make; and that also through and under a large arm, near the ground. So will it not need any stone to keep open the orifice, nor tap to direct the sap into the receiver.

This way, the tree will, in short time, afford liquor enough to brew withal; and with some of this sweet sap, one bushel of malt will make as good ale as four bushels of malt with ordinary water. The large maple, which we call the *lycamore*, is said to yield the best brewing sap, its juice being very sweet and wholesome.

To preserve the Sap for Treuing.—Insolate it by a constant exposure to the sun in proper vessels, till the rest be gathered and ready; otherwise it will contract an acidity: when there is enough, put into it as much very thin cut, and hard roasted rye-bread, as will serve to ferment it; and when it works, take out the bread, and bottle up the liquor. A few cloves in each vessel that receives the sap, as it oozes from the tree, will also certainly preserve it a twelve month. Dr. Tonge in the *Philosophical Transactions*.

TAPPING, in chirurgery. See the articles **PARACENTESIS**, and **DROPSY**.

TAP-TOO. See the article **TAT-TOO**.

TAR, or **TARR**, a gross, pitchy liquor, issuing from the wood and bark of old pines, or firs, either naturally or by burning.

When these trees are on the turn, and only fit for burning, they sometimes cut off the bark all around towards the root, and through these incisions, there continues flowing, for a considerable time, a blackish liquor, which is the *Tar*.—When this ceases, it is a sure indication the pine is quite dead; and only fit for the fire.

The chief use of *Tar*, is for the coating and caulking of ships. See supplement, article **TAR**.

TARANTISMUS, in medicine, the disease or affection of those bit by the *Tarantula*.

The patients under this malady are denominated *Tarantati*. Dr. Cornelio, in the *Philosophical Transactions*, represents this as an imaginary disease, and tells us, that the *Tarantati* or those who think themselves seized with it (excepting such as for particular ends recognize themselves so) are most or them young wanton girls, such as the Italian writers call *Dance* or *Jeune*, who

who falling, from some particular indisposition, into melancholy madness, persuade themselves, according to vulgar prejudice, that they have been bitten by a *Tarantula*.

But the evidence on the other side the question, seems too strong to be thus overturned, as will appear from the following article. **TARANTULA**, or **TARENTULA**, in natural history, a venomous insect, whose bite gives name to a new disease called *Tarantismus*.

The *Tarantula* is a kind of spider, so denominated from the city of Tarentum in Apulia, near which it is chiefly found: it is about the size of an acorn; and is furnished with eight feet, and as many eyes; its colour is various; but it is always hairy: from its mouth arise two horns, or trunks, made a little crooked, with the tips exceedingly sharp, through which it conveys its poison.

These horns, M. Geoffroy observes, are in continual motion, especially when the animal is seeking for food; whence he conjectures they may be a kind of moveable nostrils.

The *Tarantula* is found in several other parts of Italy, and even in the isle of Corsica; but those of Apulia alone are dangerous: and even these, when removed thence, are said to become harmless: it is added, that even in Apulia, none but those found on the plains are much to be feared; the air being hotter there than on the mountains.

M. Geoffroy adds it as an opinion of some, that the *Tarantula* is never venomous but in the coupling season; and Baglivi says, that it is never so but in the heat of summer, particularly in the dog-days, when, becoming enraged, it flies on all that pass by.

The bite occasions a pain, which at first seems much like that felt on the stinging of a bee, or an ant: in a few hours, the patient feels a numbness, and the part affected becomes marked with a little livid circle, which soon after rises into a very painful tumour: a little after this he falls into a profound sadness, breaths with much difficulty, his pulse grows feeble, and his senses fail; at length he loses all sense and motion, and dies unless relieved. But these symptoms come somewhat differently, according to the nature of the *Tarantula*, and the disposition of the patient. An aversion for black and blue; and on the contrary, an affection for white, red, and green, are other of the unaccountable symptoms of this disease.

All the assistance medicine has been able to discover by reasoning, consists in some chimerical applications on the wound, and in cordials, and sudorifics; but these are of little efficacy: a thing that avails infinitely more, is, what reason could never thought of, music.

As soon as the patient has lost his sense and motion, a musician tries several tunes on an instrument; and when he has hit on that, the tones and modulations whereof agree with the patient, he is immediately seen to make a faint motion: his fingers first begin to move in cadence, then his arms, then his legs, by degrees his whole body: at length he rises on his feet, and begins to dance; his strength and activity still increasing. Some will continue the dance for six hours without intermission.

After this, he is put to bed; and when he is judged sufficiently recruited from his first dance, he is called out of bed, by the same tune, for a second.

This exercise is continued for several days, six or seven at least; in which time the patient finds himself exceedingly fatigued, and unable to dance any longer; which is the characteristic of his being cured: for as long as the poison acts on him, he would dance, if one pleased, without any discontinuation, till he died of the mere loss of strength.

The patient on this perceiving himself weary, begins to come to himself; and awakes, as out of a profound sleep; without any remembrance of what had passed in his paroxysm, not even of his dance.

Sometimes the patient, thus recovering from his first access, is quite cured; if he be not, he finds a melancholy gloom hanging on him; he shuns the sight of men, and seeks water; and if he be not carefully looked to, throws himself into some river. If he do not die, the fit returns at that time twelve-month, and he is driven to dancing again. Some have had returns regularly for 20 or 30 years.

Every *Tarantulus* has his particular and specific tune; but, in the general, they are all very brisk, sprightly ones, that work cures.

This account was given in the royal academy of sciences, by M. Geoffroy, at his return from Italy, in 1702; and confirmed by letters from F. Gouye. The like history is given us by Baglivi, in an express dissertation on the *Tarantula*, published in 1696.

To such extraordinary facts, it is no wonder a few fables should be added; as, for instance, that the patient is no longer affected than while the insect lives, and that the *Tarantula* itself dances, all the while, to the same air with the person bitten.

Theory of the effects of the TARANTULA'S bite, by M. Geoffroy.

—The poisonous juice injected by the *Tarantula*, M. Geoffroy conceives, may give the nerves a degree of tension, greater

than is natural to them, or than is proportionate to their functions: and hence may arise a privation of knowledge and motion. But, at the same time, this tension, equal to that of some strings of an instrument, puts the nerves in unison to certain tones, and obliges them to shake, after being agitated by the undulations, and vibrations of the air proper to those tones. And hence this wonderful cure by music: the nerves thus restored to their motion, call back the spirits thither, which before had abandoned them.

It may be added, with some probability, and on the same principles, that the patient's aversion for some colours arises hence, that the tension of his nerves, even out of the paroxysm, being still different from what it is in the natural state, the vibrations those colours occasion in the fibres of the brain, are contrary to their disposition, and occasion a kind of dissonance, the effect of which is pain.

Theory of the effects of the TARANTULA'S bite, by Dr. Mead.

The malignity of the poison of the *Tarantula* seems to consist in its great force and energy, whereby it immediately raises an extraordinary fermentation in the whole arterial fluid, by which its texture and crasis is considerably altered: the consequence of this alteration, when the ebullition is over, must necessarily be a change in the cohesion of its parts, by which the globules, which did before with equal force press each other, have now a very differing and irregular nifus, or action; so that some of them do so firmly cohere together, as to compose molecular, or small clusters: upon this account, as there is now a greater number of globules contained in the same space, than before, and the impulse of many of these, when united together, differing according to the conditions of their cohesion, as to magnitude, figure, &c. the impetus, with which this fluid is drove towards the parts, will not only be at some strokes greater than ordinary, but the pressure upon the blood-vessel must be very unequal, and irregular; and this will be particularly felt in those which are most easily distended, as those of the brain, &c.

Upon this the nervous fluid must necessarily be put into various undulatory motions, some of which will be like those, which different objects acting upon the organs or passions of the mind do naturally excite in it; whereupon such actions must follow in the body, as are usually the consequences of the several species of sadness, joy, despair, or the like determinations of thought.

This, in some degree, is a coagulation of the blood, which will the more certainly, when attended with uncommon heat, as is the case in those countries where these creatures abound, produce such like effects as these: because the spirits separated from the blood thus inflamed, and compounded of hard, fixed and dry particles, must unavoidably share in this alteration; that is, whereas their fluid consists of two parts, one more active and volatile, the other more viscid and glutinous, which is a kind of vehicle to the former; their active part will bear too great a proportion to the viscid; and consequently they must have more than ordinary volatility and force, and will therefore, upon the least occasion imaginable, be irregularly determined to every part.

Whereupon will follow, tumblings, anger, or fear, upon a light cause; extreme pleasure at what is trivial, as particular colours, or the like: and on the other hand, sadness at what is not agreeable to the sight; nay, laughter, obscenity talk and actions, and such other symptoms as attend persons bit; because in this constitution of the nervous fluid, the most slight occasion will make as real a reflux and undulation of it to the brain, and present as lively species there, as the strongest cause and impression can produce in its natural state and condition; nay, in such a confusion, the spirits cannot but sometimes, without any manifest cause at all, be hurried towards those organs, to which at other times they have been most frequently determined; and every one knows which these are in hot countries.

The effects of music on persons touched with this poison, confirms the doctrine above delivered.—For muscular motion, we know, is no other than a contraction of the fibres, from the arterial fluid's making an effluence with the nervous juice, which, by the light vibration and tremor of the nerve, is derived into the muscle.

Thus there is a two-fold effect and operation of the music, that is, upon the body and the mind: a brisk harmony excites lively species of joy and gladness, which are always accompanied with a more frequent and stronger pulse, or an increased influx of the liquor of the nerves into the muscles; upon which suitable actions must immediately follow.

As for the body, since it was sufficient to put the muscles into action, to cause those tremors of the nerves by which their fluid is alternately dropped into the moving fibres, it is all one whether it be done by the determination of the will, or the outward impressions of an elastic fluid.

Such is the air; and that sounds are the vibrations of it, is beyond dispute: these, therefore, rightly modelled, may shake the nerves as really, as the *in-potum voluntatis* can do, and consequently may produce the like effects.

The benefit of music arises not only from their dancing to it, and so evacuating, by sweat, a great part of the inflammatory fluid; but besides this, the repeated percussions of the air hereby made, by immediate contact shaking the contractile fibres of the membranes of the body, especially those of the ear, which being contiguous to the brain, communicate their tremblings to its membranes and vessels; by these continued successions and vibrations, the cohesion of the parts of the blood is perfectly broken, and the farther coagulation prevented: so that the heat being removed by sweating, and the coagulation by the contraction of the muscular fibrillæ, the wounded person is restored to his former condition.

If any one doubts of this force in the air, he may consider, that it is demonstrated in mechanics, that the smallest percussion of the smallest body, may overcome the resistance of any the greatest weight, which is at rest; and that the languid tremor of the air, which is made by the sound of a drum, may shake the vastest edifices.

Besides this, we must allow a great deal to the determinate force, and particular modulation of the trembling percussions; for contractile bodies may be acted upon by one certain degree of motion in the ambient fluid, though a greater degree of it, differently qualified, may produce nothing at all of the like effect: this is not only apparent in two common-stringed musical instruments tuned both to the same height; but also in the trick which many have of finding the tone or note peculiarly belonging to any wine-glass, and, by accommodating their voice exactly to that tone, and yet making it loud and lasting, make the vessel, though not touched, first to tremble, and finally to burst; which it will not do, if the voice be either too low, or too high.

This makes it no difficult matter to conceive, why different persons infected with this sort of venom, do require a different sort of music, in order to their cure; inasmuch as the nerves and distensible membranes have different tensions, and consequently are not all alike to be acted upon by the same vibrations.

TARE and **Tret** in commerce, any defect, waste or diminution in the weight, the quantity, or the quality of goods.

The seller is usually to account to the buyer for the *Tare* and *Tret*.

TARE is more particularly used for an abatement, or deduction in the price of a commodity, on account of the weight of chests, casks, bags, frails, &c.

The *Tare* is very different, in different merchandizes: in some there is none at all allowed.—It is a thing much more regarded in Holland than in England, or elsewhere: a modern author, M. Ricard, treating of the commerce of Amsterdam, observes, that the *Tares* are one of the most considerable articles a merchant is to be acquainted withal, if he would trade with security.

Sometimes, the *Tare* is, as it were, regulated by custom; but generally, to avoid all dispute, the buyer and seller make a particular agreement about it. We shall here add, from the before-mentioned author, some instances of *Tares* allowed at Amsterdam, referring the reader for a more ample account to his *Negocié d'Amsterdam*, edit. 1722.

Spanish wools are subject to a kind of double *Tare*: for, first, they deduct the *Tare* marked on the bales; and after that, 24 pounds *Tare* for every 175 pound weight, besides the rebate for prompt payment. Indeed, for the common wools, the seller will seldom allow above 14 per cent. for the whole *Tare*; for which reason, the bargain is to be agreed on before.

TARE of Roman alum is 4 lib. per sack.

of Irish, &c. butter, 20 per cent.

of crude borax, 15 lib. per cent.

of cinnamon, 17 lib. the burthen.

of capers 33 per cent.

of white pepper, 40 lib. per barrel.

of black pepper, 5 lib. &c.

TARENTULA. See the article **TARANTULA**.

TARGET, a shield; thus called from the Latin, *tergum*, back, because originally made of leather, wrought out of the back of an ox's hide.

TARGUM, in the sacred literature, a name which the Jews give to their Chaldee glosses, and paraphrases on the scripture. See **PARAPHRASE**.

As the Jews, during their long captivity in Babylon, had forgot their ancient language, the Hebrew; and now understood nothing but the language of their masters, the Chaldeans: there was a necessity of explaining the prophets in that language; and to this necessity, is owing the first beginning of the Chaldee paraphrase.

To make the sense of the text understood, each doctor made a paraphrase of some part thereof in the vulgar tongue; and as these several interpretations, in time became very voluminous, certain rabbins undertook to collect them together: and this collection they called the *Targum*.

The Jewish doctors do not agree about the antiquity of the *Targum*; for the more modern Jews having blended their own

comments with those of the ancients, no certain age or era can be fixed for the whole work.

It is commonly believed, that R. Jonathan, who lived under the reign of Herod the Great, made the first Chaldee version of the prophets; and with this version mixed the interpretations borrowed from tradition.—Onkelos, it is certain, translated the pentateuch almost word for word; and without any paraphrase; and another version of the pentateuch is ascribed to Jonathan, but that without much certainty.

For the *Targum* or paraphrase on the other books; we know little of the authors, no more than those of the *Targum* of Jerusalem, which is another imperfect paraphrase on the five books of Moses: so that in strictness, the *Targum* of Jonathan and Onkelos, are the only paraphrases of any authority.

The account ascribed to Scaliger, is this: the Hebrew was translated under the reign of Tiberius into Chaldee, by Jonathan; the prophets also by Onkelos; and the books of Moses into good old Hierosolymitan, which was then used at Jerusalem, much as Latin is among us.

It is certain, there is a *Targum Hierosolymitanum* still extant: it was wrote in the vulgar tongue; but that being then greatly corrupted, we have now much ado to understand it.

These *Targumim* might have seen Jesus Christ; it is certain they lived long before the taking of Jerusalem. Scaligerana.

TARIF, or **TARIFF**, *book of rates*; a table or catalogue, drawn usually in alphabetical order, containing the names of several kinds of merchandize, with the duties or customs to be paid for the same, as settled by authority, and agreed on between the several princes and states, that hold commerce together.

TARNISHING, a diminution of the natural lustre of any thing, especially of a metal.

Gold and silver, when *tarnished*, resume their brightness, by setting them over the fire, in certain lies. Copper, pewter, &c. that are *tarnished*, recover their lustre with tripoli and pot ashes.

The breath of women, under their monthly purgations, Aristotle ascribes, *tarnishes* all mirrors.

TARPAULIN, or **TARPAWLING**, is a piece of canvass, well pitched and tarred over, to keep off the rain from any place. The term is also used in derision for a person bred at sea, and educated in the mariner's art. We also, of late, use it to express a painted floor-cloth.

TARPEIAN, **TARPIUS**, in antiquity, an epithet given to a rock in ancient Rome, of considerable height; whence, by the law of the twelve tables, those guilty of certain crimes were precipitated.*—It was on this rock that the capitol was built.

* The *Tarpeian* Rock might formerly be steep enough on one side to break a man's neck; but it could never have been of that surprizing height, mentioned by some writers, if any judgment can be formed from its appearance at present. See *Bacon's* Letters, p. 238. and *Misson's* N. Voyage, p. 103.

It took its name from a vestal, called *Tarpeia*, who betrayed the capitol, whereof her father was governor, to the Sabines; on condition they would give her all they bore on their left arms, meaning their bracelets.—But instead of bracelets, they threw their bucklers (which were likewise born on their left arm) upon her head, and crushed her to death.

Others ascribe the delivery of the capitol to her father, Spurius Tarpeius; and add, that he was precipitated down this rock by Romulus's order; and that this henceforward became the punishment of all criminals of the like kind.

TARPEIAN Games, *Ludi TARPEII*, were games instituted by Romulus, in honour of Jupiter Feretrius; and called also *Capitolini Ludi*. See **CAPITOLINE**.

TARRACE, **TARRAS**, or **TERRACE**, a coarse sort of plaister, or mortar, durable in the wet, and chiefly used to line basons, cisterns, wells, and other reservoirs of water. See **TERRACE**.

TARSUS, **TARSOE**, in anatomy, is what we vulgarly call the *instep*; being the beginning of the foot, or the space between the ankle and the body of the foot, which is called *Metatarsus*.

The *Tarsus* answers to the wrist of the hand.—It consists of seven bones: the first whereof is called *astragalus*, and by the Latins *talus*, and *calcistræ*. See **ASTRAGALUS**, and **TALUS**. The second is called the *calc*, or *calcus pedis*, or *cakaneum*; the third *navicularis*, and by the Greeks *scaphoides*; the fourth, fifth, and sixth are generally called *inveniatata*, but by Fallopius, from their figure, *cuneiformia*: lastly, the seventh, the *cuboides*. See each described under its proper article.

TARSUS is also a name given by some anatomists to the cartilages which terminate the palpebræ, or eye-lids; and from which the cilia, or hairs arise.

They are exceedingly thin and fine, which makes them light and flexible.—Their form is semicircular: that of the upper eye lid, is somewhat longer than that of the under: they leave alike to close the eyes.

TARTANE, a kind of bark used for fishing and carriage; having neither a raised poop, nor prow; and using oars.

Tartanes are common in the Mediterranean; they have only a mainmalt, and a mizzen: their sails are triangular. When they put up a square sail, it is called a *sail of fortune*.

TARTAR, TARTARUS, or TARTARUM, in chymistry, a kind of salt which rises from wines, and sticking to the top and sides of the casks, forms a crust, which hardens to the consistence of a stone.

Tartar, says a certain ingenious author, has the juice of the grape for its father, fermentation for its mother, and the cask for its matrix.

Its goodness rather depends on the number of repeated fermentations, which a succession of new wines in the same cask for several years makes, than on the soil or climate where the wine is produced.

Tartar is either *white*, or *red*, according to the colour of the wine it is produced from.—That brought from Germany is the best, as being taken out of those monstrous tuns, some whereof hold a thousand pipes of wine; so that the salt has time to come to its consistence, which is one of the chief qualities to be regarded in *Tartar*.—That of Montpellier is the next in order; then that of Lyons, Paris, &c.

White Tartar is preferred to red, and is really better; as containing less of the droffy, or earthy part.—The marks of good *Tartar* of either kind are, its being thick, brittle, brilliant, and but little earthy.

Tartar is of considerable use among the dyers, as serving to dispose the stuffs to take their colours the better.

The chymists make abundance of preparations from *Tartar*; as *Cream*, or *Crystals of Tartar*, which is nothing but *Tartar* powdered, and reduced by means of boiling water, a straining bag, and a cellar, into little crystals. See **CREAM of Tartar**.

Salt of TARTAR is made of *Tartar* washed, ground, purified, and calcined, by a reverberatory fire; or it is made by pulverizing what remains in the retort after the distillation of *Tartar*, and calcining it as above by a reverberatory fire. On the one or the other of these preparations, they pour a great quantity of hot water, to make a lye of it; this they filtrate, and evaporate the liquor by a sand-heat, till the fixed salt be found at the bottom of the vessel.—This is the pure alkali, or fixed salt of *Tartar*.

Oil of TARTAR, is the salt of *Tartar* exposed to the air for some days, in an open vessel, in a moist place, till it dissolve into a fluid; though it is improperly called an oil, being no more than a dissolved salt.

Oil of Tartar per deliquium, is held the best counter-poison to corrosive sublimate.

TARTAR Chalybeated. See the article **CHALYBEATE**.

TARTAR Emetic. See **EMETIC**.

TARTAR Foliated, is a preparation of *Tartar* with distilled vinegar, which reduces it into white leaves.

TARTAR Soluble. See the article **SOLUBLE**.

TARTAR Vitriolated, which some call *Mogistery of Tartar*, is made of oil of *Tartar* mixed with rectified spirit of vitriol: upon mixing the two, there arises a great evaporation, by means whereof, of these liquids they become solids.

TARTARIZING, a term used by some writers, for the act of refining or purifying, by means of salt of *Tartar*.

TASSEL, a sort of pendant ornament, at the corners of a cushion, or the like thing.—Also a small ribbon or silk sewed to a book, to be put between the leaves.

TASSELS, in a building, those pieces of board that lie under the ends of the mantle-trees. See **MANTLE**.

TASSEL, or TIERCELET, is also used in falconry for a male hawk.

TASSELS are also a kind of hard burrs used by clothworkers in dressing cloth: they are the heads of the manured Teazle. See **TEAZLE**.

TASTE, Savour, a sensation, excited in the soul by means of the organ of *Taste*; viz. the papillæ of the tongue, &c.

Dr. Grew, in a lecture on the diversity of *Tastes*, before the Royal Society, distinguishes them into *Simple* and *Compound*.

By *Simple TASTES*, he understands such as are simple modes of *Taste*, although mingled with others in the same thing: thus the *Taste* of a pipkin is acidulcis; of rhubarb, amar-astringent, and therefore compounded, in both; but yet in the pipkin the acid is one simple *Taste*, and the sweet another, as distinct as the bitter and astringent are in the rhubarb.

Two faults, he observes, have here been committed: the first, a defective enumerating of simple *Tastes*; the second, a reckoning them indistinctly among such as are compounded.

Simple Tastes, of which we usually only reckon six or seven sorts, are at least sixteen: 1. *Bitter*, as in wormwood; whose contrary is, 2. *Sweet*, as in sugar. 3. *Sour*, as in vinegar; whose contrary is, 4. *Salt*. 5. *Hot*, as in cloves; to which is opposite, 6. *Cold*, as in sal prunella; for we may as properly say a cold *Taste*, as an hot one, since there are some bodies which do manifestly impress the sense of cold upon the tongue, though not to the touch. 7. *Aromatic*; to which is contrary, 8. *Nauseous*, or malignant. 9. *Soft*, which are ci-

ther rapid, as in water, starch, whites of eggs, &c. or unctuous, as in oils, fat, &c. 10. *Hard*, of which he reckons four kinds; 11. *Penetrant*, which worketh itself into the tongue without any pungency; as is found in the root and leaves of the wild cucumber. 12. *Stupeficient*, as in the root of black hellebore, which being chewed, and for some time retained upon the tongue, affects that organ with a numbness, or paralytic stupor. 13. *Astringent*, as in galls: and, 14. *Pungent*, as in spirit of sal armoniac; which two last *Tastes* he makes contrary to the unctuous, as penetrant and stupeficient are contrary to the rapid one.

The *Compound TASTES* are very numerous; but we have words to express but six of them: 1. *Austere*, which is astringent and bitter, as in the green and soft stones of grapes. 2. *Acerb*, properly so called, which is astringent and acid, as in the juice of unripe grapes. 3. *Acrid*, which is pungent and hot. 4. *Muriatick*, which is salt and pungent, as in common salt. 5. *Lixivious*, which is saltiness joined with some pungency and heat. 6. *Nitrous*, which is saltiness joined with pungency and cold.

TASTE is also used, in a figurative sense, for the judgment and discernment of the mind.

We talk, and we hear talk, every day, of *Taste*, of good *Taste*, and of bad *Taste*; and yet without well understanding what we mean by the word: in effect, a good *Taste* seems at bottom to be little else but right reason, which we otherwise express by the word judgment.

To have a *Taste*, is to give things their real value, to be touched with the good, to be shocked with the ill; not to be dazzled with false appearances; but, in spite of all colours, and of every thing that might deceive or amuse, to judge soundly.

Taste and judgment then should be the same thing; and yet it is easy to discern a difference: the judgment forms its opinions from reflection; the reason, on this occasion, takes a kind of circuit to arrive at its end: it supposes principles, it draws consequences, and it judges; but not without a thorough knowledge of the case: so that after it has pronounced, it is ready to render a reason of its decrees.—*Taste* observes none of these formalities; before it has time to consult, it has taken its resolution: as soon as ever an object is presented it, the impression is made, and the sentiment formed; and we ask no more of it. As the ear is wounded with a harsh sound, as the smell is soothed with an agreeable odor, before ever the reason have meddled with those objects, to judge of them; so the *Taste* is struck at once, and prevents all reflection.

Reflections may come afterwards to confirm this *Taste*, and discover the secret reasons of its conduct; but it was not in its power to wait for them. Frequently, it happens not to know them at all; and what pains forever we use, we cannot discover what it was that determined it to think as it did.

This conduct is very different from that which the judgment observes in its decisions; unless we chuse to say that good *Taste* is, as it were, a right motion, or a kind of instinct of right reason, which hurries us on with rapidity, and conducts us more securely than all the reasonings we could use. It is a first glance of thought, which discovers to us the nature and relations of things as it were by intuition.

In effect, *Taste* and judgment are one and the same thing, one and the same disposition and habitude of the soul, which we call by different names, according to the different manners wherein it acts: when it acts by sensation, by the first impression of objects, we call it *Taste*; and when by reasoning, after having examined the thing by all the rules of art, &c. we call it judgment: so that one may say, *Taste* is the judgment of nature, and judgment is the *Taste* of reason.

Good *Taste*, as defined by Madem. Scudery and Madem. Dacier, in an express treatise of the corruption of *Taste*, is an harmony between the mind, and reason; and a person has more or less of this *Taste*, as that harmony is more or less just.

One might perhaps improve on this hint, and say, that good *Taste* is nothing else but a certain ratio or relation between the mind, and the objects presented to it.

Right reason cannot but be moved and affected with things conformable thereto, and wounded by those contrary: there is, then, a kind of sympathy which unites them as soon as ever they meet; and at their union, their good understanding, discover each other.—Make a fine discourse; use only the richest and noblest expressions; if they contain an unhappy thought, or an incoherent reasoning, that thought, this reasoning, will immediately be felt by a person of *Taste*: and the antipathy will shew itself by a movement of aversion, as sudden, as lively, and as natural as that which nature inspires us withal for toads or spiders.

TASTING, the sense whereby we distinguish flavours; or the perception which the soul has of external objects, by means of the organ of *Taste*.

Authors differ much as to the *Organ of Tasting*: Bauhin, Bartholin, Velsingius, &c. place it in the laxer fleshy parts of the tongue;

tongue; Dr. Wharton in the glands at the root of the tongue; Laurentius in the thin tunic covering the tongue; others in the palate, &c. But the great Malpighi, and, after him, all the latest writers, place it in the papillæ chiefly lying about the tip and sides of the tongue. See **TONGUE**.

These papillæ arise from the corpus nervosum which covers the muscular flesh of the tongue; whence, passing through the corpus reticulare, they stand up under the external membrane of the tongue, erect, and covered with vaginæ, or sheaths of the said membrane, to defend them from objects too violent.

These vaginæ are porous, and stick out so far, that when the aliment is squeezed, they enter within the fame, to receive the object, or the matter of *Taste*.

These papillæ, Boerhaave conjectures to arise from the ninth pair of nerves; and these, he asserts, are the only organ of *Taste*: the others, whether of the tongue, palate, or jaws, &c. he observes, contribute nothing thereto; though probably those of the cheeks next the dentes molares may.

The object of *Tasting*, is any thing, either in animals, vegetables, or minerals, from which salt or oil may be extracted. See **SALT**.

Tasting, then, is performed by the objects being attenuated, and mixed with saliva, warmed in the mouth, and applied to the tongue; where, insinuating into the pores of the membranous vaginæ of the nervous papillæ, and penetrating to the surface of the papillæ themselves, it affects and moves them; by which means a motion is communicated along the capillaments of the nerve to the common sensory, and an idea excited in the mind, of salt, acid, sweet, bitter, hot, aromatic, austere, or the like; according to the figure of the particles that strike the papillæ, or the disposition of the papillæ to receive the impulse.

TATH, in old laws, a privilege which some lords of manors enjoyed, of having their tenants sheep folded at night on their demesne lands, for the improvement of the ground.

TATIANITES, **TATIANITÆ**, a sect of ancient heretics; thus called from Tatian, a disciple of Justin Martyr.

This Tatian, who has the character of one of the most learned men of all antiquity, was perfectly orthodox during the life of his master. He was, like him, a Samaritan, by nation, not by religion, as Epiphanius seems to insinuate. They both belonged to the Greek colonies which were spread throughout the country of the Samaritans.

Justin being dead, Tatian gave into some of the errors of the Valentinians; and formed a sect called sometimes *Tatianites*, and sometimes *Eneratitæ*.

TAT-TOO, *q. d.* **TAP-TO**, a beat of a drum, at night, to advertise the soldiers to retreat, or repair to their quarters in a garrison, or to their tents in a camp.

TAU, * in our ancient customs, signifies a cross. See **CROSS**.

* *Tradendo dicta comiti Thau chorum.* So Mr. Selden, in his notes upon Eadmerus, p. 159. *Ego Eadgela prædicti regis avæ hoc opus egregium crucis Tauinate consilidavi.* See Mon. 3. Tom. p. 121.

TAU, or **TAW**, in heraldry, an ordinary, in figure of a T, supposed to represent St. Andrew's cross, or a cross potency, the top part cut off.

It is thus called from the name of the Greek T, *tau*. See **T**. **TAUGHT**, or **TAUT**, *Tights*, in the sea language, is the same as stiff, or fast.—Thus they say, *jet taught* the shrouds, the stays, or any other ropes, when they are too slack and loose.

TAUNT, a sea-term.—When the masts of a ship are too tall for her, the sailors say, she is *taunt-masted*.

TAURUS liberi libertas.—In some ancient charters, *Taurus liber* signifies a common bull kept for all tenants within such a manor, or liberty.—*Cum libertate faldie, liberi Tauri, & liberi Apri*, &c.

TAURUS, in astronomy, the *Bull*; one of the twelve signs of the zodiac, and the second in order.

The stars in the constellation *Taurus*, in Ptolemy's catalogue are 44; in Tycho's catalogue 41; in the Britannic catalogue 135. The longitudes, latitudes, magnitudes, &c. whereof are as follow:

Names and Situation of the Stars.	Signs	Longitude	Latitude.	Magn.
South of 4 in the section	18	16 49 36	9 21 47 S.	4
That following it	17	33 43	8 49 48 S.	4
That following this	18	44 58	7 28 29 S.	6
North of 4 in the section	19	15 18	5 57 13 S.	5
That fol. this in preced. shoulder	18	47 41	9 30 27 S.	6
5				
		22 50 08	5 02 24 N.	6
		23 06 10	3 41 37 N.	7
Preced. inform. under the foot	17	38 38	18 27 41 S.	4
		24 26 24	5 32 51 S.	7
		19 03 08	10 04 57 S.	7
10				
		23 30 49	0 00 50 S.	7
		23 50 24	0 07 15 S.	7
		24 47 09	3 03 43 N.	7
Preced. of square of pleiades		25 07 05	4 19 25 N.	6
In west angle of square	15	25 05 21	4 09 05 N.	5

Names and Situation of the Stars.	Signs	Longitude	Latitude.	Magn.
Mast north of pleiades	25	18 52	4 50 42 N.	7
North of square	25	14 42	4 29 02 N.	7
	25	21 31	4 21 25 N.	7
	25	25 13	4 31 33 N.	7
	25	26 40	4 29 49 N.	7
20				
South of square	25	22 30	3 54 47 N.	5
	25	38 32	4 01 39 N.	7
Lucida pleiadum	25	40 08	4 00 37 N.	3
	25	56 00	3 41 45 N.	7
In the east angle	26	01 52	3 52 37 N.	5
25				
A left, contiguous to it	26	03 19	3 57 34 N.	6
Preceding in the foot	21	13 06	13 20 06 S.	6
Subseq. in preced. shoulder	23	00 15	8 40 36 S.	5
Subsequent in foot	27	25 21	13 22 57 S.	7
30				
	27	36 33	2 38 20 N.	7
	28	00 57	0 10 38 S.	7
That in the breast	26	17 31	7 50 37 S.	4
	29	26 17	3 13 20 N.	7
In the middle of the neck	29	07 19	1 13 20 N.	5
35				
In the heel of the preceding foot	25	35 08	14 29 50 S.	4
	25	37 51	15 04 02 S.	7
Precede the square of the neck	II	0 36 09	6 33 06 N.	6
North of square of the neck	0	57 25	7 54 38 S.	5
Preceding of 2, at the knee	8	29 40 52	1 24 05 S.	6
40				
Preced. of the mid. ones in the sq. of neck	II	1 19 32	5 16 41 N.	6
	8	27 32 47	15 21 10 S.	7
	28	32 05	13 17 55 S.	7
	28	55 38	11 47 39 S.	7
That precede 1st of the hyades	II	0 27 43	5 50 14 S.	7
45				
That in the preceding cheek	8	29 14 12	12 13 17 S.	4
Subsequent of two at knee	II	1 43 42	0 47 25 S.	6
	2	09 35	0 08 53 N.	7
Subseq. of mid. ones in the squ. of neck	3	32 59	5 46 12 S.	5
	2	19 18	0 19 23 S.	7
50				
First of the hyades in nostrils	1	27 34	5 46 22 S.	3
	2	42 21	0 15 00 N.	7
That under the 1st of the hyades	1	13 39	7 20 42 S.	6
	1	33 11	6 19 57 S.	7
South of square of the neck	3	40 56	3 58 44 N.	5
55				
	1	42 49	7 23 02 S.	7
Between the nostrils and n. eye	2	51 27	4 00 34 S.	4
	3	53 21	2 37 06 N.	7
Second	2	47 13	4 09 04 S.	5
North of the south in the ear	3	51 53	0 35 21 N.	4
60				
In the heel of the hind foot	1	24 57	12 01 21 S.	5
South of south in the ear	3	51 37	0 29 46 N.	5
Third and small betw. nostr. and ear	3	11 42	13 27 55 S.	6
Preceding of north in the ear	4	09 42	1 04 06 N.	5
	2	54 01	5 41 50 S.	7
65				
	3	02 12	6 02 44 S.	7
Subsequent	4	25 18	1 12 36 N.	6
Preceding below the hyades	2	56 57	6 56 53 S.	5
In north eye	4	07 11	2 35 58 S.	3
	3	39 12	5 23 43 S.	7
70				
	3	22 25	6 59 01 S.	7
Double one betwixt nostr. and f. eye	3	36 25	5 47 16 S.	5
	3	36 51	5 52 55 S.	5
In the following shoulder	3	12 31	8 40 32 S.	5
	3	56 42	6 06 26 S.	6
75				
	4	07 06	5 37 49 S.	7
	3	57 22	6 42 04 S.	7
	3	44 57	8 04 25 S.	7
	4	05 43	6 43 28 S.	7
	4	22 35	6 00 53 S.	7
80				
Middle, beneath the hyades	4	42 07	7 05 06 S.	5
South eye, <i>galatium, aldebaran</i>	5	27 00	5 29 49 S.	1
In the following leg	4	27 10	11 46 51 S.	5
	5	14 15	6 03 20 S.	7
Preceding in the hind knee	5	24 30	9 32 32 S.	5
85				
	6	07 14	6 19 19 S.	7
Subsequent beneath hyades	6	09 52	6 12 35 S.	6
	5	40 58	6 55 14 S.	6
Subsequent in hind knee	7	49 20	0 40 23 N.	5
In root of north horn	8	41 32	6 27 25 N.	7
90				
In root of south horn	9	24 58	3 40 35 S.	6
	11	40 58	2 10 03 N.	5
	10	42 09	6 18 31 S.	7
Preced. of 3 over fourth horn	11	06 31	6 38 25 S.	7
	12	27 36	1 14 34 S.	4
95				
More south in the south horn	13	09 18	4 16 08 S.	6
	13	27 04	2 30 59 S.	6
More north	13	38 52	3 05 34 S.	6
Middle of 3 over fourth horn	15	22 54	0 48 00 S.	6
In the middle of the horn	II	10 14 58	1 03 03 S.	6
100				

T A W

Names and Situation of the Stars.	Signs	Longitude	Latitude	Magn.
	° ' "	° ' "	° ' "	
	II	17 37 31	5 42 51 N	7
		86 54 06	6 29 25 S	7
		17 04 29	5 53 14 S	6
In extremity of north horn		18 13 57	5 21 34 N	2
		17 29 44	6 33 02 S	6
105				
Hindmolt of 3 over fourth horn		18 10 06	1 20 12 S	5
		17 49 31	5 18 04 S	7
		17 59 37	6 01 45 S	7
		18 42 50	1 51 14 N	7
		19 03 45	4 43 55 S	6
110				
		19 22 21	4 48 10 S	7
		19 15 54	9 02 19 S	7
Preced. of inform. foll. n. horn		20 03 55	0 40 32 N	6
		20 08 47	6 20 26 S	7
In extrem. of fourth horn		20 27 55	2 14 24 S	3
115				
Auriga, in Tycho Inform.		21 06 07	2 29 23 S	4 5
North under fourth horn		21 09 28	6 52 43 S	6
		21 36 56	4 26 14 S	6
		21 59 23	7 20 57 S	6
		22 27 01	7 38 01 S	6
South below fourth horn				
120				
		22 39 50	5 43 23 S	6
		22 32 16	8 57 39 S	6
Inform. of Auriga		23 10 03	1 06 31 N	4 5
		22 38 44	9 33 28 S	6
		23 04 03	10 48 50 S	6
125				
		23 19 48	9 09 37 S	6
Inform. of Auriga		24 10 37	4 08 15 N	4 5
		23 46 29	9 18 02 S	6
		23 46 44	9 31 13 S	6
		24 22 33	3 12 03 S	6
Al. preced. in Orion's club				
130				
Another more fourth		24 28 58	3 44 03 S	6
Inform. of Auriga		25 12 28	2 28 05 N	4 5
		25 46 35	0 35 03 S	7
		26 03 40	1 04 43 S	6
Al. subseq. in Orion's club	II	26 30 02	3 20 40 S	6

135
TAURUS, in some ancient customs, signifies a husband.* See HUSBAND.

* Leg. H. i. cap. 7. *Videtur autem matris ejus, cujusunque Taurus alliserit.*

TAUTOLOGICAL Echo's, are such echo's as repeat the same found or syllable many times.

TAUTOLOGY, in grammar, a needless repetition of the same thing in different words.—Such, *e. gr.* is that of Virgil;

—*Si fata virum servant, si fecerit aura
Ætherea neque adhuc crudelibus occubat umbris.*

Some people, particularly the Jesuits, write and pronounce it *Tafology*. The difference arises from the different pronunciation of the Greek *upsilon* in *tautology*. The modern Greeks, it is true, pronounce the *v* as *f*; and it is argued the ancients did the like: but as custom is the standard of a language, this plea avails but little with regard to the English.

T A W. See the article T A U.

T A WING, *Skinning*; the art or manner of preparing or dressing skins in white, to fit them for use in divers manufactures, particularly for gloves, &c.

All kinds of skins may be tawed; but it is chiefly those of sheep, lambs, kids, and goats, that are used to be dressed this way; as being those fittest for gloves.

Method of TAWING, or drawing skins in white.—The wool or hair being well got off the skins, by means of lime, &c. (as described under the article SHAMMY) they are laid in a large vat of wood or stone set in the ground, full of water, wherein quick lime has been slacked; in this they continue a month or six weeks, as the weather is more or less hot, or as the skins are required to be more or less soft and pliant.

While in the vat, the water and lime is changed twice, and they are taken out and put in again every day. When taken out for the last time, they are laid all night to soak in a running-water, to get out the greatest part of the lime; and, in the morning they are laid, six together, on the wooden leg, to get off the flesh, by scraping them stoutly, one after another, on the flesh side, with a cutting two-handed instrument, called a knife; and while this is in hand, they cut off the legs, and other superfluous parts about the extremes.

This done, they are laid in a vat or pit with a little water; where being well filled with wooden pestles for a quarter of an hour, the vat is filled up with water, and the skins are rinsed therein. They are next thrown on a clean pavement to drain; which done, they are cast into a fresh pit of water, where being well rinsed, they are taken out, and laid on the wooden leg, six at once, with the hair side outermost, over which they rub a kind of whetstone very briskly, to soften, and fit them to receive four or five more preparations given them on the leg, both on the flesh side and the hair side, with the knife, after the manner above-mentioned.

These over, they are put in a pit with water and wheat-bran, and stirred about therein, with wooden poles, till the bran is

T A X

perceived to stick to them; and then they are left; after this, as they rise of themselves to the top of the water by a kind of fermentation, they are plunged down again to the bottom; and, at the same time, fire is set to the liquor, which takes as easily as if it were brandy, but goes out the moment the skins are all covered.

This operation is repeated as often as the skins rise above water; and when they rise no more, they are taken out, laid on the wooden leg, the flesh side outermost, and the knife is passed over it to scrape off the bran. The bran thus cleared, the skins are laid in a large basket, where they are loaded with huge stones to promote their draining; and when sufficiently drained, their feeding is given them, which is performed after the following manner:

For a hundred large sheep-skins, and for smaller in proportion, they take eight pounds of alum, and three of sea salt, and melt the whole with water in a vessel over the fire; pouring the dissolution out while yet lukewarm into a kind of trough, wherein is twenty pounds of the finest wheat flower, with eight dozen yolks of eggs; of all this together is formed a kind of paste, a little thicker than children's pap; which, when done, is put into another vessel, to be used in manner following:

A quantity of hot water being poured into the trough wherein the paste was prepared, two spoonfuls of the paste is mixed therewith; in order to which, they use a wooden spoon, which contains just what is required for a dozen skins: and when the whole is well diluted, two dozen of the skins are plunged therein: care being taken, by the way, that the water be not too hot, which would both spoil the paste, and hurt the skins.

Having laid some time in the trough, they are taken out, one after another, with the hands, and stretched out; this is repeated twice: when they have all had their paste, they are put in tubs, where they are filled afresh with wooden pestles.

Then they are put in a vat, where they remain five or six days, or more; and are at last taken out in fair weather, and hung out to dry on cords or racks; the quicker they dry the better; for if they be too long a drying, the salt and alum within them, are apt to make them rise in a grain, which is an essential fault in this kind of dressing.

When the skins are dry, they are put up in bundles, and just dip in fair water; from which being taken out and drained, they are thrown into an empty tub; and, after some time, are taken out, and well trampled under foot.

They are then drawn over a flat iron instrument, the top whereof is round like a battledore, and the bottom fixed into a wooden block, to stretch and open them: when opened, they are hung in the air upon cords to dry; and when dry, they are opened a second time, repassing them over the same instrument.

Lastly, they are laid on a table, pulled out, and laid smooth; and are thus in a condition for sale, and use.

After the same manner are dressed horses, cows, calves skins, &c. for the saddlers, harness-makers, &c. as also dogs, wolves, bears-skins, &c. excepting that in these the use of the paste is omitted, salt and alum-water being sufficient.

T A W N Y, in heraldry. See TENNE.

T A X*, a Tribute settled on every town, after a certain rate; and paid yearly towards the expences of the government.

* The word is formed from the Greek *ταξις*, order.

The rate, &c. of the Tax was anciently called *Tallage*, from the French *taille*, Tax. See TALLAGE, and TALLY.

The ancient Tax was what the subsidy now is; excepting that the Tax was fixed to a certain sum, *e. gr.* the fifteenth part of what the place was anciently valued at, whereas the subsidy is variable according to occasion; and that the Tax was levied on cities and towns, but the subsidy on persons. See SUBSIDY.

Anciently the Tax seems to have been imposed by the king at his pleasure; but Edward I. bound himself, and his successors, from that time forward, not to levy it but by consent of the realm. See FIFTEENTH; see also GILD and BENEVOLENCE.

The people of France were strangers to *Tailles*, or Taxes, till the time of St. Louis, when they were first imposed in form of subsidies necessary for the support of the war in the Holy Land. See CROISADE.

They were then extraordinary levies, and were raised by capitation; but they were afterwards made perpetual under Charles VII. Philip the Fair, to raise money without disturbing the people, called the people, as a third estate, into the general councils of the realm.

The name *Taille* is derived from the tally of petty tradesmen; in regard the country people appointed to collect it, not being able to write, scored down what they received, on tallies. See TALLY.

Tax also denotes the tribute which tenants were occasionally to pay their lord.

Most lords had a right of *taxing* on four occasions, *viz.* when the lord was taken prisoner in a just war; when he made his eldest son a knight; when he married his eldest daughter to a gentleman; and when he made the voyage of the Holy Land.

Naude

Naudé shews the extravagant use of this kind of *Tea*: twelve, he observes, which under Charles VI. only amounted to the sum of 20000 livres; were in 1700, under Charles VII. to the sum of 130000 livres; under Louis XI. to 474000 livres; under Charles VIII. to 600000; and under Louis XII. to 1000000 livres.

Teas were brought then into *frée*, which were those due, in the four cafes, by freemen, or those who held free lands; and *ferme* and *hoge*, which were those due from persons of base condition.

They were also distinguished into *real* and *personal*. The *personal* were imposed on the head of the servant or man in marriage, and for the dowry and other events.

TAKERS, two officers yearly chosen in Cambridge, to see the tract again of all weights, and measures observed.

The name *tax* beginning, *to measure*, and *rating* the rents of house, which was anciently the duty of their office.

TAXI, *τάξις*, in the ancient architecture, signifies the frame with *Ordinance* in the new, and is derived from *Vitruvius* to be that which gives every part of a building its just distance with regard to its use.

TAYL in heraldry, &c. See the article **TAIL**.

TCHA. See the article **TEA**.

TCHILMINAR, *TCHILMINAR*, or, as we pronounce it, *Tchilmar*, one of the most celebrated piles of ruins in the world; being the remains of a palace, supposed to have stood in the middle of the city Eleutheræ, the ancient Parosopolis, capital of the kings of Persia. See **CHILMINAR**.

TEA, *TEA*, or as the Japanese call it, *TCHA*, the leaf of a tree or shrub, growing in several provinces of China, Japan, and Siam; whose infusion is in general use as a drink.

The *Tea* tree loves to grow in valleys, at the foot of mountains, and thrives best in a stony soil. Its seed is usually sown in places exposed to the frost, and the seedlings three years after it is sown. The root is not so that of the peach tree: the leaves are green, longish at the point, and pretty narrow, an inch and a half long, and half an inch broad. The flower is much like that of the wild rose but smaller. The fruit is of different sizes, sometimes round, sometimes long, sometimes triangular, and of the ordinary form of a bean: containing two or three seeds, of a mouse colour, including each a kernel. These are the seeds by which the plant is propagated.

The tree is of various nobility, from one sort to an hundred: some there are which the men cannot know, while others far exceed the rest in a garden.

The best time to gather the leaves of *Tea*, is while they are yet finely young and juicy: when gathered, they are pulled over the smoke of boiling water to moisten them; then they are laid on copper plates, which are heated; and thus, the leaves drying, they curl up in the manner in which they are brought to us.

It is very rare to find *Tea* perfectly pure; the Chinese usually mixing other herbs with it, to increase the quantity, tho' indeed, the price it is sold for among them is moderate enough; usually it is about three-pence a pound sterling, and never more than nine-pence.

The Chinese know nothing of *Imperial Tea*, *Flower of Tea*, and many other names, which in Europe serve to distinguish the goodness, and the price of this fashionable commodity; but beside the common *Tea*, they distinguish two other kinds, *viz.* the *Imperial* and *Seamless*, which are reserved for people of the first quality, and those who are sick.

We have two principal kinds of *Tea* in Europe, *viz.*

Green Tea, which is the common *Tea* of the Chinese, &c. *F. le Compté* calls it *Bing Tea*, and says it is gathered from the plant in April.—It is held very digestive, and a little astringent: it gives a pale greenish tincture to water; and its leaves are much twisted.—The second is,

Bohea Tea, which is the *Yen Tea*, or *Bou Tcha* of the Chinese.—*F. le Compté* makes this only differ from the *Green Tea*, by its being gathered a month before it, *viz.* in March, while in the bud; and hence the smallness of the leaves, as well as the depth of the tincture it gives to water. Others take it for the *Tea* of some particular provinces; the soil being found to make an alteration in the properties of the *Tea*, as much as the season of gathering it.—It is all bought at Nankin; and it is but lately that the Dutch have introduced it into Europe, where it is now much in vogue.

Savary also speaks of a sort of *Red Tea*, or *Tartar Tea*, called *Homon Tcha*, which tinges the water with a pale red, and which is said to be extremely digestive: by means hereof it is that the Tartars are said to be able to feed on raw flesh. Its taste is earthy, and much the least agreeable of them all; but this is scarce known in England.

Tea is to be chosen of the briskest smell, and as whole as possible; and the greatest care is to be taken that it have not been exposed to the air to pall, and evaporate. The drink *Tea* is made in China, and throughout the greatest part of the east, after the same manner as in Europe, *viz.* by infusing the leaves in boiling water, and drinking the infusion hot.—Indeed, among us, it is usual to temper its bitterness with sugar, but the orientals use little or none of it with it.

However, the Japanese are said to prepare their liquor a somewhat different way, *viz.* by pulverizing the leaves, stirring the powder in hot water, and drinking it as we do *Tea*.

The Chinese are always taking *Tea*, especially at meals. It is the chief treat wherewith they refresh themselves. The most moderate take it at least thrice a day; others, ten times, or more; and yet it is computed, the consumption of *Tea* among the English and Dutch is as great in proportion as among the Orientals. In France, the use of *Tea* is much declined, and coffee is now become the prevailing liquor.

As to the properties of *Tea*, they are strangely controverted: the eastern nations are at least as much possessed with them as the Europeans; but it is, perhaps, because imagination bears as great a sway there as here. The reason why the gout and stone are unknown in China, is ascribed to the use of this plant; which is said further to cure indigestions of the stomach, to carry off a debauch, and to give new strength for drinking, to dispel wind, to cure the vapours, &c.

Sim Pauli, physician of the king of Denmark, in an express treatise on this plant, endeavours to shew, that these virtues ascribed to it in the East, are local, and do not hold with the inhabitants of Europe. According to him, those past their 40th year should never use it, as being too delicate: he says all, that *Tea* has no other virtues but those of betony; and adds, with Bauhin, that it is only a species of myrtle, and thinks it is found in Europe as well as the Indies, but this is erroneous.

This opinion, as to its virtues, is also refuted by Pechlin, in a treatise of *Tea*, intitled, *Theophilus Bibaculus, sive de Potu Theæ Dialagus*; where he maintains, that it is a good to prevent scorbutic diseases; that its gentle astringent virtues strengthen the tonic motion of the intestines, &c. But he blames the drinking it with milk, and especially after a full meal, or after much wine.

TEA M, *THEAM*, or *THAME*, in our ancient customs, signifies a royalty granted by the king's charter to the lord of a manor, for the having, restraining, and judging bondmen, necks, and villains, with their children, goods, and chattels, in his court.

TEARS, *Lachrymæ*, a watry humour, issuing out at the corners of the eye, by the compression of the muscles; serving to moisten the cornea, and to express our grief, and even to alleviate it.

The ancients had an opinion, that the *Tears* of the living were of use, at least for pleasure, to the dead; for which reason they took great care to procure them abundance at their funerals, so much, as to institute a profession or trade of weepers, as judging those of their own families insufficient.

Deer, when at bay, are commonly said to shed *Tears*: indeed, they ordinarily do yield a sort of *Tears*, which ooze into the two clefts underneath, called *Lachrymataries*, are there condensed into a kind of yellow liquor, or gum; which diluted in white wine or colden water, is reputed a sovereign remedy for fits of the mother, and the falling-sickness.

Vigil makes the hearse of Pelias shed *Tears* at the funeral pomp of his master: this is one of the passages which the modern critics censure as a breach of probability.

TEAZEL, or *TEASEL*, *Dipsacus*, or *Candide Fullonum*, or the *Fullers Thistle*, a kind of plant much used by the fullers, cloth-workers, and stocking-weavers, to card, or draw out the wool or nap from the thread or ground of several kinds of cloths, stuffs, stockings, &c. in order to render them closer, and warmer.

This plant is cultivated with great care in England and in several parts of France, particularly No manny; and the exportation thereof is prohibited, by reason of the vast use thereof in the woollen manufacture.

The stem of the plant is very high: and its extremity, as also those of its branches, bears an oblong prickly yellowish ball or bur, which is the part used.

The largest burs, and those most pointed, are esteemed the best, and are now called *Male Teazels*, they are mostly used in the dressing and preparing of stockings and coverlets; the smaller kind, properly called the *Fullers or Drapers Teazels*, and sometimes the *Female Teazels*, are used in the preparation of the finer stuffs, as cloths, rateens, &c.

The smallest kind sometimes, called *Linnet Heads*, are used to draw out the nap from the coarser stuffs, as bays, &c.

TECHNICAL, *TECHNICUS*, something that relates to art. See **ART**.

* The word is formed of the Greek *τεχνικός*, artificial, of *τέχνη*, art.

In this sense we say, *Technical Words*, *Technical Verses*, &c.—And in this sense Dr. Harris intitles his dictionary of arts and sciences, *Lexicon Technicum*.

TECHNICAL, is more particularly applied to a kind of verses, wherein are contained the rules or precepts of any art, thus digested to help the memory to retain them. See **MEMORY**.

Technical Verses are used in chronology, &c.—Such, *e. gr.* are those expressing the order and measures of the calends, nones, &c.—Those expressing the seasons; see under **AUGUST**.—Those expressing the order, &c. of the signs; see under **SIGN**. F. Labbe has composed a set of *technical* Latin verses, including all the epochs in chronology; and F. Bufler, after his example, has put both chronology and history into French verse; and even geography also.

Technical Verses are commonly composed in Latin: they are generally wretched ones, and often barbarous; but utility is all that is aimed at in them: to give some idea hereof, we will here add a few instances.—The casuists include all the circumstances which make us partakers with another in a theft, or other crime, in these two *Technical* verses:

*Iustus, conciliatus, consensus, pauper recurfus,
Participans, mutus, non eliciens, non manifestans.*

The first of F. Bufler's *Technical* verses of the history of France, are these.

*Ses loix en quatre cents Pharamond introduit,
Clodion Chevelu, qu'Aetius vainquit.
Merveux; avec lui combatit Attila;
Childeric fut chassé, mais en le rappella.*

TECHNICAL Words, are what we otherwise call *Terms of Art*. **TECUM DUCI**. See the article **DUCES**.

TE DEUM, a kind of hymn, or song of thanksgiving, used in the church; beginning with the words *Te Deum laudamus, We praise thee, O God*—It is usually supposed to be the composition of St. Augustine, and St. Ambrose.

It is used to be sung in the Romish church with extraordinary pomp and solemnity, upon the gaining a battle, or other happy event; and sometimes even to conceal a defeat.

TEETH, *Dentes*, in anatomy. See the article **TOOTH**.

Canine TEETH, } See the articles } **CANINE**.

Wolvous TEETH, } See the articles } **WOLVES**.

TEGUMENT. See the article **INTEGUMENT**.

TEINTS,* and *Semi-TEINTS*, in painting, denote the several colours used in a picture, considered as more or less high, or bright, or deep, or thin, or weakened, and diminished, &c. to give the proper relief, or softness, or distance to the several objects. See **COLOURING**.

* The word is pure French, where it signifies the fame.

TEIRCE, or **TEIRS**. See the article **TIERCE**.

TEKUPHÆ, or **THEKUPHÆ**, in the Jewish chronology, are the times wherein the sun proceeds from one cardinal point to the next.

The same term is also applied to the moments wherein the sun enters a cardinal point: these four terms, or *Tekuphæ*, are observed among the Jews with a great deal of ceremony: the reason, as we are informed by Munster, is this:

That people have a notion, that in each *Tekupha* the sun has a several angel appointed to guard, and direct it; and that in the very point wherein the sun finishes one *Tekupha*, and enters upon another, before the one director has taken place of the other, the devils have a power to exercise all kinds of tyranny in the water.

And hence, they fancy, that if any body drinks the smallest quantity of water at that time, he will infallibly have a dropy, or some other grievous distemper.

TELAMONES,* a name given by the Romans to what the Greeks called *Atlantes*, *viz.* the figures of men supporting entablatures, and other projections. See **ATLAS**.

* A late Author thinks, that the word *Tel-mon*, which he deduces from the Greek *τελον*, a *veret. b. th. t.* bears misfortune with patience, does not ill agree with those statues, which in architecture, sustain such loads.

TELESCOPE, an optical instrument, consisting of several glasses, or lens's, fitted into a tube; through which remote objects are seen as if nigh at hand.

In *Telescopes*, the lens or glass turned towards the object, is called the *Object-glass*; and that next the eye, the *Eye-glass*; and if the *Telescope* consists of more than two lens's, all but that next the object are called *Eye-glasses*.

The invention of the *Telescope* is one of the noblest, and most useful these ages have to boast of: by means hereof, the wonders of the heavens are discovered to us, and astronomy is brought to a degree of perfection, which former ages could have no notion of.

Indeed, the discovery was owing rather to chance, than to thought; so that it is the good fortune of the discoverer, rather than his skill or ability, we are indebted to: on this account it concerns us the less to know, who it was first hit on this admirable invention. It is certain it must be casual, since the theory it depends on was not then known.

Johannes Baptista Porta, a noble neapolitan, is asserted by Wolfius to be undoubtedly the first that made a *Telescope*; from this passage in his *Magia Naturalis*, printed in 1549: "If you do but know how to join the two (*viz.* the concave and convex glasses) rightly together, you will see both remote and near objects, much larger than they otherwise appear, and withal very distinct. In this way we have been

"of good help to many of our friends, who either saw remote things dimly, or near ones confusedly; and have made them see every thing perfectly."

But it is certain, Porta did not understand his own invention, and therefore neither troubled himself to bring it to greater perfection, nor ever applied it to celestial observation. What is more, the account Porta gives of his concave and convex lens's is so dark and indistinct, that Kepler, who examined it, by particular command of the emperor Rudolphus, declared to that prince, that it was perfectly unintelligible.

Fifty years afterwards, a *Telescope*, 12 inches long, was made and presented to prince Maurice of Nassau, by a spectacle-maker of Middlebourg; but authors are divided about his name. Sirturus, in a treatise of the *Telescope*, printed anno 1618, will have it to be John Lipperlein; and Borel, in an express volume on the inventor of the *Telescope*, published in 1655, shews it to be Zacharias Jansen, or, as Wolfius has it, Hanfen.

Joh. Lapreius, another workman of the same town, passes for a third inventor; having made one in 1610, on the mere relation given him of that of Zachary.

In 1620, James Metius, brother of Adrian Metius, professor of mathematics at Franeker, came with Drebel to Middlebourg, and there bought *Telescopes* of Zachary's children, who had made them public; and yet Adr. Metius has given his brother the honour of the invention; in which he is mistakenly followed by Des Cartes.

But none of these artificers made *Telescopes* of above a foot and half: Simon Marius in Germany, and Galileo in Italy, first made long ones fit for celestial observations.

Le Rossî relates, that Galileo being then at Venice, was told of a sort of optic glass made in Holland, which brought objects nearer: upon which, setting himself to think how it should be, he ground two pieces of glass into form as well as he could, and fitted them to the two ends of an organ-pipe, and with these shewed, at once, all the wonders of the invention to the Venetian noblesse on the top of the tower of St. Mark. That author adds, that from this time Galileo devoted himself wholly to the improving and perfecting of the *Telescope*; and that he thereby almost deserved all the honour usually done him, of being reputed the inventor of the instrument, and of its being denominated from him *Galileo's Tube*. F. Mabilion, indeed, relates, in his travels through Italy, that in a monastery of his own order, he saw a manuscript copy of the works of Comestor, written by one Coradus, who lived in the XIIIth century; in the third page whereof, was seen a portrait of Ptolemy viewing the stars through a tube of four joints or draws: but that father does not say that the tube had glasses in it. In effect, it is more than probable, that such tubes were then used for no other purpose but to preserve and direct the sight, or to render it more distinct, by singling out the particular object looked at, and shutting out all the foreign rays reflected from others, whose proximity might have rendered the image less precise.

This conjecture is verified by experience; we having often observed, that without a tube, by only looking through the hand, or even the fingers, or a pin-hole in a paper, objects shall appear more clear and distinct than otherwise.

Be this as it will, it is certain the optical principles, whereon *Telescopes* are founded, are contained in Euclid, and were well known to the ancient geometricians; and it is for want of attention thereto, that the world was so long without that admirable invention; as, no doubt, there are numerous others lying hid in the same principles, only waiting for reflection or accident to bring them forth.

Telescopes are of several kinds, distinguished by the number and form of their lens's, or glasses, and denominated from their particular uses, &c. such are the *Terrestrial* or *Land Telescope*, the *Celestial* or *Astronomical Telescope*: to which may be added, the *Galilean* or *Dutch Telescope*, the *Reflecting Telescope*, and the *Aerial Telescope*.

Galileo's, or the *Dutch TELESCOPE*, is a *Telescope* consisting of a convex object-glass, and a concave eye-glass.

This, of all others, is the most ancient form, being the only kind made by the inventors, Galileo, &c. or known, before Huygens: Its construction, perfections, imperfections, &c. are delivered in what follows:

Construction of Galileo's, or the *Dutch TELESCOPE*.—In a tube prepared for the purpose (the structure whereof see under the article **TUBE**) at one end is fitted a convex object lens, either a plain convex, or convex on both sides, but a segment of a very large sphere: at the other end is fitted an eye-glass, concave on both sides, and the segment of a less sphere: so disposed, as to be the distance of the virtual focus before the image of the convex lens.

Theory of Galileo's TELESCOPE.—Now, in an instrument thus framed, all people, except myopes, or those short-sighted, must see objects distinctly in an erect situation, and increased in the ratio of the distance of the virtual focus of the eye-glass, to the distance of the focus of the object-glass.

But

But for myopes to see objects distinctly through such an instrument, the eye-glass must be set nearer the object-glass. The reason of these effects will appear from what follows:

For, 1° since it is far distant objects that are to be viewed with a *Telescope*, the rays proceeding from the same point of the object, will fall on the object-glass parallel, and consequently by their refraction through the convexity, will be thrown converging on the eye-glass; but by their refraction through the concavity hereof, they will be again rendered parallel, and in such disposition they will enter the eye.

But all, excepting myopes, see objects distinctly by parallel rays. Therefore the first point is clear.

2° Suppose A (*Tab. Optics, fig. 41.*) to be the focus of the object-glass; and suppose A C the furthest ray on the right hand of the object that passes through the tube: after refraction, it will become parallel to the axis B I, and consequently after a second refraction through the concave lens, will diverge from the virtual focus. Wherefore since all the rays coming from the same extreme to the eye placed behind the concave lens, are parallel to L E; and those from the middle of the object, parallel to F G (as observed in what went before) the middle point of the object will be seen in the axis G A; and the right extreme, on the right side, *viz.* in the line L N, or parallel thereto; that is, the object will be erect: which is the second point.

3° Since all right lines parallel to L N cut the axis under the same angle, the semi-diameter of the object will be seen through the *Telescope*, under the angle A F N or E F I: the rays L E and G I entering the eye in the same manner; as if the pupil were placed in F. If now the naked eye were in A, it would see the semi-diameter of the object under the angle C A B or C A B. But since the object is supposed very remote, the distance A F in respect hereto is nothing, and therefore the naked eye, even in F, would see the semi-diameter of the object under an angle equal to A.

The semi-diameter of the object therefore, seen with the naked eye, is to that seen through the *Telescope*, as I M to I E. But it is demonstrated that I M : I E : I F : A B; that is, the semi-diameter seen with the naked eye, is to that viewed through the *Telescope*, in the ratio of the distance of the virtual focus of the eye-glass F I, to the distance of the focus of the object-glass A B: which was the third point.

Lastly, myopes have their retina too far from the crystallin humour; and diverging rays concur at a greater distance than parallel ones; and those that were parallel become diverging by bringing the eye-glass nearer the object-glass; by means of such approach, myopes will see objects distinctly through a *Telescope*: which is the fourth point.

Hence 1° to have the whole object visible, the semi-diameter of the pupil must not be less than the distance of the rays L E and G I; and therefore the more the pupil is dilated, the greater field or compass will be taken in by the *Telescope*, and *vice versa*; so that coming out of a dark place, or shutting the eye for some time before you apply it to the glass, you will take in a greater field at first glance than afterwards, when the pupil is again contracted by the increase of light. See PUPIL.

2° Since the distance of the rays E L and I G is greater, at a greater distance from the lens, the compass taken in by the eye at one view, will be greater as the eye is nearer the concave lens.

3° Since the focus of a plano convex object lens, and the virtual focus of a plano concave eye lens, is at the distance of the diameter; and the focus of an object-glass convex on both sides, and the virtual focus of an eye-glass concave on both sides, is at the distance of a semi-diameter; if the object-glass be plano convex, and the eye-glass plano concave, the *Telescope* will increase the diameter of the object, in the ratio of the diameter of the concavity to that of the convexity; if the object-glass be convex on both sides, and the eye-glass concave on both sides, it will magnify in the ratio of the semi-diameter of the concavity to that of the convexity; if the object-glass be plano convex, and the eye-glass concave on both sides, the semi-diameter of the object will be increased in the ratio of the diameter of the convexity to the semi-diameter of the concavity. And lastly, if the object-glass be convex on both sides, and the eye-glass plano concave, the increase will be in the ratio of the diameter of the concavity to the semi-diameter of the convexity.

4° Since the ratio of the semi-diameters is the same as that of the diameters, *Telescopes* magnify the objects in the same manner, whether the object-glass be plano convex, and the eye-glass plano concave, or whether the one be convex on both sides, and the other concave on both.

5° Since the semi-diameter of the concavity has a less ratio to the diameter of the convexity than its diameter has, a *Telescope* magnifies more if the object-glass be plano convex, than if it be convex on both sides.

6° The greater the diameter of the object-glass, and the less that of the eye-glass, the less ratio has the diameter of the object viewed with the naked eye, to its semi-diameter viewed with a *Telescope*; and consequently the more the object magnified by the *Telescope*.

7° Since the semi-diameter of the object is increased in the ratio of the angle E F I, and the greater the angle E F I is, the less part of the object does it take in at one view; the *Telescope* exhibits so much a less part of the object, as it increases its diameter more.

And this is the reason that determined the mathematicians to look out for another *Telescope*, after having clearly found the imperfection of the first, discovered by chance. Nor were their endeavours vain, as appears from the *astronomical Telescope* hereafter to be described.

If the semi-diameter of the eye-glass have too small a ratio to that of the object-glass, an object through the *Telescope* will not appear sufficiently clear, by reason the great divergency of the rays will occasion the several pencils representing the several points of the object on the retina to consist of too few rays.

This too is found, that equal object lens's will not bear the same eye lens's if they be differently transparent, or there be a difference in their polish. A less transparent object-glass, or one less accurately ground, requires a more spherical eye-glass than another more transparent, &c.

Hence, though it be found by experience that a *Telescope* is good, if the distance of the focus of the object-glass be six inches, and the diameter of the plano concave eye-glass be one inch and one line, or of one equally concave on both sides one inch and a half; yet it is by no means expedient to recommend to the maker either this, or any particular combination, but to try several eye-glasses, both greater and smaller, with the same object-glass, and take that through which objects appear most clear and distinct.

Hevelius recommends an object-glass convex on both sides, whose diameter is four Danick feet; and an eye-glass concave on both sides, whose diameter is $4\frac{1}{2}$ digit or tenths of a foot. An object-glass, equally convex on both sides, whose diameter is five feet, he observes, will require an eye-glass of five $\frac{1}{2}$ digits; and adds, that the same eye-glass will also serve an object-glass of eight or ten feet.

Hence, as the distance of the object-glass and eye-glass is the difference between the distance of the virtual focus of the eye-glass, and the distance of the focus of the object-glass; the length of the *Telescope* is had by subtracting that from this. That is, the length of the *Telescope* is the difference between the diameters of the object-glass and eye-glass, if that be plano convex and this plano concave; or the difference between the semi-diameters of the object-glass and eye-glass, if that be convex on both sides, and this concave on both; or the difference between the semi-diameter of the object-glass, and the diameter of the eye-glass, if that be convex on both sides, and this plano concave; or the difference between the diameter of the object-glass, and the semi-diameter of the eye-glass, if that be plano convex, and this concave on both sides.

Thus, *e. gr.* if the diameter of an object-glass on both sides, be four foot, and that of an eye-glass concave on both sides, be four and a half digits or tenths of a foot; the length of the *Telescope* will be one foot eight digits.

Astronomical TELESCOPE, is a *Telescope* consisting of an object-glass, and an eye-glass, both convex. See CONVEXITY.

It has its name, from its being wholly used in astronomical observations.

Construction of the astronomical TELESCOPE.—The tube being prepared, an object-glass, either plano convex, or convex on both sides, but to be a segment of a large sphere, is fitted in at one end, and an eye-glass convex on both sides, which is the segment of a small sphere, is fitted into the other end, at the common distance of the foci.

Theory of the astronomical TELESCOPE.—Now, an eye placed near the focus of the eye-glass, will see objects distinctly, but inverted, and magnified in the ratio of the distance of the focus of the eye-glass to the distance of the focus of the object-glass.

For 1° since it is very remote objects that are viewed through these *Telescopes*, the rays from any point of the object fall parallel on the object-glass; and, consequently, after refraction, will meet in a point behind the glass, which point is the focus of the eye-glass. From this point they begin to diverge, and fall diverging on the eye-glass, where being refracted, they enter the eye parallel.

Hence, as all but myopes see distinctly by parallel rays, a *Telescope*, thus disposed, will exhibit remote objects distinctly.

Suppose the common focus of the lens's in F (*Fig. 44.*) and make A B = B F. Since one of the rays A C, proceeding from the right side of the object, passes through A; the ray C E will be parallel to the axis A I, and therefore after refraction in the eye-glass, will fall in with it in its focus G. Since then, the eye is placed near it, and all the other rays proceeding from the same point of the object with E G, are refracted parallel thereto; the point in the right side of the object, will be seen in the right line E G.

After the like manner it appears, that the middle point of the object

object is seen in the axis GB , so that the object appears inverted.

3° From what has been already shewn, it appears that the semi-diameter of the object will be seen through the *Telescope*, under the angle EGL , which to the naked eye placed in A , is seen under the angle bAC . Suppose, now, IF equal to the distance of the focus IG ; since the right angles IFC and IEG are equal, $EGL = EFL$. Therefore drawing FM parallel to AC , we shall have $IFM = BAC$. The semi-diameter, therefore, viewed with the naked eye, is to that viewed through the *Telescope*, as IM to IE . Draw KE parallel to FM ; we shall have $IM : IE :: IF : IK$. But by reason of the parallelism of the lens's, $CE = BI = BF + FI = AB + FI$; and by reason of the parallelism of the right lines CA , and EK ; $CE = AK$, therefore $BI = AK$, consequently, $AB = IK$. And therefore $IM : IE :: IF : AB$; that is, the semi-diameter seen with the naked eye, is to the semi-diameter viewed through the *Telescope*, in the ratio of the distance of the focus of the eye-lens IF , to the distance of the focus of the object-glass AB . *Q. e. d.*

Hence, 1° as the *astronomical Telescope* exhibits objects inverted; it serves commodiously enough, for observing the stars (it mattering little, whether they be seen erect or inverted) but for terrestrial objects, it is much less proper, as the inverting frequently prevents their being known.

2° If between the eye-glass, and its focus G , be a plain well polished metal speculum LN , of the length of an inch, and of an oval figure, inclined to the axis under an angle of 45° , the rays EP and MQ will be reflected in such a manner, as that concurring in S , they make an angle PgQ , equal to PQ ; and therefore the eye being placed in S , will see the object of the same magnitude as before, only in an erect situation. By the addition therefore of such a speculum, the *astronomical Telescope* is rendered fit to observe terrestrial objects.

3° Since the focus of a glass convex on both sides, is distant from the glass itself a semi-diameter; and that of a plano convex glass, a diameter; if the object-glass be convex on both sides, the *Telescope* will magnify the semi-diameter of the object, in the ratio of the semi-diameter of the eye-glass to the semi-diameter of the object-glass; but if the object-glass be a plano convex, in the ratio of the semi-diameter of the eye-glass, to the diameter of the object-glass.

4° Wherefore, since the semi-diameter of the eye-glass has a greater ratio to the semi-diameter of the object-glass, than to its diameter; a *Telescope* magnifies the semi-diameter of the object more, if the object-glass be a plano convex, than if convex on both sides.

5° The ratio of the semi-diameter of the eye-glass, to the diameter or semi-diameter of the object-glass, is the less, as the eye-glass is a segment of a less sphere, and the object-glass of a greater. A *Telescope* therefore magnifies the diameter of the object more, as the object-glass is a segment of a greater, and the eye-glass of a lesser sphere.—And yet the ratio of the semi-diameter of the eye-glass to the object-glass must not be too small; if it be, it will not refract rays enough to the eye from each point of the object; nor will it separate those coming from different points sufficiently: by which means the vision will be rendered obscure and confused. To this may be added, what we have shewn, of the ratio of the object-glass to the eye-glass in the Dutch *Telescope*.

De Chales observes, that an object lens of $2\frac{1}{4}$ feet will require an eye-glass of $1\frac{1}{2}$ digit or tenth of a foot; and an object-glass of eight or ten feet, an eye-glass of four digits; in which he is confirmed by Eustachio de Divinis.

Huygen's great *Telescope*, wherewith Saturn's true face, and one of his satellites were first discovered, consists of an object-glass of 12 feet, and an eye-glass of a little more than three digits. Though he frequently used a *Telescope* of 23 feet long, with two eye-glasses joined together, each in diameter $1\frac{1}{2}$ digit; so that the two were equal to one of three digits. The same author observes, that an object-glass of 30 feet, requires an eye-glass of $3\frac{1}{2}$ digits; and gives us a table of proportions, for the constructing of *astronomical Telescopes*; an abridgment whereof we shall here give the reader.

D.R. of Eye Glass. Diam. of D.R. of Eye Glass. Diam. of Obj. Glass. Aperture of Eye Glass. Diam.				D.R. of Eye Glass. Diam. of D.R. of Eye Glass. Diam. of Obj. Glass. Aperture of Eye Glass. Diam.			
Rhinal Feet.	D. of Obj. Glass. Diam.	D. of Eye Glass. Diam.	D. of Eye Glass. Diam.	15	2	12	3
1	0	55	61	20	3	4	2
2	0	77	8	25	2	7	3
3	0	9	0	30	1	0	3
4	1	09	2	40	1	4	5
5	1	2	5	50	3	87	1
6	1	31	1	60	1	24	26
7	1	45	63	70	4	58	04
8	1	55	71	80	4	50	5
9	1	64	80	90	5	05	5
10	1	73	9	100	5	48	03

If in two or more *Telescopes*, the ratio between the object and eye-glass be the same, the object will be magnified the same in both.

Hence some may conclude the making of large *Telescopes* a needless trouble. But it must be remembered, as we have already laid down: that an eye-glass may be in a less ratio to a greater object-glass, than to a smaller: thus, *e. gr.* in Huygen's *Telescope* of 25 feet, the eye-glass is three digits. Now, keeping this proportion in a *Telescope* of 50 feet, the eye-glass should be six digits; but the table shews, four and a half are sufficient. Hence, from the same table it appears, that a *Telescope* of 50 feet magnifies in the ratio of 1 : 141; whereas that of 25 feet, only, magnifies in the ratio of 1 : 100.

Since the distance of the lens's is equal to the aggregate of the distance of the object and eye-glasses; and the focus of a glass convex on each side is a semi-diameter's distance, and that of a plano convex, a diameter's distance, from the lens; the length of a *Telescope* is equal to the aggregate of the semi-diameters of the lens's, if the object-glass be convex on both sides; and to the sum of the semi-diameter of the eye-glass, and of the diameter of the object-glass, if the object-glass be a plano convex.

But as the semi-diameter of the eye-glass is very small, in respect of that of the object-glass, the length of the *Telescope* is usually estimated from the distance of the object-glass, *i. e.* from its semi-diameter, if it be convex on both sides, or its diameter if plano convex. Thus a *Telescope* is said to be 12 feet, if the semi-diameter of the object convex-glass on both sides be 12 feet, &c.

Since myopes see near objects best; for them the eye-glass is to be removed nearer to the object-glass, that the rays refracted through it may be the more diverging.

To take in the larger field at one view, some use two eye-glasses, the foremost whereof is a segment of a larger sphere than that behind: to this it must be added, that if two lens's be joined immediately together, so as one touch the other, the focus is removed to double the distance which that of one of them would be at.

To shorten the *astronomical TELESCOPE*, *i. e.* to construct a *Telescope* so, as that, though shorter than the common one, it shall magnify as much:

1° Having provided a drawing tube, fit in an object lens EG (Fig. 43.) which is a segment of a moderate sphere; let the first eye-glass BD be concave on both sides, and so placed in the tube, as that the focus of the object-glass A may be behind it, but nearer to the centre of the concavity G . Then will the image be thrown in Q , so as that $GA : GI :: AB : QI$. Lastly, fit in another object-glass, convex on both sides, and a segment of a lesser sphere, so as that its focus may be in Q .

This *Telescope* will magnify the diameter of the object, more than if the object-glass were to represent its image at the same distance EQ , and consequently a shorter *Telescope* constructed this way, is equivalent to a longer in the common way. The demonstration may be seen in Wolfius.

Sir Is. Newton furnishes us with another method of contracting the *Telescope*, in his catoptrical or reflecting *Telescope*; the construction whereof see hereafter.

Land TELESCOPE, or Day TELESCOPE, a *Telescope* consisting of more than two lens's commonly of a convex object-glass, and three convex eye-glasses; or, a *Telescope* that exhibits objects erect, yet different from that of Galileo.

It has its name from its being used to view objects in the day-time, on or about the earth.

To construct a Land or Day TELESCOPE.—A tube being provided, fit in at one end an object-glass, which is either convex on both sides, or plano convex, and a segment of a large sphere: to this add three eye-glasses, all convex on both sides, and segments of equal spheres; disposing them in such manner, as that the distance of any two may be the aggregate of the distances of their foci.

Theory of a Land TELESCOPE.—Then will an eye applied to the last lens, at the distance of its focus, see objects very distinctly, erect, and magnified in the ratio of the distance of the focus of one eye-glass LK (Fig. 44.) to the distance of the focus of the object-glass AB .

For, 1° the rays, from what has been already said, falling on the object parallel, the image of the object will be represented invertedly at the distance of the principal focus: wherefore, since this image is in the focus of the first eye-glass, the rays, after a second refraction, will become parallel; and thus falling on the third lens, after a third refraction, they exhibit the inverted image invertedly, that is, an erect image of the object. Since then this image is in the focus of the third eye-glass, the rays, after a fourth refraction, will become parallel; and in this disposition the eye will receive them, and consequently there will be distinct vision, and the object will appear erect.

2° If $IQ = IK$, that is, equal to the distance of the focus of the object-glass, an eye placed in M , will see the semi-diameter of the object increased in the ratio of LM to KI ; but the ray AQ , proceeding from the focus Q of the object lens AB , after refraction becomes parallel to the axis IL , consequently the first eye lens CD joins it to the axis in M the distance of a semi-diameter.

And since the focus of the second eye-glass EF, is also in M, the ray FH, after refraction will be parallel to the axis NO, and therefore the third eye-glass will join it at the axis in P; But the semi-diameters of the lens's GH and CD are supposed equal; therefore PO=LM. Wherefore since the right angles at O and L are equal, as also HO=C L, the angle OPH is equal to CML. The semi-diameter of the object therefore appears the same in P as in M, and is consequently magnified in the ratio of LM, or PO to KL.

Hence, 1° an astronomical telescope is easily converted into a land telescope, by using three eye-glasses for one; and the land telescope, on the contrary, into an astronomical one, by taking away two eye-glasses, the faculty of magnifying still remaining the same.

2° Since the distance of the eye-glasses is very small, the length of the telescope is much the same as if you used one.

3° From the construction, it is evident, that the length of the telescope is found by adding five times the semi-diameter of the eye-glasses to the diameter of the object-glass, if a plano convex; or its semi diameter, if convex on both sides.

Huygens first observed, both in the astronomical and land telescope, that it contributes considerably to the perfection of the instrument, to have a ring of wood or metal, with an aperture, a little less than the breadth of the eye-glasses, fixed in the place where the image is found to radiate upon the lens next the eye: by means hereby the col.ours, which are apt to disturb the clearness and distinctness of the object, are prevented, and the whole compacts taken in at a view, perfectly defined.

Some make land telescopes of three lens's, which yet represent objects erect and magnified as much as the former. But such telescopes labour under very great inconveniences, both as the objects herein are tinged with false colours, and as they are distorted about the margin.

Some again use four lens's, and even more; but since some part of the rays is intercepted in passing every lens, objects are hereby exhibited dim and feeble.

Reflecting, or catoptric, or cata-dioptric TELESCOPE, is a telescope which, instead of lens's, consists chiefly of mirrors, and exhibits remote objects, by reflection, instead of refraction.

This instrument is the invention of the great Sir Iss. Newton: what determined him to apply his theories to this way, was the different refrangibility, which, as his new doctrine of light and colours, he found the rays of light were of. In effect, as he found the ratio between the greatest and least refractions of the different rays to be nearly as 28 to 27, it easily followed, that the rays could never be all restricted parallel from any lens, but would some of them diverge more, some less; beside that the foci would be disturbed; the focus of the most refrangible rays being nearer the lens than that of the least refrangible ones, by a distance which is the 27th part of the distance between the object-glass, and the focus of the least refrangible ones.

Hence he concluded, that refraction was too unequal a principle; and that lens's, of whatever figures, whether spherical, parabolical, or any of the other conic sections, and how truly spheroidal, would never suffice for the perfection of telescopes.

Upon this he had recourse to another more equable principle, viz. reflection; and made a telescope, consisting of specula, or mirrors: the first hint whereof, however, he owns he took from Dr. Gregory's optics.

Construction of a reflecting TELESCOPE.—Provide a tube ABCD (Fig. 45.) open in AD, and closed in BC, well blacked within-side, and of a length equal to the distance of the focus from the concave speculum EF. To the bottom BC, is to be fitted a concave metallic speculum *a b*, polished to the greatest possible perfection; or rather, to have the object clearer, and more distinct, let it be a glass speculum, concave on its fore-side, and equally convex on the hind-side; for unless it be of the same thickness every where, it will reflect the images of objects tinged with a spurious colour, and insinuated. Towards the other end of the tube is fixed an iron piece HL, to which is cemented a plain metallic speculum; or, which is better, a triangular prism of glass or crystal G, whose upper angle G is a right angle, the two others half right; the faces or planes that meet in the angle G to be square, and the third a parallelogram. This prism is to be so disposed, as that a ray reflected from the speculum, passing through the middle of the face G M, may cut it at right angles; but be inclined to the right angle M N in an angle of 45°. Its distance from the concave speculum EF, is to be such, as that the rays *a c* and *b d* reflected from the concave speculum, may, after a second reflection from the base of the prism, concur in the point *e*; that is, the distance of the focus *e* from the reflecting surface of the prism, and the distance of that from the concave speculum, is to be equal to the distance of the focus from the concave speculum. In I is placed a plano convex lens, whose focus is in *e*, that the reflected rays may enter the eye parallel. Lastly, this lens is covered with a thin brass or leaden plate, having a little round perforation there in, for the eye to look through, by which means all those rays are excluded, which would otherwise occasion confusion.

In the first telescope of this kind which the inventor made, the semi-diameter of the concave metallic speculum was 12½ digits, or tenths of an inch; from which, therefore, the focus was 6½ digits distant, the diameter of the eye glass was ½ of a digit; so that it magnified the diameter of the object in the ratio of 1 to 25; but he found that objects were shown somewhat obscure hereby; on which account, he afterwards recommended glass specula instead of metallic ones; adding, that there is nothing more required to the perfection of this telescope, but that the art of polishing glass be brought to greater perfection; for that some inequalities which do not hurt lens's, are found to affect specula, and prevent objects being seen distinctly.

The same author observes, that if the length of the instrument be 6 feet, and consequently the semi-diameter of the concave speculum 12, the aperture of the speculum is to be 6 inches; by which means the object will be increased in the ratio of 1 to 200 or 300.

If it be longer or shorter, the aperture must be as the cube of the quadrato quadrate root of the length, and its magnifying power as its aperture. The speculum he orders to be an inch or two broader than the aperture.

Aerial TELESCOPE, a kind of astronomical telescope, the lens's whereof are used without a tube.

In strictness, however, the aerial telescope is rather a particular manner of mounting and managing long telescopes for celestial observations in the night-time, when the transit of long unwieldy tubes is tedious, than a particular kind of telescope: the contrivance we owe to the noble Huygens.

Construction of the aerial TELESCOPE.—A tall poll or mast AB (Fig. 46. N° 2.) the length the use should be of is fixed perpendicularly in the ground. Before the erecting it, one side is planed smooth, and upon it two rulers are fixed parallel to each other an inch and half apart, including a narrow groove or channel between them, reaching from top almost to bottom. At the top of the pole is fitted a little ruckle A, moveable on its axis, and over it is drawn a cord G, double the length of the pole, and the thickness of the little finger, returning into itself, and furnished with a piece of lead, H, equal in weight to the lens and a moveable arm to be sustained thereby.

Then a wooden lath CD, two foot long, is framed so as that it may slide freely in the channel; and in the middle thereof is affixed a wooden arm E, standing out a foot from the pole, and on its extremity bearing another, F, a foot and half long fixed to it at right angles, and both of them parallel to the horizon.

2° An object-glass is included in a hollow cylinder I K, three inches long: to this cylinder is fixed a staff K L, near an inch thick, and a foot long, which rests on a brass ball M, that moves freely in its cup or socket underneath; only, on occasion, the ball and socket are fixed by a screw. That the lens thus equally balanced, may be moved with a small force, a weight N I of about a pound, is suspended by a strong wire N F, by bending of which the common centre of gravity of the weight and the lens is easily made to coincide with that of the ball. To the staff K L, is fixed a brass ribble, which is bent downwards till its point be as much below the centre of the staff, as the centre of the ball is. To the point is tied a fine silken thread L V, which of consequence will be parallel to the staff K L.

3° An eye-glass O is included in a short cylinder, and the staff P V is fixed to the same. To this is hung a little weight S, sufficient to make a balance. In Q is fixed a handle R, which carries a transverse axis, to be held in the observer's hand, and the staff P V directed towards the object-glass, is tied to the thread L V. The thread passed through a hole V, is wound about a little peg T, fixed in the middle of the staff, by the turning whereof the thread is shortened or lengthened at pleasure.

4° That the observer may be able to hold the eye-glass steady, he has a fulcrum or prop under his arm, the structure whereof appears from inspection of the figure. Lastly, to keep off the feeble light flowing from the air upon the eye, it is conveniently covered with a circle Y, perforated in the middle, fitted on to a moveable and flexible arm.

Binocular TELESCOPE. See the article BINOCULAR.

TELESCOPICAL stars are such as are invisible to the naked eye; but discoverable only by the help of a telescope. See STAR.

All stars less than of the sixth magnitude, are *telescopic* to a middling eye.

TELLER, an officer in the exchequer, of which there are four; whose business is to receive all moneys due to the crown, and thereupon to throw down a bill through a pipe into the tally-court, where it is received by the auditor's clerks, who attend there to write the words of the said bill upon a tally, and then deliver it to be entered by the clerk of the pells, or his clerk.

The tally is then split or cloven by the two deputy-chamberlains, who have their seals, and whilst the senior deputy reads the one part, the junior examines the other part with the other two clerks.

T E M

The *tellos* places are in the king's gift, and they have besides their chief clerk or deputy, four other clerks, for the dispatch of business. See *ENCHILQUE*.

TELLONIUM. See the article *THELONIUM*.

TELLUS, *Terra*, &, in astronomy. See *EARTH*.

TEMPER, in a $\left\{ \begin{array}{l} \text{physical} \\ \text{musical} \\ \text{mechanical} \end{array} \right\}$ sense. See $\left\{ \begin{array}{l} \text{TEMPERAMENT} \\ \text{TEMPERAMENT} \\ \text{TEMPERING} \end{array} \right\}$ in *music*.

TEMPERAMENT, TEMPERAMENTUM, TEMPERATURE, in physics, that habitude or disposition of a body arising from the proportion or the four primary elementary qualities it is composed of.

The notion of *temperament* arises from that of mixture, where different elements, as earth, water, air and fire (or, to speak more justly in the peripatetic way, hot, cold, moist, and dry) are blended together; by their opposition, they tend mutually to weaken and encroach on each other: and from the whole arises a sort of temperate crisis, or coalition of them all in this or that proportion; whence, according to the quality that prevails or predominates, we say a *hot* or *cold*, a *moist* or *dry* temperament.

It is controverted among the school-men, whether the *temperament* properly comprehends all the four primary qualities? or, whether those do not all cease, and a new one, a fifth, simple quality, result from the total alteration made in the other four, by their mutual action on each other?

Authors distinguish two kinds of *temperaments*, viz. *uniform*, and *diffuse*.—The first is that wherein all the qualities are mixed in an equal degree.—The second, where in an unequal one.

The uniform *temperament* can only be one; the *diffuse* admits of eight different combinations, since either any one, or any two of the qualities may prevail; whence *hot* and *moist*, *cold* and *moist*, &c.—Further, some considering that the qualities which do prevail, may not be in equal degree; and the like of those which do not prevail, make several other combinations or *temperaments*; and add 12 more to the number.—In effect, as there are infinite degrees between the highest and lowest pitch of any one of the elements, the different *temperatures* may be said to be infinite.

TEMPERAMENT, in medicine, is more particularly understood of the natural habitude and constitution of the body of man, or the disposition of the animal humours in any subject.

The notion of *temperament* arises hence, that the blood flowing in the veins and arteries, is not conceived to be a simple fluid, but a sort of an imperfect mixt, or an assemblage of several other fluids: for it does not only consist of the four simple, or primary qualities; but of four other secondary ingredients compounded thereof, into which it is supposed to be resolvable, viz. *choler*, *phlegm*, *melancholy*, and *blood*, properly so called.

Hence, as this or that ingredient humour prevails in a person, he is said to be of a *choleric*, *phlegmatic*, *melancholic*, sanguine, &c. *temperament*.

The ancient physicians brought these animal *temperaments* to correspond with the universal *temperament* above described: thus the *sanguine* temperament was supposed to coincide with *hot* and *moist*, the *phlegmatic* with *cold* and *moist*, the *melancholic* with *dry* and *cold*, &c.

Galen introduced the doctrine of *temperaments* into physic from the peripatetic school, and made it as it were the basis of all medicine; asserting that the whole of curing diseases consisted in *tempering* the degrees of the qualities, humours, &c.

On the footing medicine now stands, the *temperaments* are much less considered. The mechanical writers pare away the greatest part of the Galenic doctrine, as useless and uncertain, and consider the *temperaments* as no other than those diversities in the blood of different persons, whereby it becomes more apt to fall into certain combinations in one body than another, whether into *choler*, *phlegm*, &c. whence, according to them, people are denominated *choleric*, *phlegmatic*, &c.

The ancients distinguished two kinds of *temperaments* in the same body: the one *ad pondus*, in respect of weight; the other *ad justitiam*.

TEMPERAMENTUM ad pondus, is where the elementary qualities are found in equal quantities, and in equal proportions; such as they are supposed to be in the skin of the fingers, without which those parts would want the power of distinguishing objects with sufficient accuracy.

TEMPERAMENTUM ad justitiam, is that which contains unequal portions of those qualities, but yet in such proportion as is necessary for the discharge of the function proper to the part.—Such is the *temperament* in a bone, which contains more earthy than aqueous parts, to make it more hard and solid for its office of sustaining.

Galen observes, that the *temperament ad pondus* is only imaginary; and that though it were real, it could not subsist above one moment.

T E M

Dr. Pitcairn looks on the *temperaments*, or constitutions, as so many native diseases; according to him, any one induced with whatever *temperament* has the seeds of a real disease within him; a particular *temperament* supposing that some secretions are in greater proportion than is proper for life indefinitely long.

As the diversities of *temperaments* are no other than diversities of proportion in the liquids, which may be diversified infinite ways; so there may be an infinite number of *temperaments*: though authors have only supposed four. The sanguine, which is usually reckoned a *temperament*, the same author says, is no other than a plethora.

TEMPERAMENT, TEMPERAMENTO, in music, denotes a rectifying or mending the false or imperfect concords, by transferring to them part of the beauty of the perfect ones.

The degrees of the octave, which may be called its *elements*, as being the smallest intervals it is resolvable into, are two greater semitones, two lesser tones, and three greater tones.

Now the different situation of these elements, with respect to each other, occasions that intervals or concords of the same name, as thirds, fourths, &c. do not consist of the same degrees or elements, though there be always the same number of them: but one fourth, for instance, is agreeable and perfect, and another not.

To mend these imperfect concords, the musicians have be thought themselves to *temper*, i. e. give them part of the agreeableness of perfect ones. In order to this, they take a medium between the two, and this they call a *temperament*, which necessarily produces a new division of the octave, or which amounts to the same, new elements.

For instance, whereas naturally its elements are the greater semitone, and the greater and lesser tone; they take a middle tone formed of the greater and the less: and the only elements now are the greater semitone, and this mean tone, which renders the five intervals that are tones equal, and those that are semitones less unequal to these.

One might also divide each of the five tones of the octave into semitones, which, joined to the two it naturally has, would make twelve: in which case, the whole octave would be divided into twelve equal parts, which would be mean semitones.

It is easy to form various other kinds of *temperaments*: all the difficulty is to find such as are free from two great inconveniences, i. e. which do not alter either all the concords too much, or, at least, some of them.

All such divisions of the octave are called *tempered*, or *temperative systems*.

TEMPERATE Zone. See the article *ZONE*.

TEMPERATURE. See the article *TEMPERAMENT*.

TEMPERING, in the mechanic arts, the preparing of steel and iron, so as to render them more compact, hard, and firm; or even more soft and pliant; according to the respective occasions.

These metals are *tempered* by plunging them, while red-hot, in some liquor prepared for the occasion: sometimes pure water is used for that purpose; our locksmiths, &c. scarce use any other.

Sometimes a composition of divers juices, liquors, &c. is used; which is various, according to the opinion and experience of the workman; as vinegar, mouse-ear-water, nettle, or Spanish reddish-water, the water oozing from broken glasses, foot, salt, oil, distilled wine, sal armoniac, &c.

To harden and *temper* English, Flemish, and Swedish steel, you must give them a pretty high heat, then suddenly quench them in water to make them hard: but Spanish and Venetian steel will need only a blood-red heat before they be quenched.

If the steel be too hard, or brittle for an edge-tool, &c. let it down by rubbing a piece of grindstone or whetstone hard upon the work, to take off the black scurf: then brighten, or heat it in the fire; and as it grows hotter, you will see the colour change by degrees, coming first to a straw, or light goldish colour, then to a darker goldish colour, and at last to a blue colour. Chuse such of these colours as the work requires, then quench it suddenly in water.

The light gold colour is for files, cold chisels, and punches, that punch iron and steel: the dark goldish colour is for punches to use on brass, &c. The blue colour gives the *temper* for springs, &c.

The *tempering* of files and needles is performed in a peculiar manner.

The ancients appear to some to have had a better method of *tempering* than any of the moderns are acquainted withal; witness their works in porphyry; a stone so hard, that scarce any of our tools make any impression upon it. See *PORPHYRY*.

TEMPEST, TEMPESTAS, a storm, or violent commotion of the air, with or without rain, hail, snow, &c.

TEMPLARS, TEMPLERS, or *Knights of the Temple*, a religious-military order, first established at Jerusalem, in favour of pilgrims travelling to the Holy Land.

TEM

The original of this order, the first military one in the world, is this: In 1118, some pious and noble persons devoted themselves to the service of God, in the presence of the patriarch of Jerusalem; promising to live in perpetual chastity, obedience, and poverty, after the manner of canons.

The two principal persons were Hugo de Paganis, and Geoffrey of St. Omers. Baldwin II. then king of Jerusalem, gave them an apartment in his palace: near the temple at Jerusalem, not far from the sepulchre of our saviour; whence their denomination *Templari*.

Soon afterwards, the canons of the temple gave them a piece of ground hard by the said temple, to build them regular houses on; and the king, the lords, the patriarch, and the prelates, each gave them somewhat out of their revenue, for food and cloaths.

Their first undertaking, and what they had first in view at their institution, was to guard the highway against robbers, &c. chiefly for the safety of pilgrims and croises.

The principal articles of their rule were: That they should hear the holy office throughout every day; or, that when their military duties should prevent this, they should supply it by a certain number of pater noster: that they should abstain from flesh four days in the week, and on Fridays from eggs and milk-meats: that each knight might have three horses, and one esquire; and that they should neither hunt, nor fowl.

Their first rule was that of St. Bernard. Nine years after their foundation, a particular rule was prescribed them in the council of Troyes.

In every nation they had a particular governor, called *master of the temple*, or of the *militia of the temple*. Their grand master had his residence at Paris.

The order of *templari* was abolished at the beginning of the XIVth century, under Clement V. Edward II. of England, and Philip the Fair of France. In 1607, those in England were all arrested, and seven burnt alive. And in 1312, the order was quite suppressed in the council of Vienne, and 50 were burnt alive there.

The crimes they were charged withal were apostatizing to the Saracens, and holding correspondence with them. Some authors will have it, these crimes were only pretended; and that the true reason of the suppression of the order, was the immense riches they were possessed of. But though this might be some reason for their suppression, it could be none for burning them alive: add to this, that their effects were given to the hospitaliers, or knights of St. John. What then did the kings of England, &c. get by their suppression? And what was it to them which of those orders had the effects?

TEMPLE,* TEMPLUM, a public building, erected in honour of some deity, either true or false; and wherein the people meet to pay religious worship to the same.

* The word is formed from the Latin, *templum*, which some derive from the Greek *τεμεν*, signifying the same thing; and others from *tema*, *obscuro*, *teat off*, *separate*, in regard a temple is a place separated from common uses; others with more probability derive it from the old Latin word *templare*, to contemplate. It is certain, the ancient authors gave the name *templa* to those parts of the heavens which they marked out for the observation of the flight of birds.—Their formula was this: *templa telegua fante*.

Clemens Alexandrinus and Eusebius refer the origin of *temples* to the sepulchres built for the dead. Herodotus and Strabo will have the Egyptians to have been the first who built *temples* to the gods. The first, erected in Greece, is ascribed to Deucalion, by Apollonius, *Argonaut. lib. 3*.

In antiquity we meet with many people who would not build any *temples* to their gods, for fear of confining them to too narrow bounds. They performed their sacrifices in tall places indifferently, from a persuasion that the whole world is the temple of God, and that he requir'd no other.—This was the doctrine of the magi, followed by the Persians, the Scythians, the Numidians, and many other Nations mentioned by Herodotus, lib. 1. Strabo, lib. 15. and Cicero in his second oration against Verres.

The Persians, who worshipped the sun, believed it would wrong his power, to inclose him in the walls of a temple who had the whole world for his habitation; and hence, when Xerxes ravaged Greece, the Magi exhorted him to destroy all the temples he met with.

The Sicyonians would build no temple to their goddess Coronis; nor the Athenians, for the like reason, erect any statue to Clemency, who, they said, was to live in the hearts of men, not within stone-walls.

The Bithynians had no temples, but the mountains to worship on; nor had the ancient Germans any other but the woods. Even some philosophers have blamed the use and building of temples, particularly Diogenes, Zeno, and his followers the Stoics.—But it may be said, that if God have no need of temples, men have need of places to meet in for the public offices of religion! Accordingly, temples may be traced back even into the remotest antiquity. See Hespinian, *de Origine Templorum*.

TEM

The Romans had several kinds of temples; whereof those built by the kings, &c. consecrated by the augurs, and wherein the exercise of religion was regularly performed, were called, by way of eminence, *templa*, temples.—Those that were not consecrated, were called *ædes*.—The little temples, that were covered or roofed, they called *ædicula*.—Those open, *frons*.—Some other edifices consecrated to particular mysteries of religion, they called *fanæ* and *delubra*.

All these kinds of temples, Vitruvius tells us, had other particular denominations, according to the form and manner of their construction; as will be hereafter specified.

Indeed, the Romans out-did all nations in the point of temples: they not only built temples to their gods, to their virtues, to their diseases, &c. but also to their emperors, and that in their life-time; instances whereof we meet withal in medals, inscriptions, and other monuments. Horace compliments Augustus hercupon, and sets him above Hercules, and all the heroes of fable; in that those were only admitted into temples after their death, whereas Augustus had his temples and altars while living.

Præsent tibi maturos largimur honores;

Jurandisque tuum per nomen pinimus Aras. Epist. ad Aug.

* Suetonius, on this occasion, gives an instance of the modesty of that emperor, who would allow of no temples being erected to him in the city; and even in the provinces, where he knew it usual to raise temples to the very pious, refused any but those erected in the name of Rome as well as his own. Vid. Suet. in Cæsar. c. 52.

TEMPLE, in architecture.—The ancient temples were distinguished, with regard to their construction, into various kinds; as,

TEMPLE in ante, Aedes in antiis. These, according to Vitruvius, were the most simple of all temples, having only angular pilasters, called *antæ*, or *parastatæ*, at the corners, and two tuscan columns on each side the doors.

Tetrastyle-TEMPLE, or simply *tetrastyle*, was a temple that had four columns in front, and as many behind—such was the temple of Fortuna Virilis at Rome.

Prostyle-TEMPLE, that which had only columns in its front, or fore-side—as that of Ceres at Eleusis, in Greece.

Amphiprostyle, or double prostyle-TEMPLE, that which had columns both before and behind, and which was also tetrastyle.

Periptere-TEMPLE, that which had four rows of insulated columns around, and was hexastyle, i. e. had six columns in front—as the temple of Honour at Rome.

Diptere-TEMPLE, that which had two wings, and two rows of columns around, and was also octostyle, or had eight columns in front—as that of Diana at Ephesus. See **DIPTERE**.

Pseudo Diptere-TEMPLE, } See **PSEUDO DIPTERE**.
Hypæthros-TEMPLE, } See **HYPÆTHROS**.
Monoptere-TEMPLE, } See **MONOPTERE**.

TEMPLES, among us, denote two ins of court, thus called, because anciently the dwelling-house of the knight-templars.

At the suppression of that order, they were purchased by some professors of the common law, and converted into hospitia, or inns of courts.

They are called the *inner* and *middle temple*, in relation to Essex-house, which was also a part of the house of the templars, and called the *outer temple*, because situate without Temple-Bar.

In the *middle temple*, during the time of the templars, the king's treasure was kept: as was also that of the kings of France in the house of the templars at Paris.

The chief officer was the master of the temple, who was summoned to parliament in 49 Hen. III. And from him the chief minister of the temple-church is still called *master of the temple*.

TEMPLERS. See the article **TEMPLARS**.

TEMPLES, TEMPORA, in anatomy, a double part of the head, reaching from the forehead and eyes to the two ears. See **HEAD**.

The temples are chiefly formed of two bones, called *os temporis*.

These parts, according to physicians, were called *tempora*, from their shewing the age or time of man, by the colour of the hair, which turns white in this part before any other, which Homer seems to have been aware of, by his calling some men *Polyetapthi*, q. d. grey-templed.

TEMPORAL, TEMPORALIS, a term frequently used for secular—in which sense it stands opposed to *ecclesiastical*.

Pope Boniface wrote to Philip the Fair of France, that he was subject to him both in spirituals, and temporal.—At present all the doctors on this side the Alps own the supremacy of kings in temporal.

TEMPORAL A.Ven., } See the articles **SACRAGON**.
TEMPORAL Augment., } See the articles **AUGMENT**.

TEMPORALIS, in anatomy, a muscle, which arises by a semi-circular fleshy beginning, from a part of the os frontis, the

the lower part of the premaxilla, and upper part of the temporales from whence passing under the zygoma, and gathering together, as in a centre, it is inserted, by a short and strong tendon, into the processus coracæ of the lower jaw, which it pulls upward.—See *Tab. Anat. (Myol.) fig. 1. n. 12, fig. 6. n. 2, fig. 7. n. 1.*

This muscle is also called *cratophytes*, and is covered with a strong tendinous fide.

TEMPORALITES, or **TEMPORALITIES**, the temporal revenues of an ecclesiastic; particularly, such lands, tenelements, or lay-tees, tithes, &c. as have been annexed to bishoprics by our kings, or other persons of high rank in the kingdom.

The *temporalities* of a bishop, &c. stand opposed to his spiritualities.

The canonists on the other side the Alps anciently gave the pope a power over the *temporalities* of kings. Yet pope Clement V. owned frankly, that his predecessor Boniface VIII. had exceeded the just bounds of his authority, in meddling with the *temporalities* of the king of France. Fevret.

TEMPORALIUM Cuslos.

TEMPORALIUM Restitutio.

TEMPORARY Fortification.

TEMPORARY Hens.

TEMPORIS O. **TEMPLE Bone**, a bone on each side the head: thus denominated from its situation in the temples.

The figure of the *os temporis* is nearly circular: the fore and upper parts are very thin, consisting only of one table: the lower and hind parts are thick, hard, and uneven.

It is joined to the *os sincipitis*, by a squamous future; whence, in that part, it is called *os squamosum*. Its lower part is joined to the *os occipitis*, and sphenoides: to which latter, as I know to the bones of the upper jaw, it is joined by means of certain processes, and in that part is called *os petrosum*.—See *Tab. Anat. (Osteol.) fig. 2. lit. b. & fig. 13. lit. a.*

Each of the *os temporum* has two sinu's; the exterior whereof is lined with a cartilage, and receives the process of the lower jaw; the interior receives the lower part of the sinus lateralis of the dura mater. Each likewise has four processes; the *os jugale*, *processus mamillaris*, *styloides*, and *os petrosum*. See each described under its proper article, **MAMILLARIS**, &c.

TEMPTATION, **TENTATIO**, in theology, an induction, or solicitation to evil; whether arising from the world, the flesh, or the devil.

Mythic divines speak of *profitable temptations*, which are those trials the soul is to pass through, before it arrives at the unitive life, and the peace within.—When it surmounts that dryness and darkness it falls into, through a suspension of the effects of divine love, and can resist the world, and all the allurements it presents; these *temptations* are called *tentationes utiles* and *fructuosæ*.

TEMPTATION, **TENTATIO**, in our ancient law books, is used for a trial, proof, or assay.—*Tentatio panis fiat bis in anno.* Chart. Edw. I. See **ASSAY**, &c.

TENABLE,* in the military art, something that may be defended, kept, and held against assailants.

* The word is French formed from *tenir*; as that from the Latin, *tenere*, to hold.

Tenable is little used, but with a negative: when a place is open on all sides, and its defences all beaten down, it is no longer *tenable*. When the enemy has gained such an eminence, this post is not *tenable*.

TENAILLE, in fortification, a kind of out-work, consisting of two parallel sides, with a front, wherein is a re-entering angle.

In strictness, that angle, and the faces which compose it, are the *tenaille*.

The *tenaille* is of two kinds: *simple* and *double*.

Singles, or **single TENAILLE**, is a large out-work, as DABCE, consisting of two faces or sides AB and CB, including a re-entering angle B.—See *Tab. Fortif. fig. 6. & fig. 21. lit. d.*

Double, or **double TENAILLE**, is a large out-work consisting of two simple *tenailles*, or three salans, and two re-entering angles, FGH and HIK.—See *Tab. Fortif. fig. 7. and 21. lit. a.* See also **FLANKED**.

The great defects of *tenailles* are, that they take up too much room, and on that account are advantageous to the enemy; that the angle B is undefended; the height of the parapet hindering the seeing down into it, so that the enemy can lodge there under covert, and the sides AD and CE are not sufficiently flanked.

For these reasons, *tenailles* are now excluded out of fortification by the best engineers; and never made, but where there was time to form a horn-work.

TENAILLE of the Place, is the front of the place, comprehended between the points of two neighbouring bastions; including the curtain, the two flanks raised on the curtain, and the two sides of the bastions which face one another.

So that the *tenaille* in this sense is the same with what is otherwise called the *face of a fortress*.

TENAILLE of the Ditch, is a low work raised before the curtain, in the middle of the foss or ditch.

It is of three sorts: the first is composed of a curtain, two flanks, and two faces: the rampart of the curtain, including the parapet and talus, is but five fathom thick, but the rampart of the flanks and faces seven.—See *Tab. Fortif. fig. 21. lit. c.*

The second, which Vauban faith he found to be of very good defence, is composed only of two faces, made on the lines of defence, whose rampart and faces are parallel.

The third fort only differs from the second in this, that its rampart is parallel to the curtain of the place.

All three forts are good defences for the ditch, and lie so low, that they cannot be hurt by the besiegers cannon, till they are masters of the covert-way, and have planted their artillery there.

TENANCY, a habitation or house to live in, or a tenement, or possession held of another.

Entire TENANCY. See the article **ENTIRE**.

TENANT, or **TENENT**, **TENENS**, in law, one that holds or possesses lands and tenements of some lord or landlord, by any kind of right either in fee, for life, years, or at will.

The term *tenant* is used with divers additions—thus, *Tenant in dower*, is she that possesses lands by virtue of her dower.

Tenant per statute-merchant, he that holds land forfeited to him by virtue of a statute.

Tenant in frank-marriage, is he that holds lands or tenements by virtue of a gift thereof made to him upon marriage between him and his wife.

Tenant by courtesy, holds for his life, by reason of a child begotten by him of his wife, being an inheritrix and born alive.

Tenant by elegit, holds by virtue of the writ called an *elegit*.

Tenant in mortgage, holds by means of a mortgage.

Tenant by verge, in ancient demesne, is he who is admitted by the lord in court to lands in ancient demesne.

Tenant by copy of court-roll, is one admitted *tenant* of any lands, &c. within a manour, which time out of mind have been demised according to the custom of the manour. See **COPYHOLD**.

Tenant paravail. See the article **PARAVAIL**.

Tenant by charter, is he that holdeth by feoffment in writing or other deed. See **CHARTER**, and **FREEHOLD**.

Tenant in capite or chief, holdeth of the king in right of his crown.

Tenant of the king, is he that holdeth of the person of the king. *Joint TENANTS*, those who have equal right in lands or tenements by virtue of one title.

TENANTS in common, those who have equal right, but hold by divers titles.

Particular TENANT, he that holds only for his term.

Sole TENANT, is he who hath no other joined with him.

TENANT by execution, is he who holds by virtue of an execution upon any statute, recognizance, &c.

Customary TENANTS, See the articles **CUSTOMARY**.

Terre-TENANT, See the articles **TERRE-TENANT**.

Very TENANT, See the articles **VERY**.

Anciently, there were also *tenant by knight-service*, *tenant in burgage*, *tenant in socage*, *tenant in frank-fee*, *tenant in villenage*—and there are still *tenant in fee-simple*, *tenant in fee-tail*, *tenant upon sufferance*, &c.

TENANT, or **TENAN**, in heraldry, is used for something that sustains, or holds up the shield, or armory; and is generally synonymous with the word *supporter*.

The difference which some authors make between the two is, that *tenants* are single, and *supporters* double, one placed on each side the shield. But the proper distinction seems to consist in this, that *tenants* are human figures, and *supporters* figures of beasts.

There are various forms of *tenants*, as well as of *supporters*, viz. angels, maids, religious, savages, Moors, &c.

The first tenants, F. Menestrier observes, were trunks or branches of trees; to which the escutcheons were fastened by straps and buckles. Afterwards, the knights were represented as holding their own escutcheons, which were either hung to their neck, or else they leaned on them.

The origin of *tenants* and *supporters* is, by many, referred to the ancient tournaments, wherein the cavaliers had their arms bore by servants disguised like savages, Moors, fabulous deities, bears, lions, &c. See **SUPPORTER**.

TENAR, in anatomy. See the article **TENAR**.

TENCH-Fishing. See the article **TENCH-FISHING**.

TENDER

TENDER, in a legal sense, signifies as much, as to offer, or endeavour the performance of any thing, in order to save the penalty or forfeiture incurred by non-performance.

Thus, to *tender rent*, is to offer it at the time and place where and when it ought to be paid : which will save the condition for that time, though the landlord refuse to accept it.

TENDER, in the sea language, is a vessel, attending on some other larger, and more considerable one. See **BOAT**.

TENDINOSUM Centrum. See the article **CENTRUM**.

TENDON, **TENDO**, in anatomy, that hard, white, extreme part of a muscle, whereby it is fastened to the bone.

Most muscles have, at least, two *tendons*, one at each extreme : that fastened to that part toward which the motion is to be performed, is called the *head of a muscle*; and that fastened to the part drawn toward the other, the *tail of the muscle*.

The fibres, whereof the *tendons* consist, have been supposed to be nervous; but they are now found to be no other than productions of the same fibres, which make the belly or body of the muscle. All the difference between them is, that in the belly of the muscle they are lax, and at a distance from each other; whereas in the *tendon*, they are more closely and firmly connected.

Their whiteness proceeds wholly from the blood's being excluded, by the tightness of their texture: in effect there is the same difference between them, that there is between a skein of thread, and a cord made of the same thread.

The fibres of the *tendons* undergo no contraction, or dilatation, as those of the belly of the muscle do; they act as mere cords, to draw the parts towards each other.

Suture of a Tendon, is a very delicate operation in chirurgery. It had been abandoned a long time, and was not re-established till the last century by J. Bichat.

TENDON of Achilles. See the article **ACHILLES**.

Mr. Cowper (in the *Philosophical Transactions*) gives us an account of a cure of the *great tendon*, or *tendon of Achilles*, above the heel, after an entire division, by stitching.

Puncture of a Tendon. See the article **PUNCTURE**.

TENEBRÆ, *Darkness*, in the Romish church, a service performed on the Wednesday, Thursday, and Friday before Easter, in commemoration of the agony of our Saviour in the garden.

TENEMENT, **TENANCY**, in law, a house or lands, depending on a manour or lordship; or a fee, or farm, held of a superior lord, and which he may recall, when the term or condition is expired.

Frank TENEMENT, is any lands, house, office, or the like wherein a man has estate for life, or in fee.

Base TENEMENT, is where a man holds lands, &c. at the will of the lord.

Yet Kitchin, Briton, &c. make *frank tenement* and *base tenement* opposites; on which footing *frank tenement* should be where the tenant is at liberty to quit it when he pleases.

TENEMENTARY Lands, among our ancestors, were the outlands of manours, which the Saxon thanes or nobles let out to tenants under arbitrary rents, and services.

TENEMENTIS Legatis, in law, a writ which lies in London and other places, where the custom is to devise *tenements* by last will, as well as personal goods and chattels; for the hearing of any cause relating thereto.

TENENT. See the articles **TENANT**, and **TENET**.

TENENTES Nativi. See the article **NATIVE**.

TENENTIBUS in assisa non onerandis, a writ which lies for him to whom a disseisor has made over land, whereof he disseised another; requiring that he be not disturbed in assise for the damages awarded, if the disseisor have wherewithal to satisfy them.

TENESMUS, * **TEINEEMOS**, in medicine, a continual painful inclination to go to stool; yet without voiding any thing, unless, sometimes, a little purulent, or bloody slime.

* The word is formed from the Greek, *τενω, tendere, to stretch, bend*, in regard those attacked with this disease feel a continual tension in the fundament.

The cause of the *tenesmus* is a sharp, pungent humour, irritating the intestinum rectum, and exciting those troublesome endeavours to evacuate.—Those affected with the stone are also subject to the *tenesmus*, from the communication, or contact between the bladder and the rectum.

The cure of a *tenesmus* depends on proper evacuations and astringents; the former always preceding the latter; such are bleeding, if plethoric; and gentle cathartics, especially of the powder of rhubarb, &c.—An emetic of the Indian root, *ipeacuanha*, has been found of great service in a long standing *tenesmus*; for the augmenting one evacuation is the lessening of another; and in this particular becomes so much the more serviceable, as they happen to be contraries.

The restringents are such as are of use in other fluxes.

TENET, or **TENENT**, a particular opinion, dogma, or doctrine, professedly held by some divine, philosopher, &c.

The distinguishing *tenets* of the several sects in religion and philosophy, see under the names of the sects themselves.

TENIA. See the article **TANIA**.

TENMENTALE, or **TENMENTALE**, in our ancient customs, originally signifies the number of ten men; which number, in the time of the English Saxons, was called a *decenary*; and ten decennaries made what we call a hundred.

These ten men were bound for each other to preserve the public peace; and if any of them was found guilty of a breach thereof, the other nine were either to make satisfaction, or to bring the criminal before the king.

TENMENTALE was also used for a duty, or tribute paid to the king, consisting of two shillings for each plough-land; probably thus called, by reason each person of the decenary was bound to see it paid.

TENNE, **TENNY**, or **TAWNY**, in heraldry, a bright colour, made of red and yellow mixed; sometimes also called *brusk*, and expressed in engraving by thwart or diagonal strokes or hatches beginning from the sinister chief, like purple, and marked with the letter T.

In the coats of all below the degree of nobles, it is called *tenny*; but in those of nobles, it is called *hyacinth*; and in princes coats, the *dragon's head*.

TENON, in building, &c. the square end of a piece of wood, or metal, diminished by one third of its thickness, to be received into a hole in another piece, called the *mortise*, for the jointing or fastening the two together.

Among joiners, &c. the *tenon* is made in various forms, square, dove-tail'd, for double mortises, &c.

Vitruvius calls the *tenons*, *cardines*; dove-tailed *tenons* he calls *subscutes*, or *securacula*.

TENON-Saw. See the article **SAW**.

TENOR, **TENOUR**, the purport, or contents of a writing, or instrument in law, &c.

Warrants issued for the confirmation of sentences, express, that they shall be executed according to their form, and *tenor*.—It was impossible to retain so long a speech word for word, but the substance, or the *tenor* is this.

TENOR, **TENORE**, in music, the first mean or middle part; or that which is the ordinary pitch or tenor of the voice, when not either raised to the treble, or lowered to the base.

The *tenor* is frequently marked in thorough bases with the letter T.—The *tenor* is a part which almost all grown persons can sing. But as some have a greater compass of voice upwards, others downwards, others are confined to a kind of medium, and others can go equally either higher or lower; hence the French musicians make a variety of *tenors*—as, a counter *tenor*, a mean *tenor*, a natural *tenor*, and an upper *tenor*: to which is also added, a re-acting *tenor*, *viol tenor*, *violin tenor*, &c.

The Italians usually distinguish no more than two kinds of *tenors*, viz. *tenore primo*, or P^o or I^o, which answers to our upper *tenor*; and *tenore secundo*, or 2^o or II^o, which is our natural *tenor*; confounding the counter *tenors*, &c. under the name *baritono*.

TENOR, or **TENORISTA**, is also used for a person who sings the *tenor* part in concert—and also for any instrument proper to play it.

TENORE Indictamenti mittendo, is a writ whereby the record of an indictment and the process thereupon is called out of another court into the King's bench.

TENOUR. See the article **TENOR**.

TENSE, **TIME**, in grammar, an inflexion of verbs, whereby they are made to signify, or distinguish the circumstance of time of the thing they affirm, or attribute.

The affirmations made by verbs are different as to point of time; since we may affirm a thing *is*, or *was*, or *will be*: hence, a necessity of a set of inflections, to denote those several times; which inflections, our English grammarians call by a barbarous word *tenses*, from the French *temps*; most other languages call them simply *times*.

There are but three simple *tenses*: the *present*, as *I love, amo*; the *preter*, *preterit*, or *past*, as, *I have loved, amavi*; and the *future*, as, *I will love, amabo*.

But in regard, that in the *preter tense* one may either express the thing as just done or past, or indefinitely and barely that it was done: hence, in most languages, arise two kinds of *preteritis*; the one *definite*, marking the thing to be precisely done; as, *I have written, I have said*: and the other *indefinite*, or *aorist*, denoting a thing done indeterminately; as, *I wrote, I went*.

The *future tense* admits also of the same variety.

Beside the three simple *tenses*, others have been invented, called *compound tenses*; expressing the relation of the simple ones to each other.—The first expresses the relation of the *past* to the *present*, and is called the *preterimperfect tense*, because it does not mark the thing simply, and properly as done, but as im-

perfect, and present with respect to another thing past: as, *I was at supper when he entered*; *Cum intravit, cenabam*.

The second compound *tenſe* marks the time past doubly, and is therefore called the *plusquamperfect tenſe*; as, *I had ſupped, cenaveram*.

The third compound *tenſe* denotes the future with respect to the past; as, *I ſhall have ſupped, cenavera*.

The ſeveral *tenſes* or times, it is to be obſerved, are properly denoted in the Greek and Latin by particular inflexions; in the Engliſh, French, and other modern tongues, the auxiliary verbs to *be* and to *have*, *être* and *avoir*, are called in.

As to the oriental languages, they have only two ſimple *tenſes*, the *paſt* and *future*, without any diſtinctions of imperfect, more than perfect, &c. but this renders thoſe languages ſubject to abundance of ambiguities which others are free from.

TENSION, TENſIO, the ſtate of a thing bent, or the effort made to bend it.

Animals only ſuſtain and move themſelves by the *tenſion* of their muſcles, and nerves. A chord or ſtring gives an acuter or a deeper ſound, as it is in a greater or leſs degree of *tenſion*.

TENSOR, in anatomy. See the article **EXTENSOR**.

TENT, * **TABERNACLE**, a pavilion, or portable lodge, under which to ſhelter in the open field, from the injuries of the weather. See **TABERNACLE**.

* The word is formed from the Latin, *tentorium*, of *tendo*, I ſretch, in regard *tents* are uſually made of canvas ſtretched out, and ſuſtained by poles, with cords and pegs.

Armies encamp under *tents*: moſt of the Tartars and Arabs are wandering people, that always lodge under *tents*.

The Hebrews lodged forty years under *tents* in the deſert; which gave occaſion to the ſcenopegy or feaſt of tabernacles.

DARK TENT. See the article **DARK**.

TENT, TURUNDA, in ſurgery, is a roll of lint, made in a particular form, and put into wounds whole ſuppuratiſm is not perfect, and where there is a quantity of matter contained in the tumour, more than what comes out at the fiſt dreſſing.

Tents are uſed in order to hinder the cloſing too ſoon. But ſeveral chiriurgical writers, and particularly the author of the *Hopſtal Surgeon*, gives us numerous inſtances, wherein the uſe, eſpecially of hard *tents*, has proved prejudicial in protracting the cure, bringing on inflammations, ſinus's, mortifications, &c. in wounds and ulcers.—To remedy this, he propoſes, that the liniments, &c. be made of a liquid conſiſtence, either naturally, or by warming them; and that where *tents* may ſeem indiſpenſably neceſſary, as in large cavities, the orifice may be enlarged, and ſoft doſils put inſtead of them, which will prevent the miſchiefs commonly attending *tents*.

TENTATIVE, is ſometimes uſed adjectively: thus we ſay, a *tentative method*, meaning a kind of unartful or indirect method, which only proceeds by trying.

TENTATIVE is alſo uſed ſubſtantively, for an eſſay, or effort, whereby we try our ſtrength, or found an affair, &c. to ſee whether or no it will ſucceed.

In the French univerſities, **TENTATIVE** is the fiſt theſis or act which a ſtudent in the theology ſchool holds to ſhew his capacity: if he answers well, in this, the degree of bachelor is conferred on him.

TENTER, TRYER, or PROVER, a machine uſed in the cloth manufactory to ſtretch out the pieces of cloth, ſtuff, &c. or only to make them even, and ſet them ſquare.

It is uſually about four feet and a half high, and for length exceeds that of the longeſt piece of cloth.—It conſiſts of ſeveral long ſquare pieces of wood, placed like thoſe which form the barriers of a manege, ſo, however, as that the lower croſs-piece of wood may be raiſed or lowered, as is found requiſite, to be fixed at any height, by means of pins.—Along the croſs-pieces, both the upper and under one, are hooked nails, called *tenter-hooks*, driven in from ſpace to ſpace.

To put a piece of cloth on the **TENTER**: while the piece is yet quite wet, one end is faſtened to one of the ends of the *tenter*; then it is pulled by force of arms towards the other end, to bring it to the length required: that other end being faſtened, the upper liſt is hooked on to the upper croſs-piece, and the loweſt liſt to the loweſt croſs-piece, which is afterwards lowered by force, till the piece have its deſired breadth.—Being thus well ſtretched, both as to length and breadth, they bruſh it with a ſtiff hair-bruſh, and thus let it dry.—Then they take it off; and till they wet it again, it will ſtill retain the length and breadth the *tenter* gave it.

TENTH, Decima. See the article **TITH**.

TENTH pair of Nerves. See the article **NERVE**.

TENURE, TENURA, in law, the manner or condition wherein a tenant holds lands, or tenements of his lord; or the ſervices performed to the lord, in conſideration of the uſe and occupancy of his lands.

The kinds of ſervice, and conſequently of *tenures*, are almoſt infinite. See **SERVICE**.

Thoſe for lands held of the king, are either *great*, or *petty ſerjeanty*, in *capite*, *knightſervice*, &c.

Thoſe held of the lords were very various, *baſe*, *frank*, &c. by *homage*, *ſocage*, &c. See **BASE**, **FRANK**, &c.—The common *tenures* at this day are fee-ſimple, fee-tail, by curteſy, in dower, for life, or for years, or by copy of court-roll.

Barons by ancient TENURE. See the article **BARON**.

TEREBINTHINA, in medicine, natural hiſtory, &c. See the article **TURPENTINE**.

TEREBRA. See **TREPANUM**.

TERES, in anatomy, a name given to two muſcles of the arms, called alſo *rotundi*; diſtinguiſhed by *major* and *minor*.

TERES, or *rotundus major*, ariſes from the lower angle of the baſis of the ſcapula, and aſcending obliquely upwards, in a round ſmooth body, under the head of the longus, is inſerted with a ſhort flat tendon into the neck of the os humeri.—See *Tab. Anat.* (Myol.) fig. 1. n. 40.

The **TERES**, or *rotundus minor*, called alſo *tranſverſalis*, is frequently wanting, or at leaſt, is ſo conſounded with the *infracapſatus*, that it is loſt therein. It ariſes from the inferior angle of the ſcapula, and aſcending obliquely in a round ſheſhy body, paſſes over the upper head of the longus, and is inſerted by a ſhort flat tendon below the os humeri.

TERES Pronator Radii. See the article **PRONATOR**.

TERGIFCETOUS Plants, ſuch as bear their ſeeds on the backſides of their leaves.

Such are the **Capillaries**. See the article **CAPILLARY**.

TERM, TERMINUS, the extreme of any thing, or that which bounds and limits its extent. See **EXTREME**.

TERM, in geometry, is ſometimes uſed for a point, ſometimes for a line, &c.—A line is the *term* of a ſuperficies: and a ſuperficies, of a ſolid.

This is what the ſchools call *terminus quantitatis*.

TERM, in law, ſignifies a boundary or limitation of time, or eſtate.

In this ſenſe we ſay, a *leaſe for term of life*, for *term of years*, &c.

TERMS, * **TERMES, TERMINI**, in architecture, denote a kind of ſtatues, or columns adorned a-top with the figure of a man's, woman's, or ſaty'r's head, as a capital; and the lower part ending in a kind of ſheath, or ſcab-board.

* Some write the word *thermes*, from *bermer*, a name the Greeks gave the god Mercury; whole ſtatue, made after this manner, was placed in ſeveral of the croſs ways in the city of Athens, &c. Others bring the etymology of the word from the Roman god *Terminus*, the protector of land-marks, whole ſtatue (made without hands or feet, that he might not change his place) was uſed to be planted at the bounds of lands to ſeparate them.

Terms are ſometimes uſed as conſoles, and ſuſtain entablatures; and ſometimes as ſtatues, to adorn gardens.

Of theſe *termini*, the architects make great variety, viz. *angelic*, *ruſtic*, *marine*, *double*, in *buſt*, &c.

Military TERMS, termini militares, among the ancient Greeks, where the heads of certain divinities, placed on ſquare land-marks of ſtone, or on a kind of ſheath, to mark the ſeveral ſtadia, &c. in the roads. Theſe are what Plautus calls *lars viales*.

They were uſually dedicated to Mercury, whom the Greeks believed to preſide over the highways.

Some of them were repreſented with four heads; ſuch as we ſtill ſee in Rome, at the end of the Fabrician bridge, which is hence called *ponte de quattro capi*. It is known that Mercury was thus repreſented; and alſo called by the Latins *Mercurius quadrifrons*, as being ſuppoſed the fiſt who invented the uſe of letters, muſic, wreſtling, and geometry. See **HERMES**.

TERMS are alſo uſed for the ſeveral times or ſeaſons of the year, wherein the tribunals, or courts of judicature, are open to all who think fit to complain of wrong, or to ſeek their own by due courſe of law, or action.

In contra-diſtinction to theſe, the reſt of the year is called *vacation*.

Of theſe *terms* there are four in every year, during which time matters of juſtice are diſpatched.

Hilary-term, which, at London, begins the 23d day of January; or if that be Sunday, the next day after, and ends the 12th of February following.

Eaſter-term, which begins the Wednesday fortnight after Eaſter-day, and ends the Monday next after Aſcenſion-day.

Trinity-term, beginning the Friday next after Trinity-ſunday, and ending the Wednesday fortnight after.

Michaelmas-term, which begins the 23d of October, and ends the 28th of November following.

Each of theſe *terms* have alſo their returns. See **RETURNS**.

Oxford-TERMS. *Hilary* or *Lent-term* begins January 14, and ends the Saturday before Palm-ſunday. — *Eaſter-term* begins

the 10th day after Easter, and ends the Thursday before Whit-funday.—*Trinity-term* begins the Wednesday after Trinity-funday, and ends after the act, sooner or later, as the vice-chancellor and convocation please.—*Michaelmas-term* begins October the 10th, and ends December the 1th.

Cambridge-TERMS. *Long-term* begins January the 13th, and ends the Friday before Palm-funday.—*Easter-term* begins the Wednesday after Easter-week, and ends the week before Whit-funday.—*Trinity-term* begins the Wednesday after Trinity-funday, and ends the Friday after the commencement.—*Michaelmas-term* begins October the 20th, and ends December the 16th.

Scottish-TERMS. In Scotland, *Candlemas-term* begins January the 23d, and ends February the 12th.—*Whitsuntide-term* begins May the 25th, and ends June the 15th.—*Lammas-term* begins July the 20th, and ends August the 8th.—*Martinmas-term* begins November the 3d, and ends November the 20th.

Irish-TERMS. In Ireland the *terms* are the fairs at London, except *Michaelmas-term*, which begins October the 13th, and adjourns to November the 3d, and thence to the 6th.

TERM, in grammar, denotes some word, or expression, in a language. See **WORD**.

The word *term*, *terminus*, is borrowed metaphorically, by the grammarians and philosophers, from the measurers or surveyors of lands: as a field is defined and distinguished by its *termini*, or limits, so is a thing or matter spoken of by the word or *term* it is denoted by.

Some of our philosophers complain loudly of the great use, or rather abuse, of vague and general *terms*, which have no precise, definite signification.—To distinguish these, F. Malebranche observes, that every thing that is, (whether it have actual existence, or not) and of consequence every thing that is intelligible, is either a being, or a mode and manner of being: where, by being, is meant whatever is absolute, or which may be conceived alone, and without relation to any other thing; and by manner of being, whatever is relative, or which cannot be conceived alone.

Now, there are two kinds of manners of being; the one consisting in the relation of the parts of a whole, to some part of the same whole; the other in the relation of one thing to another: of the first kind is the roundness of a piece of wax; and of the second, the motion or situation of that same wax. If then, every thing, that is intelligible, be reducible either to beings, or matters of being, it is evident, every *term* which does not signify either of those things, signifies nothing; and that every *term* which does not signify either a being, or a manner of being, is an obscure and confused *term*.

In metaphysics, the use of such *terms* is sometimes necessary and allowable, as in speaking of the divine perfections, &c. But in physics it is always mischievous, and yet nothing is more common; e. gr. when we say, that bodies tend to their centre, that they fall by their weight, that they rise by their levity, that they move by their nature, that they change successively their forms, that they act by their virtues, qualities, faculties, &c. we use *terms* which signify nothing; and all those propositions are absolutely false in the sense most philosophers understand them.

There is no centre, in the sense commonly meant; and the *terms*, *weight*, *form*, *nature*, *quality*, and the like, do not awaken any idea either of a being, or manner of being: they are *terms* void of sense, and which persons of understanding should always avoid.

Scientia insonfati inenarrabilia verba.

TERM, in the arts, or **TERM of art**, is a word which, besides the literal and popular meaning which it has, or may have in common language, bears a further and peculiar meaning in some art, or science. See **ART**.

Or, a *term* is a word which has one or more meanings beside its grammatical one; or which has a peculiar force or import in the language of some particular science or art.

A word then becomes a *term* when its idea is rendered more complex, consists of more parts, and includes more special circumstances on some occasions than on others.

It is this greater complexness, this excess of constituent parts in the idea, that denominates it a *term* in the general.

Further, as the parts of the idea signified by any word are arbitrary, and as one may not only add new parts to those contained in the literal meaning, but also super-add others to them, alter them, extend them, and otherwise modify them at pleasure: hence the same word becomes a *term* of this or that art, or both, as the inventors or improvers of those arts have thought fit to adopt it for the common basis of certain ideas, and to modify and circumstantiate its meaning to the use of their respective arts.

See the nature and office of a *term* further illustrated in the preface to this work. See also the article **DEFINITION**.

Complex TERMS	} See the articles	COMPLEX.
Equivalent TERMS		EQUIVALENT.
General TERMS		GENERAL.
Relative TERMS		RELATIVE.
Universal TERMS		UNIVOCAL.

TERM in Logic—A proposition is said to consist of two *terms*,

i. e. two principal and essential words, the *subject* and the *attribute*.

A syllogism consists of three *terms*, the *major*, *minor*, and *conclusion*. A syllogism containing four *terms*, is vicious.

TERMS of an Equation, in algebra, are the several monomes or members of which it is composed, wherein the unknown letter is found, but in different powers and degrees; for if the same unknown letter be found in several members in the same degree or power, they all pass but for one *term*. See **EQUATION**.

Thus in this equation $a + a + b = R$, the three *terms* are a , a , b , and R ; and in this $aa + ab + ac = R + d + e$, the *terms* are aa , $ab + ac$, and $R + d + e$, which are but three, because $ab + ac$ having a in the same dimension in both parts, is taken but for one *term*.

The *first term* in any equation, is that where the unknown letter or root hath the highest dimension:—that *term* which hath the root in it of one dimension or power lower, is called the *second term*; and so on.

TERMS of Proportion in mathematics, are such numbers, letters or quantities as are compared one with another. See **PROPORTION**.

Thus if $4 : 8 :: 6 : 12$ then a, b, c, d , or $4, 8, 6, 12$, are called the *terms* of the proportion: of which a or 4 is called the *first term*, b or 8 the *second term*, &c.

A and c are also called the *antecedents*, and b and d the *consequents*.

TERMS, or courses in medicine, the menses, or women's monthly purgations. See **MENSES**.

TERMINALIA, * in antiquity, feasts celebrated by the Romans, in honour of the god Terminus.

* Varro is of opinion that this feast took its name from its being at the *term* or end of the year: but I believe it of a different sentiment, and derives it from the name of the deity in whose honour it was held.

In reality, the *terminalia*, or feast of land-marks, was held in honour of Jupiter, considered in the capacity of conservator of land-marks or bounds. Dionysius Halicarnassensis tells us, that it was Numa Pompilius who first consecrated land-marks to Jupiter; and adds, that the same prince appointed an anniversary day, wherein the country people assembling together on the bounds of the lands, should offer sacrifices in honour of the tutelary gods thereof.

The *terminalia* were held on the seventh, or, as Struvius will have it, on the tenth of the calends of March. No animal was to be sacrificed herein, it being deemed unlawful to stain the land-marks with blood: they only offered sacrifices of the first-fruits of the earth, and this in the open air, and on the spot where the land-marks were.

TERMINANDO & *Audiendo*. See the article **AUDIENDO**.

TERMINATION, **TERMINATIO**, in grammar, the ending of a word; or the last syllable thereof.

It is the different *terminations* of one and the same word on different occasions, that constitute the different cases, numbers, tenses and moods, &c.

TERMINER in law. See the article **OVER**.

TERMINISTS, **TERMINISTÆ**, a sect or party among the Calvinists, whose particular tenets are reducible to five points.

1^o That there are several persons, both in and out of the church, to whom God has fixed a certain term before their death, after which he no longer wills their salvation, how long soever they live afterwards. 2^o That God has fixed this fatal *term* of grace by a secret decree. 3^o That this *term* once elapsed, he makes them no further offer of repentance or salvation, but takes away from his word all the power it might have to convert them. 4^o That Pharaoh, Saul, Judas, most of the Jews, and many of the Gentiles were of this number. 5^o That God still bears with several of these sort of people, and even confer benefits on them after the *term* expired; but that he does not do it with any intention they should be converted.

All the other protestants, and particularly the Lutherans, look on these articles with abhorrence, as repugnant to the goodness of God, and destructive to all Christian virtue, and as contrary to scripture, particularly the following texts, *Ezek.* xviii. 23, 30, 31, 32. xxxiii. 11. 1 Tim. iv. 1, 16. 2 Pet. iii. 9. Acts xvii. 30, 31. Mat. xi. 28. Isa. lxvi. 2 Heb. iii. 7, 13. Rom. ii. 5, &c.

TERMINUS, ΤΕΡΜΑ, signifies a bound or limit.

TERMINUS a quo, * (in metaphysics) denotes the place, from whence any motion commences; in contradistinction from the other extreme, which is called the *Terminus ad quem*.

* The school men call privation a *terminus a quo*, in speaking of generation, which they consider as a species of motion.

Ad TERMINUM qui prateriit. See **AN**.

Infra TERMINUM quarejecit. See **QUARE**.

TERNARY Measure. See the article **MEASURE**.

TERRA, in geography

TERRA, in chymistry

TERRA, in natural history

} See **EARTH**.

TER

TERRA *Damnata* } CAPUT MORTUUM & DAMNATA.
 TERRA *Lemnia* } LEMNIAN.
 TERRA *Japanica* } See JAPAN Earth & Catechu.
 TERRA *Sigillata* } SIGILLATA.
 TERRA *Merita* } TURMERIC.
 TERRA *Petita*. See the article SUMMONS.

TERRA, in our ancient law-books, occurs in the sense of land, or ground, joined with divers additions; as
Terra Normanorum, the lands of such Norman noblemen as were forfeited to the crown, by the owners taking part with the French king against king Henry III.—*Terra fusa*, such land as has not been lately ploughed.—*Terra gilliflorata*, land held by the tenure of paying a gilliflower yearly.—*Terra ossita*, land sown with corn, and the crop still remaining thereon.—*Terra testamentalis*, land held free from feudal services, and devileable by will.—*Terra culta*, land that is tilled and manured, in contradistinction to *terra inculta*.—*Terra affirmata*, land let out to farm.—*Terra dominica*, or *indominicata*, demain land of a manour.—*Terra hydata*, was land subject to the payment of hydage. See *HYDAGE*.—*Terra lucrabilis*, land that may be gained from the sea, or inclosed out of a waste or common to particular uses.—*Terra wainabilis*, tillage-land.—*Terra warcila*, fallow-land.—*Terra wscalis*, wood-land, &c.

TERRA *extendenda*, is a writ directed to the escheator, &c. ordering him to inquire and find out the true yearly value of any land, &c. by the oath of twelve men, and certify the extent in Chancery.

TERRA *Firma*, in geography, is sometimes used for a continent, in contradistinction to islands.
 Thus Asia, the Indies and South America, are usually distinguished into *terra firma's* and islands.

TERRA *a terra*.—Galleys and other vessels are said to go *terra a terra*, when they never go far from the coasts.

The phrase is also applied in the manage to horses which neither make curvets nor balotades, but run smoothly on the ground on a pressed gallop, only making little leaps or risings with the fore feet.

The *terra a terra* is properly a series of very low, easy leaps, which a horse makes forward, bearing sidewise, and working on two treads.—In this motion he lifts both legs at once; and when those are on the point of descending, they are accompanied by the hind legs with a short and quick cadence, always bearing and staying on the haunches, so that the motions of the hind quarters are very short and quick.

The term is also applied by the French to dancers, who cut no capers, nor scarce quit the ground.

And hence it is also figuratively applied to authors, whose style and direction is low and creeping.

TERRÆ <i>Ager</i>	} See	AGER.
TERRÆ <i>Aratrum</i>		ARATRUM.
TERRÆ <i>Aratura</i>		ARATURA.
TERRÆ <i>Denariatus</i>		DENARIATUS.
TERRÆ <i>Legem Amittere</i>		AMITTERE.
TERRÆ <i>Lex</i>		LEX.
TERRÆ <i>Librata</i>		LIBRATA.
TERRÆ <i>Obolata</i>		OBOLATA.
TERRÆ <i>Quadrantata</i>		QUADRANTATA.
TERRÆ <i>Quadrugata</i>		QUADRUGATA.
TERRÆ <i>Trinoda</i>	TRINODA.	
TERRÆ <i>Uncia</i>	UNCIA.	

TERRÆ-Filius, son of the earth, a student in the university of Oxford, formerly appointed in public acts to make jesting and satirical speeches against the members thereof, and to tax them with any growing corruptions, &c.

TERRACE, or TERRAS, a walk, or bank of earth raised in a garden or court, to a due elevation for a prospect.

The terrace is an earth-work usually lined, and breasted with a strong wall, in compliance with the natural inequality of the ground.—Sometimes it is made in talus, or a slope, and covered with turf.

Counter TERRACE, is a terrace raised over another to join two grounds, or raise a parterre.

TERRACE is also applied to the roofs of houses that are flat, and whereon one may walk: as also to balconies that project.

The terrace is properly the covering of a building which is in plat-form; as that of the peristyle of the Louvre, or that of the observatory, paved with flint and mortar. All the buildings of the oriental nations are covered with terraces, to take the fresh air on, and even to lie on.

TERRACE, or TERRAS, used for mortar. See TARRACE.

TERRAGE, or TERRAGIUM, anciently signifies a service, in which a tenant or vassal was bound to his lord, to plough and reap the ground for him.

Others will have it money paid for digging, or breaking the ground in fairs and markets.

Quieti sint de theloneo, paravagio, passagio, lastagio, tallagio, carvagio, prisagio & terragio.

TER

TERRAQUEOUS, * an epithet given to our globe or earth, considered as consisting of land and water; which together constitute one mass.

* The word, like the thing, is a compound of *terra* and *aqua*, earth and water.

Some philosophers, particularly Dr. Burnet, tax the frame and fashion of the *terraqueous* globe as rude, unartful and disorderly; and conclude it highly absurd to suppose it came thus out of the hands of the Creator, and therefore have recourse to a deluge for the making it thus.

But others can perceive a world of art and conveniency, even in this apparent disorder: Mr. Derham particularly observes, that the distribution of land and water is admirable, the one being laid over the other so skillfully thro' all the world, that there is a just equipoise or ballance of the whole globe.—Thus the northern ocean ballances the southern, and the American continent is a counterpoise to the European, African and Asiatic.

And what some may object, that the waters occupy too great a part of the globe, which they imagine would be of more use were it dry land, he obviates, by shewing that this would deprive the world of a due quantity of vapours and rain: for if the cavities which contain the sea and other waters were deeper, though the quantity of water were the same, and only the surface lesser and narrower, the evaporations would be so much the less, inasmuch as they are made from the surface, and consequently are in proportion thereto.

TERRAR. See the article TERRIER.

TERRAS. See the TERRACE, and PAVEMENT.

MARBLE TERRAS. See the MARBLE.

TERRÉ-PLEIN, in fortification, the top, platform, or horizontal surface of the rampart whereon the cannon are placed, and the defenders perform their office. See RAMPART.

It is thus called, as lying level, having only a little slope outwardly to bear the recoil of the cannon.

It is terminated by the parapet on that side towards the campaign, and by the inner talus on the side towards the place:—its breadth is from 24 to 30 feet.

TERRÉ-TENANT, is he who hath the actual possession of the land, otherwise called the *occupant*. See TENANT and OCCUPANT.

Thus a lord of a manour having a freeholder, who letteth out his freehold to another to be occupied: this occupier, who has the actual possession, is called the *terre-tenant*.

TERRÉLLA, MIKPOTH, little earth, is a magnet turned of a just spherical figure, and placed so as that its poles, equator, &c. do exactly correspond to those of the world.

It was thus first called by Gilbert, as being a just representation of the great magnetic globe we inhabit.

Such a *terrella*, if nicely poised, and placed in a meridian like a globe, it was supposed, would be turned round like the earth in 24 hours by the magnetic particles pervading it; but experience has shewn this to be a mistake.

TERRÉLLA <i>Birds</i>	} See	BIRDS.
TERRÉLLA <i>Globe</i>		GLOBE.
TERRÉLLA <i>Line</i>		LINE Terréllal.
TERRÉLLA <i>Paradise</i>		PARADISE.
TERRÉLLA <i>Roads</i>		ROAD.

TERRIER, or TERRAR, in our ancient customs, a collection of acknowledgments of the vassals, or tenants of a lordship, containing the rents, services, &c. they owe their lord; and serving as a title or claim for demanding and executing the payment thereof.

At present, by *terrier* we mean no more than a book or roll, wherein the several lands, either of a private person, or of a town, college, church, &c. are described.

The *terrier* should contain the number of acres, and the scite, boundaries, tenants names, &c. of each piece or parcel.

TERRIER also denotes the lodge or hole which foxes, badgers, rabbits, &c. dig themselves under ground, and wherein they save themselves from the pursuit of the hunters.—Hence

TERRIER is also used for a kind of little hound to hunt those animals, which like a ferret, creeps into the ground, and by that means affrights and bites them; either tearing them with his teeth, or else halting them by force out of their holes.

TERRIS *bonis & cattalis rehabendis post purgationem*, a writ for a person to recover his lands, goods, or chattels, formerly seized, after having cleared himself of a felony, upon suspicion whereof he was convicted, and delivered to his ordinary to be purged.

TERRIS *& cattalis tentis ultra debitum levatum*, a writ judicial for the restoring lands or goods to a debtor, who is distrained beyond the quantity of the debt. See DISTRESS.

TERRIS *liberandis*, a writ lying for a man convicted by attainr, to bring the record and process before the king, and take a fine for his imprisonment, and deliver him his lands and tenements again, and release him of the strip and waste.

TERRITORY, *Districus*, the extent or compass of land within the bounds, or belonging to the jurisdiction of any state, city or other division.

It is a maxim, that the church has no *territory*, i. e. it has no temporal jurisdiction; and therefore an ecclesiastical judge cannot arrest any body, not even a priest.

It is much in this sense, that Cujas says, the church has an auditory, but no *territory*.

TERSION,* **TERSIDO**, the act of wiping or rubbing a thing. See **ABRASION**.

*The word comes of *tero*, I wear.

TERTIAN, **TERTIANA**, a fever or ague intermitting every other day; so that there are two fits in three days.

The method of curing *tertians*, as well as other agues, is by the cortex, either given in substance or decoction: this last form is best in weak constitutions, and where the fits are not too regular; but the substance is more to be depended on as to certainty in other cases. See **AGUE**.

TERTIARY canon. See the article **CANON**.

TERTIATE, in gunnery.—To *tertiate* a great gun, is to examine the thickness of the metal at the muzzle, whereby to judge of the strength of the piece, and whether it be sufficiently fortified or not.

This is usually done with a pair of calliper compasses, and if the piece be home-bored, the diameter less by the height, divided by 2, is the thickness at any place.

TERTII *internodi pollicis extensor* } See { **EXTENSOR**.

TERTIO *adjunctio propositio de* } See { **PROPOSITION**.

TERTIUS *Scalenus* } See { **SCALENUS**.

TERONCIUS, in antiquity, a very small brass coin in use among the Romans.

The inconvenience of such very small pieces being soon found, the *teronius* became disused, but its name was still retained in reckoning; and thus it became a money of account.

The *teronius*, at first, was a quarter of the *as*, or *lira*; hence, as the *as* contained 12 ounces, the *teronius* contained three; whence the name, which is formed of the Latin, *tres unciæ*.

Teronius was also used for a quarter of the denarius, so that when the denarius was at ten *as*, the *teronius* was worth two and a half; and when the denarius was risen to 16, the *teronius* was worth four. See **DENARIUS**.

TESSELLATED pavement, **pavimentum TESSELLATUM**, a new pavement of mosaic work, made of curious small square marbles, bricks or tiles, called *tesseles*, from the form of dies.

Tesselated pavements were much used in the tents of the Roman generals.

TESSARA-COSTA, in our ancient writers. See the article **QUADAGESIMA**.

TEST,* or **TEST OATH**, a form of oath, whereby the doctrine of transubstantiation, the sacrifice of the Mass, the invocation of saints, &c. are abjured.

*The word signifies *proof* or *trial*, being formed of the Latin, *testis*, witness; this oath being a mark or evidence that the person is not a Roman catholic.

The *test* oath was first introduced by authority of parliament in 1672; and they who refused to take it, were excluded the privilege of holding any public offices.

TEST, among chymists and refiners, the same with *coppel*, or *coppel*, an instrument used in the purifying gold and silver. See supplement, article **TEST**.

TESTA septia. See the article **SEPTUM**.

TESTACEOUS, in natural history, an epithet given to those fish, which are covered with a strong, thick shell; as oysters, pearl fish, &c.

In strictness, however, *testaceous* is only applied to fish whose strong and thick shells are entire: those which are soft, thin, and consist of several pieces jointed, as the lobster, &c. being called *crustaceous*. See supplement, articles **TESTACEOUS**, and **CRUSTACEOUS**.

In medicine, all preparations of shells, and substances of the like kind, are called *testaceous*.—Such are powders of crabs' claws, &c., pearl, &c.

They, and others, suppose the virtue of all *testaceous* medicines to be alike; that they seldom or never enter the lacteals, but that the chief of their action is in the first passages; in which however they are of great use in absorbing acridities.

Hence they become of use in fevers, and especially in rectifying the many distempers in children, which generally owe their origin to such acridities.

TESTAMENT,* **TESTAMENTUM**, in law, a solemn and authentic act, whereby a person declares his will, as to the disposal of his estate, effects, burial, &c.

*The word is formed from the Latin, *testamentum*, which the lawyers usually derive from *testatio mentis*.

A *testament* has no effect till after death, and is always revocable till then. As *testaments* are acts, of all others the most subject to deceits, surprise, &c. it was found necessary to use all kinds of precautions to prevent the wills of the deceased from being eluded, and the weakness of dying persons from being abused.

The most ancient *testaments* among the Romans were made *viva voce*, the testator declaring his will in the presence of se-

ven witnesses: these they called *nuncupative testaments*; but the danger of trusting the will of the dead to the memory of the living, soon abolished these: and all *testaments* were ordered to be in writing.

The French legislators thought *holographic testaments*, i. e. *testaments* wrote wholly with the testator's hand, an abundant security; but the Roman law, more severe, did not admit of *testaments* without further solemnity.

The easiest, and most favourable, is the 21st law in the *code de testamentis*, which permits such as are unwilling to trust the secret of their *testaments* to others, to write it with their own hand, and to close it in the presence of seven witnesses, declaring to them that it is their *testament*, after which it is to be signed by all the seven witnesses.

Otherwise to make a solemn *testament*, it was required to be attested by seven witnesses, and sealed with their seals.

Yet the *military testament* was not subject to so many formalities: the soldier was supposed too much employed in defending the laws, to be subject to the trouble of knowing them. His tumultuary profession excused him from observing all the rules. See **MILITARY**.

Testaments, wherein fathers disposed of their estates among their children, had particular privileges, and were dispensed from most of the ordinary formalities.

Probate of a TESTAMENT. See the article **PROBATE**.

TESTAMENTARY adoption, } See { **ADOPTION**.

TESTAMENTARY succession, } See { **SUCCESSION**.

TESTAMENTARY tutelage, } See { **TUTORAGE**.

TESTATOR or **TESTATRIX**, the person who makes his, or her, will and testament.

M. Gillet shews, that a person incapable of a legacy, cannot demand any sum which the *testator* in his testament declares himself indebted to him in; in regard such a declaration of debt is presumed a fraud, against the intention of the law.

TESTA NEVILL, or **TESTA DE NEVILL**, an ancient record kept by the king's remembrancer in the Exchequer, containing the king's fees throughout the greatest part of England, with acquisitions of lands alienated, and forfeitures.

It was denominated from its compiler, John de Nevill, one of the itinerant justices under king Henry III.

TESTATUM, in law, a writ in personal actions; where, if the defendant cannot be arrested on a capias in the county where the action is laid, but is returned *non est inventus* by the sheriff, this writ shall be sent into any other county, where such person is thought to be, or to have wherewithal to satisfy the demand.

It is called *testatum*, because the sheriff has before testified, that the defendant was not to be found in his Bailiwick.

TESTE, a term commonly used in the close of a writ, where the date is contained, which begins with *teste meipso*, if it be an original writ; or if judicial, *teste Matthæ Hale, Mil. or Francisco North, Mil. &c.* according to the court where it comes.—In some ancient formula's, we read *teste curiæ Angliæ*. See **WRIT**.

TESTES, in anatomy, two white, soft, oval bodies, serving for generation; usually called, diminutively, *testicles*. See **TESTICLE**.

TESTES, of the brain, are two little, round, hard bodies, placed between the third and fourth ventricle, near the pineal gland. See **BRAIN**.

TESTES syndactes, } See the article { **SYNODALES**.

TESTIBUS bis, } See the article { **HIS**.

TESTICLE,* *testis*, a double part in animals of the male kind, serving for the office of generation.—See *Tab. Anat. (Splanchn)* fig. 1. lit. w. w.

*They are called *testicles*, by diminution of *testes*, witnesses; as giving testimony of virility; they are what we properly call *genitoria*, *genitalia*.—The Greeks call them *diæma*, or *twins*.

In man, and most animals, the *testicles* are exterior; in some, as fowls, interior.—Some men have only one, ordinarily they have two, and some have naturally had three; nay anatomists assure us they have known four.

The *testicles* are soft, white bodies, of an oval figure, and about the size of a pigeon's egg: they have been thought to be of a glandulous substance, and, according to the present doctrine of the glands, they may be allowed to be so still.

They are formed of a convolution of divers kinds of vessels, particularly the spermatic veins and arteries, the latter of which bring the blood whence the seed is to be secreted in the meanders of the *testicles*, and the former return it back again after the secretion made.

The rest of the *testicle* is made up of feed-vessels, which indeed are but one continued series or rope, intricately convoluted and wound up as it were into a bottom, but adhering so laxly, that it is easily drawn out into length, and in rats, &c. may be shaken from its close texture.—These female vessels terminate in the parastata.

The *testicles*, with the parastata, are said to be inclosed in three proper coats; the first the musculo-fascia, derived from the cremaster muscle; the second the elythroides, or vaginalis, which is a continuation of the external lamina of the peri-

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tonum; the third the albuginea. See each under its proper article.

The common capsula or membrane including both *testicles*, is the scrotum; which see described under the article SCROTUM. For the use of the *testicles*, in preparing and secreting the seed. See SARD.

TESTIMONIAL, a kind of certificate, signed either by the master and fellow of the college, where a person last resided, or by three, at least, reverend divines, who knew him well for three years last past; giving an account of the virtues, uniformity, and learning of the person.

Such a *testimonial* is always required before holy orders are conferred, and the bishop even ordinarily demands one of a priest before he admits him to a benefice.

TESTIMONIAL is also a certificate under the hand of a justice of peace, testifying the place and time when and where a soldier or mariner died, and the place of his dwelling, and whether he is to pass.

TESTIMONY. See EVIDENCE.

For the credibility of human testimony. See CERTITUDE.

TESTUDO, in natural history. See TORTOISE.

TESTUDO, in antiquity, was particularly used among the poets, &c. for the ancient lyre; by reason it was said to have been originally made, by its inventor Mercury, of the black or holl' shell of a *testudo aquatica*, or sea tortoise, which he accidentally found on the banks of the river Nile.

Dr. Milneux has an express discourse, in the *philosophical transactions*, to shew that the tortoise-shell was the basis of the ancient lyre, and that the whole instrument had thence the denomination *testudo*; which account lets some light into an obscure passage in Horace, ode 3. lib. 4. mistaken by all the commentators:

O, *testudinis arcæ*
Quæ nec strepitum, Pieri, temperas;
O musæque pisces
Donaturæ cygni, si libeat, sonum.

TESTUDO, *tortoise*, in the military art of the ancients, was a kind of cover or screen which the soldiers, e. gr. a whole company, made themselves of their bucklers, by holding them up over their heads, and standing close to each other.

This expedient served to shelter them from darts, stones, &c. thrown upon them, especially those thrown from above when they went to the assault.

TESTUDO was also a kind of large wooden tower which moved on several wheels, and was covered with raw bullocks hides, serving to shelter the soldiers when they approached the walls to mine them, or to batter them with rams.

It was called *testudo*, from the strength of its roof, which covered the workmen as the shell does the tortoise.

TESTUDO, in medicine, denotes a soft broad tumour, or gathering of impure humours between the skull and the skin, called also *talpa*, as resembling the subterraneous windings of a tortoise or mole.

TESTUDO veliformis quadrabilis, a hemispherical vault, or ceiling of a church, &c. wherein four windows are so contrived, as that the rest of the vault is quadrable, or may be squared.

The determination of these windows was a problem proposed to the great mathematicians of Europe, particularly the cultivators of the new calculus differentials, in the *acta eruditorum Lipsiæ*, by Sig. Viviani, under the fictitious name of A. D. pio licet pusillo geometra, which was the anagram of *postremo Galilæi discipulo*.

It was solved by several persons, particularly M. Leibnitz, the very day he saw it: and he gave it in the *Leipscic acts* in an insinuating manner; as also did M. Bernoulli, the marquis del Hospital, Dr. Wallis, and Dr. Gregory.

TETANUS, **TETANOS**,* in medicine, a kind of tonic spasm, or convulsion, wherein the fore and hind muscles of the head are rendered rigid and inflexible; so that it can neither bend one way nor the other.

* The word is formed from the Greek *τενω*, to stretch, strain.

TETANUS, or **TETANOS**, is also used, in a more general sense, for an universal convulsion or rigidity seizing the whole body at once.

In this sense, the *tetanus* is subdivided into *emprosthotonus* and *opisthotonus*. See EMPROSTHOTONOS and OPISTHOTONOS.

TETRACHORD,* **TETRACHORDON**, in the ancient music, a concord consisting of three degrees, tones, or intervals, or four sounds or terms; called also by the ancients *διάρχομα*, and by the moderns a *fourth*. See FOURTH.

* The word is formed of the Greek, *τετρα*, of *τετρας*, four times, and *χορδον*, a chord, or string.

This interval had the name *tetrachord* given it with respect to the lyre, and its chords or strings.

Ancient authors make frequent mention of the *synaphe*, or conjunction; and *diazeuxis*, or disjunction of *tetrachords*—To conceive their meaning, it must be observed, that two *tetrachords* were said to be joined, when the same chord was

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the highest of the first, or lowest instrument, and the lowest of the second; as was the case in the two *tetrachords* that composed the ancient heptachord, or seventh.

But when two *tetrachords* had no common chord; but, on the contrary, had each their different ones to begin and end withal, so that between the two there were two intervals of a tone, then the *tetrachords* were said to be *disjoined*, which was the case in the two *tetrachords* that composed the octachord or octave. See OCTAVE.

TETRACTYC, *arithmetical*. See the article ARITHMETIC.

TETRACTYS, in the ancient geometry.—The Pythagoric *tetractys* is a point, a line, a surface, and a solid.

TETRADIAPASON, *quadruple diapason*, a musical chord, otherwise called a quadruple eighth, or a nine and twentieth. See DIAPASON.

TETRADITÆ, **TETRADITES**, in antiquity, a name given to several different sects of heretics, out of some particular respect they bore to the number four, called in Greek, *τετρα*. Thus the Sabbathans were called *tetradites*, from their fasting on Easter-day, as on the fourth day, or on Wednesday.

The Manichees, and others, who admitted of a quaternity instead of a trinity in the Godhead, or four persons in lieu of three, were also called *tetraditæ*.

The followers of Petrus Fullenis bore the same appellation of *tetradite*, by reason of the addition they made to the trifigium, to countenance an error they held, that in our Saviour's passion, it was not any particular person of the Godhead, e. gr. the son, that suffered, but the whole Deity. See TRISAGION. The ancients also gave the name *tetraditæ* to children born under the fourth moon, and these they believed unhappy.

TETRAEDRON,* or **TETRAHEDRON**, in geometry, one of the five regular or platonic bodies, or solids, comprehended under four equilateral and equal triangles.

The *tetraedron* may be conceived as a triangular pyramid of four equal faces. Such is that represented (Tab. Geomet. Fig. 59.)

It is demonstrated by mathematicians, that the square of the side of a *tetraedron*, is to the square of the diameter of a sphere wherein it may be inscribed in a subequalateral ratio: whence it follows, that the side of a *tetraedron* is to the diameter of a sphere it is inscribed in, as $\sqrt{2}$ to the $\sqrt{3}$; consequently they are incommensurable.

TETRAGON,* **TETRAPENON**, in geometry; a quadrangle, or a figure with four angles.

* The word is formed from the Greek, *τετρα*, four, and *γωνια*, angle.

Thus a square, parallelogram, rhombus, and trapezium, are *tetragonal* figures.

TETRAGON, in astrology, denotes an aspect of two planets with regard to the earth, when they are distant from each other a fourth part of a circle, or 90°—as, AD (Tab. Astron. Fig. 3.)

The *tetragon* is expressed by the character □.

TETRAGONIAS, a name given to a meteor, whose head is of a quadrangular figure, and its tail or train long, thick and uniform; this is not much different from the *trabs* or beam.

TETRAGONISM, **TETRAPONIOMOS**, a term which some authors use to express the quadrature of the circle.

TETRAGONUS, in anatomy, a muscle, called also *quadratus genæ*. See QUADRATUS.

TETRAGRAMMATON, **TETRAPAMMATON**, a denomination given by the Greeks to the Hebrew name of God יהוה, *Yehova*, because in the Hebrew consisting of four letters.

TETRAMETER,* in the ancient poetry, an Iambic verse consisting of four feet.

* The word is formed from the Greek, *τετρα*, four, and *μετρον*, measure, q. d. four metres.—We meet with none of these but in the comic poets, as Terence, &c.

TETRAPASTON,* in mechanics, a machine wherein are four pulleys. See PULLEY.

* The word is formed from the Greek, *τετραπαστων*.

TETRAPETALOUS, in botany, an epithet given to flowers that consist of four single petals or leaves placed around the pistil.

These M. Jussieu calls *polypetalous* flowers.

Mr. Ray, who calls them *tetrapetalous*, makes them constitute a distinct class, which he divides into

1^o. Such as have an uniform *tetrapetalous* flower, and their seed-vessels a little oblongish, which he therefore calls *siliquosæ*; as the keiri or leucoum luteum, the dentaria, the leucoum siliquosum, allyson, viola lunaris, paronychia, helleborus, allaria, rapa, napus, sinapis, rapistrum, eruca spuria, erysimum, cardamine, turritis, pilosella siliquosa, and the raphanus rusticanus and aquaticus.

2^o. Such as have their seed-vessels shorter, which therefore, for distinction sake, he calls *capsulatae* and *siliiculosæ*; as the myagræum, draba, leucoum siliqua subrotunda, cochlearia, nasturtium,

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tium, lepidium vulgare, thlapi, brasicamarina, glastum, crucamarina, &c.

3°. Such as have a seeming *tetrapetalous* flower, that is, a monopetalous one, divided deeply into four partitions, which he particularizes also as *anomalous*; as the papaver, argemone, veronica, lathy mallus, plantago, coronopus, psyllium, lysimachia filiquosa, alfine spuria, &c.

TETRAPHARMACUM,* ΤΕΤΡΑΦΑΡΜΑΚΟΝ, in the general, denotes any remedy consisting of four ingredients.

* The word is compounded of τετρα, four, and φαρμακον, drugs, or remedy.

TETRAPLA,* in church history, a bible disposed by Origen under four columns, in each whereof was a different Greek version, viz. that of Aquila, that of Symmachus, that of the Seventy, and that of Theodotion. See **BIBLE**.

* The word is formed from the Greek τετραπλος, quadruplex, four-fold.

Sixtus of Sienna confounds the *tetrapla* with the hexapla; but the *tetrapla* is a different work, composed after the hexapla, and in favour of such as could not have the hexapla.

Some authors are of opinion, that the order wherein the four versions of the *tetrapla* were ranged, was different from that wherein we have rehearsed them; and particularly, that the *septuagint* was in the first column; but S. Epiphanius says expressly to the contrary, and places it in the third—He even gives us Origen's reason for putting it there, which was, says he, that the best version might be in the middle, that the others might be the more easily confronted therewith, and corrected from it.

Baronius, however, in his annals for the year 231, takes the *septuagint* to have been in the third place in the hexapla, but in the first in the *tetrapla*; but Epiphanius gives it the same place in both.

TETRAPTOTE, TETRAPTOTON, in grammar, a name given to such defective nouns as have only four cases:—such are *aites*, &c.

TETRARCH,* ΤΕΤΡΑΡΧΑ, a prince, who holds and governs a fourth part of a kingdom.

* The word is original; Greek, τετραρχος, formed of τετρα, four, and αρχη, rule, dominion.

Such, originally, was the import of the title *tetrarch*; but it was afterwards applied to any petty king, or sovereign, and became synonymous with *ethnarch*, as appears from the following considerations: 1°. That Pliny makes mention of six *tetrarchies* within the cities of Decapolis. 2°. That Herod's kingdom was only divided into three parts, that yet were called *tetrarchies*, and the sovereigns thereof, Luke iii. 1. *tetrarchs*. 3°. Josephus, *Antiq. Jud. lib. 14. c. 23*, tells us, that after the battle of Philippi, Anthony going into Syria, constituted Herod *tetrarch*; and on medals the same Herod is called *ethnarch*.

TETRASTICH, ΤΕΤΡΑΣΤΙΚΟΝ, a stanza, epigram, or poem consisting of four verses.

TETRASTYLE,* in the ancient architecture, a building, and particularly a temple, with four columns in its front.

* The word is formed from τετρα, four, and στυλος, column.

TETRASYLLABICAL, a word consisting of four syllables.

TEUTONIC, something belonging to the *Teutons*, an ancient people of Germany, inhabiting chiefly along the coasts of the German ocean.

TEUTONIC language, is the ancient language of Germany, which is ranked among the mother-tongues.

The *Teutonic* is now called the *German* or *Dutch*, and is distinguished into *upper* and *lower*.

The *upper* has two notable dialects, viz. 1°. the Scandian, Danish, or perhaps Gothic; to which belong the languages spoke in Denmark, Norway, Sweden, and Iceland. 2°. The Saxon; to which belong the several languages of the English, Scots, Frisian, and those on the north of the Elbe.

To the lower belong the Low Dutch, Flemish, &c. spoke through the Netherlands, &c.

TEUTONIC order, a military-religious order of knights, established towards the close of the XIIth century; and thus called, because consisting principally of Germans, or *Teutons*.

The origin, &c. of this order was thus: the Christians under Guy of Lusignan, laying siege to Acre, or Acon, a city of Syria, on the borders of the Holy Land; at which siege were present, Richard king of England, Philip Augustus of France, &c. some Germans of Bremen and Lubeck, touched with compassion for the sick and wounded of the army, who wanted common necessities, set on foot a kind of hospital under a tent, which they made of a ship's sail; and here betook themselves to a charitable attendance on them.

This started a thought of establishing a third military order, in imitation of the templars, and the hospitalers.

The design was approved by the patriarch of Jerusalem, the archbishops and bishops of the neighbouring places, the king

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of Jerusalem, the masters of the temple and the hospital, and the German lords and prelates then in the Holy Land; and by common consent, Frederic, duke of Suabia, who was then at their head, sent ambassadors to his brother Henry, king of the Romans, to solicit the pope to confirm the new order.

Calixtus III. who then governed the church, granted it by a bull of the 23d of February, 1197; and the new order was called, *The order of Teutonic knights of the house of St. Mary of Jerusalem*.

The pope granted them all the privileges of the templars, and the hospitalers of St. John; excepting that they were to be subject to the patriarchs, and other prelates; and that they should pay tithe of what they possessed.

The first master of the *Teutonic* order, Henry Walpot, elected during the time of the siege of Acre, after the taking of that city, purchased a garden, wherein he built a church and an hospital, which was the first house of the *Teutonic* order. Such is the account given by Peter of Duisbourg, a priest of this order.

Jacques de Vitry differs a little herefrom; and relates, that the *Teutonic* order was established at Jerusalem before the city of Acre was besieged.

These two opinions Hartknoch, in his notes on Duisbourg, reconciles, by saying, that the order was first instituted by a private person, a German, at Jerusalem; that it was confirmed by the pope, the emperor, and the princes, at the siege of Acre; and that after the taking that city, it was become so considerable, that it was known all over the world.

If it be true, that it was a private person who first set on foot the order, and that these people of Bremen and Lubeck only joined with him, as some authors assert, we do not know the precise year of its origin.

The order made no great progress under the three first grand masters; but under the fourth, Herman de Salza, it became very powerful; in such, that Conrad, duke of Mazovia and Cujavia, about the year 1230, sent an embassy to him, to solicit his friendship and assistance, offering him and his order the provinces of Culmes and Livonia, with all the lands they could recover from the idolatrous Prussians, who harassed him exceedingly with their continual incursions, and against whom he intended this new militia; his own kingdom of the order of *Christ*, or of Dobrin, instituted for the like purpose, being found too weak.

De Salza accepted the donation, and Gregory IX. confirmed it; and to aid the knights in reducing the Prussians, Innocent IV. published a crusade. With this help, in a year's time, they subdued the provinces of Warmia, Natangia, and Barthia; the inhabitants whereof renounced the worship of idols; and in the course of fifty years more, they reduced all Prussia, Livonia, Samogitia, and Pomerania, &c.

In 1204, duke Albert had founded the order of sword-bearers, port gloves, which now became united to the *Teutonic* knights, and the union was approved by pope Gregory IX. Waldemar III. king of Denmark, sold also to the order the province of Elbein, the cities of Nerva and Weissenberg, and some other provinces.

A new union some time afterwards occasioned great divisions and troubles in this order: it was with the bishops and canons of Prussia and Livonia, who hereupon took the habit of the *Teutonic* order, and shewed the sovereignty with the knights, in their respective dioceses.

The order, thus masters of all Prussia, built the cities of Elbing, Marienbourg, Thorn, Dantzca, Königsberg, and some others: the emperor Frederic II. permitted them to add to the arms of their order, the imperial eagle; and S. Louis, in 1250, allowed them to quarter the flower-de-luce.

After the city Acre had been recovered by the infidels, the grand master of the *Teutonic* order removed his seat from that city to Marienbourg. As the order grew in power, the knights took more state on them; and at length, instead of friars, brothers, as at first, would be called *lords*. And though the grand master Conrad de Zolnera, or Rutenkeine, opposed this innovation, his successor Conrad Waleroth not only approved it, but even procured himself to be treated with honours only rendered to the greatest princes.

Divisions being got into the order, the kings of Poland made their advantage of them: the Prussians revolted to them; and after several wars between the knights and the Poles, the former yielded to king Casimir the upper Prussia, and did homage to him for the lower.

Lastly, at the time of the reformation, Albert, marquis of Brandenburg, then grand master, becoming Lutheran, renounced the dignity of grand master, dissolved the commanderies, and drove the knights out of Prussia.

Most of the knights followed his example, and embraced the reformation: the rest transferred the seat of their order to Margentheim, or Marienthal in Franconia, which they still retain.

They there elected Walter of Cromberg their grand master, formed a process against Albert, and the emperor put him to the

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the ban of the empire. The order, however, could never recover their domains; but are now little more than the shadow of what they formerly were, having only three or four commanderies, scarce sufficient for the ordinary subsistence of the grand master and his knights.

The officers of the *Teutonic order*, when in its splendour, were the grand master, who resided at Marienburg; under him were the grand commander; the grand marshal, who had his residence at Königsberg; the grand hospitaller, who resided at Elbing; the drapet, who took care to furnish the habits; the treasurer, who lived at the court of the grand master; and several commanders, as those of Thorn, Culme, Brandenburg, Königsberg, Elbing, &c.

They had also their commanders of particular castles, and fortresses; advocates, provisors, intendants of mills, provisions, &c.

Wassilius in his annals says, they had 28 commanders of cities, 46 of castles, 81 hospitalers, 35 masters of convents, 40 stewards, 37 provisors, 93 masters of mills, 100 brothers or knights to take the field, 162 brothers of the choir, or priests, and 6200 servitors or domestics.

TEXT, a relative term, contra distinguished to *glafs* or *commentary*; and signifying an original discourse, exclusive of any note or interpretation.

Infinite pains have been taken by the critics, to restore, reconcile, let, explain, &c. the *text* of the bible, and that of the classics.

Mr. Wotton accounts for all those misunderstandings between the new and old testament, particularly as to the prophecies in the old, cited as fulfilled in the new, from the corruption of the *text* of the old testament; and to obviate objections made against Christianity on that head, has published an *Essay towards restoring the true text of the Old Testament*.

This restoration he attempts to effect from the Samaritan pentateuch, the Roman pialter, the apostolical constitutions, &c. But all our critics take this corruption of the *text* to be imaginary, and look out for other ways of solving those difficulties.

TEXT is particularly used for a certain passage of scripture chose by a preacher to be the subject of his sermon.

Anciently, the lawyers began all their pleadings with like *texts* of scripture.

A *text-book*, in several universities, is a classic author wrote very wide, by the students, to give room for an interpretation dictated by the master or regent, to be inserted in the interlines.

In this sense, the French say, proverbially, *Glose d'Orléans plus obscure que le texte*.

The Spaniards give the name *text* to a kind of little poem, or set of verses, placed at the head of a gloss, and making the subject thereof; each verse being explained, one after another, in the course of the gloss.

TEXT, in ancient law-authors, is appropriated to the book of the four gospels, by way of eminence.—These were written in gold letters, and carefully preserved in the churches.

Codex aurato conscriptus grammati scriptus.
Audius evangelium conscriptum corpore textum.

TEXTUARIES, **TEXTUARI**, a name given the sect of the Caraites, among the Jews. See **CARAITES**.

Hillel holds among the traditionaries, and Schammai among the *textuaries*.

The civil and canon lawyers, sometimes also call a book containing the bare text, without any gloss or commentary, a *textuary*, *textuarium*.

TEXTUS, *Roffensis*, is an ancient manuscript, containing the rights, customs, tenures, &c. of the church of Rochester, granted by the laws of Ethelbert, Hlothere, Eadred and Withered kings of Kent, collected by Einulf, the venerable bishop of Rochester, about the year 1100.

TEXTURE,* **TEXTURA**, properly denotes the arrangement and cohesion of several slender bodies or threads interwoven, or intangled among each other; as in the webs of spiders, or in cloths, stuffs, &c.

* The word is Latin, formed of *texo*, I weave.

TEXTURE is also used in speaking of any union or cohesion of the constituent particles of a concrete body; whether by weaving, hooking, knitting, tying, chaining, indenting, intruding, compressing, attracting, or any other way.

In this sense, we say a close compact *texture*; a lax, porous *texture*; a regular, or irregular *texture*, &c.

A great deal depends on the *texture* of the component parts of a body; hence most of its particular properties, its specific gravity, colour, &c.

THABORITES, or **TABORITES**. See **TABORITE**.

THACK T L, } See the articles } **TYLES**.

THAIN, **THANUS**, } See the articles } **THANE**.

THALAMI *nervorum opticum*, in anatomy, two oblong prominences of the lateral ventricles of the brain; medullary without, but a little cineritious within.

They are thus called, because the optic nerves rise out of them.

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THALMUD. See the article **TALMUD**.

THAME. See the article **TEAM**.

THANE, or **THAIN**, **THANUS**, the name of an ancient dignity among the English, or Anglo-Saxons.

Skene makes *thane* to have been a dignity equal with that of the son of an earl: Camden will have it, that *thanes* were only dignified by the offices which they bore.

There were two kinds or orders of *thanes*: the *king's thanes*, and the *ordinary thanes*.—The first were those who attended our English-Saxon kings in their courts, and who held lands immediately of the king: whence, in domesday-book, they are promiscuously called *thani*, and *servientes regis*.

Soon after the conquest, this name was diffused; and instead thereof they were called the *king's barons*, *barones regis*.

Their origin is referred to king Canutus, who, taking the chief of the Danish nobility, to the number of 3000, for his guard; and arming them with battle-axes and habres with gilt handles, called them *thing-lib*, from the two Danish words *thing* or *their*, body of nobility, and *lib*, order of battle.

The ordinary *thanes*, or *thani minores*, were the lords of manours, who had particular jurisdiction within their limits, and over their own tenants.

These changed their name for that of barons; and hence their courts are called *courts baron* to this day.

In old authors, charters, &c. we also meet with **THANE**, as signifying a nobleman; tho' sometimes only a freeman; and sometimes a magistrate.

THANE-LANDS, were lands granted by charter of the Saxon kings to their *thanes*.

THAUMATURGUS,* *worker of miracles*; an appellation which the Romanists give to several of their saints, eminent for the number and greatness of their miracles.

* The word is formed from the Greek *thauma*, wonder, *thing*, and *ergon*, work.

St. Gregory, call'd *Thaumaturgus*, or Gregory of Neocæsarea, was a disciple of Origen, about the year 223, and afterwards bishop of Cæsarea in Pontus; and in that capacity he assisted at the first council of Antioch, and at that of Ephesus against Paulus Samosatensis.—St. Leo of Catania is also called *Leo Thaumaturgus*. He lived in the VIIIth century; and his body is still honoured at Rome in the church of St. Martin de Tours.—St. Francis Paul, and St. Francis Xavier, are the great *thaumaturgi* of these last ages.

THAWING, the resolution of ice into its former fluid state, by the warmth of the air.

THEANDRIC, *ΘΕΑΝΔΡΙΚΟΣ*, *Dei-virile*; a term signifying divine and human under one—formed from *Θεός*, God, and *ανδρ*, man.

S. Dionysius, bishop of Athens, first used the word *theandric*, to express a double operation, or two operations united in Jesus Christ; the one divine, the other human.*—The Monophysites afterwards abused it, to signify the one only operation which they admitted in Jesus Christ; in whom they believed there was a mixture of the divine and human nature, whence resulted a third nature, which was a compound of the one and the other, whose operations followed the essence and qualities of the mixture, and were neither divine nor human; but both at once, or, in one word, *theandric*.

* *Θεοανδρική ενέργεια*, *theandric* or *Dei-virile*, operation, in the sense of Dionysius and Damascenus, is thus exemplified by Athanasius. When Christ heard the person who was born blind, the spittle he voided, was human, but the opening of the eyes was done by his divine power. And thus, in raising Lazarus he called as man, but awaked him from the dead as God.

The term *theandric*, and the dogma of *theandric* operations, were examined with great care and attention, at the council of Lateran, held in 649; where pope Martin solidly refuted the notion of *theandric* operations, and shewed, that the sense wherein St. Dionysius first used the word, was catholic, and quite remote from that of the Monophysites and Monothelites.

THEANTHROPOS,* *ΘΕΑΝΘΡΩΠΟΣ*, *God-man*; a term sometimes used in the schools, to signify Jesus Christ, who is God-man, or two natures in one person.

* The word is formed from the Greek, *Θεός*, Deus, and *ανθρωπος*, homo, man.

THEATER,* or **THEATRE**, **THEATRUM**, among the ancients, a public edifice, for the exhibiting of scenic spectacles or shews to the people.

* The word is formed from the Greek, *θεατρον*, *spectacle*, *shew*, of *θεαομαι*, *specto*, *video*, I see.

Under the word *theater* was comprehended, not only the eminence whereon the actors appeared, and the action passed; but also the whole area, or extent of the place, common to the actors and spectators.

In this sense, the *theater* was a building encompassed with portico's, and furnished with seats of stone, disposed in semicircles, ascending gradually over one another, which encompassed a space called the *orchestra*, in the front whereof

was the proscenium, or pulpitum, whereon the actors performed, and which is what we distinctly call the *theater*, or stage.

On the proscenium stood the *scena*, a large front, adorned with orders of architecture, behind which was the postscenium, or place where the actors made themselves ready, retired, &c. So that the *scena*, in its full extent, comprehended all the part belonging to the actors.

In the Greek *theaters*, the orchestra made a part of the *scena*; but in the Roman *theaters*, none of the actors ever descended into the orchestra; which was taken up by the seats of the spectators.

The most celebrated *theaters* remaining of antiquity, are the *theater* of Marcellus, and that of Pompey; which are also called *amphitheaters*.

At Athens are still seen the remains of the temple of Bacchus, which was the first *theater* in the world, and was a masterpiece in architecture.—All *theaters* were consecrated to Venus and Bacchus.

THEATER, among the moderns, more peculiarly denotes the stage, or place whereon the drama, or play is exhibited: answering to the proscenium of the ancients.

In its full latitude, however, the **THEATER** includes the whole play house: in which sense, it is a spacious room, or hall, part whereof is taken up by the *scena*, which comprehends the stage, the decorations, and the machines; and the rest is distributed into a space, called the *pit*, or *parterre*, which is covered with seats, boxes, &c. and terminated with an elevation of one or two galleries, disposed into benches ascending over one another.

THEATER is also used in architecture, chiefly among the Italians, for an assemblage of several buildings, which, by a happy disposition and elevation, represents an agreeable scene to the eye.

Such as are most of the vineyards at Rome; but particularly that of Monte Dragone, at Fieschi; and in France, the new castle of St. Germain en Laye.

Anatomical THEATER, in a school of medicine and chirurgery, is a hall, with several rows of seats, disposed in the circumference of an amphitheater, having a table, bearing on a pivot, in the middle, for the dissection of bodies.

Such is the anatomical *theater* of the royal garden at Paris.

The **THEATER** at Oxford is a beautiful building, erected by archbishop Sheldon, for the use of scholastic exercises.

THEATINES, an order of nuns, under the direction of the *Theatins*.

There are two kinds of *Theatines*, under the title of *sisters* of the immaculate conception, who form two different congregations, the one engaged by solemn vows, and the other only by simple vows.—Their common foundress was Ursula Benincasa. Those who make the simple vows are the most ancient, and are called absolutely *Theatines* of the congregation: they had their rise at Naples, in 1583.

The others are called *Theatines* of the hermitage: the whole business of these is praying in retirement, and an austere solitude, to which they engage themselves by solemn vows.

The *Theatines* of the first congregation take care of the temporal concerns of these last. Their houses stand together, and communicate by a large hall. Their foundress drew up their constitutions, and laid the foundation of their house at Naples, but died before it was finished.

Gregory the XVth, who confirmed the new institute under the rule of St. Augustin, appointed that they should be under the direction of the *Theatins*. Urban VIII. revoked this article by a brief in 1624, and subjected them to the nuncio of Naples; but Clement IX. annulled this brief, and submitted them anew to the *Theatins* by a brief in 1668.

THEATINS, a religious order of regular priests; thus called from their first superior Don John Pietro Cassia, archbishop of Chieti, in the kingdom of Naples, which was anciently called *Theate*.

The same archbishop became afterwards pope, by the name of Paul IV. after having been a companion of Gaetan, a Venetian gentleman, the first founder of this order, at Rome, in 1524.

The *Theatins* were the first who assumed the title of *regular clerics*. They have not only no lands, or fixed revenues, either in common or in property; but they do not even ask or beg any thing; but wait for what Providence shall send them for their subsistence.

They employ themselves much in foreign missions; and in 1627 they entered upon Mingrelia, where they have an establishment: they have had the like in Tartary, Circassia, and Georgia, but this they have since abandoned, by reason of the little fruit they perceived thereof.

Their first congregation appeared at Rome in 1524, and was confirmed the same year by Clement VII.—Their constitutions were drawn up at a general chapter in 1604, and approved by Clement VIII.—They wear the priests habit.

THEATRE. See **THEATER**, and **AMPHITHEATER**.

VOL. II.

THEBAID, **THEBAIS**, a famous heroic poem of Statius; the subject whereof is the civil war of Thebes between the two brothers Eteocles and Polynices; or Thebes taken by Thebes.

Statius was twelve years in composing his *Thebaid*, which consists of twelve books: he wrote under Domitian.—He is censured by the best critics, as Boiss, &c. for a vicious multiplicity of fables and actions, for too much heat and extravagance, and for going beyond the bounds of probability.

Several Greek poets had composed *Thebaids*, or poems of this name before him; the principal were, Antagoras, Antiphanes of Colophon, Menelaus the Aegian; and an anonymous author mentioned by Pausanias, lib. 9.

Aristotle, praising Homer for the simplicity of his fable, opposes to him the ignorance of certain poets, who imagined that the unity of fable or action was abundantly provided for by the unity of the hero, and who composed *Thebaids*, *Herculeids*, &c. in each whereof they collected every thing that had ever happened to their principal person.

THEFT, *Furtum*, in law, an unlawful, felonious taking away another man's moveable and personal goods, against the owner's will, with an intent to steal them.

It is divided into *theft*, or larceny, properly so called, and *petty theft*, or petty larceny; the former whereof is of goods above the value of 12 d. and is deemed felony.—The other, which is of goods under that value, is not felony.

Open *theft* from the person, or in the presence of the owner, is properly called *robbery*.

THEFTBOTE, the receiving a man's goods again from a thief, or other amends by way of composition, and to prevent prosecution, that the felon may escape unpunished; the punishment whereof is imprisonment, but not loss of life, or member.

THEISM. See **DEISM**.

THEKUPHÆ. See the article **ТЕКУПНÆ**.

THELONIUM, **TELONIUM**, signifies toll.

Breve assendi quieti de THELONIO, a writ lying for the citizens of a city, or burgesses of a town, that have a charter or prescription to free them from toll; against the officers of any town or market, who would constrain them to pay it, contrary to the said grant or prescription.

THEME, **THEMA**, a subject or topic, to write or compose on.

THEME, among astrologers, denotes the figure they construct when they draw the horoscope; representing the state of the heavens for a certain point, or moment required; i. e. the places of the stars, and planets, for that moment.

The celestial *theme* consists of 12 triangles, inclosed within two squares, and called the *twelve houses*.

THENAR, in anatomy, a muscle, whose office is to draw the thumb from the fore-finger; whence it is also denominated *abductor pollicis manus*.

There is a similar muscle belonging to the great toe, sometimes also called *thenar*, or *abductor pollicis pedis*.

The antagonists to these are called *antithenari*.

THENOPSYCHITES. See **THNTOPSYCHITES**.

THEOCATAGNOSTÆ, * a sect of heretics, or rather of blasphemers, who presum'd to find fault with certain words and actions of God, and to blame many things in the scriptures.

* The word is formed from the Greek Θεός, God, and ἀνέστη, ἡσυχία, I judge, or condemn.

Marshall, in his tables, places these heretics in the VIIIth century; for what reason we know not; Damascenus being the only author that mentions them, but without taking any notice of the time of their appearance.

Add to this, that in Damascenus's treatise of heresies, we meet with heretics that were not so much the authors of sects subsisting at any certain time, as wicked persons, such as are found in all times, and all ages.

THEOCRACY, * a state governed by the immediate direction of God alone.

* The word is formed from Θεός, God, and ἀρχή, power, empire.

According to Josephus, the ancient Government of the Jews was *theocratic*; God himself ordering and directing every thing belonging to the sovereign authority.

This *theocracy* lasted till the time of Saul; when the Israelites, weary thereof, desired they might have a king like other nations: and thence forward the state became monarchic.

There was also a kind of imaginary *theocracy* at Athens: while the sons of Codrus were disputing the succession, the Athenians, wearied out with the miseries of an intestine war, abolished the royalty, and declared Jupiter the only king of the people of Athens.

THEODOLITE, a mathematical instrument, much used in surveying, for the taking of angles, distances, altitudes, &c.

It is made variously; several persons having their several ways of contriving it, each attempting to make it more simple and portable, more accurate and expeditious, than others. The following one is not inferior to any we have seen: it consists of a brass circle, about a foot diameter, cut in form of *Fig. 25, Tab. Surveying*; having its limb divided into 360 degrees, and each degree subdivided either diagonally, or otherwise, into minutes.

Underneath at *cc*, are fixed two little pillars *bb*, (*fig. 25. n. 2.*) which support an axis, whereon is fixed a telescope, consisting of two glasses, in a square brass tube; for the viewing of remote objects.

On the centre of the circle, moves the index *C*, which is a circular plate, having a compass in the middle, whose meridian line answers to the fiducial line *aa*: at *bb* are fixed two pillars to support an axis, which bears a telescope like the former, whose line of collimation answers to the fiducial line *aa*.—At each end of either telescope is fixed a plain sight for the viewing nearer objects. See **SIGHT**.

The ends of the index *aa* are cut circularly, to fit the divisions of the limb *B*; and when that limb is diagonally divided, the fiducial line at one end of the index shews the degrees and minutes upon the limb. The whole instrument is mounted with a ball and socket, upon a three-legged staff.

Most theodolites have no telescopes, but only four plain sights, two of them fastened on the limb, and two on the ends of the index.

The use of the theodolite is abundantly shewn in that of the femicircle, which is only half a theodolite. See **SEMICIRCLE**.—And in that of the plain-table, which is occasionally made to be used as a theodolite. See **PLAIN-Table**.

Note, the index and compass of the theodolite likewise serve for a circumferentor, and are used as such.

THEOGONY,* that branch of the heathen theology which taught the genealogy of their gods.

* The word is formed from *Θεο*, *God*, and *γον*, *geniture*, *seed*, *offspring*.

Hesiod gives us the ancient theogony, in a poem under that title. Among the most ancient writers, Dr. Burnet observes, that theogony and cosmogony signified the same thing. In effect, the generation of the gods of the ancient Persians, fire, water, and earth, is apparently no other than that of the primary elements.

THEOLOGICAL Criticism, } See **CRITICISM**.

THEOLOGICAL Prebend, } See **PREBEND**.

THEOLOGIUM,* in the ancient theater, was a place, or little stage, above that whereon the ordinary actors appeared. See **THEATER**.

* The word is Latin, formed from *Θεο*, and *λογος*, *speech*, *discourse*.

The thelogium was the place where their Gods appeared.—It also included the machines whereon they descended, and from which they spoke.

There was a thelogium required for the representation of the Ajax of Sophocles, the Hippolytus of Euripides, &c. *Scal. Poet. lib. 1. cap. 1.*

THEOLOGY,* Divinity; a science which instructs us in the knowledge of God, and divine things; or which has God, and the things he has revealed, for its object.

* The word is compounded of *Θεο*, *God*, and *λογος*, *discourse*. Theology is a science which shews us what we are to believe of God, and the manner wherein he would be served.—It is divided into two branches, the *natural*, and the *revealed* or *supernatural*.

Natural THEOLOGY, is the knowledge we have of God from his works, by the light of nature, and reason.

Supernatural THEOLOGY, is that which we learn from revelation.

Positive THEOLOGY, is the knowledge of the holy scriptures, and of the signification thereof, conformably to the opinions of the fathers and councils; without the assistance of any argumentation. But some will have it, that this ought to be called *expositive*, rather than *positive*.

Moral THEOLOGY, is that which teaches us the divine laws relating to our manners and actions.

Scholastic, or **School THEOLOGY**, is that which proceeds by reasoning; or that derives the knowledge of several divine things from certain established principles of faith.

The ancients had a three-fold theology; the first, *μυθικη*, *mythic*, fabulous, which flourished among the poets; and was chiefly employed in the theogony, or genealogy of the gods.

The second, *πολιτικη*, *political*, which was that chiefly embraced by the politicians, priests, and people, as most suitable and expedient to the safety, quiet, and prosperity of the state.

The third, *φυσικη*, *natural*, chiefly cultivated by the philosophers, as most agreeable to nature and reason.—The physical or natural theology acknowledged one only supreme God; to which it added demons or spirits, as mediators between him and man.

Bachelor in THEOLOGY, } See the articles **BACHELOR**.

Mythic THEOLOGY, } See the articles **MYSTIC**.

THEOPASCHITES, **THEOPASCHITÆ**, a sect of heretics in the Vth century, the followers of Petrus Fullenis, or Peter

the Fuller; whence they are sometimes also denominated *Ful-loniani*.

Their distinguishing doctrine was, that the whole trinity suffered in the passion of Jesus Christ.

This heresy was embraced by the Eutychian monks of Scythia; who using their utmost efforts to make it obtain, raised great disorders towards the beginning of the following century.

It was condemned, at its first rise, in the councils of Rome and constantinople, held in 481; it was again revived in the IXth century, and again condemned in a council at Rome, held in 862 under pope Nicholas I.

F. le Quien, in his notes on Damascenus, says, that the same error had been taught before Fullenis, by Apollinarius, whose disciples were the first that were called *theopaschites*, or *theopaschitæ*.

THEORBA, * **THIORBA**, or **TIORBA**, a musical instrument, made in form of a large lute; except that it has two necks, or juga, the second and longer whereof sustains the four last rows of chords, which are to give the deeper tones.

* The word is formed from the French, *teorbe*, or *theorbe*, and that from the Italian, *tiorba*, which signifies the same; and which some will have to be the name of the inventor.

The theorba is an instrument which for many years succeeded to the lute, in the playing of thorough-basses: it is said by some to have been invented in France by the sieur Hotteman, and thence introduced into Italy, &c.

The only difference between the theorba and the lute is, that the former has eight bass or thick strings, twice as long as those of the lute; which excess of length renders their sound far exceeding soft, and keeps it up so long a time, that it is no wonder many prefer it to the harpsicord itself. At least it has this advantage over it, that it is easily removed from place to place, &c.

All its strings are usually single; though there are some who double the bass-strings with a little octave, or the small strings with an unison; in which case, bearing more resemblance to the lute than the common theorba, the Italians call it the *arcileuta*, or *arch-lute*.

THEOREM, in the mathematical method, a proposition which terminates in theory, and which considers the properties of things already made, or done.

Or, a theorem is a speculative proposition, deduced from several definitions compared together.—Thus, if a triangle be compared with a parallelogram standing on the same base, and of the same altitude, and partly from their immediate definitions, and partly from other of their properties already determined, it is inferred, that the parallelogram is double the triangle; that proposition is a theorem.

Theorem stands contradistinguished from *problem*. See the article **PROBLEM**.

There are two things to be chiefly regarded in every theorem, viz. the proposition, and the demonstration: in the first is expressed what agrees to some certain thing under certain conditions, and what does not.

In the latter, the reasons are laid down, by which the understanding comes to conceive that it does or does not agree thereto.

Theorems are of various kinds.

Universal THEOREM, is that which extends to any quantity without restriction, universally—as this, that the rectangle of the sum and difference of any two quantities, is equal to the difference of their squares.

Particular THEOREM, is that which extends only to a particular quantity—as this: in an equilateral right lined triangle, each of the angles is 60 degrees.

Negative THEOREM, is that which expresses the impossibility of any assertion—as, that the sum of two biquadrate numbers cannot make a square number.

Local THEOREM, is that which relates to a surface—as, that triangles of the same base and altitude are equal.

Plane THEOREM, is that which either relates to a rectilinear surface, or to one terminated by the circumference of a circle—as, that all angles in the same segment of a circle are equal. See **PLANE**.

Solid THEOREM, is that which considers a space terminated by a solid line; that is, by any of the three conic sections—e. g. this: that if a right line cut two asymptotic parabolas, its two parts terminated by them shall be equal. See **SOLID**.

Reciprocal THEOREM, is one whose converse is true.—As, that if a triangle have two equal sides, it must have two equal angles: the converse of which is likewise true, that if it have two equal angles, it must have two equal sides.

THEORETIC, * **THEORETICAL**, or **THEORIC**, something relating to theory, or that terminates in speculation.—In which sense it stands opposite to *practical*.

* The word is formed from the Greek, *θεωω*, *I see*, *I view* or *contemplate*.

The sciences are ordinarily divided into *theoretical*, as theology, philosophy, &c. and *practical*, as medicine, law, &c. See **SCIENCE**.

THEORETIC, THEORETICUS, is an appellation peculiarly given to an ancient sect of physicians, contradistinguished by it from the empirics.

Theoretic physicians were such as applied themselves to a careful study and consideration of what relates to health and diseases; the principles of the human body, and its structure and parts, with their actions and uses; whatever details it either naturally or supernaturally; the different uses of diseases, their nature, causes, signs, indications, &c. the textures, properties, &c. of plants, and other medicines, &c. — In a word, the *theoretic* physicians were such as went on the foot of reason, in opposition to the empirical physicians, who went wholly on experience.

THEORETICAL Arithmetic, } See { **ARITHMETIC.**
THEORETICAL Philosophy, } **PHILOSOPHY.**

THEORETIC Money, in ancient authors, was what was raised by way of tax on the people, to defray the expences of theatrical representations, and other spectacles.

There were particular questors and treasurers of the *theoretic money*. — By a law of Eubulus, it was made a capital crime to pervert the *theoretic money* to any other use; even to employ it in the occasions of war.

THEORETICAL Astronomy, is that part of astronomy which considers the true structure and disposition of the heavens, and heavenly bodies; and accounts for their various phenomena therefrom.

It is thus called in opposition to that part which considers their apparent structure, or their disposition as viewed by the eye; which is called *spherical astronomy*. See **SPHERICAL**.

The several parts of *theoretical astronomy*, see under **SYSTEM, SUN, STAR, PLANET, EARTH, MOON, SATELLITE, and COMET**.

THEORY, a doctrine which terminates in the sole speculation, or consideration of its object, without any view to the practice, or application thereof.

To be learned in an art, &c. the *theory* suffices; to be a master of it, both the *theory* and practice are required. — Machines, many times, promise very well in the *theory*, yet fail in the practice.

We say, *theory* of the moon, *theory* of the rainbow, of the microscope, the camera obscura, the motion of the heart, the operation of purgatives, &c.

THEORIES of the Planets, &c. are systems or hypotheses, according to which the astronomers explain the reasons of the phenomena or appearances thereof.

THEOTOCUS, Deipara. See **MOTHER of God**.

THERAPEUTÆ, ΘΕΡΑΠΕΥΤΑΙ, a Greek term signifying servants, more especially those employed in the service of God. The Greeks gave the appellation *therapeutæ* to such as applied themselves to a contemplative life, whether it were from the great concern they had for their souls, or from the particular mode and manner of their religion; the word *θεραπεύω*, whence *therapeutæ*, signifying the care a physician takes of his patient, or the service any one renders another.

Philo, in his first book of the contemplative life, relates, that there were a people spread throughout most of the known world, but particularly throughout Egypt, and about Alexandria, who renounced their friends, their goods, &c. and who, after discharging themselves of all temporal concerns, retired into solitary places, where they had each their separate mansion, called *femineum*, or monastery.

He adds, that they there resigned themselves wholly to the exercises of prayer and contemplation, were continually as in the presence of God, prayed mornings and evenings, eat nothing till after sun-set, and many of them not above once in three, or even six days; nor then any thing but a piece of bread seasoned with salt, or, at best, with hyssop.

They carried nothing with them into their *femineum* but the books of Moses, the prophets, the psalms, and other like writings, wherein they sought for mystical and allegorical meanings from a persuasion that the scriptures were only shadows or figures, the hidden meanings whereof were to be unfolded. They had usually also books left them by the founders of their sect. — They met together every seventh day in a large *femineum* to confer together, and to partake of the mysteries.

There are two points relating to those *Therapeutæ* exceedingly controverted among critics, viz. 1^o, whether they were Jews or Christians; and, 2^o, if they were the latter, whether they were monks or seculars?

As to the first, Scaliger *de Emend. Temp.* maintains, they were Essene Jews; but Valefius on Eusebius rejects this opinion of Scaliger, 1^o, because Philo never calls them Essenes. 2^o, because there were no Essenes but in the Holy Land; whereas the *Therapeutæ* were spread through Greece, and all the barbarous nations. 3^o, Because Josephus, who gives a very ample account of the Essenes, does not say one word of the *Therapeutæ*, or the *therapeutic life*.

Yet Valefius allows them to be Jews; and Photius is of his opinion: the chief reasons Valefius gives are what Philo says, 1^o, that they read nothing but the law, and the prophets. 2^o, that they had some books of their founders; and how can

this quadrate with the Christians, who were then in their first rise? 3^o, that they only prayed twice a-day, whereas the Christians then prayed much oftener. 4^o, that the Christians had no hymns or psalms till after the time of Antoninus. And lastly, that the Christians could not, at that time, be spread over the world.

Nevertheless Eusebius, *lib. II. Hist. Eccl. c. 17*. St. Jerom, Sozomen, Nicephorus, Baronius, Petavius, M. Godæau, Montfaucon, &c. maintain the *Therapeutæ* to have been Christians; urging, that nothing can be more conformable to the practices of the church than the account given of them by Philo; that those books of their founders are the gospels, and other writings of the apostles; and that there are indications even of bishops and other ministers among them.

But M. Boubier, president of the parliament of Dijon, refutes this opinion; supposing it inconsistent in Philo, a Jew, to write a book expressly in praise of Christians.

Several authors, however, as Cassian, F. Helyot, &c. maintain, that the *Therapeutæ* were not only Christians, but that they were also religious: and, in effect, M. Boubier allows, that if they were Christians, they must be confessed to have been monks. — As to his argument, that Philo would never have wrote a panegyric on the Christians; it is answered, that they were people of his own nation, Jews; as he himself expresses it; and that he only looked on them as a sect of Jews, who, by their extraordinary virtue, did honour to his nation. But though the Christianity of the *Therapeutæ* appears probable enough; yet their monachism is not made out at all.

THERAPEUTICE,* THERAPEUTICS, that part of medicine which is employed in seeking out remedies against diseases, and in prescribing and applying them to effect a cure. See **MEDICINE**.

* The word is Greek *θεραπευτικη*, formed from *θεραπεύω*, to attend, to nurse, cure, &c.

Therapeutice teaches the use of diet, pharmacy, chirurgery, and the *methodus medendi*.

THERAPEUTICE is also used figuratively, in speaking of the mind, and of discourses made to correct the errors and defects thereof.

Such is the *Therapeutice* or *Therapeutics* of Theodoret; being a treatise against the errors or unwholesome opinions of the Greeks, i. e. the heathens.

THERAPHIM, a **THERAPHIM**, a Hebrew term, which has given great torture to the critics. — We meet with it 13, or 14 times in scripture, where it is commonly interpreted *rabbs*: but the rabbins are not contented to have it simply signify idols, but will have it denote a peculiar sort of idols or images intended for the knowledge of futurity, i. e. oracles.

R. David de Pomis observes, that they were called *theraphim*, from רַפָּה, *raphah*, to leave, because people quitted every thing to consult them. — He adds also, that the *theraphim* were in human shape; and that, when raised upright, they spoke at certain hours, and under certain constellations, by the influence of the celestial bodies. But this is only a rabbinical fable, which he has learned from Abenezra.

Others hold, that the *theraphim* were brazen instruments which pointed out the hours and minutes of future events, as directed by the stars. — De Pomis corrects Abenezra, saying, that the *theraphim* being made under a certain constellation, the devil made them speak under the same.

R. Eliezer tells us the reason why the rabbins will have the *theraphim* to speak, and render oracles: 'tis, says he, because it is written in the prophet Zachary, x. 2. The *theraphim* have spoke vain things.

The same rabbin adds, that to make the *theraphim*, they killed a first-born child, clove his head, and seasoned it with salt and oil; that they wrote on a plate of gold the name of some impure spirit, laid it under the tongue of the dead, placed the head against the wall, lighted lamps before it, and prayed to it, and that it then talked with them.

Be this as it will, Vossius observes, that beside the passage of Zachary just quoted, it appears likewise from Ezekiel xxi. 2. that the *theraphim* were consulted as oracles.

De Pomis endeavours to shew, that the *theraphim*, with Michol put in David's bed, were not of this kind, because they were not in the figure of men; but R. Eliezer is of another sentiment.

As to the manner of making the *theraphim*, Vossius takes it to be a vain tradition of the rabbins, though R. Tanchuma and Jonathan, in his *Targum*, Gen. xxxi. 19, relate it after R. Eliezer. — The chief reason of his credulity is, that Laban who had not quite lost all notion of the true God, as appears from Gen. xxxi. 33, could not be guilty of so great a cruelty: but Vossius does not consider that this custom might not be less real, for its not having been established so early as Laban; and that the Hebrews sometimes burnt their children to Moloch.

F. Kircher directs us to seek the origin of the *theraphim* in Egypt; adding, that the word is Egyptian. — Spencer, in his dissertation on the *animi et humanæ*, maintains the word to be Chaldean, and to signify the same with *jeraphim*; the Chaldeans being frequently known to change the *im* into *im*, thus

is, *finto i.* He adds, that those images were borrowed from the Amorites, Chaldeans, or Syrians; and that the *serapis* of the Egyptians is the same thing with the *theraphim* of the Chaldeans. See Selden *de diis Syriis*, synt. i. c. 2.

THERIACA, ΘΕΡΙΑΚΑ, *TREACLE*, in medicine, a name given by the ancients to various compositions esteemed good against poisons; but now chiefly restrained to what, by way of distinction, we call *theriaca andromachi*, or *venice treacle*.

This is a compound of no less than 64 drugs, prepared, pulverized and reduced, by means of honey, into an electuary.

The basis, or foundation of the composition, is vipers flesh. M. Charas has wrote a particular history of the animals, plants and minerals, which enter the composition of this famed remedy.

It is said to be sovereign against the bites of venomous beasts, and in the wind-colic; and is also used in intermitting fevers, and in cases requiring perspiratives and diaphoretics; also in continual fevers, especially such as are malignant, and where the pulse is low and ticking; and in the small-pox and measles: and, as most of the ingredients thereof are very hot, in all diseases, where the natural heat is weak and languid.

Andromachus, Nero's physician, passes for the inventor of the *theriaca*; at least, it was he who gave the first description thereof in elegiac verses: his son did the same in prose, and Democrates in iambics.

Anciently, the *treacle* made at Venice had all the vogue: and many still retain the ancient prejudice: but it is now prepared at Montpellier, at Paris, and at London, with as much advantage as at Venice.

There is another vulgar kind of *theriaca*, called *Diatysaron*, because only consisting of four ingredients. See **DIATYSARON**.

Treacle water, and *treacle vinegar* are found good preservatives against putrid air, whether by only being smelt at, or by rubbing the wrists, temples and nose therewith.

THERMÆ, ΘΗΡΜΑΙ, in architecture, ancient buildings, furnished with baths, especially of the hot kind.

* The word is formed from the Greek, *ἄσπος, hot*.

Among the noblest monuments of ancient Rome, are reckoned the *thermæ*, or baths of Dioclesian.

Thermæ, or hot springs, it is commonly argued, owe their heat to a collocation, or effervescence of the minerals in them. Though Dr. Woodward ascribes it to the subterraneous heat, or fire, which communicates with them by some spiracle or canal, whereby a greater quantity of heat is derived thither than to ordinary springs. See *supplement article THERMÆ*.

THERMOMETER, *THERMOMETRUM*, an instrument shewing, or rather measuring, the increase and decrease of the heat and cold of the air.

The *Thermometer* and *thermoscope* are ordinarily accounted the same thing: Wolfius, however, makes a difference; but shews withal that what we call *thermometers* are, in reality, no more than *thermoscopes*.

There are various kinds of *thermometers*, the constructions, defects, theory, &c. whereof are as follow:

Construction of the THERMOMETER, depending on the rarefaction of the air.—In the tube BC, (*Tab. Pneumatica*, fig. 3. n. 2.) to which is fastened a glass ball AB, is put a quantity of common water mixed with aqua regia, to prevent its freezing; and the mixture is tinged with a solution of vitriol to give it a greenness. In filling the tube, care is taken that there be so much air left in the ball and the tube, as, that when at its greatest condensation in the middle of winter, it may just fill the ball; and yet in its greatest rarefaction in summer, it may not drive the liquor out of the tube. To the other extreme of the tube is fastened another glass ball CD, open to the air at D: on each side the tube is applied the scale EF, divided into any number of equal parts.

Now, as the ambient air becomes warmer, the air in the ball and the top of the tube expanding, will drive the liquor into the lower ball; and consequently its surface will descend: on the contrary, as the ambient air grows colder, that in the ball becoming condensed, the liquor will ascend.

Construction of the mercurial THERMOMETER.—In the same manner, and with the same caution as before, put a little quantity of mercury, not exceeding the bigness of a pea, into the tube BC (*fig. 4. n. 2.*) thus bent in wreaths, that, taking up the less height, it may be the more manageable, and less liable to harm; divide this tube into any number of equal parts to serve for a scale.

Here the approaches of the mercury towards the ball A will shew the increases of the degree of heat.—The reason is the same as in the former.

The defect of both these instruments consists in this, that they are liable to be acted on by a double cause: for, not only a decrease of heat, but also an increase of weight of the atmosphere, will make the liquor rise in the one, and the mercury in the other; and, on the contrary, either an increase of heat, or decrease of weight of the atmosphere, will make it descend. See **BAROMETER**.

Construction of the Florentine or common THERMOMETER.

The academists del Cimento, considering the inconveniences of the *thermometers* here described, attempted another, that should measure heat and cold by the rarefaction and condensation of the spirit of wine; though those be vastly less than that of air, and consequently the alterations in the degree of heat likely to be much less sensible.

The structure of their *thermometer* is this: on some little pieces of turmeric is poured a quantity of rectified spirit of wine, which hereby receives a red tincture; this done, the spirit of wine is filtrated again and again through a brown paper, that the coarser particles of the root may be separated therefrom. With the spirit thus tinged and prepared, they fill a glass ball A B (*fig. 5. n. 2.*) and the tube B C; and that all the spirit may not defend in winter into the ball, it is convenient to put the ball into a lump of snow, mixed with salt: or, if the instrument be to be made in summer, into spring-water impregnated with salt-petre, that the condensed spirit may shew how far it will retire in the extreme cold.

If it rise to too great a height from the ball, part of it is to be taken out; and that the tube may not be made longer than needs, it is convenient to immerge the ball, filled with its spirit, in boiling water, and to mark the furthest point to which the spirit then rises.

At this point the tube is to be hermetically sealed by the flame of a lamp; and at the sides is to be added a scale, as in the former *thermometer*.

Now, spirit of wine rarifying and condensing very considerably; as the heat of the ambient air increases, the spirit will dilate, and consequently will ascend in the tube; and as the heat decreases, the spirit will descend: and the degree or quantity of ascent and descent will be seen in the scale. Yet as the ratio of yesterday's heat to to-day's is not hereby discovered, this instrument is not strictly a *thermometer*, any more than the former.

It is to be here observed, 1^o. that as the natural gravity of the liquor makes it tend downwards, so it resists its ascent out of the ball into the tube; and that the more, as it rises higher: for which reason, it were best to have the tube BC horizontal. 2^o. Since there must of necessity be some air left in the void part of the tube over the liquor, that air, by its elasticity, will tend downwards, and of consequence will resist the rise of the liquor, and be compressed by it as it does rise: its elasticity therefore is thus increased.

3^o. Since it is found from experience, that a less degree of heat is communicated more easily to the spirit of wine in the ball than a greater, the rarefactions of the spirit of wine are not proportionable to their producing causes; especially since a greater degree of heat finds more liquor in the tube than a less does, to which, notwithstanding, the heat may be more easily communicated than to that stagnating in the ball.

On these accounts, the Florentine *thermometer*, though that commonly in use, is far from being an accurate measure of heat, &c. to which may be added what Dr. Halley observes in the *philosophical transactions*, that he has learned from those who have kept spirit of wine long, that it always loses part of its expansive force in course of time.

Another great defect of these, and other *thermometers*, is, that their degrees are not comparable with each other. They mark, indeed, the different degrees of heat and cold, but each marks only for itself, and after its own manner; for that they do not proceed from any point of heat, or cold, that is common to them all. It is with them as with two clocks, which for want of having been first set to the same hour by the sun, will, indeed, mark that one, two, or more hours are passed, but not what hour it is by the day.—Nor can we be assured, that when the liquor is risen a degree in two different *thermometers*, they have both suffered the same impression of an equal additional heat: since the spirit of wine may not be the same in both, and in proportion as the spirit is more or less rectified, it will rise more or less high by the same heat.

Nor is this all: for in graduating *thermometers* they take equal lengths of the tube for equal ascents of the spirit; whereas, supposing the diameters of the tube equal throughout, which very rarely happens, there are so many irregularities within-side, that a certain length of tube sometimes requires double the quantity of liquor to fill it, that the same length in another tube of the same diameter requires. All which arises from the unequal thickneses of the parietes of tubes in different places; and from accidental prominences and cavities, always found in the inner surfaces of tubes; and especially from their being almost always bigger at one end than the other.

Hence it is, that the comparison of *thermometers* becomes so precarious and defective.—Yet the most curious and interesting use of *thermometers* is, what ought to arise from such comparison. It is by this we should know the heat or cold of another season, of another year, another climate, &c. and what is the greatest degree of heat or cold that men and other animals can subsist in.

M. de Reaumur has contrived a new *thermometer* for the purpose; wherein the inconveniences above recited are remedied. See its description at large in *Mém. de l'Acad. R. des Scien. an 1730*, p. 645. *hijl. p. 15. item, an. 1731*, p. 334. *l'ijl. p. 7.*

Various

Various methods have been proposed by various authors, for finding a fixed point, or degree of heat and cold, from which to account the other degrees, and adjust the scale; that so observations made at the same or different times, in different places, might be compared together.

Some note the place the liquor is at in winter, when water begins to freeze; and again, that in summer, when butter placed near the ball of the thermometer, melts: the intermediate space they divide into two equal parts, the middle point whereof answers, in their graduation, to temperate heat; and each moiety they sub-divide into ten degrees, adding four other equal degrees on each of the two extremes. But this method supposes the same degree of heat and cold to answer to the freezing of all water, and the melting of all butter; as also, that all thermometers receive the same impressions from the same degree of heat; all which suppositions are contrary to experience.

Others advise the ball of the thermometer to be put in a quantity of snow and salt, and the point the liquor is at to be noted. Thence the thermometer is to be removed into a deep cave or cellar, where no external air reaches: so that the liquor receiving the action of a temperate air, may shew the intermediate space into 15, or more equal parts, which they continue beyond each extreme: but this method is liable to the same inconveniences as the former.

Dr. Halley assumes that for a fixed degree of heat wherein spirit of wine begins to boil; but there is reason to suspect this too of being precarious: though after him, M. Amontons retains the degree of heat answering to boiling water, for the graduating his mercurial thermometer. But as the different specific gravities of water, argue a difference of mass and texture, it is highly probable that heat of all boiling waters is not the same; so that this essential point is yet undetermined.

THERMOSCOPE,* an instrument shewing the changes happening in the air with respect to heat and cold.

* The word *thermoscope* is generally used indifferently with that of *thermometer*. There is some difference, however, in the literal import of the two; the first signifying an instrument that shews, or exhibits the changes of heat, &c. to the eye, formed from *thermo*, heat, and *scope*, order, I see; and the latter an instrument that measures those change, from *thermo*, heat, and *metron*, to measure: on which foundation the *thermometer* should be a more accurate *thermoscope*, &c. This difference the excellent Wolfius taking hold of, declares all the thermometers in use as *thermoscopes*, shewing that none of them properly measure the changes of heat, &c. none of them do more than indicate the same. Tho' their different heights yesterday and to-day shew a difference of heat, yet since they do not discover the ratio of yesterday's heat to to-day's, they are not strictly thermometers.

In the *Alia erud. Liff.* we have a method of graduating the common thermometers so, as that the unequal divisions thereof shall correspond to equal degrees of heat, whereby the ratio of to-day's heat to yesterday's will be measured, and consequently the *thermoscope* be improved in a thermometer.

The method is that of Car. Renaldinus, and is described by the Leipzig editors thus: take a slender tube about four palms long, with a ball fastened to the same; pour into it spirit of wine, enough just to fill the ball when surrounded with ice, and not a drop over. In this state, seal the orifice of the tube hermetically, and provide fix vessels, each capable of containing a pound of water, and somewhat more; and into the first pour 11 ounces of cold water, into the second 10 ounces, into the third 9, &c. This done, immerse the thermometer in the first vessel, and pour into it one ounce of hot water; observing how high the spirit rises in the tube, and noting the point with unity: then remove the thermometer into the second vessel, into which is to be poured two ounces of hot water, and note the place the spirit rises to, with 2. By thus proceeding till the whole pound of water is spent, the instrument will be found divided into 12 parts, denoting so many terms or degrees of heat; so that at 2, the heat is double to that at 1, at 3 triple, &c.

But this method, though plausible, Wolfius shews is deceitful, and is built on false suppositions: for it takes for granted, that we have one degree of heat, by adding one ounce of hot to 10 of cold water; two degrees, by adding two ounces to 10, &c. It supposes also that a single degree of heat acts on the spirit of wine in the ball with a single force, a double with a double force, &c. Lastly, it supposes that if the effect be produced in the thermometer by the heat of the ambient air, which is here produced by the hot water, the air has the same degree of heat with the water.

But none of these suppositions is true: for, as to the first, allowing the heat of the hot water, equally distributed through the cold, one degree of it will then be distributed through 11 two through 10, three through 9, &c. Taking therefore equal bulks of the water, *i. e.* gr. a twelfth part of each, the heat will not be double in one, triple in another, quadruple in another, &c.

The first supposition therefore is erroneous, and so is the second; for neither is the heat of the hot water equally diffused

throughout the cold, nor does the heat of the hot water act uniformly on the spirit of wine, *i. e.* not with the same force during all the time of its action.

For the third supposition, the heat of the ambient air acts not only on the spirit of wine in the ball, but also on that in the tube; and therefore this as well as that will be changed.

THESEA, or THESSEA, ΘΗΣΕΙΑ, in antiquity, seals celebrated by the Athenians, in honour of Theseus.

In spite of the important services that hero had done his country, in delivering it from a shameful tribute of so many youths of either sex sent yearly to be devoured by the Minotaur in Crete (as the fable has it) or just as slaves to Minos king of Crete, as the histories have it; from which he freed them, by overcoming Taurus, Minos's general: he was banished for some time, and retired to Scyro, under the protection of Lycomedes king of that island, who finally slew him out of jealousy.

The gods, it is said, revenged this treatment Theseus received from the Athenians, by afflicting them with a famine, which the oracle assured them should not cease till they had avenged his death.—Upon this they slew Lycomedes, brought Theseus's bones to Athens, placed them in a temple erected to him, and appointed *thesia* to be held every eight day of each month, wherein largesses were distributed to the people, and the day was spent by the rich in feasting and rejoicing.

THESIN, — Per Arsin & THESIN. See *Per ARSIN*.

THESIS,* in the schools, a general proposition which a person advances, and offers to maintain.

* The word is pure Greek, Θέσις, *posicion*; formed from θέω, *pono*, I put, or I lay down.

In the colleges it is frequent to have placards, containing a number of these *theses*.—There are *theses* in theology, in medicine, in philosophy, in law, &c.—The maintaining a *thesis*, is a great part of the exercise a student is to undergo for a degree.

THESIS, in logic, &c.—Every proposition may be divided into *thesis*, and hypothesis, *thesis* contains the thing affirmed or denied, and hypothesis the conditions of the affirmation or negation.

Thus, in Euclid, If a triangle and parallelogram have equal bases and altitudes, (is the hypothesis) the first is half of the second, the *thesis*.

Arts and *THESIS*. See the article *ARSIS*.

THEURGY,* ΘΕΟΥΡΓΙΑ, a name which the ancients gave to that sacred part of magic, which we sometimes call *white magic*, or the *white art*.

* The word is formed from the Greek Θεός, *God*, and εργον, *work*, *g. d.* the art of doing divine things, or things which God alone can do, or the power of working extraordinary and supernatural things by invoking the names of God, saints, angels, &c.

Accordingly, those who have wrote of magic in the general, divide it into three parts; the first whereof is called *theurgy*, as operating by divine or celestial means; the second, *natural magic*, performed by the powers of nature; and the third, *pyromancy*, which proceeds by invoking demons.

THICK Intestines. See the article *INTESTINES*.

THIGH, a part of the body of men, quadrupeds, and birds, between the leg and the trunk. See *LEG*, &c.

The several parts of the *thigh* have different names: the fore and upper part is joined to the groin, or *inguen*; the side makes the hanch, or hip, *coxa*, *coxenta*, the upper hind part the buttock, *clunis*; the lower and hind part the ham, *plica*, of *post* and *plica*, because it bends backwards; and the fore-part the knee, *genu*, of the Greek γονυ, which signifies the knee.

The bone of the *thigh* is the largest and strongest in the whole human body, as being to bear the whole burthen thereof.

whence its name *femur*, of *fero*, I bear.

THINKING, Cogitation, a general name for any act, or operation of the mind.

Chavin, with the Cartesians, will have thinking to consist in a certain native, inherent motion, or agitation of the human mind, whereof itself is conscious.—Native and inherent, since he conceives it no other than the very essence of the mind itself, or, at least, its principal and fundamental property:—an *agitation*, since there is a new modification or change made in the mind, which we scarce know how to conceive without motion; add, that the origin and etymology of the word *cogitation*, according to Varro and Festus, implies as much; *cogito* being used for *coagito*.

When the mind turns its view inwards, upon itself, the first idea that offers, says Mr. Lock, is *thinking*; wherein it observes a great variety of modifications, and thereof frames to itself distinct ideas: thus the perfection annexed to any impression on the body made by an external object, is called *sensation*.

When an idea recurs without the presence of the object, it is called *remembrance*.

When sought after by the mind, and brought again in view, it is called *recollection*.

When held there long under attentive consideration, it is *contemplation*.

When ideas float in the mind without regard or reflection, it is called a *revery*: when they are taken express notice of, and, as it were registered in the memory, it is *attention*: and when the mind fixes its view on any one idea, and considers it on all sides, it is *study* and *attention*.

These are the most obvious modes of *thinking*; but there are several others which we know of; and, doubtless, the mind is capable of infinite others, whereof we have no notion at all.

The school philosophers usually divide *thinking*, with regard to the objects it is employed about, into understanding, *intellectio*; and willing, *volitio*.

And hence, those are said to be the two powers or faculties of the human mind.

Intellectual *thinking* is farther subdivided into divers kinds: the first, when the mind merely apprehends or takes notice of a thing, called *perception*: the second, when it affirms or denies a thing, called *judgment*: the third, when it gathers or infers a thing from others given, called *reasoning*: the fourth, when the mind disposes its own thoughts or ideas in order, called *method*.

Volitive *thinking*, or volitions, admits of infinite different modifications, or new determinations.

Some authors extend the idea of *thinking* further; and consider it in God, angels, brutes, &c. whence a new division of *thinking* into divine, angelical, human, and animal or sensitive.

But the two first we know little or nothing of. The third is that we have already been treating of.—As to the last, viz. animal or sensitive thought, it is defined to be an action of the soul attending to an external object, effected by means of the animal spirits duly agitated in the brain, to excite an idea. See SPIRITS, KNOWLEDGE, THOUGHT, &c.

The Cartesians maintain, that *thinking* is essential to the human soul; and, consequently, that there is no time when the soul does not *think*: but this doctrine is overturned by Mr. Lock, who shews, that in sleep without dreaming, there is an entire cessation of all the modes of *thinking*.

I think, cogito, according to des Cartes, is the first, and most certain of all truths; from which alone we draw this consequence, *therefore I am*, or exist, *sum*.—One might also say, *cogito, ergo Deus est*; *I think, therefore there is a God*.—Logic is defined the art of *thinking* justly.

THIRD, *Tertius*. See NUMBER, and NUMERATION.

THIRD, in music, a concord resulting from a mixture of two sounds containing an interval of two degrees.

It is called *third*, as containing three terms, or sounds between the extremes.

The *third*, in Italian, *terza*, in French *tierce*, in Latin *tertia*, has no general name in the Greek: it is the first of the imperfect concords; i. e. of such as admit of majority and minority, without ceasing to be concords.—And hence it is, that it is distinguished into two kinds.

The first, which the Italians call *dizono* (from the greek *dizono*) or *terza maggiore*, and we the greater *third*, is composed diatonically of three terms, or sounds, containing two degrees, or intervals; one whereof, in the ancient system, is a greater tone, and the other a lesser tone: but in the modern temperate system they are both equal, as *ut, re, mi*; or *ut, mi*. Chromatically it is composed of four semitones; two whereof are greater, and the *third* less: it takes its form from the ratio sesqui-quarta 4:5.

The second *third*, which the Italians call *trihemitono*, or *semi-dizono*, or *terza minore*, and we the lesser *third*, is composed, like the former, of three sounds or terms, and two degrees or intervals: but these degrees, diatonically, are only a greater tone, and a semitone. Chromatically it is composed of three tones, two greater, and one less; as *re, mi, fa*; or *re, fa*.

It takes its form from the ratio sesqui-quinta 5:6. Both these *thirds* are of admirable use in melody; and make, as it were, the foundation and life of harmony.

They are used agreeably both ascending and descending; and that either running over all the degrees, as *ut, re, mi*; or *re, mi, fa*; or skipping the middle degree, as *ut, mi*; or *re, fa*.

But it is to be observed, that the greater *third* has somewhat gay and sprightly in rising, and somewhat heavy and melancholic in falling: the lesser *third*, on the contrary, has somewhat soft and tender in rising, and somewhat brisk in falling.—For the use of the greater or lesser *third* in the series of the scale.

There are two other kinds of *thirds* that are dissonant and vicious; the first only composed of two greater semitones, and, by consequence, of a semitone less than the lesser *third*: this they call the *defective third*.

The second, on the contrary, has a semitone more than the greater *third*; and this they call the *redundant third*.

The *defective third* is very frequent in Italian songs, especially those composed for instruments; but is not to be used without necessity, and a great deal of discretion. The *redundant third* is absolutely forbidden.

THIRD Borough, in our ancient law-books, denotes a constable. See CONSTABLE.

THIRD Earing, in husbandry, the tilling or ploughing of the ground a third time.

THIRD Estate. See ESTATE, COMMONS, &c.

THIRD Night-awn-hynd: by the laws of Edward the Confessor, a guest who had lain three nights in an inn, was reputed a domestic, and his host was answerable for what offence he should commit.

For one night he was accounted *uncuth*, for two nights *guest*, and the third, *awn-hynd*.—*Prima nocte incognitus, secunda hospes, tertia domesticus censetur*.

THIRD Order, a sort of religious order, that observes the same rule, and the same manner of life, in proportion, as some other two orders instituted before.

The *third orders* are not originally religious orders, but associations of secular, and even married persons, who conform, as far as their condition will allow them, to the design, intention, and rules of a religious order which associates and directs them.

The Premonstrantes, Carmelites, Augustines, and Franciscans, dispute among themselves the honour of having first introduced *third orders*: but the pretensions of the last appear to be the best founded.

The first contend, that the THIRD order of Premonstrantes began in the life-time of their founder St. Norbert, who died in 1134.

F. Diego de Coria Maldonado, a Spanish Carmelite, who has a particular treatise on the *third order* of Carmelites, derives them immediately, as well as the Carmelites themselves, from the prophet Elijah; and among the great men who have made profession of that *third order*, reckons the prophet Obadiah, who lived 800 years before Christ; and among the women, our Saviour's great grandmother, under the borrowed name of St. Emerentiana. This Obadiah, he says, was controller-general of the house of king Ahab, mentioned in the first book of kings, chap. xviii. and was a disciple of the prophet Elijah. After serving that prince, and his successors, he retired to serve God, and entered the prophetic order of Eljah, but without quitting his house, his wife, or children.

The author adds, that he was not properly of the *third order*, but of the second, which consisted of married people, and was called the order of *enunuchs*, under the direction of Elijah. Such, according to him, is the foundation of the *third order* of Carmelites.

F. Helyot shews, that this *third order* was not begun till the year 1476, when Sixtus IV. gave permission to the prior and provincials of the Carmelites, to give the regular habit and rule of their order, to people of both sexes, married or unmarried, living at liberty in the world. De Coria reckons St. Louis, king of France, in the *third order* of the Carmelites.

The THIRD order of Augustines, if we credit F. Bruno, was instituted by St. Augustin himself: but the arguments he produces are so frivolous, that F. Heylot observes, they are not worth the refuting.

The THIRD order of Franciscans was instituted by St. Francis in 1221, in favour of people of both sexes, who being smitten with the preachings of that saint, demanded of him an easy manner of living a Christian life: upon which he gave them a rule, the constitutions whereof are not now extant as wrote by himself, but only as reduced and confirmed by pope Nicholas IV. 68 years afterwards.

The first order of this saint are the monks called *minor friars*, comprehending the cordeliers, capuchins, and recolects, the second comprehends the nuns of St. Clare; and the third several persons of both sexes, who live at liberty, and these are what we call the *third order*. See FRANCISCAN, &c.

Of this order, which was only established for secular persons, several of both sexes, to attain the greater perfection, have afterwards commenced religious, and formed various congregations, under various names, as *religious penitents of the third order*, &c.

THIRD Point, or TIERCE-point, in architecture, the point of section in the vertex of an equilateral triangle.

Arches or vaults of the *third point*, called by the Italians *di terzo acuto*, are those consisting of two arches of a circle, meeting in an angle a-top. See ARCH.

THIRD Point in perspective,	} See the articles	POINT.
THIRD Rate,		RATE.
THIRD Subsidy-duty,		DUTY.
Title of the THIRD year,		TITLE.

THIRDINGS, the third year of the corn or grain growing on the ground at the tenant's death, due to the lord for a heriot, within the manour of Turfat, in Herefordshire. See HERIOT.

THIRST, a painful sensation, occasioned by a vellication of the nerves of the throat or fauces, and producing a desire of drinking.

Rohault says thus: the liquor of the stomach, which enters into a thick vapour, and ascends from the stomach up into the throat, to moisten it; being too much warmed, either from a want of some other liquor to temper and dilute it, or from any other cause, becoming too thin, subtle, and penetrating a vapour, is so far from moistening and cooling the throat, that, on the contrary, it dries and heats it; and hence that motion in the nerves, the sensation whereof we call *thirst*.

Thirst sometimes also arises from a mere dryness of the part; and sometimes from sharp salts, more immediately velleicating the fibres of the throat.

There are various kinds of liquors which quench *thirst*; some by tempering the stomach liquor; others by diluting, and even dissolving the salt; and others by moistening and supplying the fibres.—Acids are particularly fitted for this end.

Thirst may be sometimes eluded by rolling a clean bullet or a pebble in the mouth, which occasions an extraordinary issue of saliva to moisten the throat, &c.

Mr. Boyle mentions a man who could easily abstain from drinking for nine days, and yet have his diet nothing more liquid than usual: the secretions of urine, sweat, &c. being performed all the while regularly, and in the same quantity as usual. In dropical cases, where there is not a right secretion of the urine by the renal glands, and the vessels and parts of the body are loaded with too great a quantity of ferous humours, a great moderation in drinking might be attended with good success, provided some liquor could be found out to allay that uneasy sensation: probably this would be best performed by mucilages acidulated with spirit of vitriol or sulphur, or gellies with juice of lemon, &c. and that a small quantity of such a composition now and then used, might be of as much real service in quenching *thirst*, as draughts of liquors which increase the symptoms.

THIS TLE, *Carduus*, a name common to divers plants, whose flowers consist of several little, narrow, longish petals, ranged close together into a sort of head, and whose leaves are usually spinose, or prickly.—The most known of these plants are the *blissful THISTLE*. See *CARDUUS BENEDICTUS*.

Milk THISTLE, or *our Lady's THISTLE*, *Cardus Marianæ*, the decoction whereof is by some recommended against the dropsy, jaundice, and pains of the kidneys.

And the *Fuller's THISTLE*, or *Taxel*, which see under the article *TAXEL*.

Order of the THISTLE, or of St. Andrew, is a military order in Scotland; instituted as some say, by Hungus, or Hungo, king of the Picts, after a victory obtained over Athelstan. The legend is, that a cross of St. Andrew (the patron of that kingdom) appearing to him at the time of the engagement, he blessed the happy augury, took the figure thereof into his standard in honour of his protector, and instituted an order of knights, whose collar is of gold interwoven with *thistle* flowers, and sprigs of rue.

From the collar hangs a medal, on which is the image of St. Andrew with his cross on his breast; with this motto, *Nemo me impune lacessit*. No body shall provoke me unpunished. Others give a different account of its origin, and assure us, it was instituted after the conclusion of a peace between Charles VII. of France, and the then king of Scotland.

The abbot Justinian goes up higher, and will have it to have been instituted by Achais I. king of Scotland, in 809; who, after an alliance made with Charlemagne, took for his device the *thistle*, with the words *nemo me impune lacessit*, which, in effect, is that of the order: he adds, that king James IV. renewed the order, and took St. Andrew for its protector.

The order only consists of twelve knights, besides the king, who is the chief, or sovereign. Their ordinary badge is a green ribbon, to which hangs a *thistle* of gold, crowned within a circle of gold, in which is the forefard motto.

Our Lady of the THISTLE, was also a military order instituted in 1370, by Louis II. duke of Bourbon.—It consisted of 26 knights, whereof that prince and his successors were the chiefs: their badge was a sky-blue girdle; and, on solemn occasions, a mantle of the same colour, with a gold collar, interwoven with flower-de-luces, among which was the word *esperance*, hope, in capitals.

THISTLE-TAKE, a custom in the hundred of Halton, in the county of Chester, whereby, if in driving beasts over the common, the driver permits them to graze, or take but a *thistle*, he shall pay a half-penny a beast to the lord of the fee.

At Fiskerton, in Nottinghamshire, by ancient custom, if a native, or cottager killed a swine above a year old, he paid the lord one penny; which was also called *thistle-take*.

THLIPSIS, *θλipsis*, is used by anatomists, for the compression of any vessel, or aperture, whereby its cavity is lessened.

THNETOPSYCHITES, a sect in the ancient church, who believed the soul of man perfectly like that of brutes; and taught that it died with the body. See *Soul*.

* The word is compounded of the Greek, *θνητος*, mortal, and *ψυχη*, soul.

We meet with no account of these heretics any where, but in J. Damascenus, *hæres.* 90. unless they be the same with those

Eusebius speaks of, *Hist. Eccles. lib. 9. c. 38.* who relates, that in Origen's time there were heretics in Arabia, who taught that the soul of man died with the body; but that it should rise again with it at the end of the world. He adds, that Origen refuted them in a numerous council, and reclaimed them from their errors.—St. Augustin and Isidore call them the Arabian heretics.

Marshall, in his tables, has disguised the word, for want of understanding it; he writes it *thetopschites*, instead of *thnetopschites*: he likewise places them in the Vth century; but on what grounds we cannot imagine.

THOMEANS, THOMEANS, THOMITES, or *Christians of St. THOMAS*, a people of the East-Indians, who, according to tradition, received the gospel from the apostle St. Thomas.

Upon the arrival of the Portuguese at Calcut, in their first voyage to the Indies, they met with ancient christians, who pretended to be descended from those converted by St. Thomas. The *Thomeans* being informed of a new people arrived among them, who bore a particular veneration for the cross, sent ambassadors to them to make an alliance with them, and to solicit their assistance against the Gentile princes, by whom they were greatly oppressed.

It is certain that the *Thomeans* are indigenous, or originally of India: they are also called *Nazarenæ*; but custom has affixed to that name an idea of contempt: and their other name *Mappuley*, and, in the plural, *Mappuleymar*, is accounted more honourable.

They form a very considerable clan, or cast; but are always divided with factions, inveterate enemies, &c. The clan extends through all the country from Calcut to Travenor; not that all the tract is possessed wholly by them; sometimes they have a whole town to themselves, and sometimes only a certain quarter in it.

They own themselves strangers in that country, and their tradition is, that they came thither from the country about the city of Meilapur, or St. Thomas; by reason they were persecuted by the prince thereof. But the time of this transmigration no body knows any thing of; for they keep no monuments.

The *Thomeans* ascribe their conversion, their discipline, &c. to St. Thomas: their breviary adds, that their apostle passed thence into China.

We shall not here enter into the dispute, whether the St. Thomas so famed in the Indies be the apostle, or some other saint of that name; which latter is the opinion of several learned men, and particularly of M. Huet.

But the progress of the history of this church is not less difficult to trace than its origin: our European books mention the patriarch of Alexandria's sending bishops to the Indians, particularly St. Pantenus, St. Frumentius, &c. It may be doubted, whether or no it were to these Indians that they were sent: Baronius, indeed, maintains it was; but the Portuguese author *da Historia d'Ethiopia*, endeavours to prove it was to Ethiopia these ancient missionaries went. All we know for certain is, that the *Thomeans*, for several ages, were furnished with bishops from the side of Babylon, or Syria; and that there is a kind of patriarch at Babylon who continues to furnish them.

Whether or no their apostle ordained them any bishops (the order whereof may have been since extinct through want of proper subjects, as F. Bouchet imagines) is a question: all we can say is, that the *Thomean* church, at the first arrival of the Portuguese, was wholly governed by these foreign bishops.

The language they use, *in sacris*, is the Chaldee, some say the Syriac: as to their ordinary language, it is the same with that of their neighbours.

The Chaldee used on these occasions was doubtless brought among them by their bishops: it is added, that at the time the East was infected with Nestorianism, Eutychanism, &c. the bishops likewise carried them these heresies.

Such a mixture of opinions, with a total interruption of pastors, sometimes for several years together, occasioned that horrible chaos their religion was in at the arrival of the Portuguese: for a specimen whereof we shall add their manner of celebrating the Eucharist.

Over the altar was a kind of gallery; and while the priest was saying the beginning of the office below, a cake of flower of rice was frying in oil or butter above: when enough, the cake was let down in a basket upon the altar, where the priest consecrated it. As to the other species, for wine, they used a kind of brandy or arrack variously prepared in that country. Nor was their ordination much more regular; the archdeacon, who was sometimes more respected than the bishop himself, frequently ordained priests.

Their other abuses were infinite: the Portuguese, for these two last centuries, have laboured the reformation of this church; and have employed both the ecclesiastical and secular power therein: for this end they have called the *Thomean* bishops to the councils at Goa, have instructed, charged them, &c. and have even sent them for instruction to Portugal and Rome: but finding that they were still apt to relapse at their return; and that no good was like to be done with them, they resolved to exclude them once for all, and to appoint an European bishop.

in their room. These proceedings have rendered the Portuguese infinitely odious to the *Thomæans*.

The person who contributed most to the reform, was Dom Frey Aleixo de Meneses, archbishop of Goa, who governing the Portuguese Indians for some time, in defect of a viceroy, took that occasion to call a synod in the village of Diamper, where abundance of regulations were made, and the *Thomæans* united to the Roman church: and in this he was seconded by the Jesuits.

After the death of the archbishop, a great part of the *Thomæan* church relapsed again, and thus still continues, partly Roman, partly *Thomæan*.

THOMAS—*Christians of St. Thomas*; } See { THOMÆANS.
THOMAS'S *Hospital*, } HOSPITAL.

THOMISM, or THOMÆISM, the doctrine of St. Thomas Aquinas, and his followers the *Thomists*; chiefly with regard to predestination, and grace.

There is some doubt what the true, genuine *Thomism* is: the Dominicans pretend to hold pure *Thomism*; but there are other authors who distinguish the *Thomism* of St. Thomas, from that of the Dominicans.

Others again make *Thomism* no other than a kind of Janfenism disguised; but Janfenism we know has been condemned by the popes, which pure *Thomism* never was.

In effect, the writings of Alvarez and Lemos, who were appointed by their order to lay down and defend before the holy see the dogmata of their school, have since been reputed the rule of pure *Thomism*.

The modern school has abandoned many of the ancient *Thomists*, whose sentiments and expressions appeared to Alvarez and Lemos too hard; and the new *Thomists*, who pass the bounds marked by these two doctors, cannot give their opinions for the sentiments of the school of St. Thomas, which the pope has forbid being censured.

The *Thomism* allowed, is that of Alvarez and Lemos: those two authors distinguish four classes of *Thomists*: the first, which they reject, destroys or takes away liberty; the second and third do not differ from Molina.

The last, which Alvarez embraces, admits a physical promotion, or predetermination, which is a complement of the active power, whereby it passes from the first act to the second; that is, from complete and next power to action.

This promotion they hold is offered in sufficient grace: sufficient grace is given to all men; and that they have a complete, independent, next power not to act, and even to reject the most efficacious grace.

THOMISTS, a sect of school divines, who maintain *Thomism*.

The avowed antagonists of the *Thomists* are the Scotists.

THOMITES. See the article THOMÆANS.

THORACIC, THORACICUS, in anatomy, an epithet given to two branches of the axillary artery, on account of their conveying the blood into some parts of the thorax.

The *thoracic* arteries are distinguished into *upper* and *lower*.—There are likewise *thoracic* veins, an *upper* and *lower*, destined for the reconveyance of the blood from the thorax to the axillary vein.

THORACIC DUCT, *Ductus THORACICUS*, or *Chyliferus*, is a little canal arising from, or rather it is a continuation of, the ext. or mouth of the receptaculum chyli.

It mounts all along the thorax, whence it takes its name, and ends in the left subclavian vein. It is sometimes called *Pecquet's duct*, or *ductus Pecquetianus*, from M. Pecquet, supposed to be the first discoverer thereof.

Indeed the *thoracic* duct, Dr. Wharton assures us, was observed by Barthol. Eustachio in 1563; but its use, and communication with the receptaculum chyli, was then unknown. And hence it is that Pecquet, a physician of Dieppe, is commonly held to have first discovered it, in 1651; whence its denomination *ductus Pecquetianus*: tho' the description he gives of its insertion is faulty.—Van Horne confounds it with the receptaculum, or, as he calls it, *cisterna chyli*.

In its progress through the thorax, it is furnished with a proper integument from the pleura, besides the membrane it has in common with the receptaculum: at about one third of its way it divides, but it soon unites again.

Dr. Drake observes, that it has valves in different places of its tract; Eustachio says glands. Its use is to carry the chyle and lymph from the receptaculum into the subclavian, by which it is forwarded to the cava, and thence to the heart.

THORAX, * ΘΩΡΑΞ; in anatomy, that part of the human body which forms the capacity of the breast, and wherein are included the heart and lungs.—See *Tab. Anat. (Osteol.) fig. 3. n. 13. 13. fig. 7. n. 15. 15.*

* It is its name from the Greek, *Θωραξ*, to leap; by reason of the continual throbbing motion of the heart, which is contained therein.—Galen calls it *cisterna*, and says it contains the part that excites to love.

The *thorax* is also called the *second* or *middle venter*, and properly the *chest*.

It is bounded a-top by the clavicles, and at bottom by the cartilago xiphoides, and the diaphragm.—Its fore-part is called the *sternum*, or *breast-bone*; its side parts, the *costæ*, or *ribs*; its hind-parts are the *spina dorsæ*, and its *vertebræ*, with the *emphate*.

Beside the heart and lungs, the *thorax* likewise contains the ascending cava, the aorta, the pulmonary vein and artery, the trachea, œsophagus, &c.

It is lined within-side with a membrane called the *pleura*, and divided in the middle by another called the *mediastinum*.

THOROUGH-Bass, in music, is that bass which continues quite through the composition. See BASS.

THOUGHT, *Sentiment*, a general name for all the ideas consequent on the operations of the mind, and even for the operations themselves.

As in the idea of *thought*, there is nothing included of what we include in the idea of an extended substance; and that whatever belongs to body, may be denied to belong to *thought*: we may conclude that *thought* is not a mode of extended substance, it being the nature of a mode not to be conceived, if the thing whereof it is the mode be denied. Hence we infer, that *thought* not being a mode of extended substance, must be the attribute of some other substance very different.

F. Malebranche, with the spirit of a Cartesian, denies that a man who thinks seriously on the matter, can doubt but that the essence of the mind consists altogether in *thought*, as that of matter does in extension; and that according to the various modifications of *thought*, the mind sometimes wills, sometimes imagines, &c. as, according to the various modifications of extension, matter is sometimes water, sometimes wood, fire, &c. By the way, by *thought* he does not mean the particular modifications of the soul, i. e. such or such a *thought*, but *thought* or thinking in the general, considered as capable of all kinds of modifications or ideas: as by extension he does not mean such or such an extension, as a square, oval, or the like, but extension in the abstract, considered as susceptible of all kinds of modifications or figures.

He adds, that he takes it to be impossible to conceive a mind which does not think, though it be easy to conceive one which does not feel, or imagine, or will; in like manner as it is impossible to conceive a matter which is not extended, though it be easy to conceive one that is neither earth, nor metal; nor square, nor round; nor that is even in motion.

Hence it may be concluded, that as it is possible there may be matter which is neither earth nor metal; nor square, nor round; nor even in motion: it is also possible, that a mind may neither perceive heat nor cold; nor joy nor grief; nor imagine any thing, nor will any thing; so that these modifications are not essential to it. Thinking alone, therefore, according to this author, is the essence of the mind, as extension alone is the essence of matter.

But this doctrine no longer passes among us. The followers of Sir Isaac Newton, and the new philosophy, deny extension to be the essence of matter, and the followers of Mr. Locke deny *thought* to be the essence of the mind.

THOUSAND. See the article NUMERATION.

THOUSAND years reign. See the article MILLENIUM.

THRASHING, or THRESHING, in agriculture, the act of beating the corn out of the ears. See CORN.

There are two ways of separating corn from the ear—the first by beating it with a flail, which is properly what we call *thrashing*.

Some authors will not by any means we should call this by the Roman name *tritura*, or *triturationis*, but *flagellatio*, or *flagellum*, a *scurge*, or *flail*.

The other manner, still practised in several countries, as we are informed by Liger, is to make mules or horses trample on it backwards and forwards.—This is properly what the ancients called *tritura* and *triturationis*.

But they also used oxen therein; witness the Hebrews, who sometimes yoked four oxen together for this purpose.

Another way among the ancients was with a kind of sledge made of boards joined together, and laden with stones or iron, upon which a man was mounted, and the whole drawn over the corn by horses: this instrument was called *traba*, or *tribula*.

It is a rule among husbandmen, that the season for *thrashing*, is as soon as the corn has sweated in the heap, or mow.

THRAVE, or THREAVE of corn, in most parts of England, is twenty-four sheaves, or four shocks of six sheaves to the shock—though in some counties they only reckon twelve shocks to the *thrave*.

King Athelstan, anno 923, gave by charter to St. John of Beverly, four *thraves* of corn for every plough-land in the east-riding of Yorkshire.

*Thou threvest he becom king,
Of illa plough of oft-riding.*

THREAD, in botany, is underwood of those capillaments usually found in the middle of flowers; as in the lily, tulip, rose, &c. There are two kinds: those which support apices, are particularly called *filamina*; and those which have none *fililla*. See Supplement, article STAMINA.

Gold Thread, } See the articles } **GOLD.**
Virgins Thread, } **THREAD.**
Thready Marble, } **MARBLE.**

THREAVE. See the article **THRAVE**.

THREE-Legged-Staff, an instrument consisting of three wooden legs, made with joints, so as to shut all together, and to take off in the middle, for the better carriage; and usually having on its top a ball and socket: its use is to support and adjust instruments for astronomy, surveying, &c.

Three Chapters, } See the articles } **CHAPTER.**
Compasses of Three Legs, } **COMPASSES.**
Ombre by Three, } **OMBRE.**
Rule of Three, } **RULE.**

THRENGI, or **THRENGES**, in our ancient Customs, a denomination given to vassals, but not those of the lowest degree, but such who held lands of the chief lord: otherwise called *drengi*, and *drenges* *. See **DRENCHERS**.

* *Quia vero non erant ad hoc tempore regis Willielmi milites in Anglia, sed threnges; præcipit rex ut de eis, milites fierent ad defendendam terram: fecit autem Lanfrancus threngos suos milites, &c. Somn. Gavelk.*

The Name was imposed by the conqueror: for when one Edward Sharnbourn of Norfolk, and others, were ejected out of their lands, they complained to the conqueror; insinuating, that they were always on his side, and never opposed him; which, upon inquiry, he found to be true; and therefore he commanded, that every one should be restored to their lands, and he for ever after be called *drenges*, or *threnges*. Spelm. du Cang.

THRENODY, **THRENODIA**, a mournful, or funeral song.

THRIHING, } See the articles } **THRIHING.**
THRINIUM-Gild, } **THRINIUM-Gild.**

THROAT, the anterior part of an animal between the head and the shoulders, wherein is the gullet.

Physicians include under the word *throat*, all that hollow or cavity which may be seen when the mouth is wide open.

It is sometimes also called *isthmus*, by reason it is narrow, and bears some resemblance to what are called by the geographers *isthmi*. See **FAUCES**.

THROAT, in architecture, fortification, &c. See **GORGE**, and **GULA**.

THRONE, **ΘΡΟΝΟΣ**, a royal seat, or chair of state, enriched with ornaments of architecture and sculpture, made of some precious matter, raised one or more steps, and covered with a kind of canopy.

Such are the *thrones* in the rooms of audience of kings, and other sovereigns.

THROW the Glove, } See the articles } **GLOVE,**
THROWED Silk, } **SILK.**

THROWS of Women, the Pains of child-birth.

THROWSTER, one who prepares raw silk for the weaver; by cleansing and twisting it.

THUMMIM, in the scripture learning. See **URIM** and **THUMMIM**.

THUNDER, a noise in the lowest region of the air, excited by a sudden kindling of sulphurous exhalations. Seneca, Rohault, and other authors, both ancient and modern, account for *thunder*, by supposing two clouds impending over one another, the upper and rarer whereof becoming condensed by a fresh accession of air raised thither by warmth from the lower parts of the atmosphere, or driven upon it by the wind; immediately falls forcibly down upon the lower, and denser cloud; by which fall, the air interposed between the two being compressed, that next the extremities of the two clouds is squeezed out, and leaves room for the extremity of the upper cloud to close tight upon the under: thus a great quantity of air is inclosed, which at length escaping through some winding irregular vent or passage, occasions that noise which we call *thunder*.

But this could only reach to the phenomena of *thunder* heard without lightning; and, in effect, we have now a better solution: *thunder* is not occasioned by the falling of clouds, but by the kindling of sulphurous Exhalations, in the same manner as the noise of aurum fulminans.

“There are sulphurous exhalations, says Sir Isaac Newton, “always ascending into the Air when the earth is dry; there “they ferment with the nitrous Acids, and sometimes taking “fire, generate *thunder*, lightning, &c.

That, beside the vapours raised from water, &c. there are also exhalations carried off from sulphur, bitumen, volatile salts, &c. is past all doubt; the vast Quantity of sulphurous and bituminous matter all over the surface of the earth, and the volatile salts of plants and animals, afford such an ample stock

thereof, that it is no wonder the air should be filled with such particles, raised higher or lower, according to their greater or lesser degree of subtilty and activity; and more copiously spread in this or that quarter, according to the direction of the winds.

Now, the effects of *thunder* are so like those of fired gunpowder, that Dr. Wallis thinks we need not scruple to ascribe them to the same cause: and the principal ingredients in gunpowder we know are nitre and sulphur: charcoal only serving to keep the parts separate for their better kindling.

Hence, if we conceive in the air a convenient mixture of nitrous and sulphurous particles, from the sources above-mentioned; and those, by any cause, to be set on fire; such explosion may well follow, and with such noise and light, the two phenomena of *thunder*, as in the firing of gunpowder: and being once kindled, it will run from place to place, this way or that, as the exhalations happen to lead it; much as is found in a train of gunpowder.

This explosion, if high in the air, and remote from us, will do no mischief; but if near us, they may destroy trees, animals, &c. as gunpowder would do in the like circumstances.

This nearness or distance may be estimated by the interval of time between the flash, and the noise. Dr. Wallis observes, that ordinarily the distance between the two is about seven seconds; which, at the rate of 1142 feet in a second of time, gives the distance about a mile and a half: but sometimes it comes in a second or two, which argues the explosion very near us, and even among us. And in such cases, the reverend Doctor assures us, he has more than once foretold the mischief that befell.

Upon the whole, that there is in lightning a sulphurous vapour, appears from the smell of sulphur which attends it, and from the sultry heat in the air which usually precedes it; and that there is a nitrous vapour along with it, the same author concludes hence, that we know of no other body so liable to a sudden and violent explosion. And as to the kindling of these materials, we know that a mixture of sulphur and steel filings, with a little water, will of itself break forth into actual flame. Nothing therefore is wanting to the explosion, but some chalybeate, or vitriolic vapour; and among the various effluvia from the earth, the doctor does not doubt, but there must be some of that kind: but what he leaves as a probability, we can produce a kind of proof of.

In history we meet with instances of its raining iron in Italy, and iron stones in Germany: Jul. Scaliger tells us, he had by him a piece of iron rained in Savoy. Cardan reports 1200 stones to have fallen from heaven, some of them weighing 30, some 40, and one an hundred and twenty pound, all very hard, and of the colour of iron.

The matter of fact is so well attested, that Dr. Lifter, in the *Philosophical Transactions*, builds a whole theory of *thunder* and lightning on it; maintaining, that they both owe their matter to the vapour or exhalation of the pyrites.

That rattling in the noise of *thunder*, which makes it seem as if it passed through arches, or were broken variously, is doubtless owing to the sound being excited among clouds hanging over one another, and the agitated air passing irregularly between them.

THUNDER BOLT.—If what we call *lightning*, act with extraordinary violence, and break or shatter any thing, it is called a *thunder-bolt*; which the vulgar, to fit it for such effects, suppose to be a hard body, and even a stone.

But that we need not have recourse to a hard solid body to account for the effects commonly attributed to the *thunder-bolt*, will be evident to any one, who considers those of the pulvis fulminans, and of gunpowder.

The phenomena of the *thunder-bolt* are, that it oftener strikes on high places than on low: that it frequently burns people's cloaths, without touching their bodies: that it sometimes breaks their bones, without hurting their flesh, or their cloaths; and that it has even melted the sword without injuring the scabbard.

The first is easily accounted for, from the ordinary height of the clouds, out of which the lightning darts: as to the rest, exhalations may be very different from one another; some, e. gr. coming nearest the nature of sulphur, may only yield a very slight lambent flame, which will only affect such things as take fire the soonest; and others, on the contrary, so subtle and penetrating, as to come near the nature of volatile salts or of aqua fortis, which spare not bodies, and spend their whole force on hard ones.

The chevalier de Louville, of the French academy of sciences, accounts for some of the effects of *thunder* upon a new principle: as to killing of animals, without burning or wounding them, it is naturally enough ascribed to the sulphur, which falling near enough the person, the fumes thereof stop his respiration. As to trees, buildings, &c. split or beaten down, there must be another cause. Mr. Louville, therefore, supposes, that when the *thunder* is high, its flame is dissipated before it arrives at the earth: and that the air being violently driven

THY

driven along by the impetuous motion of the flame, and of consequence exceedingly condensed, becomes as it were a hard body, capable of producing terrible effects. Places struck with *thunder-bolts*, were held sacred among the ancients. Nigidius has a curious treatise on the *thunder-bolt*.—Marcellus Ficinus, and some others, maintain, that coral dissipates panic fears, and keeps off *thunder-bolts* and hail: Fortunat Licetus has endeavoured to account for this physically: but F. le Brun proves very easily, that all these philosophers are mistaken.

On medals, the *thunder-bolt* is sometimes found to accompany the emperors heads; as that of Augustus. In which case, it is a mark of sovereignty, and of a power equal with the gods. Appian informs us, that the *thunder-bolt* was the principal divinity of Selencia; adding, that it was adored, even in his time, with various hymns and ceremonies.

THUNDERING Legion, *Legio Fulminans*, was a legion in the Roman army, consisting of Christian soldiers, who in the expedition of the emperor Marcus Aurelius against the Sarmatæ, Quadi, and Marcomanni, are said to have saved the whole army, then ready to perish of thirst, by procuring, with their prayers, a very plentiful shower thereon; and at the same time, a furious hail, mixed with lightening and thunderbolts, on the enemy.

This is the account commonly given by ecclesiastical historians: and the whole story is engraven in bas-reliefs, on the Antonine column. And hence arose the denomination *thunderers*: though some say, that the legion those Christians were of, was called the *thundering legion* before.

THURSDAY, the fifth day of the Christians week, but the sixth of that of the Jews. See **DAY**, and **WEEK**.

Holy **THURSDAY**, } See HOLY.
Maunday **THURSDAY**, } See MAUNDAY *Thursday*.

THUS. See the article **FRANKINCENSE**.

THYMUS, *θυμος*, in anatomy, a conglobate gland, situated in the upper part of the thorax, under the clavicle, where the cava and aorta divide into the subclavian branches.

The *thymus* is that part which in a breast of veal we call the *sweet-bread*.—This gland is big in infants, but as they grow in age, it becomes less; its arteries and veins are branches of the carotides and jugulars. It has nerves from the par vagum, and its lymphatic vessels discharge themselves into the ductus thoracicus.

The learned Dr. Tyfon supposes the use of this gland to be for a diverticulum to the chyle in the thoracic duct of a foetus, whose stomach being always full of the liquor in which it swims, must keep the thoracic duct distended with chyle; because the blood which the foetus receives from the mother, fills the veins, and hinders the free entrance of the chyle into the subclavians.

Mr. Chefelden observes, that where the *thymus* in men is very small, the thyroid glands increase proportionably; but in such brutes as have fallen under his observation, it is just the contrary: from which he is inclined to believe that they belong to the same lymphatics, and that either of them increasing as much as both ought to do, if both increased, answers the same end as if both did; and that the reason why the *thymus* increases rather than the thyroid glands in brutes, is, because the shape of their thorax affords convenient room for it to lodge in; and that in men, the reason why the thyroid glands increase so much, is, because there is no room in that part of the thorax where the *thymus* is seated, for a large gland to be lodged.

THYMUS, in medicine, is used for a kind of wart, growing on the parts of generation, the fundament, and several other places of the body, with cloven asperities, like those of the herb *thyme*, whence its name. See **WART**, and **WEN**.

The ordinary method of curing a *thymus*, is by ligature and desiccative lotions, or by caustics; and if large, by incision; taking care first to secure the greater vessels by tying them.

THYROARYTÆNOIDEUS, in anatomy, a muscle situate under the cartilago thyroides; from the fore and back part of which it arises with a very broad head, and terminates in the arytenoides, which it constricts, and also shuts the larynx.

THYROIDEÆ Glandulæ, **THYROID Glands**, are two glands of the larynx.

There are four pretty large glands, which serve to moisten the larynx; two above, and two below.—The two latter are called *thyroides*; situate at the bottom of the larynx, aside of the annular cartilage, and of the first ring of the trachea; one on each side.

They are in form of little pears; their colour a little reddish, their substance more solid, more viscous, and resembling more the flesh of the muscles, than the other glands.

They receive nerves from the recurrents, arteries from the carotides; and veins which pass to the jugulars, and lymphatics, and discharge themselves into the thoracic duct.

Their use is to separate a viscid moisture, serving to line and lubricate the larynx, to facilitate the motion of its cartilages, to obtund the acrimony of the saliva, and to soften the voice.

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THYROIDES,* *ΘΥΡΟΙΔΗΣ*, in anatomy, the first and largest of the five cartilages of the larynx; called also *scutiformis*.

* The word is formed from the Greek, *θυρεος*, buckle, and *ειδος*, form.

In the middle is a prominence, called *pomum adami*. The *thyroides* is usually parted by a line running along its middle; whence some make two of it, though in reality it is very rare that it is found double.

It is near a square, and at each angle has a process: the two uppermost are the longest, and tie it by means of a nervous ligament to the es hyoides: the two lower, and shorter, connect it to the second cartilage, called *cricoides*.

THYRSUS, *ΘΥΡΣΟΣ*, in antiquity, the sceptre which the ancient poets put in the hands of Bacchus, and wherewith they furnish the Menades in their Bacchanalia.

The *thyrsus* was originally a lance, or spear, wrapt up in vine-leaves; wherewith Bacchus is said to have armed himself, and his soldiers in his Indian wars, to amuse and deceive the unpractised Indians, and make them suspect no hostile intent.

Hence it was afterwards borne in the feasts and sacrifices of that god; and as the satyrs, who were Bacchus's soldiers, were supposed to have fought with it, it became a custom to represent them therewith.

TIARA,* *ΤΙΑΡΑ*, an ornament or habit, wherewith the ancient Persians covered their head; and which the Armenians and kings of Pontus, wear on medals; these last, because descended from the Persians.

* Latin authors call it indifferently *tiara*, and *diadema*.

Strabo says, the *tiara* was in form of a tower; and the scholiast on Aristophanes's comedy, *ΑΧΑΡΝΕΣ*, act 1. scene 2. affirms, that it was adorned with peacock's feathers.—Some moderns, however, fancy the scholiast is here speaking of the casq which the ancient Persians wore in war; rather than of the habit which they wore on the head in the city. but they do not seem to have considered the passage in the poet, to which the scholiast refers: the matter there spoken of is peace, and ambassadors sent to treat of peace, with habits of pomp and ceremony, *Αρχαγοι γαρ, &c.* These ambassadors, these peacocks, all these things of pomp and ostentation, displease me. By these peacocks, says the scholiast, he means the *tiara*, which among the Persians are ornaments of the head, wherein are peacock's feathers. &c.

St. Jerom on Dan. chap. iv. defines the *tiara* a kind of cap, *genus pileoli*, wore by the Persians and Chaldeans: and in another place, he adds, it is like Ulysses's cap.—The ancient scholiast on Juvenal, describes it as a priest's cap, which descending over the cheeks, was tied under the chin: which agrees very well with the form of that which we see Mithridates wear on medals.—Servius on Virgil, lib. 8. *Æneid*, calls the *tiara* a Phrygian cap; and Statius, *Thybaid*. lib. 8. gives it the kings of Parthia, who, doubtless, borrowed it from the Persians.—Justin attributes the long garment and *tiara* of the Persians, to Semiramis's disguise; in which she passed for Ninus.

The kings of Persia alone had the right of wearing the *tiara* straight and erect: the priests, and great lords, wore it depressed, or turned down on the fore-side. Xenophon in his *Cyropædia* says, that the *tiara* was sometimes encompassed with the diadem, at least in ceremonies; and had frequently the figure of a half moon embroidered on it: others are of opinion, that the diadem was in figure of a moon, and that it was hence the *tiara* was called *lunata*: Lastly, others think that the *tiara* itself was made sometimes in form of a half moon.—From what we have said, it appears, that there were different forms of *tiara*'s; and, in effect, Paichalius, *de coronis*, distinguishes no less than five different kinds. See **DIADEM**.

TIARA is also the name of the pope's triple crown; anciently called *regnum*.

The *tiara* and keys are the badges of the papal dignity; the *tiara* of his civil rank, and the keys of his jurisdiction: for, as soon as the pope is dead, his arms are represented with the *tiara* alone, without the keys.

The ancient *tiara* of the popes was a round high cap. John XXIII. first encompassed it with a crown. Boniface VIII. added a second crown; and Benedict XII. a third.

TIBIA, in anatomy, the bony part of the leg, between the knee and the ankle. See **FOOT**.

The *tibia* consists of two bones, called *scilicet*, the one on the inside the leg, called the *fibula*, or *little scilicet*.

The other on the outside, called by the common name *tibia*, or the *great scilicet*. See the following article.

TIBIA is, properly, the inner and bigger bone of the leg, called also *scilicet majus*.—See *Tab. Anat. (Osteol.) fig. 3. n. 22, 22. & fig. 7. n. 26, 26.*

The *tibia* is hard and firm, having a pretty large cavity in its middle, to contain the medulla, or marrow.

It is almost triangular; its fore, and sharp edge being called the *spin*: in its upper extremity, it has two large sinu's, tipped with a soft and fine cartilage, from its figure, called *cartilago lunata*;

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Iunata; which runs in between the extremities of the two bones, and grows very thin at its edge; serving to facilitate a small side motion in the knee, like that in the articulation of the lower jaw.

The *finus* receive the two protuberances of the femur, or thigh-bone; and the production which is between the *finus*'s of the *tibia*, is received into the *finus* which divides these two protuberances of the femur.

By bending the knee, we bring the leg, in walking, in a straight line forward; which we could not have done without this articulation; but like those who have the misfortune to have a wooden leg, we must have brought our foot about in a semi-circle, in going even upon a plain, but more evidently upon an ascent.

On the side of this upper end, the *tibia* has a small knob, which is received into a small *finus* of the *fibula*; and on its fore-part, a little below the patella, it has another, into which the tendons of the extensors of the leg are inserted.

Its lower extremity, which is much smaller than its upper, has a remarkable process, which forms the inner ankle; and a pretty large *finus*, divided in the middle by a small protuberance: the *finus* receives the convex head of the *astragalus*, and the protuberance is received into the *finus*, in the convex head of the same bone.—It has another shallow *finus* in the side of its lower end, which receives the *fibula*.

Mr. Cheselden gives an instance of a Boy of seven Years of age, where both the epiphyses at the upper end of the *tibia*, were so far separated, that not more than half each *tibia* was joined to half the epiphyses; which made his legs wholly useless.—This had been occasioned by the nurse's holding him out to stool by the heels and back, when very young; which is, among them (as he observes) too common a practice.

TIBIA Biceps. See the article **BICEPS**.

TIBIALIS, or **TIBIÆUS**, in anatomy, a name given to two muscles of the leg; distinguished by *anticus*, and *posticus*.

TIBIALIS anticus, this springs from the exterior process of the *tibia*, and becoming gradually broad and fleshy about the middle of the *tibia*, down the fore-part of which it runs, is contracted again into a slender, smooth tendon, which passes under the ligamentum annulare, and is partly inserted into the os cuneiforme majus, and partly into the bone of the metatarsus, that supports the great toe. Its office is to draw the foot up.—See *Tab. Anat. (Myol.) fig. 1. n. 62. fig. 2. n. 44.*

TIBIALIS posticus, this is derived from both bones of the *tibia*, and from the ligament that binds them together; and runs with a smooth, strong tendon through the *finus* on the inner malleolus, under the annular ligament, to the inside of the os naviculare.—See *Tab. Anat. (Myol.) fig. 1. n. 69. fig. 2. n. 53. fig. 7. n. 43.*

Its office is to draw the foot inwards: from the use sailors make of it, it is also called the *nautilus*.

TICHONIC System, or *Hypothesis*. See **TYCHONIC**.

TIDE, * the same with time, or season. See **TIME**, &c.

* The word is originally Saxon, *tid*, which signifies the same.

Silvæ-TIDE, } See the articles { **SHROVE**.
Twelfth-TIDE, } **TWELFTH**.
Whitsun-TIDE, } **WHITSUN-TIDE**.

TIDES, two periodical motions of the waters of the sea, called also the *flux* and *reflux*, or the *ebb* and *flow*.

When the motion of the water is against the wind, it is called a *windward tide*—when wind and tide go the same way, *lee-ward tide*—when it runs very strong, it is called a *tide-gate*. To *tide it over*, or *up* into any place, is to go in with the *tide*, either ebb or flood, as long as that lasts; then to stay at anchor all the time of contrary *tide*; and thus to set in again with the return of the next *tide*.

It is said to *flow tide* and *half tide* when the *tide* runs three hours in the offing longer than it does by the shore: but, by *longer*, they do not mean its running more hours; but that, if it be high water offshore at 12, it will not be so in the offing till three.—If it ebb and flow longer, they say it runs *half tide* and *half quarter*.

When the moon is in the first and third quarter, *i. e.* when she is new and full, the *tides* are high and swift, and are called *spring tides*—when she is in the second and last quarter, the *tides* are lower and slower, and called *neap tides*.

Phænomena of the TIDES.—The sea is observed to flow, for certain hours, from south towards north; in which motion, or flux, which lasts about six hours, the sea gradually swells; so that entering the mouths of rivers, it drives back the river-waters towards their heads or springs.

After a continual flux of six hours, the sea seems to rest for about a quarter of an hour; after which it begins to ebb or retire back again from north to south, for six hours more: in which time, the water sinking, the rivers resume their natural course. Then, after a seeming pause of a quarter of an hour, the sea again begins to flow as before, and thus alternately.

Thus does the sea ebb twice a day, and flow as often; but not in the same hours thereof. The period of a flux and reflux is 12 hours 50 minutes, so that the *tides* return later and later each day, by 50 minutes, or $\frac{1}{4}$ of an hour, 5 minutes.

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Now, 12 hours 50 minutes is a lunar day; *i. e.* the moon passes the earth's meridian later and later each day by 50 minutes. So that the sea flows as often as the moon passes the meridian, both the arch above, and that below the horizon; and ebbs as often as she passes the horizon, both the eastern and western point thereof.

This further agreement we observe between the moon and the sea; that the *tides*, though constant, are not equal: but are greatest, when the moon is in conjunction, or opposition to the sun, and least when in quadrature thereto.

Lastly, those *tides* are the greatest, which happen in the new and full moon, at the times of the equinoxes.

Add, that the same things are observed throughout most of the coasts of Europe; only that the *tides* are so much the less, and happen the later, as the coasts are the more northerly.

These phenomena of the *tides* are admirably accounted for, from the principle of gravitation. All we require to their solution is, that the earth and moon, and every particle thereof, mutually gravitate towards each other; the reasonableness of which assumption, see under the article **GRAVITATION**.

Indeed the sagacious Kepler, long ago, conjectured this to be the cause of the *tides*: "If," says he, the earth ceased to attract its waters towards itself, all the water of the ocean would rise and flow into the moon: the sphere of the common attraction extends to our earth, and draws up the water." Thus thought Kepler, in his *Introd. ad Theor. Mot.* This surmise, for it was then no more, is now abundantly verified, in the following theory, deduced by Dr. Halley, from the Newtonian principles.

Theory of the TIDES.—1°. As the surface of the earth and sea is naturally globular; if we suppose the moon A (*Tab. Geography, fig. 6.*) perpendicularly over some part of the surface of the sea, as E; it is evident the water E, which is now nearest the moon, will gravitate towards it more than any other part of the earth and sea in the hemisphere F E H.

The water in E therefore raised, by this means, be raised towards the moon; *i. e.* it will be lighter than usual, and of consequence it will swell in E.

For the same reason the water in G being the most remote from the moon, will gravitate less towards the same, than any other part of the earth or sea in the hemisphere F G H.

The water here, therefore, must approach less towards the moon, than any other part of the globe; *i. e.* it must be raised the contrary way, and will therefore swell in G.

By this means, the surface of the ocean must necessarily form itself into a spheroidal, or oval figure, whose longer diameter is E G; its shorter F H. And thus, the moon shifting her position in her diurnal motion round the earth, this oval of water must shift with her; by which means are effected those two floods and ebbs, observable every 25 hours.

2°. Since, in the conjunctions and oppositions of the sun and moon, the gravitation of the water to the sun conspires with its gravitation towards the moon; but in the quadratures, the water raised by the sun is depressed by the moon: hence it is that the *tides* are greatest in the syzygies, and least in the quadratures.

In effect, there are two *tides* every natural day, from the action of the sun, as there are in the lunar day from that of the moon; all governed by the same laws: only those caused by the sun are much less than those of the moon: because though the sun be ten thousand times bigger than both the earth and moon, yet he is at so immense a distance, that the earth's semi-diameter bears no proportion thereto.

Hence, the different *tides* depending on the particular actions of the sun and moon are not distinguished, but confounded. The lunar *tide* is somewhat changed by the action of the sun; and this change varies every day, by reason of the inequality between the natural and the lunar day.

3°. Since the greatest *tides* about the equinoxes (*viz.* those happening in the syzygies) arise from the sun and moon being in the equinoctial; and those about the solstices, from the sun and moon being in the tropics; for this reason, those greatest *tides* about the equinoxes are greater than those about the solstices; since the greater the circle is, wherein the waters move, the greater is their agitation. And if the moon flood fill in the pole, the swelling would become immovable about the pole, and the high water be fixed therein.

4°. Since the *tides* are somewhat changed by the libration of the waters, which use to retain a motion impressed on them for some time; for this reason the highest *tides* are not precisely in the very conjunction and opposition of the moon, but two or three *tides* afterwards.

5°. Since the sun is somewhat nearer the earth in winter than in summer; hence it is, that the greatest equinoctial *tides* are observed to be a little before the vernal equinox, and a little after the autumnal one.

6°. Since the greatest of the two *tides* happening in every diurnal revolution of the moon, is that when in the moon is nearest the zenith, or nadir: for this reason, while the sun is in the northern signs, the greater of the two diurnal *tides* in our climates, is that arising from the moon above the horizon; when

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when the sun is in the southern signs, the greatest is that arising from the moon below the horizon.

7°. Such would the *tides* regularly be, if the earth were all over covered with sea very deep; but by reason of the Shoals of some places, and the narrowness of the straits in others by which the *tides* are propagated, there arises a great diversity in the effect, not to be accounted for, without an exact knowledge of all the circumstances of the places; as the position of the land, and the breadth and depth of the channels, &c. For a very flow and imperceptible motion of the whole body of water, where it is (for example) two miles deep, will suffice to raise its surface 10 or 12 feet in a *tide's* time; whereas if the same quantity of water were to be conveyed through a channel of 40 fathom deep, it would require a very great stream to effect it in so large inlets as are the channel of England and the German ocean; and where the *tide* is found to set strongest in those places where the sea grows narrowest, the same quantity of water being in that case to pass through a smaller passage.

This is most evident in the straits between Portland and C. de la Hogue in Normandy, where the *tide* runs like a sluice; and would be yet more between Dover and Calais, if the *tide* coming round the island did not check it.

This Force being once impressed upon the water, continues to carry it above the level of the ordinary height in the ocean, particularly where the water meets a direct obstacle, as it does in St. Maloes; and where it enters into a long channel, which running far into the land, grows very strait at its extremity, as it does into the Severn sea at Chepflow and Bristol.

This shoalness of the sea, and the intercurrent continents, are the reasons that in the open ocean high water is not at the time of the moon's appulse to the meridian, but always some hours after it, as it is observed upon all the western coast of Europe and Africa, from Ireland to the Cape of Good Hope; in all which a south-west moon makes high-water, and the same is reported to hold in the west of America.

It would be endless to recount all the particular solutions, which are easy corollaries from this doctrine; as, why the lakes and seas, such as the Caspian sea, and the Mediterranean sea, the Black sea and Baltick, have no sensible *tides*: for lakes having no communication with the ocean, can neither increase nor diminish their water, in order to rise and fall; and seas that communicate by such narrow inlets, and are of so immense an extent, cannot in a few hours time receive and empty water enough to raise or sink their surface any thing sensibly.

To demonstrate the excellency of this doctrine, the example of the *tides* in the port of Tunking in China, which are so extraordinary, and different from all others we have yet heard of, may suffice. In this port there is but one flood and ebb in 24 hours, and twice in each month, *viz.* when the moon is near the equinoctial, there is no *tide* at all, but the water is stagnant; but with the moon's declination there begins a *tide*, which is greatest when she is in the tropical signs; only with this difference, that when the moon is to the northward of the equinoctial, it flows when she is above the earth, and ebbs when she is under, so as to make high-water at moon-setting, and low-water at moon-rising: but, on the contrary, the moon being to the southward, makes high-water at rising, and low-water at setting, it ebbing all the time she is above the horizon.

The cause of this odd appearance is suggested by Sir Isaac Newton to arise from the concurrence of two *tides*, the one propagated in six hours out of the great South-Sea along the coast of China, the other out of the Indian sea from between the islands, in twelve hours, along the coast of Malacca and Camboya. The one of these *tides* being produced in north latitude, is, as hath been said, greater, when the moon being to the north of the equator, is above the earth, and less when she is under the earth. The other of them, which is propagated from the Indian sea, being raised in south latitude, is greater when the moon declining to the south, is above the earth, and less when she is under the earth: so that of these *tides*, alternately greater and lesser, there come always successively two of the greater and two of the lesser together every day, and the high-water falls always between the arrival of the two greater floods, and the low-water between the times of the arrival of the two lesser floods: and the moon coming to the equinoctial, and the alternate floods becoming equal, the *tide* ceases, and the water stagnates: but when she has passed to the other side of the equator, those floods which in the former order were the least, now becoming the greatest, that which before was the time of the high-water, now becomes the low-water, and the reverse: so that the whole appearance of these strange *tides* is, without any forcing, naturally deduced from these principles, and is a great argument for the certainty of the whole theory.

TIDE-WAITERS, or TIDE-MEN, certain officers belonging to the custom-house, appointed to watch or attend on ships coming from abroad, to see that nothing be landed till the customs be paid.

They are thus called, because they go aboard the ships at their arrival in the mouth of the Thames, and come up with the tide.

T I M

TIERCE, or TEIRCE, a measure of liquid things, as wine, oil, &c. containing the third part of a pape, or forty-two gallons.

TIERCE, in music. See the article **THIRD**.

TIERCE, in gaming, a sequence of three cards of the same colour.

TIERCE, in fencing. See the article **GUARD**.

TIERCE Order. See the article **THIRD Order**.

TIERCE point. See the article **THIRD point**.

TIERCED, TIERCE, in heraldry, denotes the shield to be divided by any of the partition lines, party, coupy, tranchy, or taily, into three equal parts, of different colours or metals. If the chief and base be of the same colour when divided by a fesse, they blazon it by expressing the colour, and mentioning the fesse; otherwise, they say it is *tierced in fess*, and mention each of the colours; or *tierced in pale*, if so divided in pale.

TIERCELET. See the article **TASSEL**.

TIGE, in architecture, a French term for the shaft or fust of a column, comprehended between the astragal and the capital.

TIGHT. See the article **TITE**.

TILE. See the article **TYLE**.

TILLER, or TILLAR, in husbandry, a little young tree left to grow till it be sellable.

TILLER of a ship, is a strong piece of wood fastened to the rudder; called also the helm.—See *Tab. Ship. fig. 2. n. 105*. See also the article **RUDDER**.

The name is chiefly given to that which serves for a helm in a boat, and which in a ship would be called the *helm*.

TILLING, TILLAGE, in gardening and agriculture, a moving or stirring of the ground with the plough, or spade; which being performed on the surface, enters to a certain depth, and makes the lower and upper parts change place: by which means the goodness of the earth is kept from being spent in feeding useless plants.

The rule, as to gardening in general, is, that hot and dry earth should be *tilled* in summer, either a little before, or while it rains, or soon after; and that neither too often nor too deep: and in hot weather it is not to be performed, unless watered soon after; but for moist, cold and strong earth, it must never be *tilled* in time of rain, but rather in the greatest heats. As to arable lands, that which is clayey, stiff, cold, and moist, is generally *three times tilled*; in spring, summer, and at seed-time for wheat; and four times for barley.

These repeated ploughings are very advantageous to the soil, both as they destroy weeds, and as the ground is hereby laid in ridges, which prevents its being over-drenched in wet seasons, saves it much from blights, and bleak weather, and makes the land lighter and fitter for the seed to take root in, and to imbibe the nitrous dews and influences of the air.

TILT. See **TURNAMENT**.

TILT-BOAT, a boat covered with a *tilt*, *i. e.* a cloth, or tarpawling, sustained by bails or hoops over the stern, for the sheltering of passengers.—Such is that which carries passengers between London and Gravesend. See **BOAT**.

TIMAR, a tract or portion of land which the Grand Signior grants to a person on condition of serving him in war, on horseback.

Some define the *timar* a portion of land assigned to a spahi, or other person fit to serve on horseback, to enjoy during his life for his subsistence.

Meninski describes it as a stipend or revenue granted to old soldiers who have deserved well, in lands, and possessions of castles, towns, villages, fields, or in tithes, and other fruits and incomes; sometimes with the prefecture, jurisdiction, or signiory of the said places.

The *timar* is a kind of fief granted for life. The whole Ottoman empire is divided into sangiackies, or banners, under which all such as hold *timars*, who are called *Timariots*, are bound to lift themselves when summoned upon any expedition.

Timars may be resigned as benefices among us, only obtaining the consent of the begierbey, or governor of the province.—Indeed, for *timars* of above 2000 aspers *per annum*, called *zaim*, the grand vizir alone grants dispensations.

TIMARIOTS, those who enjoy lands on the footing and tenure of *timars*. See **TIMAR**.

The *timariots* are obliged to serve in war personally, with as many men and horses for service as their *timar*, by the estimate made thereof, contains times 2500 aspers, or about six pounds sterling; and to maintain them constantly mounted and armed after their manner, to be ready to march at all hours when commanded, and that on pain of death, nothing, not even sickness itself, being allowed to excuse them.

Besides this service, they likewise pay an acknowledgment of one tenth of their revenue.—If they have any children of age to bear arms, and fit for the service after their decease, or in defect thereof, if they have any relations that have the least interest, the *timar* is used to be continued to them on the same conditions, otherwise it is transferred to others.

If

If the revenue thus held of the grand signior exceed 15000 aspers, or 30 pounds sterling, they who hold it are not called *timariots*, but *rubaffi*, or *zaims*, these always have the administration of justice in the place, under the sanction of the province.

The *timariots* have different appointments, from 4 or 5000 aspers, equal to about 12 pounds sterling, to 20000 aspers: but unless their *timar* exceed 8000 aspers, they are never obliged to march, except when the grand signior goes to the army in person, on which occasion none are exempted.

The origin of the *timariots* is referred to the first sultans, who being masters of the fiefs or lands of the empire, erected them into baronies or commanderies, to reward the services of their bravest soldiers; and especially to raise and keep on foot a number of troops without disturbing any money.

But it was Soliman II. that first established the order and discipline among these barons, or knights of the empire; and by his order it was that the number of horsemen each should maintain was regulated.

This body has heretofore been not only exceedingly powerful, but great and illustrious throughout all the empire; but avarice, the ordinary fault of the orientals, has occasioned their declension of late years.

The viceroys and governors of provinces manage their matters so at court, that *timars*, even out of their jurisdiction, are given to their domestics, or to such as will give them the most money for them.

There are two kinds of *timariots*, the one appointed by the Porte, the other by the vicery of the country; but the revenues of both are less than those of the *zaims*, and their equipage and tents less in proportion.

Those who have their patents from the court, have from 5 or 6000 aspers, to 19999 aspers *per annum*; if they have one asper more, they become *zaims*. Those who receive their patents from the viceroys, have from 3 to 6000 aspers *per annum*.

This cavalry is better disciplined than that properly called the *spahis*, though the *spahis* be the neatest, and briskest. These last only fight in platoons; whereas the *zaims* and *timariots* are divided into regiments, and commanded by colonels, under the direction of *bashaws*.—The *bashaw* of Aleppo, when in the army, is colonel general of this militia.

TIMBER, includes all kinds of felled and seasoned woods, used in the several parts of building; as carpentry, joinery, turnery, &c. See **WOOD**, and **BUILDING**.

The kinds of **TIMBER** are numerous: we shall only mention some of the most useful, from Evelyn's *Sylva*, &c.—as,

1^o. *Oak*, the uses whereof need no enumerating: to endure all seasons and weathers, there is no wood like it; hence its use in pales, shingles, posts, rails, boards, &c. For water-works it is second to none; and where it lies exposed both to air and water, there is none equal to it.

2^o. *Elm*: this felled between November and February, is all spine or heart, and no sap, and is of singular use in places where it either is always wet, or always dry; its toughness likewise makes it of use to wheel-wrights, mill-wrights, &c. nor must it be omitted, that its not being liable to break and fly in chips, makes it fit for dressers and planks to chop on.

3^o. *Beech*: its chief use is in turnery, joinery, upholstery, and the like, as being of a clean, white, fine grain, not apt to bend, nor flit; it has been sometimes, especially of late, used for building *timber*, and if it lie constantly wet, is judged to out-last oak.

4^o. *Alb*: its use is almost universal; it is good for building, or other occasions where it may lie dry; it serves the carpenter, cooper, turner, plough-wright, wheel-wright, gardener; as also it is used at sea for oars, hand-spikes, &c.

5^o. *Fir*, commonly known by the name of *deal*, is of late much used in building, especially within doors, for stairs, floors, wainscot, and soft works of ornament.

6^o. *Walnut-tree*: this is of universal use, excepting for the out-sides of buildings; none is better for the joiners use, it being of a more curious brown colour than *beach*, and less subject to worms.

7^o. *Chestnut-tree*, next to oak, is the *timber* most sought for by joiners and carpenters: it is very lasting.

8^o. *Service-tree*, used in joinery, as being of a delicate grain, and fit for curiosities: it also yields beams of considerable bigness proper for building.

9^o. *Poplar*, *abel*: this and *aspen*, differing very little from one another, are much used of late instead of *fir*: they look as well, and are tougher and harder.

10^o. *Alder*, much used for sewers or pipes to convey water: when always wet, it grows hard like a stone; but where sometimes wet and sometimes dry, it rots presently.

Felling of TIMBER.—The season for this work usually commences about the end of April, in regard the bark then generally rises the most freely; so that where a quantity of *timber* is to be felled, the statute requires it to be done then, for the advantage of tanning. See **TANNING**.

However, the opinions and practices of authors are very different, as to the best season for felling *timber*: Vitruvius recommends an autumnal fall, others advise December and Ja-

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nuary: Cato was of opinion, that trees should have borne their fruit before felling, at least that their fruit should be first ripe; which falls in with the sentiment of Vitruvius.

In effect, though *timber* unbarbed be most obnoxious to worms, yet we find the wild oak, and many other kinds, if felled too late, when the sap begins to be full, to be very subject to worms; whereas about mid-winter, it neither casts, ruts, nor twines. It were happy, therefore, if a method of tanning without bark could be invented, that trees being felled more early, the *timber* might be the better seasoned.

The ancients had a great regard to the age of the moon in the felling their *timber*.—If their rules avail aught, they are these: Fell *timber* in the wain, or four days after new moon; some say, let it be the last quarter. Pliny orders it to be in the very article of the change, which happening on the last day of the winter solstice, the *timber*, says he, will be immortal: Columella says from the 20th to the 28th day; Cato, four days after the full; Vegetius, from the 15th to the 25th for ship *timber*; but never in the increase, trees then most abounding with moisture, the only source of putrefaction.

Some even have a regard to the temper and time of the day; the wind to be low, neither east nor west, neither in frosty, wet, nor dewy weather, and finally never in the forenoon. Lastly, some regard is had to the species: *fir* is best felled when it begins to spring, both as it then quits its coat best, and as the wood, according to Theophrastus, is by that means rendered wonderfully durable in water. Elm, says Mr. Worlidge, is to be felled between November and January, in which case it will be all heart, at least the sap will be very inconspicuous: this, he adds, is also the only good season for felling ash. Some authors add further, that in felling *timber*, care should be taken, first, only to cut it into the heart, and so to let it stand till dry; by which means the moisture is evacuated in drops, which would otherwise occasion putrefaction.

Seasoning of TIMBER.—After felling and sawing it, some advise it to be laid up very dry in an airy place, yet out of the wind and sun, or at least free from any extremities of either; and that it may not decay, but dry evenly, they order it to be daubed over with cows dung.

It is not to stand upright, but to lie all along, one piece over another, only kept apart by short blocks interposed, to prevent a certain mouldiness, which they are otherwise apt to contract in sweating one another; from which frequently arises a kind of fungus, especially if there be any fatty parts remaining. Others advise boards, planks, &c. to be laid in some pool, or running stream for a few days, to extract the sap from them, and afterwards to dry them in the sun or air. By this means, it is said, they will be prevented from either chappings, casking or cleaving; but against shrinking there is no remedy. Mr. Evelyn particularly recommends this method for *fir*.

Others again are for burying them in the earth, others in wheat, and others for scorching and seasoning them in fire, especially piles, posts, &c. that are to stand either in water or earth.

Sir Hugh Platt informs us, that the Venetians burn and scorch their *timber* for ship-building in the flaming fire, continually turning it round with an engine, till it has got a hard, black, crusty coal upon it.

Preserving of TIMBER.—When boards, &c. are dried, seasoned, and fixed in their places, care is to be taken to defend and preserve them; to which the smeared them with linseed-oil, tar, or the like oleaginous matter, contributes very much.

The Dutch preserve their gates, portulices, draw-bridges, sluices, &c. by coating them over with a mixture of pitch and tar, whereon they strew small pieces of cockle and other shells, beaten almost to powder, and mixed with sea-sand, which incrusts and arms it wonderfully against all assaults of wind and weather.

Timber felled before the sap is perfectly at rest, is very subject to the worms; to prevent or cure which, Mr. Evelyn gives us the following secret, as most approved. Put common sulphur in a cucurbit, with as much aqua-tortis, as will cover it three fingers deep; distil it to a dryness, and let it have two or three rectifications.

Lay the sulphur remaining at bottom on a marble, or in a glass, and with the oil it diffuses into, anoint the *timber*. This, he adds, not only infallibly prevents or cures the worminess, but preserves all kinds of woods, and even many other things, as ropes, nets, and masts, from putrefaction, either in air, water, or snow.

For such as would go a shorter way to work, two or three anointings with linseed-oil may do very well. As to posts, &c. that are to stand in the ground, the burning the out-sides to a coal is a very great preserve.

As to the chops or clefts green *timber* is liable to after-working, and which is a very great eye-sore in many new buildings, they are closed by anointing, lapping, and soaking it with the fat of salted beef-broth, twice or thrice repeated.—Some carpenters use grease and saw-dust mingled together in some proportions.—But the former method is excellent; only it is not to be used while the *timber* is green.

TIMBER-trees, the wood of *timber*, before it be felled, particularly that of oak, &c.

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For the raising, planting, transplanting, pruning, &c. of *timber-trees*. See NURSERY, PRUNING, and TRANS-PLANTING.

TIMBER MEASURE.—*Timber* is usually measured and estimated by the load or ton, which is a solid measure containing 40 feet of round *fisher*, or 50 of hewn *timber*. The denomination of *load*, &c. we suppose arises hence, that 40 or 50 solid feet of such *timber* weighs about a ton, *i. e.* 20 hundred weights, which is usually accounted a cart-load.

1°. For the measuring of round *timber*: the practice is, to gird the tree about, in the middle of the length; and folding the line twice, to take one length or quarter of the whole, and account that for the true side of the square; then for the length, it is counted from the butt-end of the tree, so far up as the tree will hold half a foot girth, as they call it, *i. e.* so long as the line, twice folded, is half a foot.

The dimensions thus taken, the quantity of *timber* is had, either by multiplying the side of the square into itself, and that product by the length, by the method of cross multiplication.

Or, more easily and speedily on Gunter's line, by extending the compasses from 12 to the side of the square in inches; for that extent turned twice (the same way) from the length in feet, will reach to the content in feet.

Or it may be done better still, on Coggeshal's sliding-rule by setting 12 on the girth line D, to the length in feet on the line C. Then against the side of the square, on the girth line D, taken in inches, you have on the line C the content of the *timber* in feet. See Coggeshal's SLIDING-Rule.

Note, 1°. this method of measuring round *timber*, though common, is yet erroneous; and the content found hereby, it is demonstrated, is less than the true content or measure in the ratio of 11 to 14. How to avoid this error, and measure it justly, we have shewn under the use of Coggeshal's sliding-rule.

2°. If the tree have any great boughs that are *timber*, as the phrase is, *i. e.* which will hold foot girth, they are commonly measured, and added to the rest: the solidity of the whole being thus found, they divide it by 40, which brings it into loads.

3°. In measuring round *timber* for sale, they usually cast away an inch out of the square for the bark, if oak; so that a tree 10 inches square, they only account as if 9; but for ash, elm, beech, &c. an inch is too much.

4°. For the measuring hewn or squared *timber*: the practice is, to find the middle of the length of the tree, and there to measure its breadth, by clapping two rules, or other straight things to the sides of the tree, and measuring the distance between them: in the like manner they measure the breadth the other way. If the two be found unequal, they add them together, and take half the sum for the true side of the square. The dimensions thus taken, the content is found either by cross-multiplication, Gunter's scale, or the sliding-rule, after the manner already directed.

The content divided by 50, gives the number of loads.

Note, if the *timber* be unequally sided, this method of measuring it is erroneous, always giving the content more than the truth; and the more so, as the difference of the sides is greater; yet custom has authorized it.

To measure such *timber* justly, a mean proportional should be found between the unequal sides, and this mean should be accounted the side of the square.

For the measuring of taper *timber*, and *timber* of other forms, as cubes, prisms, pyramids, &c. See the article SLIDING-Rule.

Bearing of TIMBER, } See BEARING.

Casing of TIMBER Work, } See CASING.

TIMBER, or TIMMER of furs, * as ermines, martens, fables, and the like, denotes 40 skins.—Of other skins, six score. *Ruff*.

* *Hæc civitas (sc. Cæsar) nunc reddebat de firma 45 libras & tres timbriciæ pelium Montanarum L.L. Edw. Conf.*

TIMBERS of ermine, in heraldry, denote the ranks or rows of ermine in noblemen's coats. See ERMINE.

TIMBER, in falconry. To *timber*, is to nestle, or make a nest, as birds of prey do.

TIMBRE, or TIMMER, in heraldry, denotes the crest of an armoury, or whatever is placed a-top of the escutcheon, to distinguish the degree of nobility, either ecclesiastical or secular. See CREST.

Such is the papal tiara, cardinal's hat, the cross, mitre, coronet, mortar, and particularly the calks or helmets, which the ancients called more especially *timbræ*, from their resembling a kind of bell without a clapper, which the French call *timbre*, or because they resounded like those *timbræ* when struck. *This is the opinion of Loiseau, who derives the word from the Latin, *timbrum*.

T I M E, a succession of phenomena in the universe; or a mode of duration, marked by certain periods and measures; chiefly by the motion and revolution of the sun.

The idea of time in the general, Mr. Lock observes, we acquire by considering any part of infinite duration, as let out

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by periodical measures: the idea of any particular time or length of duration, as a day, an hour, &c. we acquire last by observing certain appearances at regular, and, seemingly, equidistant periods.

Now, by being able to repeat those lengths or measures of time as often as we will, we can imagine duration, where nothing really endures or exists; and thus we imagine to *measure*, next year, &c.

Some of the latter school-philosophers define time to be the duration of a being whose existence is neither without beginning nor end: by this time is distinguished from eternity.

Aristotle and the peripatetics define it *numerus motus secundum prius & posterius*, or a multitude of transient parts of motion, succeeding each other, in a continual flux, in the relation of priority and posteriority.

Hence it should follow, that time is motion itself, or at least the duration of motion, considered as having several parts, some whereof are continually succeeding to others: but on this principle, time or temporal duration would not agree to bodies at rest, which yet no body will deny to exist in time, to endure for a time.

To evade this inconvenience, the Epicureans and Corpuscularians made time to be a sort of flux, different from motion, consisting of infinite parts, continually and immediately succeeding each other, and this from eternity to eternity; but others have exploded this notion, as establishing an eternal being, independent of God. For how should there be a flux before any thing existed to flow? and what should that flux be, a substance or an accident?

Time may be distinguished like place, into *absolute*, and *relative*.

Absolute TIME, is time considered in itself, and without any relation to bodies, or their motions.—This flows equally, *i. e.* it never proceeds either faster or slower, but always glides on in a constant, equable tenor.

Relative or apparent TIME, is the sensible measure of any duration by means of motion.—For since that equable flux of time does not affect our senses, nor is any way immediately cognizable thereby, there is a necessity for calling in the help of some nearly equable motion to a sensible measure, whereby we may determine its quantity, by the correspondency of the parts of this with those of that.

Hence, as we judge those times to be equal which pass while a moving body, proceeding with an equable velocity, passes over equal spaces; so we judge those times to be equal which flow while the sun, moon, and other luminaries perform their revolutions, which, to our senses, are equal.

But since the flux of time cannot be accelerated, nor retarded, whereas all bodies move sometimes faster and sometimes slower, and there is, perhaps, no perfectly equable motion in all nature; it appears hence to follow, that absolute time should be something truly and really distinct from motion. For let us suppose the heavens and the stars to have remained without motion from the very creation: does it hence follow, that the course of time would have been at a stand? or rather, would not the duration of that quiescent state have been equal to the very time now elapsed?

Since absolute time is a quantity uniformly extended, and in its own nature most simple, it hence comes to be represented by mathematicians, to the imagination, under the most simple, sensible magnitudes, and particularly right lines and circles, with which it bears a near analogy, in respect of its genesis, similarity, &c.

It is not, indeed, necessary that time should be measured by motion; any constant periodical appearance in seemingly equidistant spaces, as the freezing of water, the blowing of a plant, &c. returning at set periods, might do as well. In effect, Mr. Lock mentions an American people, who count their years by the coming and going away of birds.

Some authors distinguish time into *astronomical* and *civil*.

Astronomical TIME, is that taken purely from the motion of the heavenly bodies, without any other regard.

Civil TIME, is the former time accommodated to civil uses, and formed and distinguished into years, months, days, &c.

Time makes the subject of chronology. See CHRONOLOGY.

TIME, in music, is an affection of sound, whereby we denominate it long, or short with regard to its continuance in the same degree of tune.

Time and tune are the great properties of sound, on whose difference or proportions music depends: each has its several charms; where the time or duration of the notes is equal, the differences of tune alone are capable to entertain us with endless pleasure.

And of the power of time alone, *i. e.* of the pleasures arising from the various measures of long and short, swift and slow, we have an instance in the drum, which has no difference of notes, as to tune.

Time, in music, is considered either with respect to the absolute duration of the notes, *i. e.* the duration considered in every

every note by itself, and measured by some external motion foreign to the music; in respect to which the composition is said to be *quick* or *slow*: or it is considered with respect to the relative quantity or proportion of the notes compared with one another. See **NOTE**.

The signs or characters by which the *time* of notes is represented, are shewn under the article **CHARACTERS in music**, where the names, proportions, &c. are also expressed.

A *femi-breve*, for instance, is marked to be equal to two minims, a minim to two crotchets, a crotchet to two quavers, and so on, till in a duplicate ratio, *i. e.* in the ratio of 2 : 1. Now, where the notes respect each other thus, *i. e.* where they are in this ratio, the music is said to be in *duple*, *i. e.* *double*, or *common time*.

When the several notes are triple of each other, or in the ratio 3 : 1, that is, when the *femi-breve* is equal to three minims, the minim to three crotchets, &c. the music is said to be in *triple time*.

To render this part as simple as possible, the proportions already stated among the notes are fixed and invariable, and to express the proportion of 3 : 1, a point (.) is added on the right side of any note, which is deemed equivalent to half of it; and by this means a pointed *femi-breve*, O, becomes equal to three minims, and so of the rest.

From hence arise several other ratios constituting new kinds of triple time; as 2 : 3 and 3 : 4, &c. but these Mr. Malcolm observes are of no real service, and are not perceived without a painful attention. For the proportions of the times of notes, to afford us pleasure, must be such as are not difficultly perceived; on which account the only ratios fit for music, besides that of equality, are the *double* and *triple*.

Common or duple TIME, is of two species.—The first, when every bar or measure is equal to a *femi-breve*, or its value in any combination of notes of a lesser quantity.

The second, where every bar is equal to a minim, or its value in lesser notes. The movements of this kind of measure are various, but there are three common distinctions; the first *slow*, signified at the beginning by the mark C; the second *brisk*, signified by C ; the third *very quick*, signified by D .

But what that *slow*, *brisk* and *quick*, is, is very uncertain, and only to be learned by practice. The nearest measure we know of, is to make a quaver the length of the pulse of a good watch, then a crotchet will be equal to two pulses, a minim to four, and the whole measure or *femi-breve* to eight. This may be reputed the measure of *brisk time*; for the *slow*, it is as long again, and the *quick* is only half as long.

The whole measure then of *common time* is equal to a *femi-breve* or a minim; but these are variously subdivided into notes of less quantities.

Now to keep the *time* equal, we make use of a motion of the hand or foot, thus: knowing the true *time* of a crotchet, we shall suppose the measure or bar actually sub-divided into four crotchets for the first species of *common time*; then the half measure will be two crotchets; therefore, the hand or foot being up, if we put it down with the very beginning of the first note or crotchet, and then raise it with the third, and then down to begin the next measure; this is called *beating of time*. By practice, they get a habit of making this motion very equal, and consequently of dividing the measure or bar into equal parts, up and down; as also of taking all the notes in the just proportion, so as to begin and end them precisely with the beating. In the measure of two crotchets, they beat down the first, and the second up.—Some call each half of the measure in *common time*, a *time*; and so they call this the mode or measure of *two times*, or the *duple* measure.

Again, some mark the measure of two crotchets with a 2 or 3, signifying it to be equal to two notes, whereof four make a *femi-breve*; and some mark it $\frac{2}{4}$ for quavers.

For *triple TIME*, see the article **TRIPLE-TIME**.

TIME in Fencing.—There are three kinds of *time*; that of the sword, that of the foot, and that of the whole body. All the *times* that are perceived out of their measure, are only to be considered as appeals, or feints, to deceive and amuse the enemy. See **FENCING**.

TIME of Peace,	} See	PEACE.
TIME in Grammar,		TENSE.
TIME in Mechanics,		MOTION.
Periodical TIME,		PERIOD.
Equation of TIME,		EQUATION.
Kipper-TIME,		KIPPER.
Unity of TIME,		UNITY.
TIME-Keeper, or TIME-Measure,		CHRONOMETER.

TIMBER. See the articles **TIMBER**, and **TIMBRE**.

TIN, *Stannum*, a whitish metal, softer than silver, yet much harder than lead.

The chymists, &c. hold *tin* a species of imperfect metal, generated of two different seeds, *viz.* that of silver, and that of lead: which renders it a kind of compound of both; and they say accordingly it is sometimes found both in lead and silver mines.

Tin, however, has also its proper mines, of which our counties of Cornwall and Devonshire are an abundant evidence: the

greatest part of the *tin* consumed in Europe is produced from thence; and Camden even supposes that abundance of *tin*, in those two provinces, to have given the original denomination *Britann* to the whole kingdom.—In the *Synacloga*, *Britannia* signifies *Land of tin*, from which Buchart derives the name *Britann*.

The principal characters or properties of *tin*, enumerated by Boerhaave, are, that it is the lightest of all metals; very little ductile or elastic; the most fusible and volatile of all metals; scarce dissoluble by acids, unless the weaker sort; and easily and intimately miscible with other metals, the ductility whereof becomes diminished by such mixture.

The same author concludes, that sulphur is a prevailing ingredient in *tin*, and deduces several of its particular properties therefrom. He adds, that could the metal be perfectly purged of this heterogeneous sulphur, it is probable it would be found no other than silver.

Several authors also had before noted a great conformity, in divers particulars, between these two metals; as, that both grow bitter when dissolved by acids; that when fused together, there is scarce any separating them again, not even by lead. Add, that Mr. Boyle, and others, give us several instances of silver being actually produced in considerable quantity from *tin* ore.

Some naturalists judge the analogy greater between *tin* and lead, and contend that *tin* is only lead, under a less degree of coction; but if there be some marks of agreement between them, there are as many of disagreement. The calx of lead, for instance, easily fuses and volatilizes, but that of *tin* not without the utmost difficulty. If *tin* and lead be mixed by a vehement fire, a vehement effluvia ensues, and they both run into a calx; add, that *tin* is easily revived; but lead not without great labour.

The method of getting, preparing, &c. the *tin* in the Cornish mines, much the best and most considerable in the world, is given us in the *Philosophical Transactions*.—The working of the *tin* mines is very hard and difficult, not only by reason of the great depth which the veins descend to, even as low as 60 fathom; but also because the rocks, through which passages are frequently cut, are extremely hard. Nor is the softening earth found in the *tin* mines much less inconvenient to the workmen, both by reason of the foetid, malignant vapours it exhales, and of the current of water often met withal therein: these disadvantages often render it impracticable for the workmen to hold it above four hours together.

The mineral stone or ore being dug and drawn out of the mine, is first broke into pieces with large iron mallets; then brought to a stamping-mill, where it is still pounded smaller with stampers, much like those of paper-mills; and the water passing through it washes away the earthy parts, leaving the metallic ones behind: this lution is repeated twice, to make the better separation.

This done, they dry it in a furnace on iron-plates, and grind it very fine in a crasing-mill, then wash it again, and dry it: and in this state, the metallic matter is called *black tin*.

To convert it into *tin*, *i. e.* into *white tin*, they carry it to a furnace, or blowing-house; where, by means of a charcoal fire, kept up by huge bellows worked with water, it is smelted: after it has passed all these preparations, and is become cold, they forge it, which is the last thing done to it in the works.

The dross or scoria scummed off the *tin* in fusion, being melted down with fresh ore, runs into metal; and even the *casualty*, *i. e.* the matter washed and separated from the ore in the mill, being thrown up in heap, after resting six or seven years, they work it over again, and it yields as good *tin* as any of that of Germany.

The workmen distinguish several kinds of *tin*; as *mas-tin*, which is the best sort, a fool whereof weighs 80 pounds; and *mine-tin*, which is the next, a fool thereof weighing about 52 or 50 pounds. The *tin* got from the soft, gravelly earth, they call *gray-tin*, to distinguish it from that got from the stones, which is better by almost half.—Two pounds of black *tin*, when melted, yield about one of white.

There is a curiosity in these Cornish mines, which the lover of natural history will be pleased to hear; it is this: that in digging, at the depth of 40 or 50 fathoms, they frequently meet with large timber, still entire.

Chilley, in his *Natural History*, goes back as far as the legends to place them there; but without having recourse to so great antiquity, they who believe that the mines, when exhausted of their ore or mineral matters, renew and fill again in course of time, will soon solve the difficulty, by supposing, that in the first working of these mines, these timbers had been let down to serve as props and pillars.

But there are other people who think the renewal of the mines itself a difficulty as great as the former. However, what the former author adds, *viz.* that in some places in the mines they likewise find pick-axes, &c. with wooden shafts, as also brass nails, and that even a medal of Domitian, has been found in one, seems to countenance the opinion. See **MINE**.

Method of assaying TIN.—To find whether *tin* be soft and ductile, or harsh and brittle, there are two kinds of assays; the first, is by putting the *tin* in a mould of cast-brass, and there melting it. If the metal be harsh, it will be taken out heavier than before; if otherwise it will be lighter. The second, is by casting the melted *tin* into a little mould, made of a soft stone. This mould is to have a little canal of moderate length, which conducts the matter into a cavity, capable of containing half a billiard ball: if the *tin* be harsh, it appears whitish towards the entry of the mould, otherwise it is tinged superficially with a very faint, bluish brown.

For the use of *tin* in the composition of pewter, see PEWTER. The chymists call *tin* by the name *Jupiter*: but from what analogy between the metal and the planet, we leave them to explain.

By the analyses made of *tin*, they hold it compounded of earth, sulphur, a metallic salt, and mercury.—The chief chymical preparations from it are, *salt of tin*, *flowers of tin*, and *diaphoretic of tin*.

Salt of TIN, or of *Jupiter*, is made from *tin* calcined, and distilled vinegar poured thereon; from which, by means of fire, and then of a cool place wherein it is put, a very white salt is drawn; but this is a very difficult thing to obtain.

Flowers of TIN, are a kind of white cosmetic, or paint for the complexion; drawn from *tin* with sal ammoniac, by means of sublimation.

Diaphoretic of TIN, is fine *tin* and regulus of antimony melted, first simply together, and then with salt-petre. Whence, after various lotions, is drawn a powder, held to be sovereign against divers diseases.

Cerufs of TIN, is a white powder, procured from *tin*, whereof a *fucus* is made, called *Spanish white*.—This cerufs is not made with vinegar, as that of lead is; but with the urine of a young person: the powder is also used to colour Delft ware.

Calx of TIN, is the metal reduced into powder, either by means of fire, or by being dissolved in an acid menstruum, and precipitated with an alkali. See supplement, article STANNUM.

TINCTURE RUBIA. See the article RUBIA.

TINCTURE, TINCTURA, in pharmacy and chymistry, a separation of the finer and more volatile parts of a mixed body, made by means of a proper menstruum dissolving the same. See MENSTRUUM, and DISSOLUTION.

TINCTURE is more particularly used for an extract of part of the substance of a body, especially its flavour and colour, which are hereby communicated to the menstruum.

We have cephalic tinctures, antiscorbutic tinctures, stomachic tinctures, anticolic tinctures, invigorating tinctures, &c. and tinctures drawn from roses, from corals, &c.

To make a tincture, the matter is usually bruised, put into a matras, and the menstruum, which commonly is spirit of wine, poured on it, to the height of two or three fingers above it. Then the glass is closed, and set for digestion, in a sand-heat, during five or six days, or till the spirit is well impregnated, and has received a high colour.

Thus are tinctures of odiferous vegetables, as cinnamon, &c. drawn; and the same method serves for those of metals, and minerals.

The tinctures of metals, so much talked of by the chymists and alchymists, are not proper tinctures; they are only dissolutions, wherein the metal is divided and attenuated to a greater degree than it is in its natural and ordinary dissolvents.

If the tincture were irreducible; that is, if the metal were dissolved to such a degree, as that it could not be brought back again into metal; or, which comes to the same, if the principles which compose it were disunited, it would be what the chymists have so long and so earnestly wished for, and sought with such infinite pains, especially with regard to gold; the irreducible tincture whereof is what should be called *aerum potable*.

But no such tincture has ever yet been discovered: the potable gold, described by them, being only gold extremely divided; and the case is the same with the tinctures of other metals.

The intention of metalline tinctures is to rarefy and extend the sulphur of the metal as much as possible, and so to render the fixed and earthy parts as subtil and volatile as may be: and if they are designed to be of use in medicine, some harmless and agreeable medium is to be used.

The alchymists give the name *grand mineral tincture* to the philosophers stone; from an opinion, that all required to their operation, is to give the colour or tincture of gold to fixed mercury.

Marble, alabaster, and bones, receive tinctures from lixiviums, and sharp juices; and Mr. Boyle thinks there is reason to hope the same may be done with precious stones: rock crystal, it is certain, is tinged by subterraneous juices; and all the other colour'd gemms, even the sapphire itself. See supplement, GEMMS.

In the memoirs of the French academy, mention is made of certain liquors, *e. gr.* spirits drawn from wheat, which will extract tinctures, even out of some precious stones. It is added,

they are always more capable of producing this effect, as they give a greater degree of redness to the solution of vitriol.

TINCTURE of Amber } See the article } AMBER.

TINCTURE of Cassia, } CASSIA.

TINCTURE is also applied by the heralds to the colours used in escutcheons, or coats of arms; under which, with them, are likewise reduced the two metals, *or* and *argent*, because often represented by yellow and white.

TINEA, in medicine, a disease called by the Arab writers *shabasi*, and in English usually a *scald-head*; it is nearly a-kind to achores.

The *tinea* is a disease of the leprous kind: authors usually reckon three species of it, *viz.* a *dry*, *moist*, and *lupinous*; but these, in reality, are only so many degrees of the same disease.

Turner defines the *tinea* an ulcer arising in the heads of children, from a vicious, corrosive, or saline humour, which preying on the cutaneous glands, in time destroys their texture. It has its name *tinea*, *q. d. mola*, from the similitude it bears to the holes eat by that insect in paper, &c.—In the first stage it is covered with a white, dry, scurfy, or squamous matter: in the second the subjacent flesh appears granulated: and in the third it is ulcerous.

The internal remedies proper for the *tinea* are, mercurials, proper cathartics, and dietetics, with edulcorants; and sometimes a salivation, especially by unction, has been found efficacious, after all other methods have proved vain. The externals are fomentations made of roots of oxylapathum, birthwort, horse radish, wormwood, &c. boiled in water, and strained; to which are added, spirits of wine camphorated, &c. also liniments of hog's lard, white precipitate mercurial ointments, with powdered brimstone; and sometimes powder of Roman and white vitriol, red precipitate, &c. but these last must be used with great caution.

TIN-GLASS, *Bismuth*, a mineral matter, white, smooth, and in all appearance, resembling *tin*; but hard, brittle, and disposed in shining scales, as if it were pieces of glass, whence its name. See BISMUTH.

TINCLING of the Ear. See the article TINNITUS.

TINNING, the covering or lining any thing with melted *tin*, or with *tin* reduced to a very thin leaf.

Looking-glasses are foliated or *tinned* with thin plates of beaten *tin*, the whole bigness of the glass, applied and fastened thereto by means of quicksilver. See LOOKING-GLASS.

Kettles, sauce-pans, and other kitchen utensils, are *tinned* with melted *tin*; and locks, bits, spurs, &c. with leaf-*tin*, by the help of fire.

The plumbers, on some occasions, *tin* or whiten their sheets of lead; in order to which they have a *tinning* furnace, filled with live coal, at the two sides whereof two men are placed, who hold up the sheets over the fire to heat; and the *tin* leaves being laid over them, as fast as the sheets grow hot, and the *tin* melts, they spread it, and make it take by rubbing it with tow and rosin.

TINNITUS Auris, TINCLING or buzzing of the Ear, a disease pretty frequent in the ear, consisting in the perception of a sound which is not, or, at least, is not external.

This perception may be occasioned by the beating of an artery in the ear, by an inflammation, or abscess of the tympanum or the labyrinth, by the admission of foreign bodies, by commotions of the cranium, or blows on the ears, &c.—Extraordinary and irregular motions of the animal spirits are also found to occasion the *tinnitus*, as we find in deliriums, phrensies, vertiges, &c.—The *tincling* of the ear is reckoned one of the diagnostic signs of the plague.

TIPSTAVES, officers appointed by the marshal of the King's-bench, to attend the judges with a rod or staff tipped with silver, and take charge of such persons, as are either committed, or turned over at the judge's chambers.

The denomination is also sometimes given to those more frequently called *bastons*; who are the warden of the Fleet's officers, attending the king's courts with a painted staff, for the taking into custody such prisoners as are committed by the court; and to attend such prisoners as go at large by licence.

TIRE, or, as the seamen pronounce it *TEER of Guns*, is a row of guns placed along a ship's side, either above, upon deck, or below: the former of which are called the *upper tire*, the latter the *lower tire*.

TITANS, TITANES, TITANEZ, in the ancient mythology, the sons of Uranus or Cælus, and Vesta, *i. e.* of heaven and earth, according to Hesiod and Apollodorus; or which comes to the same thing, of Æther and Tellus, according to Hyginus. Apollodorus reckons five *Titans*: Oceanus, Cæus, Hyperion, Crilus, and Japetus; all elder brothers of Saturn: Hyginus reckons six, all, except Hyperion, different from the former: their names, Briareus, Gyges, Sterope, Atlas, Hyperion, and Cottus; but he seems to include the hundred-handed giants in the number, which Apollodorus, and the generality of mythologists, distinguish from the *Titans*.

The tradition is, that Coelus, by the same wife, Vesta, had Briareus, Gyges, and Cottus, the hundred-handed giants, and had chained them up in Tartarus: Vesta, the earth, their mother, resenting this treatment, raised the *Titans* against their father, her husband: all, excepting Oceanus, made war upon him, and dethroned him, setting up Saturn in his place. Saturn, it seems, prov'd no more favourable to them than his father; but continued the giants in their prison.—Upon this Jupiter revolted against Saturn; serving him as he had done Coelus; and rescued the three giants: who afterwards proved of great service to him in the war which the *Titans* waged against him.

This war lasted ten years: but at length the *Titans* were vanquished; Jupiter remained in peaceable possession of heaven, and the *Titans* were buried under huge mountains thrown on their heads.

Hyginus gives another origin of the *Titans*: he derives them from *Titan*, Saturn's eldest brother, by Coelus and Vesta; who, though presumptive heir of heaven, yet finding his father and mother more inclined for Saturn than for him, surrendered to him his right of succession, on condition he should not bring up any male child, that the empire of heaven might revert to his own issue the *Titans*.

But Jupiter, Neptune, and Pluto having been afterwards saved by the artifice of Ops; *Titan* and his sons, the *Titans*, made war on Saturn, vanquished, and imprisoned him; thus he continued in the power of his enemies, till Jupiter being grown up, made war on the *Titans*, and delivered his father.

F. Pezron, in his antiquity of the Celts, makes that people to be the same with the *Titans*; and their princes the same with the giants in scripture.—He adds, that the word *Titan* is perfect Celtic, and derives it from *tit*, earth, and *den* or *ten*, man: and hence it was the Greeks also called them very properly *γῆγενεῖς*, *q. d. terrigenæ*, earth-born.

The word *TITAN* is also used by the poets for the sun—in which case it is likewise Celtic, though from another root, being formed from *ti*, house, or habitation; and *tan*, fire. Hesychius observes, that *Titan* is likewise used for sodomite.—He adds, that it is also one of the names of antichrist; in which sense it must be wrote *Titan*, in Greek, to contain the numeral letters of 666; which in the apocalypse xiii. 18. is the number of the beast.

TIT E, or **TIGHT**—The seamen say a ship is *tite*, when she is so staunch as to let in but very little water.

This is known by the smell of the water pumped out; for if she let in but little, it will always stink; otherwise not.

TITHES, **TYTHS**, **TENTHS**, *Decime*, or *Dixmes*, the tenth part of all profits or fruits, both predial, personal, and mixt; allotted to the clergy for their maintenance.

Of *tithes* there are three kinds, *viz. personal, predial, and mixt*.

Personal TITHES, are those due or accruing from the profits of labour, art, trade, navigation, and industry of men.

Predial TITHES, are those which arise either from the fruits of the ground; as corn, hay, underwood, flax, hemp, &c. or from the fruits of trees: as apples, pears, plums, cherries; or from the produce of the garden.

And **Mixt TITHES**, are such as arise from beasts, and other animals fed with the fruits of the earth: as cheese, milk, wool, lambs, calves, fowls, &c.

Predial tithes, again, are either *great* or *small*.

Great TITHES, are those of corn, hay, and wood.

Small TITHES, are those of flax, &c. which are *predial*; and those of wool, milk, cheese, lambs, ferrets, &c. which are *mixt*.

The *tithes* of grounds newly broke up and cultivated, are called *decime novales*, and always belong to the vicar, as well as the small *tithes*.—The novelty is confined to forty years.

The custom of giving or paying *tithe* is very ancient: in Gen. xiv. 20. Abraham gives Melchisedech the tenth of all the spoils he had taken from the four kings he had defeated: in Gen. xxviii. 22. Jacob makes a vow at Bethel, to give the tenth of all the riches he shall gather in that sojourn, to God.

But these *tithes* were free and voluntary; and, beside, differed in divers other respects from what was afterwards called *tithe*: what Melchisedech received, was only the tenth of the spoils, not of Abraham's possessions; and this once, not annually; and beside, not as maintenance, which Melchisedech wanted not, but as homage: add, that this was only from one priest to another; for Abraham had not only a priest in his loins, but was a priest himself.—And as to Jacob, who was also a priest, what he did was the effect of a vow, voluntarily taken, to offer the tenth of all he should possess; not to any other priest, but to God himself upon an altar.

Tithe was first legally enjoined by Moses, Lev. xxvii. 30. Num. xviii. 21. Deut. xiv. 22.—That legislator obliged the Israelites to several kinds of *tithes*; as, 1^o. The first *tithe*, תְּשִׁיבָה, which was a *tithe* of all the fruits, given to the Levites; this was not taken till after the oblation called תְּנוּפָה, had been made.

2^o. The second *tithe*, was a tenth part of the nine remaining after payment of the first *tithe*. This *tithe* was set apart in

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each family; and the master of the family was obliged to carry it to Jerusalem, and to use it there; or, in case he could not, he was to redeem it, or convert it into money: in which case he was to add a fifth to it, and carry the money to Jerusalem. The Rabbins say, that if he did not redeem it himself, that is, if he did not substitute his own money in lieu of it, but sold it to another, he was only required to carry the bare price to Jerusalem, without any addition.

3^o. The *tithe of the tithe*, was the tenth part of all the *tithes* that had been given the Levites by the people: for the Levites, after they had got all their *tithes* of the people, divided the whole into ten parts; and in their turn, gave a *tithe* to the priests. This *tithe* the Rabbins call תְּרוּמַת תְּרוּמָה, *oblation of the tithe*, קִרְיַשׁ הַתְּרוּמָה, *tithe of tithes*, or קִרְיַשׁ הַקִּרְיַשׁ, *tithe of things sanctified*.—And this the Levites were obliged to carry to the temple; the rest was reserved for their own subsistence.

4^o. The *tithe of the third year*, was another kind of *tithe*, not much different from the second *tithe*, excepting that it was less troublesome, by reason they were not obliged to carry it to Jerusalem. Every seventh year God appointed the ground should lie and rest, nor should the owners even gather the fruits which it produced spontaneously: that year, therefore, they paid no *tithe*, but only the six preceding ones.

Now, every third of these six years, *i. e.* on the third, and the sixth, they raised, as usually, the first *tithe*; and after that a second.—But this second they did not carry to Jerusalem either in kind or in money; but kept it by them to be spent by the Levites, the strangers, the fatherless, and the widows of the place, Deut. xiv. 28, 29.

This was also called the *tithe of the poor*, and the *third tithe*; and these third years when it was paid, were called the *tithe years*.

All these *tithes* amounted to above one sixth of the revenue of each person: for if, for instance, a master of a Family reaped 6000 measures of wheat, and 100 were first taken away for the first fruits or oblation, he had only 5900 left: from this 5900, taking away the first *tithe* 590, there remained 5310, the tenth whereof is 531; which being taken for the second *tithe*, leaves 4779 for the proprietor; who consequently has given 1121, *viz.* 121 more than a sixth of the whole.

Of the 590, which the Levites received for their first *tithe*, 59 went to the priests for the *tithe of tithes*; so that they were left 531 for their own subsistence, and that of their families. These matters are all further explained in the Talmud, where-in are two books on *tithes*, also in the book of benedictions, בְּרָכּוֹת, in the commentaries of Bartenora, Mainonides, R. Schelomoh Jarrhi, in Scaliger, Amama, Selden, Frischmuth, Quensied, Varenius, Hottinger, Sigonius, Cunæus, Godwyn, Leidecker, &c.

Under the new law, it is not Jesus Christ that established *tithes*, as it was God himself did it under the old law by the ministry of Moses: the christian priests, and the ministers of the altar of the new covenant, lived at first, wholly of the alms and oblations of the devout.

In after times the laity gave a certain portion of their revenues to the clergy, but voluntarily, and not out of any constraint or obligation: the first instances we have of this, are in the 1Vth and Vth centuries.

This gift was called *tithe*; not that it was really a tenth part of their income, or near so much: but only in imitation of the *tithes* of the old law.

In the following age, the prelates in their councils, in concert with the princes, made an express law to the purpose, and obliged the laity to give a full tenth part of their revenues, their fruits, &c. to the ecclesiastics.

This the church enjoyed without disturbance for two or three centuries; but in the VIIIth century the laity got hold of part of these *tithes*, either by their own authority, or by grants and donations of the princes; and appropriated them to their own uses.

Some time afterwards they bestowed them, or applied them to the founding of monasteries or chapters; and the church contented, at least tacitely, to this restitution.

In 1179, the third council of Lateran, held under Alexander III. commanded the laymen to restore all the *tithes* they yet held, to the church.

In 1215, the fourth council of Lateran, held under Innocent III. moderated the matter a little; and, without fixing any thing of the *tithes* which the laity already possessed, forbade them to appropriate or take any more for the future.

Fra. Paolo, in his treatise of beneficary matters, is of opinion, that the custom of paying *tithes* under the new law, began in France; and asserts, that there are no instances of it before the VIIIth and IXth Centuries: but it must be mistaken; for in the 2d council of Matiscona, held in 585, it is said expressly, that the christians had a long time kept inviolate that law of God, whereby *tithe* of all their fruits was enjoined to be given to holy places, &c.

In effect, Origen, H. m. XI. on Num. thinks, that the old laws of Moses, touching the first fruits and *tithes*, both of

cattle, and of the fruits of the earth, are not abrogated by the gospel; but ought to be observed on their ancient footing. The Vth canon of the council of Matiscona, orders *tithes* to be paid to the ministers of the church according to the law of God, and the immemorial custom of the christians, and that upon penalty of excommunication: which is the first penalty we find imposed on such as would not pay *tithe*.—On which grounds it is that many among the modern clergy hold their *tithes* to be *jura divina*.

Others, on the contrary, plead, that the recompence to be given church ministers, is differently ordained by God, according to the differences he has put between his two great dispensations, the law and the gospel: under the law he gave them *tithes*; under the gospel, having left all things in his church to charity, and christian freedom, he has given them only what shall be given them freely, and in charity. That the law of *tithes* is in force under the gospel, all the protestant divines, except some among the English, deny; for though hire to the labourer be of moral and perpetual right, yet that special kind of hire, the *tenth*, can be of no right or necessity, but to the special labour for which God ordained it: that special labour was the levitical and ceremonial service of the tabernacle, Numb. xviii. 21, 31. which was abolished: the right therefore of the special hire must be abolished too.

That *tithes* were ceremonial, is evident from their not being given to the Levites till they had been first offered as a heave offering to the Lord, ver. 24, 28.

He, then, who by the law brings *tithes* into the gospel, brings in likewise a sacrifice, and an altar; without which, *tithes*, by the law, were un sanctified and polluted, ver. 32. And therefore they were never thought of in the first christian times, till ceremonial altars and oblations had been brought back.

The Jews themselves, ever since their temple was destroyed, though they have rabbies and teachers of the law, yet pay no *tithes*, as having no proper Levites to whom, nor any altar whereupon, to hallow them; which argues, that the Jews themselves never looked on *tithes* as moral, but merely ceremonial. Add, that *tithes* were not allowed to the priests and Levites merely for their labour in the tabernacle; but in consideration of this likewise, that they were not allowed to have any other part or inheritance in the land, ver. 20, 24. and, by that means, for a tenth, lost a twelfth.

In effect, for the first three hundred years after Christ, no mention is made in all ecclesiastical history of any such thing as *tithes*; though in that time, altars and oblations had been recalled, and the church had miserably Judaized in many other things. The churchmen confessedly lived all that time on freewill offerings; nor could the defect of paying *tithes* be owing to this, that there were wanting civil magistrates to injoin it; since christians, having lands, might have given out of them what they pleased; and the first christian emperors, who did all things by advice of the bishops, supplied what was wanting to the clergy, not out of *tithes* which were never proposed, but out of their own imperial revenues.

The first authority produced, setting aside the apostolical constitutions, which few of the patrons of *tithes* will insist on, is a provincial synod at Cullen in 356, where *tithes* are voted to be God's rent: but before that time, divers other abuses and complaints had got ground, as altars, candles at noon, &c. And thus one complaint begot another; as it is certain that *tithes* suppose altars.

It is alledged, that *tithes* are of early and solemn force among us; having been paid by statute ever since the Saxon king Athelstan, anno 928: to which it may be answered, that Romefort, or Peter-pence, had been likewise paid to the pope by statute above 200 years longer, viz. from the year 725. And by the way it is to be noted, that these ancient *tithes* among our ancestors, kept a nearer analogy to their original in the Mosaic law; for the priests had but a third part, the other two thirds being appointed for the poor, and to adorn and repair the churches, as appears from the canons of Ecbert and Elfric.

The custom of paying *tithes*, or of offering a tenth of what a man enjoys, or of what he reaps from it, has not only been practised under the old and the new law, but we also find something like it among the heathens.

Xenophon, in the 5th book of the expedition of Cyrus, gives us an inscription upon a column near the temple of Diana, whereby the people were warned to offer the tenth part of their revenues every year to that goddess.

The Babylonians and Egyptians gave their kings a tenth of their revenues: See Aristotle in his *Oeconomies*, lib. 2. Diogenes Siculus, lib. 5. and Strabo, lib. 15.—Afterwards the Romans exacted of the Sicilians a tenth of the corn they reaped; and Appian tells us, that those who broke up, or tilled any new grounds, were obliged to carry a tenth of their produce to the treasury.

The Romans offered a tenth of all they took from their enemies, to the gods; whence the name of Jupiter Prædator: The Gauls, in like manner, gave a tenth to their god Mars,

as we learn in the commentaries of Cæsar.—And Festus de Verbo, signifi. allures us, that the ancients used to give *tithe* of every thing to their gods. *decima quæque victoris diis suis offerrebant.*

Authors have been strangely perplexed, to find the original of a custom, established among so many people in different manners and religions, to give a *tenth* to their kings, their gods, or their ministers of religion. Grotius takes it to arise hence, that the number ten is the most known and the most common among all nations; by reason of the number of fingers, which is ten. On this account he thinks it is, that the commandments of God were reduced to ten, for people to retain them with greater ease; that the philosophers established ten categories, &c.

Impropriated and appropriated TITHES, called also *infodated tithes*, are those alienated to some temporal or ecclesiastical lord, united to their fee, and possessed as secular goods. See **IMPROPRIATION**.

By the council of Lateran, held under Alexander III. in 1179, the alienation or infodation of *tithes* is prohibited for the future: whence all infodations made since that time are generally held by the canonists, illegal.

Some attribute the original of these impropriated *tithes* to Charles Martel; and hold him damned for first giving the revenues of benefices to secular nobles: but Baronius will have this a fable, and refers their origin to the wars in the Holy Land; which is also the opinion of Pasquier.

The tribute, it seems, which the Romans imposed on all the provinces of their empire, was a tenth part of all the fruits: hence several authors observe, that the Franks having conquered the Gauls, and finding the imposition established, they kept it on foot, and gave those *tithes* in fee to their soldiers: and thus, say they, was the origin of infeodated, or impropriated or appropriated *tithes*.

But the truth is, they are not so ancient; nor do we find any mention of them before the reign of Hugh Capet; even the very council of Clermont, held in 1097, as hot as it was in the interests of the church, does not say one word of them; which yet would undoubtedly have made loud complaints of such an usurpation, had it been then known.

Rate-Tithe. See the article **RATE-Tithe**.

TITHING, *Decenna*, or *Decury*; a number or company of ten men, with their families; knit together in a kind of society, and all bound to the king, for the peaceable behaviour of each other. See **FRANK-PLEDGE**.

In these companies there was one chief person, who from his office was called *testingman*; and at this day in the west *testingman*, though now no more than a constable; the old custom of tenmentals, or *tithings*, being long since disused.

TITILLATION, *Titillatio*, the act of *Tickling*, i. e. exciting a sort of pleasurable idea, by a gentle application of some soft body, upon a nervous part; and which usually tends to produce laughter.

TITLE, *Titulus*, an inscription put over any thing, to make it known.

The word is more particularly used for the inscription in the first page of a book, expressing the subject thereof, the author's name, &c.

What tortures abundance of authors, is to find specious *titles* for their books: a *title* should be simple, and yet clear: these are the two genuine characters of this kind of composition. Assuming *titles* are a prepossession against the author.

The French are much addicted to fanfaronnades in their *titles*; witness that of M. le Pays, *Amities, Amours, Amourettes*; or that improvement hereon, *Flours, Fleurons, Fleurettes*, &c.

TITLE, *Titulus*, in the civil and canon law, denotes a chapter or division of a book.

A *title* is subdivided into paragraphs, &c.—Each of the 50 books of the digest consists of a number of *titles*; some of more, others of less.

TITLE is also an appellation of dignity, distinction, or pre-eminence; given to persons possessed of the same.

The *titles* of order or dignity, Loyseau observes, should always come immediately after the name, and before the *titles* of office.

The king of Spain has a whole page of *titles*, to express the several kingdoms, and signories he is master of. The king of England takes the *title* of king of Great-Britain, France, and Ireland: the king of France, the *title* of king of France and Navarre: the king of Sweden entitles himself king of the Swedes and Goths: the king of Denmark, king of Denmark and Norway: the king of Sardinia, among his *titles*, takes that of king of Cyprus and Jerusalem: the duke of Lorraine, the *title* of king of Jerusalem, Sicily, &c.

The cardinals take *titles* from the names of some churches in Rome: as, of St. Cecilia, St. Sabina, &c. and they are called cardinals of the *title* of St. Cecilia, &c.

The emperor can confer the *title* of prince, or count of the empire; but the right of suffrage in assemblies of the empire depends on the consent of the estates.

The Romans gave their Scipio's the *titles* of Africanus, Asiaticus, &c. and to others, they gave the *titles* of Macedonicus, Numidicus, Creticus, Parthicus, Dacicus, &c. in memory of the victories obtained over the people of those countries.—The king of Spain, after the like manner, gives honourable *titles* to his cities, in recompence for their services, or their fidelity.

TITLE expresses also a certain quality ascribed by way of respect to certain princes, &c.

The pope has the *title* of *holiness*; a cardinal prince of the blood, that of *royal highness*, or *most serene highness*, according to his nearness to the throne; other cardinal princes, *most eminent highness*; an archbishop, *grace* and *most reverend*; a bishop, *right reverend*; abbots, priests, religious, &c. *reverend*.

As to secular powers, to the emperor is given the *title* of *imperial majesty*; to kings, *majesty*; to the king of France, *most christian majesty*; to the king of Spain, *catholic majesty*; to the king of England that of *defender of the faith*; to the Turks, *grand signior*, and *highness*; to the prince of Wales, *royal highness*; to the dauphin of France, *serene highness*; to electors, *electoral highness*; to the grand duke, *most serene highness*; to the other princes of Italy and Germany, *highness*; to the doge of Venice, *most serene prince*; to the republic or senate of Venice, *signory*; to the grand master of Malta, *eminence*; to nuncios and ambassadors of crowned heads, *excellency*.

The emperor of China, among his *titles*, takes that of *son of heaven*. The Orientals, it is observed, are exceedingly fond of *titles*: the simple governor of Schiras, for instance, after a pompous enumeration of qualities, lordships, &c. adds the *titles* of *flower of courtesy*, *nutmeg of consolation*, and *rose of delight*.

TITLE, in law, denotes a right which a person has to the possession of any thing.

It is also an authentic instrument, whereby a man can prove and make appear his right.

A prescription to twenty years, with a *title*, is good, and of thirty without a *title*.

There must be at least a colourable *title* to come into possession of a benefice, otherwise the person is deemed an intruder.

TITLE, in the canon law, is that by virtue whereof a beneficiary holds a benefice:—such is the collation of an ordinary, or a provision in the court of Rome founded on a resignation, permutation or other legal cause.

The *title* of a benefice, or beneficiary, is either a true, or a colourable one.—A true or valid *title*, is that which gives a right to the benefice: such is that received from a collator who has a right to confer the benefice on a person capable thereof, the usual solemnities being observed. See **COLLATION**, &c.

Colourable *title* is a seeming one; i. e. such a one as appears valid, and is not.—Such would that be founded on the collation of a bishop, in case the benefice in question were not in his collation.

By the canons, a colourable *title*, though false, produces two very considerable effects. 1^o. That after peaceable possession for three years, the incumbent may defend himself by the rule de *triennali possessione*, against such as would dispute the benefice with him. 2^o. That in case he be prosecuted within three years, and obliged to surrender the benefice, he shall not be obliged to restore the produce of it, during the time he possessed it.

TITLE * is also used in several ancient synods and councils, for the church to which a priest was ordained, and where he was constantly to reside.

* Nullus in presbyterium, nullus in diaconum, nisi ad certum titulum ordinetur, Concil. Londin. Ann. 1125.

There are many reasons why a church might be called *titulus*, *title*; the most probable, Cowel takes to be this, that in ancient days the name of the saint to whom the church was dedicated was engraven on the porch, as a token that the saint had a *title* to that church: whence the church itself became afterwards to be called *titulus*.

TITLES, or **TITULAR Churches**, M. Fleury observes, was formerly the denomination of a particular kind of churches at Rome. See **CHURCH**.

In the VI. and VII. centuries, there were four sorts of churches in that metropolis, viz. patriarchal, titular, diaconal and material.—The *tituli*, *titular*, were as it were, parishes, each assigned to a cardinal priest, with a certain district or quarter depending thereon, and a font for the administration of baptism in case of necessity.

Clerical or Secular TITLE, denotes a yearly revenue or income of the value of 50 crowns, which the candidates for priesthood were anciently obliged to have of their own; that they might be freed of a subsistence.

By the ancient discipline there were no clerics made, but in proportion as they were wanted for the service of the church,

which is still observed with regard to bishops; none being consecrated, but to fill some vacant see.

But for priests and other clerics, they began to make vague ordinations in the east as early as in the Vth century: this occasioned the council of Chalcedon to declare all vague and absolute ordinations null.

Accordingly, the discipline was pretty well observed till towards the end of the XIth century; but then it began to relax, and the number of priests was exceedingly increased; either because the people became desirous of the privileges of the clericate, or because the bishops sought to extend their jurisdiction.

One of the great inconveniencies of these vague ordinations was poverty, which frequently reduced the priests to fordid occupations, and even to a shameful begging. To remedy this, the council of Lateran laid it on the bishops to provide for the subsistence of such as they should ordain without *title*, till such time as they had got a place in the church that would afford them a settled maintenance.

There was also another expedient found out to elude the canon of the council of Chalcedon, and it was appointed that a priest might be ordained on the *title* of his patrimony; that is, it was not necessary he had any certain place in the church, provided he had a patrimony sufficient for a creditable subsistence.

The council of Trent retrieved the ancient discipline in this respect, forbidding all ordinations, where the candidate was not in peaceable possession of a benefice sufficient to subsist him; and allowing no body to be ordained on patrimony or pension, unless where the bishop declares it to be expedient for the good of the church: so that the benefice is the rule, and the patrimony the exception.

But this rule is not regarded, even in some catholic countries, particularly France, where the patrimonial *title* is the most frequent; and the *title* is even fixed to a very moderate sum, about 3 l. 15 s. per annum sterling. Indeed at Paris, and in some other dioceses, 150 livres are required.

As to religious, the profession they make in a monastery serves them for a *title*, in regard the convent is obliged to maintain them: and as to mendicants, they are maintained upon the *title* of poverty.

Those of the house, and society of the Sorbonne, are also ordained without any patrimonial *title*, and on the sole *title* of poverty, it being supposed a doctor of the Sorbonne can never want a benefice. See **SORBONNE**.

TITUBATION, or **TREPIDATION**, in astronomy, a kind of libration or shaking, which the ancient astronomers attributed to the crystalline heaven, to account for certain inequalities, which they observed in the motion of the planets. See **TREPIDATION**.

TITULAR, or **TITULARY**, denotes a person invested with a title, in virtue whereof he holds an office or benefice, whether he performs the functions thereof or not.

In this sense the term is used in opposition to survivor, and to a person only acting by procurator, or commission. An officer is always reputed *titular* till he have resigned his office, and the resignation have been admitted.

TITULAR is sometimes also applied adjectively to a person who has the title and right of an office or dignity, but without having possession, or discharging the function thereof.

It is sometimes also used abusively for a person who assumes and pretends a title to a thing, without either a right thereto, or a possession thereof.

TITULAR Churches. See the article **TITLE**.

TIMESIS,* **TMETHEI**, in grammar, a figure whereby a compound word is separated into two parts, and one or more words interpose between them.

* The word is formed from the Greek, τιμας, feci, I cut.

Thus, when Terence says, *quæ meo cuique animo lubitum est facere*, there is a *timesis*; the word *quæcunque* being divided by the interposition of *meo*.

Lucretius abounds in *Timesis*; as, *sepe solutantum tactu præterque meantum*: or, *diffidit petis est se, iungi seque gregari*; and, *dispectis disque gregatim*.

TOBACCO, or **TABACCO**, a medicinal herb, not known in Europe till after the discovery of America by the Spaniards, and first imported about the year 1560.

The Americans of the Continent call it *petun*, those of the islands *yoli*. The Spaniards, who gave it the name *tabacco*, took it from Tabaco, a province of Yucatan, where they first found it, and first learned its use.

The French, at its first introduction among them, gave it various names; as *nicotiana*, or the *ambassador's herb*, from John Nicot, then ambassador of France, II. in Portugal, who brought some of it with him from Lisbon, and presented it to a grand prior of the house of Lorraine, and to queen Catherine de Medicis; whence it was also called *queen's herb*, and *grand prior's herb*.—They also gave it other names, which are now all reduced to the original name *tabac*, or *tabaco*, from *tabaco*, given it by Hernandez de Toledo, who first sent it into Spain and Portugal.

Culture and preparation of TOBACCO.—*Tobacco* is cultivated in several parts of America, particularly in the Caribbee Islands, Virginia, &c. where they are forced to mix ashes with the soil, to prevent its rising too thick.—After sowing, they water it every day, and on very hot days cover it up, to prevent its being scorched by the sun.

When it is risen to a convenient pitch, they transplant it, much as we do lettuce, only at a distance of three feet, and in a soil prepared with great care: when replanted, it is kept continually weeded, the stem frequently cleaned, and the lowest leaves and the suckers it puts forth, taken off, that ten or fifteen of the finest leaves may have all the nourishment.

The leaves thus reserved being ripe, which is known by their breaking when bent, the stalks are cut, and left to dry two or three hours in the sun; after which they are tied two by two, and hung up on ropes under a shed to be dried by the air. When the leaves are sufficiently dried, they are pulled from off the stalks, and made up in little bundles; which being steeped in sea-water, or for want thereof, in common water, are twisted in manner of ropes, and the twists formed into rolls, by winding them with a kind of mill around a stick.—In this condition the *tobacco* is imported into Europe, where it is cut by the tobaccoists for smoking, or formed into snuff, and the like.

Besides the *tobacco* of the West-Indies, there are considerable quantities cultivated in the Levant, the coasts of Greece and the Archipelago, the island of Malta and Italy.—The marks of good twist *tobacco*, are a fine shining cut, an agreeable smell, and that it have been well kept.

Tobacco is either taken by way of snuff, as a sternutatory, or as a masticatory by chewing it in the mouth, or by smoking it in a pipe.

It is sometimes also taken in little longish pellets put up the nose, where it is found to produce very good effects, to attract a deal of water or pituita, unload the head, resolve catarrhs, and make a free respiration; for the subtle parts of the *tobacco* in inspiration are carried into the trachea and lungs, where they loosen the peccant humours adhering thereto, and promote expectoration.

Some have left this *tobacco* in their noses all night; but this is found to occasion vomiting usually on the morrow morning. Another thing charged on this way of application, is, that it weakens the sight.

Tobacco is held at first rate narcotic or opiate. When taken in great quantities in the way of snuff, it is found to pre-judice the smelling, it also greatly diminishes the appetite, and in time often gives rise to a phthisis.

That taken in way of smook, it often also dries and damages the brain. Borghi, in a letter to Bartholine, mentions a person who through excess of smooking had dried his brain to that degree, that after his death there was nothing found in his skull but a little black lump, consisting of mere membranes.

Some people use the infusion of *tobacco* as an emetic; but this is a very dangerous and unjustifiable practice, and often produces violent vomitings, and stupidity.

Bates an Fuller give some receipts, in which *tobacco* is an ingredient, with mighty encomiums in asthmatic cases.—A strong decoction of *tobacco*, with proper carminatives and cathartics, given clyster-wise, sometimes proves of good effect in what is usually called the *fluxus colicæ*, and also in the iliac passion.

A drop or two of the chymical oil of *tobacco* being put on the tongue of a cat produces violent convulsions, and death itself in the space of a minute; yet the same oil used in lint, and applied to the teeth, has been found of service in the tooth-ach; though it must be to those that have been used to the taking of *tobacco*, otherwise great sickness, reaching, vomiting, &c. happen; and even in no case is the internal use of it warranted by ordinary practice.

A strong decoction of the stalks, with sharp-pointed dock and allom, is said to be of good service, used externally, in cutaneous distempers, especially the itch: some boil them for that purpose in urine. The same decoction is said to be infallible in curing the mange in dogs.

Sim. Paulli, physician to the king of Denmark, in an express treatise on *tobacco*, observes that the merchants frequently lay it in bog-houses, to the end that becoming impregnated with the volatile salt of the excrements, it may be rendered the bricker, more fetid and stronger.

Amurath IV. emperor of the Turks, the grand duke of Muscovy, and the emperor of Persia, have prohibited the use of *tobacco* in their states.—Our king James I. wrote a treatise expressly against it, entitled, *A counter-blast to tobacco*. By a bull of pope Urban VIII. such are excommunicated as take *tobacco* in churches.

T O D of Wool is mentioned in the statute 12 Car. II. c. 32. as a weight containing 28 pounds, or two stone.

Some will have the word derived from the French, *toile*, a *carpet*, with which, by usage, two stone of wool is added.

TOES, by anatomists called *digiti pedis* are the extreme divisions of the feet; answering to the fingers of the hand. See **FOOT**. The *toes* of each foot consist of 14 bones; the great *toes* having two, and the rest three each; they are like the bones of the fingers, but shorter.

In the *toes* are found twelve ossa sesamoides, as in the fingers. The gout chiefly seizes the great *toe*.

TOFT, **TOFTUM** or **TOFTA**, in our law-books, a parcel of land, or a place where a messuage hath stood, but is decayed or casually burnt, and not re-edified.

TOGA, in antiquity, a wide woollen gown, or mantle, without sleeves, used among the Romans, both by men and women.

In process of time, none wore the *toga* but lewd women, whence that of Horace.—*In matrona, pectusve togata*.

The *toga* was of divers colours, and admitted of various ornaments: there was that called *toga demissa*, wore within doors; *toga forensis*, wore abroad; *toga militaris*, used by soldiers, tucked up after the Gabinian fashion; and *toga picta*, or *triumphalis*, wherein the victorious triumphed, this was embroidered with palms: that without any ornaments, was called *toga pura*.

The *toga* was sometimes wore open, and called *aperta*; sometimes girt or tucked up, called *præcincta*; and this cincture or girding again, according to Sigonius, was of three kinds; *laxior*, or the loose kind, where the tail trailed on the ground; *adstrictior*, the close kind, wherein it did not reach so low as the feet; and *Gabinia*, where one of the skirts or lapets was girt round the body.

Sigonius distinguishes the several *togæ*, or Roman gowns into *pura*, *canidia*, *palla*, *picta*, *prætexta*, *trabea* and *paludamentum*. See **PRÆTEXTA**, **PALUDAMENTUM**, &c.—The *toga pura* was also called *virilis*.

Jus TOGÆ, or privilege of the *toga*, was the same with the privilege of a Roman citizens, i. e. the right of wearing a Roman habit, and of taking, as they explain it, fire and water through the Roman empire.

TOILES, snares, or nets, set by hunters for catching of wild beasts; as deer, &c.

TOILET, a fine covering, of linnen, silk, or tapestry, spread over the table in a bed-chamber, or dressing-room, to undress and dress upon.

The dressing-boxes, wherein are kept the paints, pomatums, essences, *patience*, &c. the pin-cushion, powder-box, brushes, &c. are esteemed parts of the equipage of a lady's toilet.

That of the men consists of comb-case, brushes, &c. To make a visit to one at his toilet, is to come to entertain him while he is dressing or undressing.

Satin, lace, velvet, brocade, point de France, &c. are now ordinarily used for *toilets*: anciently they were made much plainer, whence the name, which is formed from the French, *toilette*, a diminutive of *toile*, any thin stuff.

TOISE, a French measure, containing fix of their feet, or a fathom.

TOISON d'Or, a term in heraldry for a golden fleece, which is sometimes borne in a coat of arms. See **GOLDEN FLEECE**.

TOL, in law, a term signifying to defeat, or take a way.—From the Latin, *tolle*, which signifies the same.

Thus to *tol* the entry, is to take away the right of entry.

TOL-BOOTH, or **TOLL-BOOTH**, a place in a city, where goods are weighed, to ascertain the duties or import thereon.

TOLERATION, in religion, a term which has made a great figure in the disputes among protestants, who have been exceedingly divided about the measures of toleration, or the degrees to which heretics and schismatics are, or are not to be suffered.

Many of the church of England have zealously opposed the toleration of presbytry, &c. nor has the church of Scotland been behind-hand with them in their zeal against episcopacy.*

* When a bill was brought into parliament for the toleration of all protestants in the exercise of religious worship; the general assembly of the kirk did most humbly beseech, yea, they were bold in the Lord, and in the name of the church of God, earnestly to obtest his grace [the lord high commissioner] and the most honourable estates, that no such motion of any legal toleration to those of the prelatical principles might be entertained by the parliament. See *Life of Qu. Anne*, p. 95.

But all who have reasoned consistently from the principles of the reformation, have been for toleration; as well perceiving they had no right to oblige any body to follow their particular sentiments: but the difficulty is, the setting bounds to this toleration.

M. Bafnage, and some other distinguish *civil toleration* from *ecclesiastical*.—The latter allows of different, and even opposite sentiments in the church, and the first permits them in civil society.

By *civil toleration*, is meant impunity and safety in the state for every sect which does not maintain any doctrine inconsistent with the peace and welfare of the state.—This civil or political toleration implies a right of enjoying the benefit of the laws, and of all the privileges of the society, without any regard to difference of religion.

Ecclesiastical toleration, is an allowance of certain opinions, which not being fundamentals, do not hinder those who profess them from being esteemed members of the church.—But as to the quality and number of these fundamental points, they never could, nor in all probability ever will, be agreed upon.

TOLL, TOLLUM, a Saxon term, though derived originally from the Latin *tollere*, *to take away*, or rather the Greek *τὸ λύναι*, *to loose*.—It has two acceptations, denoting, 1^o, a liberty to buy and sell within the bounds of a manor; and 2^o, *TOLL* is also used for a tax or custom paid for passage, or for vending goods in a market, fair, or the like.

Some records make mention of *toll thoro*, or *thorough toll*, which is money paid for passage in or through the manor ways, or over ferries, bridges, &c.—*Toll-take*, is a passing or driving cattle over a private man's ground.—And *Toll-turn*, or *turn-toll*, which is paid at the return of beasts from fairs and markets, though they are not fold.

By the ancient law, the buyers of corn and cattle in fairs or markets were made to pay *toll* to the lord of the market, in testimony of the contract there lawfully made in open market, because private contracts were held unlawful.

Some interpret *toll* a liberty as well to take, as to be free from *toll*; for that they who are infeoffed with *toll*, are custom-free. Of this freedom from *toll*, the city of Coventry bears an ancient charter, granted them by Leofric or Luriche, earl of the Mercians in Edward the Confessor's time, who, at the importunity of Godiva his lady, granted this freedom to the city.

TOLLBOOTH, } See the articles } **TOLBOOTH.**

TOLU Balsam, } **BAL AM.**

TOMAN, or **TOUMAN**, a kind of imaginary money used among the Persians in the keeping of their books, and to facilitate the reduction of money in the payment of considerable sums.

The *toman* consists of fifty abassi's, or a hundred mamoudi's or two hundred shahes, or ten thousand dinars; which amount to about three pounds, six shillings and eight-pence sterling.

D'Herbolet derives the word from the language of the Moguls, where it signifies the number ten thousand.—Eben Arabeschah says, that the word *toman*, when used to express a weight, or money, contains ten thousand silver Arab drachmas, called *matkal*; which are a third lighter than the Attic.

The Moguls, &c. frequently use *toman* for ten thousand men; and say, *c. gr.* that the city Samarcand contains seven *tomans* of people fit to bear arms; and that of Andechan nine *tomans*.

TOMB* includes both the grave or sepulchre, wherein a deceased is interred; and the monument erected to preserve his memory.

* The word is formed from the Greek, *τύμβος*, *tyμβos*, *sepulchre*, or according to Menage, from the Latin, *tumba*, which signifies the same.

Among the Romans none but the emperors, vestals, and persons signalized by great actions, were allowed to have *tombs* in the cities; the rest were all in the country, near the high-roads; whence those common words, *sepulchra*, *abbi*, *viator*; which are still retained in the inscriptions of our monuments, tho' set up in churches, &c.

At Anchiale was anciently seen the *tomb* of Sardanapalus, with this inscription in verse: *Sardanapalus built Anchiale: and Tarasus in one day: go, passenger, eat, drink, and be merry; the rest is nothing.* Vid. Strab. Geog. lib. 14.

The Romans had a kind of empty tomb, called *cenotaphium*, an *honorary tomb*, wherein the body of the deceased was not laid. It was used to be built in favour of persons perishing at sea, in remote countries, &c. where no sepulture could be had.

The occasion hereof was a superstitious notion, that the souls of those, who had not funeral honours, wandered an hundred years by the banks of the rivers of hell, before they were admitted to pass over.—The *cenotaphium* being made, the same ceremonies were practised as at real funerals.

The *cenotaphia* were inscribed with the words *ob honorem*, or *memoriae justitiam*; whereas other *tombs*, wherein the ashes were really deposited, were inscribed D. M. S. q. d. sacred to the manes.—When the words *tuus cinis* were added, it declared the ashes inclosed therein belonged to a Person infamous for some crime.

Characters of TOMBS. See the article **CHARACTER.**

TOME, **TOMOE**, a bound book, or writing that makes a just volume.

All the works of such an author are compiled, and reduced into one, or more *tomes*. There are *tomes* in folio, in quarto, in octavo, duodecimo, &c.—The *cancels* printed in the Louvre are in 37 *tomes*. Salmon has wrote the life of Christ in 12 *tomes*. See **VOLUME.**

TOMENTUM, properly signifies flecks, or locks of wool; but by botanists is used for that soft downy matter which grows on the leaves of some plants, hence are named *tomentose*; as, *verbascom tomentosa*, *catinus tomentosus*, &c.

M. Winslow observed a kind of *tomentum* in the secretory vessels of the glands; and from this accounts for the secretion of the various fluids from the blood. See **GLAND**, and **SECRETION.**

TON. See the article **TUNE.**

TOMKIM and TOMPION. See the article **TAMION.**

TONDIN, or **PANDINO**, in architecture. See **TURF.**

STONE, or **TUNE**, in music, a property of sound, whereby it comes under the relation of *grave* and *acute*; or, the degree of elevation any sound has, from the degree of swiftness of the vibrations of the parts of the sonorous body.

For the cause, measure, degree, difference, &c. of *tones*, see **TUNE.**—The variety of *tones* in human voices arises partly from the dimensions of the wind-pipe, which, like a flute, the longer and narrower it is, the sharper is the *tone* it gives; but principally from the head of the larynx, or knot of the throat; the *tone* of the voice being more or less grave, as the rima, or cleft thereof is more or less open.

STONE is more particularly used in music for a certain degree or interval of tune, whereby a found may be either raised or lowered from one extreme of a concord to the other; so as still to produce true melody.

Musicians, beside the concords, or harmonical intervals, admit three lesser kinds of intervals, which are the measures and component parts of the greater, and are called *degrees*: the nature, origin, use, &c. whereof, see under the article **DEGREE.**

Of these degrees, two are called *tones*, and the third a *semitone*; their ratio's in numbers are 8 : 9, called a *greater tone*; 9 : 10, called a *lesser tone*; and 15 : 16, a *semitone*.

The *tones* arise out of the simple concords, and are equal to their differences: thus the *greater tone* 8 : 9 is the difference of a fifth and a fourth: the *lesser tone* 9 : 10 the difference of a lesser third and fourth, or of a fifth and sixth greater: and the *semitone* 15 : 16, the difference of a greater third and fourth.

Of these *tones* and *semitones* every concord is compounded, and consequently every one is resolvable into a certain number thereof.—Thus the lesser third consists of one *greater tone* and one *semitone*—the greater third of one *greater tone* and one *lesser tone*.—The fourth of one *greater tone*, one *lesser tone*, and one *semitone*.—The fifth of two *greater tones*, one *lesser tone*, and one *semitone*.

For the use of these *tones*, &c. in the construction of the scale of music, see **SCALE.**

DIAZOEUTIC TONE. See the article **DIAZOEUTIC.**

TONGUE, *Lingua*, in anatomy, an oblong member, whose form and situation are sufficiently known, and whose use is to be the organ of taste, and the principal instrument of speech and deglutition.

It is fastened to the os hyoides, the larynx, and to the fauces, by means of a membranous ligament running along the lower side of it, about half way, called the *frænum*.

The main bulk and body of the *tongue* is made up of muscles, which are covered on the upper part with a papillary nervous substance, over which are spread two membranes.—The outer of these membranes is pretty thick, and full of papillæ, of a pyramidal figure, especially towards the tip; which papillæ stand pointing towards the root of the *tongue* in a bending posture, which makes their figure to be concavo-convex. These apices, or papillæ, are so very minute and slender in men, that they make the coat appear on the upper part to be villous, especially as they approach nearer to the root. The figure of the papillæ, in human *tongues*, is not so plainly discernable to the naked eye as not to need the microscope. In brutes they are generally larger, stiffer, and more conspicuous; and in some almost cartilaginous, as may be felt in the *tongues* of cats, and oxen, but more sensibly in lions. On the upper side, at a little distance from the tip, this membrane becomes thin, smooth, and glabrous, and as it were, polished by the lower parts of the mouth whereon it slides.

Under this lies a thin, soft, reticular kind of coat, punched through with innumerable holes, and always lined with a thick and white, or yellowish mucus. This membrane is so exceeding tender, and full of mucus, that it is not to be examined by the naked eye, unless boiled: by which it grows tough, and easily separable from the external membrane, and from the nervous part of the *tongue* which lies immediately under it. After boiling, it appears like a kind of gauze, between whose threads innumerable holes appear, through which the apices of the papillary body underneath it are exerted. This membrane on the upper side, next the outward, appears white, with a cast towards yellow, but is black on the side next the tongue.

Many authors do not allow this to be a membrane, and will only have it to be a mucus hardened by boiling; but since it has so much of the resemblance of a membrane, and that authors agree in allowing two membranes to the tongue, Dr. Drake does not scruple to number it among them; since there does not appear to be any other second membrane reckoning, with Malpighi, the innermost part under the tongue a part of the outer membrane.

Immediately under this appears a nervous papillary body spreading itself to a pretty thickness over the whole surface of the *tongue*. This body, on the under side, is every-where level and smooth, except in some few places, where it is connected to the subjacent muculous part by some nervous twigs, which it sends into it.—Malpighi distinguishes the papillæ, which make the principal part hereof, into three kinds, from their different magnitudes and figures when observed with the microscope; of which, those seated on the sides and tip are very singular, resembling little round pyramids, with globes on their tips like the horns of snails.—All these papillæ, which are the immediate organs of tasting, send their apices, or extremities, through the mucous membrane, into the pyramidal papillæ of the outer membrane, which are hollow to receive them, and seem to be nothing else but a kind of cases to defend these nervous papillæ from injuries, which the salts and aperities of those bodies which we take into our mouths, might do them.

The rest, and much the greatest part of the body of the *tongue* is muculous, consisting of plans of fibres in different directions: the first, or external plan, consists of strait fibres, which cover the *tongue* from one extreme to the other; when these contract, they shorten it. Under this are several other plans, running from the under to the upper side, which serve to make it broad and thin. These two kinds of fibres lie *stratum super stratum*, a plate of the one, and then a plate of the other.

Authors are not agreed about the number of muscles which compose the *tongue*: some confounding those of the os hyoides with those of the *tongue*, reckon eight, others nine, others ten, and more pair. Some number those proper to the *tongue* alone six pair, others five, others four, and some no more than three. Of this last opinion is our accurate Mr. Cowper, who allows no more than three genuine pair of muscles to the *tongue*, viz. the *genioglossum*, which pulls the *tongue* forwards, and puts it out of the mouth; the *ceratoglossum*, which draws it into the mouth, or pulls it on one side; and the *styloglossum*, which draws the *tongue* up in the action of deglutition.

Besides these muscles, the *tongue* is also moved by a bone situated at its root, and making as it were its basis, called *os hyoides*.

Down the middle of the *tongue*, lengthwise, runs a seam, called *linea mediana*, which divides it to the bottom into two equal parts, but not so effectually but that the blood-vessels of one side communicate with those of the other.—These vessels are arteries from the carotides and veins called *ramulæ*, and are very conspicuous about the frænum under the *tongue*, serving to reconvey the blood to the external jugulars. These veins are frequently opened in the angina, and are the last resort of old women in this case.—The nerves of the *tongue* come from the fifth, sixth, and ninth pairs; the two first of which have been called *gustatorii*, and the latter *motorii lingue*. See NERVE.

Howsoever necessary an organ the *tongue* be in speech, &c. yet Jac. Rolandus has published an account of a mouth without a *tongue*, which spoke perfectly, and performed its other natural functions; the person he speaks of is Pet. Durand, who losing his *tongue* by a gangreen, could yet speak perfectly, as also taste, swallow, and chew his food; which last, however, he could only do on that side he put it into, being unable to turn it to the other side of his mouth. We have very lately had also in England an instance of the same kind, in one Margaret Cutting. See *Philos. Transf.* anno 1748.

TONGUE-grafting, } See the articles } ENGRAFTING.
TONGUE-tied, } RANULA.

TONIC,* TONIKOE, in medicine, is applied to a certain motion of the muscles, wherein the fibres being extended, continue their extension in such manner, as that the part seems immovable, though in reality it be in motion. See MUSCLE.

* The word is formed from the Greek, *tonao*, to stretch.

Such is the case of a man standing, of birds planing or swimming through the air, &c.—Galen says, that the muscles act even when at rest; for after having made any contraction to fix themselves in a certain state or disposition, the preserving of that contraction is what we call the *tonic motion*.

TONICAL Echo. See the article ECHO.

TONNAGE, } See the articles } TUNNAGE.
Duty of TONNAGE, } DUTY.
TONNING, } TUNNING.

TONSILS, TONSILLÆ, in anatomy, two round glands, situate near the root of the tongue, on each side the uvula, under the common membrane of the fauces, with which they are covered: they are called also *amygdalæ*, or almonds of the ears.

TONSURE,* the art or act of cutting the hair, and shaving the head. See HAIR.

* The word is formed from the Latin, *tondere*, to shave.

The *tonsure* was anciently a mark of infamy in France; in-much, that when they would render any prince incapable of succeeding to the crown, they cut off his hair, and shaved him. See further under the article BEARD.

TONSURE, in the Romish church, is used for the entrance, or admission into holy orders.

In propriety, *tonsure* is the first ceremony used for devoting a person to God and the church, by presenting him to the bishop, who gives him the first degree of the clericate, by cutting off part of his hair, with certain prayers and benedictions. Some hold the *tonsure* a particular order; others, as Loyseau, only the mark and form of ecclesiastical orders in general.

The *tonsure* suffices to make a Cleric: the rest is only to qualify him for the holding benefices.—A person is capable of the *tonsure* at seven years of age; hence a benefice of simple *tonsure* is such a one as may be enjoyed by a child of seven years old. The *tonsure* is the basis of all the other orders.

TONSURE is also used for the corona, which priests, &c. wear, as the mark of their order, and of the rank they hold in the church. See CROWN.

The barbers have the measures and dimensions of the different kinds of *tonsures*, or clerical crowns; to be practised according to the different degrees and orders.—A cleric's *tonsure*, a sub-deacon's *tonsure*, a deacon's *tonsure*, a priest's *tonsure*, are each successively bigger than other.

TOOLS, simple and popular instruments, used in the more obvious operations; and particularly in the making of more complex instruments.

Tools are divided into *edge-tools*, *spring-tools*, *pointed-tools*, &c. See INSTRUMENTS.

TOOTH, *Dens*, in anatomy, a little, hard, smooth bone, set in the gums, and serving to masticate or chew the food, to bite, &c.—See *Tab. Anat.* (Osteol.) fig. 2 lit. d, e, f.

Men, and most terrestrial animals, as also many of the fishes, have two rows of *teeth*, the one in the upper jaw, and the other in the lower.

In men, the ordinary number of *teeth* is 32; sixteen in each jaw; all fixed in peculiar sockets, called *alveolæ*, in the juncture or articulation called *gomphosis*, and by the joiners, *pegging*.

They are of three sorts: those in the fore-part of each jaw are called *incisores*, *cutters*; and are four in number in each jaw, broad, thin, and flat: some call them the *primores*, because they appear the first; others the *adversis*; and others the *ridentes*, *laughers*, because they shew themselves first in laughing.

Behind these, on each side of each jaw, stand two which are a little more prominent, and pointed, called *canini*, by the common people *eye-teeth*, because part of the nerve which moves the eyes is inserted into them, whence the danger of pulling them out.

Behind these are five in each jaw, called the *molars*, or *grinders*, being those which in men serve chiefly for mastication.

The incisores have generally only a single root, or fang; the canini sometimes two; and the molars three or four, especially the hind ones, which are put to the greatest stress.

The *teeth*, according to Peyer, are formed of convolved skins, hardened and bound together by a viscid mucus: and if we view the grinders of deer, horses, and sheep, &c. we shall find great reason to be of his mind.

Others speak of their formation otherwise. The sockets, Dr. Quincy observes, are lined with a thin membrane, upon which are several vessels, through which there passes a thick transparent humour, that, as it increases, hardens in form of *teeth*; and about the seventh or eighth month after birth, they begin to pierce the edge of the jaw, and tear the periosteum and gums, which being very sensible, create a violent pain, and other symptoms incident to children in the time of dentition.

The *teeth* begin not to appear all at a time; but first the dentes incisivi of the upper, and then those of the lower jaw appear, because the thinnest and sharpest; after them come out the canini, because they are sharper than the molars, but thicker than the incisivi; and last of all the molars, because they are thickest and bluntest.

Of this viscous transparent liquor, which is indurated into the substance of the *teeth*, there are two lays, one below the other, divided by the same membrane which covers all the cavity of the jaw: the uppermost lay forms the *teeth* which come out first; but about the seventh year of age they are thrust out by the *teeth* made of the undermost lay, which then begin to sprout; and if these *teeth* be lost, they never grow again.

If some have been observed to shed their *teeth* twice, they have had three lays of this viscous humour, but this hardly ever happens.

About the one and twentieth year, the two last of the molars spring up, and are called *dentes sapientie*, because they arise when the person is at years of discretion.

The *teeth*, M. de la Hire the younger has found to have all that part which stands out beyond the jaw, covered with a peculiar substance called *enamel*, quite different from the rest of the bone.

This enamel, by some others called the *periostrum*, is composed of an infinity of little fibres, which grow to the bone by their roots, much like nails or horns.

This composition is very discernable in a broken *tooth*, where the origin and situation of these fibres are apparent. M. de la Hire is persuaded, that the growth of these fibres is performed much like that of nails. If by any accident a little part of this enamel be broke off, so that the bone is left bare, that is, if the very roots of the fibres be taken away, the bone, in that part, will grow carious, and the *tooth* inevitably perish; there being no bone in the body that can bear the air. See Bone.

Indeed, in some persons the enamel is very much wore and injured, by rubbing them much with dentrifices, &c. so that the bone appears through, and yet the *tooth* keeps sound; but the reason is, that the bone is not quite bare, but there is still a thin lay of the enamel which preserves it; but this lay being thin enough to be transparent, the yellow bone is seen through it.

Sometimes also a *tooth* breaks, and the bone is left bare, yet the person does not find any pain or aking from it: the reason is, that the hole in the root or fang of the *tooth* through which a little branch of a nerve enters that renders the *tooth* sensible, being quite stopp'd up by age, or the like, has pinch'd off the nerve, and taken away all communication between the *tooth* and the origin of the nerves, and, by consequence, all sensibility.

It also happens in some *teeth*, that the fibres are only in little sheaves, or bundles, whose upper extremities meet, but not their lower; as is the case in most of the grinders, where the separation of the bundles is apparent. Here, if the upper extremity of the fibres chance to be broken, or wore off, the separation between two of the bundles often enlarges itself, so as to admit some hard particle of the food, by which means a little aperture being made through the enamel, the bone is laid bare, and the *tooth* soon rots. This inconvenience is remedied a little by stopp'ing up the hole with lead, which prevents the sharp pungent parts of the food from penetrating to the bone, and there occasioning pain.

What we have said is illustrated by the figures in *Tab. Anat. (Osteol.) fig. 14.* where ACFH expresses the extremity of the jaw the *teeth* are set in; AEC and FGH the roots or fangs of the *teeth* inclosed in the jaw; ADCB and FLHI the enamel, compos'd of little fibres ranged aside of each other, which cover all that part of the *tooth* without side the jaw; II several threads joined at the upper extremity, but apart at the lower; MM holes through which the nerves enter the roots of the *teeth*; NN a *tooth* clos'd up.

The *teeth*, Mr. Derham observes, furnish us with a notable instance of the wisdom and goodness of the Creator: their peculiar hardness is very remarkable, considering the tender substance they are formed of.

The ancients, and even Riolanus, among the moderns, have held them to be incom bustible, and the only part of the body that was so; on which account they were placed with great care in the urns among the ashes of the deceased: but the opinion is false, there having only been two found in the tombs of Westphalia, one of which was half calcined.

Another popular error is, that the *teeth* continue growing for ever, even in old people, to the hour of their death. M. de la Hire observes, it is only the enamel or polish that grows, which is a substance very different from the *teeth*.

The form, disposition, and order of the *teeth*, are admirable: the foremost are weak and far from the centre, as being only preparers to the rest; the others being to grind and mince, are accordingly stronger, and placed near the centre of motion.

Galen puts the case, that the order of the *teeth* should have been inverted, and the grinders, *e. gr.* put in the place of the incisors; and asks, what use *teeth* had then been of, and what confusion would not there have arose by such a slight oversight in the disposal only? Upon which he argues, that if any person should dispose a company of 32 men, the number of the *teeth*, in a just order, we should judge him an intelligent person: why then should we not judge the same of the Creator, &c.

Again their various forms, in various creatures, is no less considerable, being all curiously adapted to the peculiar food and occasions of the several species of animals: thus in the rapacious they are fitted for the catching, holding, and tearing the prey; in herbaceous for the gathering and communion of vegetables; and in such as have no *teeth*, as birds, the bill supplies the defect.

Add, that the temporary defect of them is no less observable in fumes: that children, for instance, should have none while they are not able to use them, but to hurt themselves, or the mother; and that at the very age when they can take in the more substantial food, and live without the breast, and begin to need *teeth* for the sake of speech; that then, their *teeth* should begin to appear, and gradually grow as they more and more stand in need of them.

Some persons are born with all their *teeth*, as Marcus Curius Dentatus, and Cneius Papius Carbo; others have only had one continued *tooth*, reaching the whole length of the jaw, as

Pyrrhus king of Epirus, and Prusias son of the king of Bithynia: others are said to have had two or three rows on the same jaw, as Hercules.

Mentzelius, a German physician, assures us, that he saw an old man at Cleves, 1666, aged 120 years, who had a new set of *teeth* two years before, which cut wth great pain; and he saw an Englishman at the Hague, who cut a new set of *teeth* in his 118th year.

A Danish physician, named Hagerup, maintains in certain theses, that one may hear with the *teeth*.

As to animals, there are some fishes which have *teeth* on their tongues, as trouts; others have them at the bottom of the gullet, as the cod-fish; some, as the great sea-dog or shark, called *canis carcharias*, have three, four, or five rows of *teeth* on the same jaw; the crocodile three, and those all incisors; vipers have two large crooked canine *teeth*, which are moveable, and ordinarily lie flat, only being raised when they would bite. And the rana piscatrix, sea-frog, or sea-devil, has whole rows of the like moveable *teeth*.—The toad and cuttle-fish have no *teeth*, and yet they can bite.

Artificial TEETH, are those set in lieu of natural ones which are wanting.—They are usually made of ivory, or the tooth of the sea lion; but in regard ivory, in a little time, grows yellow in the mouth, Fabricius advises them to be made of the shin-bone of a bullock, which preserves its colour.

The custom of wearing ivory *teeth*, and of binding them in with a gold wire, is very ancient: Lucian and Martial speak of it as practis'd among the Romans.

Guillemeau gives us the composition of a paste for making artificial *teeth*, which shall never grow yellow. the composition is white wax granulated, and melted with a little gum elemi, adding powder of white mastic, coral, and pearl.

TOOTH in the manage.—It is by a horse's *teeth*, chiefly, that his age is known.

The *teeth* of a horse are of four kinds, *viz.* 24 jaw-*teeth*, or grinders, at the bottom of the mouth, beyond the bars; 12 on each side the channel, ranged six above, and as many below.—These never fall, nor are they used for the distinction of age.

Twelve foal-*teeth*, or milk-*teeth*, which come in the fore-part of the mouth at three months old, and usually cast at two years and half.

Four tusks, placed alone in the bars between the fore-*teeth* and grinders, one on each side below, and as many above. Mares seldom have tusks, and when they have, they are small, and are reckon'd an imperfection.

Twelve gatherers, growing before in the place of the foal-*teeth* and grinders, and with which horses draw their fodder, cut grass, &c. These are divided into

Nippers, which are the two foremost *teeth* above, and as many below, which a horse first changes.

Middle *teeth*, or separators, parting the nippers from the corner *teeth*, are the two next the nippers, one on each side of them, both above and below, and are those which change next.

Outward, or corner *teeth*, are those next the tusks above and below, and which are cast last.—They shoot forth from the gum at five years of age, and have a hollow, wherein is a black speck, resembling a bean, called the *mark*, which continues till seven or eight years of age, and then begins to fill up.

TOOTH-ACH, a very common disease, by physicians called *odontalgia*.

The *tooth-ach* usually proceeds from a caries which rots the bone, and eats it hollow. For the causes, &c. of this caries, see TOOTH.

Sometimes it proceeds from a deluxion of a sharp matter upon the gums.—For the *tooth-ach*, a paste made of soft bread, and the seed of stramonium, laid on the tooth affected, abates the pain; if the tooth be hollow, and the pain great, a composition of equal quantities of opium, myrrh, and camphire, made up into a paste with brandy or spirits of wine, and about a grain or two put into the hollow place, puts a stop to the caries and blunts the acute pain of the nerve; by which it often gives immediate relief.

Chymical oils, as those of origanum, cloves, tobacco, &c. are also of service, destroying, by their hot caustic nature, the texture of the sensible vessels of the tooth affected; though, from too liberal an use of them, frequently proceeds a deluxion of humours, and sometimes an impostumation.

A blister applied behind one or both ears seldom fails to cure the *tooth-ach*, especially when attended with a hot deluxion of humours, and swelling of the gums, face, &c. Liniments of ointment of marshmallows, elder, &c. mixed with rum, brandy, or spirit of wine camphorated, are good, used outwardly, to abate the swelling.

Mr. Chefelden mentions one cured of the *tooth-ach* by applying a small cauterizing iron to the anthelix of the ear, after he had undergone bleeding, purging, salivation, setons, &c. to no purpose: the case was very remarkable; for when he was seized with it, a convulsion of that whole side of his face followed,

loosel, whenever the pain became acute, or whenever he attempted to speak.

See also, in his treatise of butter, maintains, that there is no better means of keeping the teeth fair and sound, than by rubbing them over with butter: a medicine much less dastardly than that of the Spaniards, who wash their teeth every morning with urine.

To prevent and cure the surly in the gums, it is recommended to wash the mouth every morning with salt and water; and to hinder the teeth from spoiling or growing carious, some use only powder of hartshorn to rub the teeth with, and then wash the mouth with cold water: it is alleged, this is preferable to other dentifrices, on this account, because their hard particles are apt to abrade that fine smooth polish, with which the surface of the teeth is covered, and which is their preservative from the ill effects of air, aliment, liquors, &c. which occasion ailments of the teeth when wore off.

Dentifrices are usually compounded of powders of hartshorn, red coral, bone of the cuttle-fish, burnt alum, myrrh, dragon's blood, &c. Some commend powder of bricks, as sufficient to answer all the intentions of a good dentifrice. See DENTIFRICE.

TOP gallant,

TOP-mist,

Have out for sails,

} See the articles } FORE-top-gallant.
} HEAVE.

TOPARCHY,* a little state, or signory; consisting only of a few cities, or towns; or a petty country governed and possessed by a *toparch*, or lord.

* The word is formed from the Greek, *τοπος*, place, and *αρχη*, command, government.

Judea was anciently divided into ten *toparchies*. See Pliny, lib. 5, c. 14. and Joseph. lib. 3, c. 2. de Bel. Jud. & lib. 5, &c.—The last mentioned author calls the cities of Azotus, Jamna, and Phasaelis, which Herod left by testament to his sister Salome, a *toparchy*.

Procopius only gives the quality of *toparchy* to the kingdom of Edessa; to Abazarus, the *toparch* or lord whereof there is a tradition, that Jesus Christ sent his picture, with a letter.

TOPAZ, a sort of gem or precious stone; esteem'd the third in order after the diamond.

The *topaz* is transparent; its colour, a beautiful yellow, or gold colour: it is very hard, and takes a fine polish.—It is the true chrysolite of the ancients, and is found in several parts of the Indies, in Ethiopia, Arabia, Peru, and Bohemia.

The oriental *topazes* are most esteemed; their colour borders on the orange: those of Peru are softer, but their colour much the same: the yellow of those of Bohemia is a little cloudy; and they are the softest of all, and their polish the coarsest. Those of Madagascar were once in much esteem, but are now held good for little.

Tavernier mentions a *topaz*, in the possession of the great Mogul, weighing 157 carats, which cost 20,000 sterling: and Bactus de Bont, in his treatise of precious stones, affirms to have seen in the cabinet of the emperor Rudolphus, whose physician he was, a *topaz* above three foot long, and six inches broad. Probably it might be some other stone a little transparent, of a *topaz* colour.

The *topaz* is easily counterfeited; and there are fictitious ones, which, to the eye, do not come behind the natural ones. If we might believe the ancients, the *topaz* has very notable virtues; but these are now in discredit: and yet the *topaz* is of some use in medicine, reduced into an impalpable powder, and levigated in water.

Some say, it takes its name *topaz* from an island in the red sea, of the same name, where it was first found by Juba, king of Mauritania; but it was known to the Hebrews before, as appears from the 18th psalm. See supplement, articles TOPAZIUS, and CHRYSOLITHUS.

TOPHUS, in medicine, a stony or chalky concretion in any part of an animal body; as in the bladder, kidneys, &c. or in the joints.

Dr. Rutty, in his treatise of the urinary passages, takes the stone to arise from the attraction between volatile saline particles: of which particles the stone, when viewed with a microscope, seems to be made up: he thinks the fault of these aggregates of saline particles, ought generally to be supposed to begin in, or proceed from, the papillæ of the kidneys, and not from the sediment of urine in the bladder.

The reason why wine-drinkers are more subject to the stone, and other concretions, than malt or water drinkers, he supposes to be the volatile and saline, or earthy particles contained in the wine in greater quantities than in the ale, &c. A calculus, he observes, reduced to a caput mortuum, will upon the affusion of warm water, dissolve, and entirely mix; but in a short time will again settle, and the particles thereof so closely unite or attract, as that, by repeated affusions, they cannot be brought again to dissolve.

TOPIC, in rhetoric, a probable argument, drawn from the several circumstances and places of a fact, &c.

TOPICE,* ΤΟΠΙΚΗ, TOPICA, expresses the art or manner of inventing and managing all kinds of probable arguments.

* The word is formed from the Greek, *τοπος*, place: its subject being the places, which Aristotle calls the *seats* of arguments.

Aristotle has wrote *topics*; and Cicero a kind of comment on them, to his friend Trebatius, who, it seems, did not understand them.—But the critics observe, that the *topica* of Cicero agree so little with those eight books of *topics* which pass under the name of Aristotle, that it follows necessarily, either that Cicero was much mistaken; which is not very probable; or that the books of *topics* now attributed to Aristotle, are not wholly his.

Cicero defines *topica*, or *topice*, to be the art of finding arguments, *disciplina inveniendorum argumentorum*.

Rhetoric is sometimes divided into two parts: judgment, called also *dialektice*; and invention, called *topice*.

TOPICS,* or TOPICAL remedies, in medicine, are commonly used for what we otherwise call *external remedies*, i. e. such as are applied outwardly to some particular diseased, and painful part.

* The word is formed from *τοπος*, locus, place.

Such are plaisters, cataplasms, blisters, unguents, salves, collyriums, &c.

The gout is never cured by *topics*: they may alluage the pain for a time; but for a cure, the source of the evil must be attacked with internals.

TOPOGRAPHY,* a description, or draught of some particular place, or small tract of land; as that of a city or town, manour or tenement, field, garden, house, castle, or the like; such as surveyors set out in their plots, or make draughts of, for the information and satisfaction of the proprietors.

* The word is formed from *τοπος*, place, and *γραφω*, I describe.

Topography differs from *chorography*, as a particular from more general; *chorography* being a description of a country, a diocese, province, or the like. See CHOROGRAPHY.

TORCH, *Tada*, a sort of luminary; properly, a stick of fir, or other resinous and combustible matter, as pine, linden, &c. more or less thick, and long; encompassed at one end with fix wax candles, which being lighted, yield a kind of gloomy brightness.

Torches are used in some church ceremonies, particularly at the processions of the holy sacrament in the Romish church, and at the interments of the poorer people.

Formerly they were used at the funerals of those of the first rank; but tapers and flambeaux are now introduced in their stead; and frequently also called by their name.

TORCULAR, or TORCULARIS, among chirurgions, a contrivance for stopping bleedings in amputations.

TORCULAR *Heraphili*,* in anatomy, a name given to a part in the duplicatures of the dura mater; formed of a concourse of a branch of the longitudinal sinus, with the lateral sinus's.

* It has its name *torcular* from its resembling a press, or screw: *Heraphili* is added from the discoverer's name.

TORE,* TORUS, in architecture, a large round moulding used in the bases of columns.

* Daviler derives the word from the Greek, *τορος*, a cable, whereof it bears some resemblance; or from the Latin, *torus*, a bed, as being supposed to represent the edge of a bed or quilt, swelled out with the weight of the incumbent column.

The *tor* is also called *gras baton*, and *tordin*.—It is the bigness that distinguishes the *torus* from the astragal.

The bases of Tuscan and Doric columns have but one *tor*, which is between the plinth and the listel.—In the Attic base there are two; the upper, which is the smaller; and an under, or bigger.—See Tab. *Architect.* fig. 3. & fig. 24. lit. 1. & fig. 26. lit. h m.

TOREUMATOGRAPHY, a Greek term, signifying the knowledge, or rather description, of ancient sculptures, and basso-relievo's.

The invention of *tozeumatography* is owing to Phidias, and its perfection to Polykletes: the Italian gravers have let a great deal of light into the *tozeumatography*.

TOREUTICE,* ΤΟΡΕΥΤΙΚΗ, that part of sculpture, called turning.

The word is formed of the Greek, *τορος*, lathe, of *τορος*, *τερεβρος*, perfore.

TORIES, or TORYS, a party or faction in England, opposite to the whigs.

These two celebrated parties, which have so long divided our country, will make a considerable article in the English history, nothing inferior, in many respects, to that of the Guelphs and Gibellins.—The division has gone so deep, that it is presumed, no Englishman, who has any concern or principles at all, but inclines more to one side than the other: for which reason, we shall borrow our account of them from the mouths of foreigners, who may be supposed more impartial; and particularly from M. de Cize, a French officer, some time in the service of England, who has wrote the *History of whiggism and torijism*, printed

printed at Leipzig, anno 1717; and M. Rapin, whose *dissertation sur les whigs & les toris*, printed at the Hague the same year, is well known.

During the unhappy war, which brought king Charles I. to the scaffold; the adherents of that king were first called *cavaliers*, and those of the parliament *round-heads*; which two names were afterwards changed into those of *toris* and *whigs*, on the following occasion.

A kind of robbers, or banditti in Ireland, who kept on the mountains, or in the islands formed by the vast bogs of that country, being called *toris*; a name they still bear indifferently with that of raparees; the kings enemies accusing him of favouring the rebellion in Ireland, which broke out about that time, gave his partisans the names of *toris*; and on the other hand the *toris*, to be even with their enemies, who were closely leagued with the Scots, gave them the name of *whigs*, which is that given in Scotland to another kind of banditti, or fanatics, in that country.

The cavaliers, or *toris*, had then principally in view the political interests of the king, the crown, and the church of England; and the round-heads, or whigs, propounded chiefly the maintaining the rights and interests of the people, and of protestantism. Nor have the two factions yet lost their first views; though their first names, *cavalier* and *round-head*, be now entirely disused.

This is the most popular account; and yet it is certain the names *whig* and *tory* were but little known till about the middle of the reign of king Charles II. M. de Cize relates, that it was in the year 1678, that the whole nation was first observed to be divided into *whigs* and *toris*; and that on occasion of the famous deposition of Titus Oates, who accused the catholics of having conspired against the king and the state.—The appellation *whig* was given to such as believed the plot real; and *tory* to those who held it fictitious.

We should here confine ourselves to the *toris*; and for what regards the *whigs*, refer to that article; but since by comparing and confronting the two parties together, both the one and the other will appear in the stronger light, it would be imprudent to separate them: so that we rather chuse to say the less under the word *whigs*, and refer thence hither.

The factions we are speaking of, may be considered either with regard to the state, or to religion.—The *state toris* are either violent or moderate: the first would have the sovereign to be absolute in England, as in other countries, and his will to be a law. This party, which is not very numerous, has yet been considerable; 1^o. On account of its leaders, which have been lords of the first rank, and generally ministers and favourites. 2^o. In that being thus in the ministry, it engaged the church *toris* to maintain stiffly the doctrine of passive obedience. 3^o. Because the king has usually thought it his interest to support them.

The moderate *toris* would not suffer the king to lose any of his prerogatives; but neither would they sacrifice those of the people. These, says Mr. Rapin, are true Englishmen; have frequently saved the state, and will save it again whenever it shall be in danger, either from the violent *toris*, or from the republican *whigs*.

The *state whigs* again, are republican or moderate: the first, according to our author, are the remains of the party of the long parliament, who took in hand to change the monarchy into a commonwealth: These make fo slender a figure, that they only serve to strengthen the party of the other *whigs*. The *toris* would persuade the world, that all the *whigs* are of this kind; as the *whigs* would make us believe that all the *toris* are violent.

The moderate *state whigs* are much in the same sentiments as the moderate *toris*; and desire the government may be maintained on its ancient foundation: all the difference is, that the moderate *toris* lean a little more to the side of the king, and the moderate *whigs* to that of the parliament and people. These last are in a perpetual motion to prevent the rights of the people from being broke in upon; and have sometimes taken precautions at the expence of the crown.

Before we consider our two parties with regard to religion, it must be observed, that the reformation, as carried on to a greater or lesser length, divided the English into episcopalians, and presbyterians or puritans: the first contended, that the episcopal jurisdiction should be continued on the same footing, and the church in the same form, as before the reformation: the latter maintained, that all ministers or priests had equal authority; and that the church ought to be governed by presbyteries, or consistories of priests and lay elders.

After long disputes, the more moderate of each party relaxed a little of their stiffness, and thus formed two branches of moderate *whigs*, and moderate *toris*, with regard to religion; but there was a much greater number who kept to their principles with inconceivable firmness: and these constituted two branches of rigid episcopalians and presbyterians, subsisting to this day; and now comprized under the general names of *whigs* and *toris*; in regard the first join the *toris*, and the latter the *whigs*.

From what has been observed, we may conclude, that as the names *tory* and *whig* have a regard to two different objects,

they are equivocal, and of consequence ought never to be applied without expressing in which sense it is done—for the same person may be, in the different respects, both *whig* and *tory*.

A presbyterian, for instance, who wishes the ruin of the church of England, is certainly, on that score, of the party of *whigs*; yet if he oppose the attempts some of his party would make against the royal authority, it cannot be denied but he is effectually a *tory*.

After the like manner, the episcopalians ought to be esteemed as *toris* with regard to the church; and yet how many of them are *whigs* with regard to the government?

For the rest, the general motives that have formed and kept up the two parties, appear, in the main, to be no other than the private motives of particular persons: self-interest is the primum mobile of their actions; ever since the rise of these factions, each has struggled earnestly to get the advantage over the other; inasmuch as from such superiority accrue places, and honours, and promotions, &c. which the prevailing party usually distributes among its own members, exclusive of the contrary party.

As to the characters commonly attributed to the *whigs* and *toris*; the *toris*, says M. Rapin, appear fierce and haughty: they treat the *whigs* with the greatest contempt, and even somewhat hardly, when they have the advantage over them: they are very hot and vehement, and proceed with a rapidity which yet is not always the effect of heat and transport, but has its foundation sometimes in good policy: they are very subject to change their principles, as their party prevails, or gives way.

If the rigid presbyterians prevail in the *whig* party, it would not be less hot and zealous than that of the *toris*; but it is said they have not the direction thereof; which gives room to affirm, that those at the head of the *whig* party are much more moderate than the chiefs of the *toris*: add, that they usually conduct themselves on fixed principles, proceed to their end gradually, and without violence; and their slowness is not less founded on good politics, than the hastiness of the *toris*.—Thus much, says our author, may be said to the advantage of the moderate *whigs*; that, in the general, they maintain a good cause, viz. the constitution of the government as by law established.

TORMINA, in medicine, a term sometimes used to express pains in the general; but more particularly a species of pain called *tormina ventris*, or *alvi*, in English, the gripes.

Young children are very often troubled with gripes; it is upon this account, that nurses, in order to prevent or remedy them, usually mix with their spoon-meats, a little brandy or some carminative feeds, as caraway seeds, &c.

Some children breed their teeth with violent gripes, which are apt to bring on convulsions of the bowels.

In adults, the dry gripes is usually cured by the exhibition of warm cathartics, such as tincture of hiera piera, elixir fatulis, tincture of rhubarb, &c. with the assistance of opiats.

See *suppl. ment. article* TORMINA.

TORNADO, or **TURNADO**, a sudden and violent gust of wind from all points of the compass; very frequent on the coast of Guinea. See **WHIRLWIND**.

TORNESOL. See the article **TOURNESOL**.

TORPEDO, in natural history, a sea-fish, famed both among the ancient and modern naturalists, for a remarkable numbness wherewith it strikes the arm of such as touch it.

Various are the accounts given us of this singular fish; some authors raising the effects it produces, to a kind of miracle; and others treating them as little better than chimeras; some solving the appearance one way, and some another. But M. Reaumur, of the French academy of sciences, has at length cleared the point, and set the matter in a satisfactory light.

The *tropedus* is a flat fish, much of the figure of the thornback; sufficiently described in most treatises of fishes, and commonly enough found about the coasts of Provence, Gascony, &c. where the people eat it without any danger. See its figure represented in *Tab. Natural history*, fig. 9.

Phænomena of the TORPEDO.—Upon touching it with the finger, it frequently, though not always happens, that the person feels an unusual painful numbness, which suddenly seizes the arm up to the elbow, and sometimes to the very shoulder and head.

The pain is of a very particular species, and is not to be described by any words; yet messieurs Lorenzini, Borelli, Redi, and Reaumur, who all felt it severely, observe it to bear some resemblance to that painful sensation felt in the arm, upon striking the elbow violently against a hard body: though M. Reaumur assures us, this gives but a very faint idea of it.

Its chief force is at the instant it begins; it lasts but a few moments and then vanishes entirely. If a man do not actually touch the *tropedus*, how near soever he holds his hand he feels nothing: if he touch it with a stick, he feels a faint effect: if he touch it through the interposition of any pretty thin body, the numbness is felt very considerably; if the hand be pressed very strong against it, the numbness is the less, but still strong enough to oblige a man speedily to let go.

Theory of the TORPEDO.—There are different ways of accounting for this effect: the firsts, that the ancients, who con-

tented themselves with ascribing a torporific virtue or faculty to this animal.

The second will have the effect produced by the *torpedo* to depend on an infinite number of corpuscles issuing continually out of the fish, but more copiously under some circumstances than others: this is the opinion most generally received; being adopted by Redi, Perazzoli, and Lorenzini.

They explain themselves thus, as the fish emits a quantity of corpuscles, proper to heat us, so the *torpedo* emits a quantity of corpuscles fit to numb the part they insinuate themselves into; whether it be by their entering in too great abundance, or by their falling into tracts or passages very disproportionate to their figures.

The third account is that of Borelli, who looks on this emission of corpuscles, as imaginary: he says, that upon touching the fish, it puts itself into a violent tremor or agitation, and that this occasions a painful numbness in the hand that touches it. But M. Reaumur assures us, that notwithstanding all the attention he could view this fish withal, when ready to stroke the numbness, he could perceive nothing of this trembling or agitation.

The last and justest hypothesis, is that of M. Reaumur: the *torpedo*, like other flat fishes, he observes, is not absolutely flat, but its back, or rather all the upper part of its body, is a little convex: when it did not, or would not, produce any numbness in such as touched it, its back, he found, always preserved its natural convexity; but whenever it would dispose itself to resent a touch or thrust, it gradually diminished the convexity of the back parts of the body; sometimes only rendering them flat, but sometimes even concave.

The very next moment, the numbness always began to seize the arm; the fingers that touched, were obliged to give back, and all the flat and concave part of the body was again seen convex: and whereas it only became flat insensibly, it returned to the convexity so swiftly, that one could not perceive any passage from the one to the other state.

The motion of a ball out of a musket, is not, perhaps, much quicker than that of the fish resuming its former situation; at least the one is not more perceivable than the other.

It is from this sudden stroke, that the numbness of the arm arises; and accordingly, the person when he begins to feel it, imagines that his fingers have been violently struck. And it is the mere velocity of the stroke that produces the numbness.

The wonder is, how so soft a substance, as that of the fish, should give so rude a blow: indeed a single stroke of a soft body could never have done it; but in this case, there is an infinity of such strokes given in an instant. To explain the admirable mechanism hereof, we must give a view of the parts whereon it depends.

This mechanism, then, consists in two very singular muscles, *b, b*, described by several authors, who have given the anatomy of the *torpedo*. Redi, and after him Lorenzini, call them the *musculi salicati*; their form is that of crescents, and they together take up almost half the back of the fish; the one on the right side, and the other on the left. Their origin is a little above the mouth; and they are separated from each other by the bronchia, into the last of which they have their insertion.

What is singular in them, is their fibres; if, with the authors above-mentioned, we may give that name to a sort of smaller muscles as big as goose quills; of an assemblage whereof the two great muscles are quills. These lesser muscles are hollow cylinders, their length nearly equal to the thickness of the fish, and ranged a-side of each other; all perpendicular to the upper and lower surfaces of the body, accounting these surfaces as two nearly parallel planes. The exterior surface of each of these cylinders, consists of whitish fibre, whose direction is the same with that of the cylinder: but these fibres only form a kind of tube, whose parietes are not above the thickness of a leaf of paper. The cavity of the tube is full of a soft matter, of the colour and consistence of pap, divided into twenty five, or thirty different little masses, by so many partitions, parallel to the base of the cylinder; which partitions are formed by transverse fibres: so that the whole cylinder is in some measure composed of twenty-five or thirty smaller cylinders placed over each other, and each full of a medullary substance.

We need only now remember, that when the *torpedo* is ready to strike its numbness, it slowly flattens the outer surface of its upper part; and the whole mechanism, whereon its force depends, will be apparent. By that gradual contraction it bends, as it were, all its springs; renders all its cylinders shorter, and at the same time augments their bases, or, which amounts to the same, stretches all the little inclosures which divide the soft matter. In all probability, too, the large fibres, or little muscles, in that moment, lose their cylindrical form, to fill the vacancies between them.

The contraction being made to a certain degree, all the springs unbend; the longitudinal fibres are lengthened, the transverse ones, or those which form the inclosures, are shortened; each inclosure, drawn by the longitudinal fibres which are lengthened, drives the soft matter it contains, upwards; in which it

is apparently assisted by the undulatory motion, which is in the transverse fibres when contracting.

If then, a finger touch the *torpedo*, it instantly receives a stroke, or rather several successive strokes, from each of the cylinders whereon it is applied. As the soft matter is distributed into divers inclosures, it is more than probable, all the strokes are not given precisely at the same moment: nor, were there no inclosures to separate the matter, its impression would give strokes, in some measure, successive: for all parts of soft bodies do not strike at once; the impression of the last does not take till after the first have done acting. But these several inclosures serve to augment the number of the springs, and, of consequence, the velocity and force of the action.

These quick re-iterated strokes given by a softish matter, shake the nerves, suspend, or change the course of the animal spirits, or some fluid equivalent: or, if you had rather, these strokes produce an undulatory motion in the fibres of the nerves, which eludes or disagrees with that they should have, in order to move the arm. And hence the inability we are under of using the same, and the painful sensation which accompanies it.

Hence it is, that the *torpedo* does not convey its numbness to any degree, except when touched on these great muscles; so that the fish is very safely taken by the tail, which is the part by which the fishermen catch it.

The authors who have accounted for the effect of the *torpedo* from torporific effluvia, have been obliged to have recourse to the same two muscles; but then they only make them reservoirs of the corpuscles, whereby the numbness is effected.

Lorenzini, who has observed the contraction as well as Reaumur, pretends that all its use, is to express those corpuscles from out of the hollow fibres of these muscles wherein they are imprisoned; but this emanation of corpuscles admitted by most authors, is disproved by M. Reaumur, from the following considerations:

1^o. In that no numbness is conveyed, if the hand be at the smallest distance from the *torpedo*: now, to us, their own comparison, if the *torpedo* numbs as the fire warms, the hands would be affected at a distance from the one as well as from the other.

2^o. In that the numbness is not felt till the contraction of the muscles is over; whereas were the cause in torporific particles expressed by the contraction, the effect would be felt in the time of the contraction.

3^o. In that were the numbness the effect of torporific particles, it would be conveyed by degrees, as the hand warms by degrees. Lastly, in that the *torpedo* conveys its numbness to the hand, through a hard, solid body, but does not do it through the air. Were the only use the *torpedo* makes of its faculty, the saving itself from the fishermen, as some have supposed, it would signify but little; for it is very rare that it escapes their hands.

Pliny, Aristotle, and most naturalists, therefore agree, that it likewise serves it for the catching of other fishes: all we know for certain, is, that it lives on other fishes, and that it is generally found on banks of sand, &c. probably to serve it as a foundation or support for the exerting its faculty.

M. Reaumur had no fishes alive to examine what the *torpedo* would do to them; but an animal of the feather'd kind he tried it on, viz. a drake, which being shut up a while in water with the fish, was taken out dead; doubtless from its too frequent contacts on the *torpedo*.

In the history of Abyssinia, we are assured, that if the *torpedo* kill living fishes, it seems to bring dead ones to life again; dead fishes being seen to stir if put in the same vessel with it: but this is much less credible than what is told us in the same history, that the Abyssinians use *torpedos* for the cure of livers, by tying down the patient to a table, and applying the fish successively upon all his members, which puts him to cruel torment, but effectually rids him of his disease.

Bellonius assures us, that our own *torpedos*, applied to the soles of the feet, have proved successful against fevers.

M. du Hamel, in his history of the academy of sciences, anno 1677, mentions what he calls a kind of *torpedos*, which he compares to conger eels: M. Richer, from whom he has that account, affirms, on his knowledge, that they numb the arm strongly, when touched with a staff, and that their effects even go to the giving vertigos.

TORQUE, in heraldry, a round roll of cloth twisted and stuffed; such is the bandage frequently seen in armories about the heads of moors, savages, &c.

It is always of the two principal colours of the coat. The *torque* is the least honourable of all the enrichments wore on the helmet by way of crest.

TORREFACTION*, in pharmacy, a kind of roasting or aflation, wherein a drug is laid to dry on a metalline plate placed over or before coals, till it become friable to the fingers.

* The word is formed from the Latin, *torrificare*, to roast.

Torrefaction, is particularly used, when, after reducing some drug, as rhubarb, or myrrabalan, into powder, it is laid on an iron or silver plate, and that placed over a moderate fire till the powder begin to grow darkish; which is a mark that those remedies have lost their purgative virtue, and have acquired a more astringent one.

Formerly they used to *torrefy* opium, to get out some malignant parts fancied to be in it, before they dar'd use it in medicine; but the effect was, that its volatile spirits and sulphur, wherein its greatest virtue consists, were hereby evaporated.

TORRENT, **TOERENS**, in geography, a temporary stream of water, falling suddenly from mountains wherein there have been great rains, or an extraordinary thaw of snow; sometimes making great ravages in the plains.

TORRICELLIAN, a term very frequent among physical writers, used in the phrases, *torricellian tube*, or *torricellian experiment*, on account of the inventor, Torricelli, a disciple of the great Galileo.

TORRICELLIAN Tube, is a glass tube, as AB, about 3 foot long, and $\frac{3}{4}$ of an inch in diameter, represented *Tab. Pneumatica*, fig. 6. n^o. 2. whose upper orifice A is hermetically sealed.

TORRICELLIAN Experiment, is performed by filling the *torricellian tube* AB with mercury; then stopping the orifice B with the finger, inverting the tube, and plunging that orifice in a vessel of stagnant mercury C.—This done, the finger is removed, and the tube sustained perpendicular to the surface of the mercury in the vessel.

The consequence is, that part of the mercury falls out of the tube into the vessel, and there remains only enough in the tube to fill from 28 to 31 inches of its capacity, above the surface of the stagnant mercury in the vessel.

Those 28, &c. inches of mercury are sustained in the tube by the pressure of the atmosphere on the surface of the stagnant mercury; and according as the atmosphere is more or less heavy, or as the winds blowing upwards or downwards, heave up or depress the air, and so increase or diminish its weight and spring, more or less mercury is sustained from 28 inches to 31.

The *torricellian experiment* makes what we now call the *barometer*.

TORRID Zone, that tract of earth lying under the line, and extending on each side to the two tropics, or to 23 degrees and a half of latitude.

The ancients believed the *torrid zone* uninhabitable; but from the later navigations we learn, that the excessive heat of the day there is tempered by the coldness of the night.

TORT, in law, denotes injustice, or injury: as, *de son tort meme*, in his own wrong, &c.

Hence also *tort-feasor*, &c.—The word is pure French, where it signifies the same.

Exécutor de son Tort. See the article **EXECUTOR**.

TORTOISE-Shell, the shell, or rather scales* of a testaceous animal, called a *tortoise*; used in insulating, and in various other works, as for snuff-boxes, combs, &c.

* Mr. Catelby observes, that the hard strong covering which incloses all sorts of tortoises is very improperly called a shell; being of a perfect bony texture; but covered on the outside with scales, or rather plates, of a horny substance: which are what the workmen call *Tortoise shell*. Phil. Trans. N^o. 438. p. 117.

There are two general kinds of *tortoisés*, viz. the *land*, and *sea tortoise*; *testudo terrestris*, & *marina*.

The *sea tortoise*, again, is of four kinds, viz. the *fresh tortoise*, the *caretta*, the *cabobanna*, and the *liger-bu*; but it is the caret alone which furnishes that beautiful shell, so much admired in Europe.

The shell of the caretta, or hawkbill tortoise is thick, and consists of two parts, the upper, which covers the back, and the lower, the belly: the two are joined together at the sides by strong ligaments, which yet allow of a little motion.—In the fore part is an aperture for the head and fore legs, and behind for the hind legs and tail.

It is the under shell alone that is used: to separate it they make a little fire beneath it, and as soon as ever it is warm, the under shell becomes easily separable with the point of a knife, and is taken off in laminae or leaves.

The whole spoils of the caret consists in 13 leaves or scales, 8 of them flat, and 5 a little bent: of the flat ones, there are 4 large ones, sometimes a foot long, and seven inches broad.

The best *tortoise-shell* is thick, clear, transparent, of the colour of antimony, sprinkled with brown and white: when used in marquetry, &c. the workmen give it what colour they please by means of coloured leaves which they put underneath it.

In generation, Rondeletius observes, that the embraces of the male and female *sea-tortoisés* continue for a whole lunar month; and that they squirt water out of the nostrils in the same manner as the dolphin. On the Brazilian shore they are said to be so big as sometimes to dine fourscore men; and that in the Indian sea the shells serve the natives for boats. De Laet notes, that in the island of Cuba they are of such a bulk, that they will creep along with five men on their backs. See *supplement article TESTUDO*.

TORTOISE, in the military art. See **TESTUDO**.

TORTURE, a grievous pain inflicted on a criminal, or person accused, to make him confess the truth.

The forms of *torture* are different in different countries. In some they use water, in others iron, in some the wheel or rack, in some the boot, tumbrilins, &c. See **RACK**, **BOOT**, &c.

In England the use of all *torture* is abolished, both in civil and criminal matters, and even in cases of treason; though something like it still remains, where the criminal refuses to plead.

In France the *torture* is not generally practised in civil matters; but by an ordinance of 1670, if a person be accused of a capital crime, he may be put to the question, i. e. to the *torture*, if there be a considerable proof against him, and yet not proof enough to convict him.

There are two kinds of *torture*: the one *preparatory*, appointed before sentence passed; the other *definitive*, decreed by a sentence of death.

The *preparatory torture* is ordered *manentibus linteis*, so that if the accused do not confess, he cannot be condemned to death, but only *ad opus citra mortem*.

The *definitive torture* is that which a condemned criminal is put to, to make him confess his accomplices. The ordinary *torture* is given at Paris with six pots of water, and one little rattle; and the extraordinary, with six other pots, and the great tressle.

In Scotland the *torture* is given with the boot. See **BOOT**.—In some other countries, by heating the criminals feet; in others, with wedges, &c.

The *torture*, says M. Bouter, is a sure expedient to destroy an innocent person of a weak complexion, and to save a criminal or a robust one.—It was a noble saying of an ancient, *They who can bear the torture will lie, and also they who cannot bear it*.

TORY. See the article **TORIES**.

TOTAL Cause, { See the articles { **CAUSE**.

TOTAL Eclipse, { See the articles { **ECLIPSE**.

TOTTED.—A good debt to the king, by the foreign apportioner, or other officer in the Exchequer, paid for such by writing the word *tot*, q. d. *tot pecunia regi debentur*, whence it is said to be *totted*.—Also that which is paid is to be *totted*. See **EXCHEQUER**.

TOUCAN, in astronomy, a modern constellation of the southern hemisphere, consisting of eight small stars; otherwise called *ansæ Austrinae*.

TOUCH, in music. An organ is said to have a good *touch*, or stop, when the keys close and lie down well, being neither too loose nor too stiff.

TOUCH the wind, in the sea language, is when the steer's-man at the helm is bid to keep the ship as near the wind as may be.

TOUCHING is sometimes used for the sense of feeling.

TOUCHING, in geometry. A right line is said to *touch* a circle, when it meets in such a manner as, that being produced, it does not cut, but falls without the circle.

TOUCH-stone, a black, smooth, glossy stone, used to try metals upon.

The ancients called it *lapis Lydius*, the *Lydian stone*, from Lydia, a country of Asia minor, whence it was brought.

The moderns call it *touch stone*, in regard the proof they make of metals, chiefly silver, is by touching or rubbing the metal to be tried on this stone, and comparing the colour of the mark it leaves thereon, with the mark of another piece of metal of the same species, whose goodness is past doubt. See *supplement article TOUCH-Needles*.

TOUMAN. See the article **TOMAN**.

TOURNAMENT. See the article **TOURNAMENT**.

TOUR, *turn*, a French term, often used among English writers for a journey.—Thus we say the *tour* of Paris, of Rome, &c.

Tour of hair, a tress or border of hair, going round the head, which, mingled dexterously with the natural hair, lengthens and thickens it. See **HAIR**.

These *tours* are for men.—The women likewise use *peruques*, and false hair, either to hide their age, or to fix the tresses of their natural hair on the forehead and temples.

The form is different according to the mode, sometimes raised and curled, sometimes straight and laid flat along the forehead.

TOURN, in law. See the article **TURN**.

TOUT temps prêt & uncore off, that is, always ready, and so at the present time: a kind of plea in way of excuse or defence for him that is sued for any debt or duty belonging to the plaintiff.

Per my & per Tour. See the article **PER**.

TOW.—Whatever is drawn or dragged after a ship or boat with a rope, is said to be *towed*.

TOWAGE* the halving or drawing a ship or barge by men or beasts, or by another ship or boat fastened to her, in order to make her enter a port, ascend a river, or the like.

* The word is probably derived from the Saxon, *teow*, to draw, drag.

The term is also used for money, or other recompence, given by bargemen to the owner of the ground next the river where they

they *tow* or barge or other vessel, for the liberty of passing along the side thereof.

TOWER, TURRIS, a tall building, consisting of several stories, and usually of a round form, though sometimes square, or polygonal.

Before the invention of guns, they used to fortify places with *towers*, and to attack them with moveable *towers* of wood, mounted on wheels, to fit the besiegers on a level with the walls, and drive the besieged from under the same.

These *towers* were sometimes 20 stories, and 30 fathom high: they were covered with raw skins, and an hundred men were employed to move them.

Towers are also built to enable people, by their elevation, to view to a great distance.—These are of all figures, as square, round, pentagonal, &c. See PHAROS.—In China is a famous *tower* of Porcelain, whereof the Dutch relate wonders.

Towers are also built for fortresses, prisons, &c. as the *Tower* of London, the *towers* of the battie, &c.

The *Tower* of London is not only a citadel to defend and command the city, river, &c. but also a royal palace where our kings with their courts have sometimes lodged; a royal arsenal, wherein are arms and ammunition for 60000 soldiers: a treasury for the jewels and ornaments of the crown; a mint for coining of money; the great archive, wherein are preserved all the ancient records of the courts of Westminster, &c. and the chief prison for state criminals.

In the midst of it is the great square, *white tower*, built by William the Conqueror.—Within the *Tower* is a parochial church, exempt from all jurisdiction of the archbishop, and a royal chapel, now dilapidated.

The chief officer of the *Tower* is a constable, under whom is the lieutenant, who acts by his direction, and in his absence. He has, by grant of several of our kings, *unam lagnam*, two gallons and a pint of wine out of every vessel, and a certain quantity out of every boat laden with lobsters, oysters, and other shell fish, and double the quantity out of every alien's boat passing by the *Tower*: to him also belongs a fee of 200 *l.* for every duke committed prisoner, 100 *l.* for every peer not a duke, and 50 *l.* for every commoner.

Under the constable, and in his absence, under the lieutenant, are a *gentleman-porter*, and divers wardens.—The first has charge of the gates to lock and unlock them, and deliver the keys every night to the constable or lieutenant, and receive them of him the next morning: he commands the warders who are upon the day's wait, and at the entrance of a prisoner has for his fee *vestimenta superiora*, or else a composition for the same, which is usually 30 *l.* for a peer, and 5 *l.* a piece for others.

Note, the ancient allowance from the king to a duke or marquis, a prisoner in the *Tower*, was 12 *l.* a week, now but 4 *l.* To all other lords anciently 10 *l.* a week, now 2 *l.* 4 *s.* 5 *d.* To knights and gentlemen anciently 4 *l.* a week, now 13 *s.* and 4 *d.* And to the inferior persons, now 10 *s.* a week.

For the yeomen warders of the *Tower*. See WARDER.

In the *Tower* is likewise kept a court of record every Monday, by prescription, for the liberty of the *Tower*, of debt, trespass, and other actions of any sum.

Beside the ancient liberty of the *tower*, which adjoins to it, the Old Artillery Garden by Spittle-Fields, and the Little Minories, are within the *Tower* liberty, within which the gentleman porter has the same power and authority as sheriffs within their respective counties.

Hollow Tower, in fortification. See HOLLOW Tower.

TOWN, a place inhabited by a considerable number of people, of an intermediate magnitude and degree between a city, and a village. See VILLAGE, &c.

It is hard to give a tolerable definition of a *town*, in regard the idea is a little arbitrary, and unfixed. A *town* is generally without walls, which is the character that usually distinguishes it from a city; but this does not hold universally.

We have several kinds of *towns*, borough *towns*, market *towns*, country *towns*, &c. See BOROUGH, &c.

TOWN-HOUSE,
Freedom of a Town, { See the articles { FREEDOM.
Hanse Towns, { HANSE.

TOXICUM, ΤΟΞΙΚΟΝ, a word particularly used to express a sort of poison, said to be used by the Indians to their arrows, in order to render wounds made by them incurable.

The word in a more general sense signifies any poison.

The Indians are supposed to poison their arrows, daggers, &c. with the virus of vipers, the mischievous effects whereof continue a long time after the matter is quite dried up.

TRABEATION, TRABEATIO, in the ancient architecture, the same with entablature. See ENTABLATURE.

It consists of three principal members or divisions, viz. the architrave, freeze and cornice, each of which consists of divers lesser members and ornaments.

The proportion, members, &c. are different in the several orders.

TRACE, a mark or impression which any thing leaves behind it in passing over another.

TRACES of the brain, among the Cartesian philosophers, are those impressions, more or less deep, which they say, sensible objects make on the fine fibres of the brain, by means of the organs of sense.

These impressions are also called *traces* of the object; the course of the animal spirits they say serves to keep them up, and to renew them.

The vivacity of the imagination they say arises from the prodigious quantity of *traces* of different objects in the brain, which are so linked together, that the spirits cannot be sent into one of them, but they run into all the rest; by which means the ideas occasioned by the application of the spirits to those several *traces*, are all excited, as it were, at once.

Memory, according to the same, consists in the *traces* which the animal spirits have impressed.

Trace of a hare, among hunters, is her footing in the snow; distinct from other treadings, called *doubling*, and *pricking*, &c.

Traces also denote the tracks of ravenous beasts, as wolves, wild beasts, &c.

TRACHEA, * in anatomy, a large arterial vessel, called also *aspera arteria*, and popularly the *wind-pipe*, being the canal or tube which carries the air into the lungs, for the use of respiration and speech.—See Tab. Anat. (Splanchn.) fig. 14. lit. c. c. e. d. d. &c.

* Galen gave it the name *trachea*, τραχηα, because of its being rough and uneven; on which account the Latins also called it *aspera*.

TRACHOMA, ΤΡΑΧΩΜΑ, in medicine, a roughness or asperity of the inner part of the palpebræ, attended with an itching, and redness, and frequently with pustles, resembling millet seeds.

Its degrees are the fycosis, and tylosis, or rather those are higher disorders into which the *trachoma* is liable to degenerate.

TRACT, TRACTUS, properly denotes an extent of ground, or a portion of the surface of the terraqueous globe.

TRACT, or *TRACTATE*, TRACTATUS, does also signify a small treatise, or written discourse upon any subject.

TRACT, in hunting, denotes the trace or footing of a wild beast.

TRACTION, *drawing*, the act of a moving power whereby the moveable is brought nearer to the mover; called also *attraction*. See ATTRACTION.

TRACTRIX, in geometry, a curve line, called also *catenaria*. See CATENARIA.

TRADE, *traffic*, *commerce*, the act or art of dealing, buying, selling, exchanging, &c. of commodities, bills, money, &c.

For the origin, progress, &c. of *trade*. See COMMERCE, and NAVIGATION.

Balance of TRADE. See the article BALANCE.

TRADE-WINDS denote certain regular winds at sea, blowing either constantly the same way, or alternately this way and that; thus called from their great use in navigation, and the Indian commerce.

The *trade-winds* are of different kinds, some blowing three or six months of the year one way, and then the like space of time the opposite way; these are very common in the Indian seas, and are called *monsoons*.

Others blow constantly the same way; such is that general wind between the tropics, which off at sea is found to blow all day long from east to west.—For the phenomena of each, with their physical causes, see WIND.

Dr. Lister has a conjecture in the *Philosophical Transactions*, that the tropical or *trade-winds* arise, in great part, from the daily and constant exhalations of a sea-plant, called the *sargassa*, or *lenticula marina*, which grows in vast quantities from 36° to 18° north latitude, and elsewhere upon the deepest seas.—For the matter of wind coming from the breath of one only plant, must needs be constant and uniform; whereas the great variety of trees and plants at land, furnishes a confused matter of winds. Hence, he adds, it is, that these winds are briskest about noon; the sun quickening the plant most then, and causing it to breathe faster and more vigorously. Lastly, the direction of this wind of east to west, he attributes to the general current of the sea; for a great air is observed to be constantly led along with the stream of the river: nor must it be omitted, that every plant is, in some measure, a heliotrope, and bends itself, and moves after the sun, and consequently emits its vapour thitherward; so that the direction of the *trade-wind* is, in some measure, also owing to the course of the sun.

Dr. Gordon has another hypothesis: the atmosphere, which surrounds the earth, and moves along with it in its diurnal motion, he supposes to keep pace therewith, that part of it at least which is near the earth, if the remoter part should be judged to lose ground.

If then there were no changes in the atmosphere's gravity, he supposes it would always go along with the earth from west to east in an uniform motion, altogether insensible to us: but the portion of the atmosphere under the line being extremely rarefied,

rarified, its spring expanded, and so its gravity and pressure much less than the neighbouring parts of the atmosphere, it is incapable of the uniform motion towards the east, and must therefore be pressed westwards, and makes the continual breeze from east to west between the tropics.

TRADING Society. See the article SOCIETY.

TRADITA Nexu. See ABALIENATION.

TRADITION, TRADITIO, the act of delivering a thing into the hands of another.—The sale of a moveable is completed by a simple tradition.

TRADITION, in matters of religion, is applied to those laws, doctrines, relations, &c. which have been handed down to us from our fore-fathers, without being written.

Taking tradition in this sense, for every thing relating to faith, or the rites and ceremonies of religion thus derived down to us from the primitive church, there are two kinds, viz. *apostolical* and *ecclesiastical* tradition.

Apostolical **TRADITION,** which is what we properly call *tradition*, is defined by the Romanists to be the unwritten word of God, descended from the apostles to us through a continual succession of the faithful.

By this tradition, say they, it is, that the holy scriptures have been kept entire, both as to the letter, i. e. the text, and as to the spirit or sense thereof. This tradition the council of Trent declares to have the same authority with the holy scripture itself, and pronounces every one who rejects it a heretic.

Ecclesiastical **TRADITIONS,** are certain statutes and regulations regarding the rites, customs and circumstances of religion, introduced since the time of the apostles by councils, popes, &c. and continued to our time through a constant observance of the church.

The Romanists make another division of tradition, viz. into *written* and *unwritten*.

Written **TRADITION,** is that whereof we find some traces in the ancient fathers, and doctors.

Unwritten **TRADITION,** is that whereof there appear no signs or steps in any of the fathers extant.

The church of Rome pretends to be the depository of each kind: tradition she holds to be absolutely necessary in the church, grounding this necessity on the promise of infallibility which Jesus Christ is pretended to have made her.

Yet others of that communion deny tradition, how excellent soever it may be for the reclaiming of heretics, to be absolutely necessary; maintaining, that the church would not be less infallible, nor less the rule of doctrine, &c. if the fathers had never wrote at all.

TRADITIONARY, TRADITIONARIUS, a name given among the Jews, to such of them as acknowledge tradition, follow it, and explain the scriptures thereby: in opposition to the Caraites, who refuse any thing but the pure scriptures themselves.

The *traditionaries* are what we more usually call rabbins and rabbinites, or talmudists.—Hillel thone among the *traditionaries*, and Schammai among the *texturaries*.

TRADITORES, a name given in the first ages of the church to such christians as, in times of persecution, to avoid death and martyrdom, delivered up the sacred writings to the persecutors.

The enemies of religion, even under the old law, made their utmost efforts to deprive the world of the holy scriptures: in that cruel persecution which Antiochus raised against the Jews, the books of the law were very solicitously sought after, torn, and burnt, and such as kept them were put to death; as we read in the first book of Maccab. cap. i. ver. 56, 57.

Dioclesian renewed the same impiety, by an edict published in the 19th year of his empire, commanding all the sacred books to be brought to the magistrates, and burnt.

Many weak christians, and even some bishops, overcome by the fear of punishment, carried in their books to the persecutors; which the church detesting, made very severe laws against them, and gave them the infamous name of *traditores*, from *trado*, I deliver, betray.

As the great pretence of the schism of the Donatists was, that the catholics tolerated the *traditores*, it was decreed in the council of Arles, held in 314, that such as should be found guilty of having delivered up any of the holy books or vessels, should be deplored from the order of the clergy, &c.

TRADUCIANS,* TRADUCIANI, a name which the Pelagians anciently gave the catholics, because of their teaching that original sin was transmitted from father to children, or that it was communicated to the children by the father in the way of generation.

* The word is formed of the Latin, *tradux*, which was made use of to express that communication; and *whica* comes from *traduco*, I transmit, or propagate from one to another.

At present some give the appellation *traduciani* to such as hold that the souls are transmitted to the children by the father. See SOUL.

TRADUCTION,* the act of translating, or turning out of one language into another. See TRANSLATION.

* The word is formed of *trans*, beyond, and *ducere*, I lead, I draw.

TRAFFIC.* See the articles TRADE, and COMMERCE.

* The word is formed from the French, *trafic*, and that from the Italian, *traffico*, which is again borrowed from the Arabic.

The principal *traffic* in Muscovy and the North is in furs and skins: the great *traffic* of the Dutch in the East is in spices: The *traffic* of money is mostly carried on at the Exchange.

TRAFINE. See TREPANUM.

TRAGACANTH,* or **ADRAGANTH,** or *Gum Dragon*, a kind of gum oozing out at certain fissures in the trunk and larger branches of a plant or little shrub of the same name, growing in many parts of the Levant.

* The word is Greek, *τραγανθα*, formed of *τραγος*, goat, and *ακανθα*, thorn.

The naked hillocks of mount Ida in Candia, M. Tournefort tells us, produce a deal of the plant *tragacantha*, or goat's-thorn, which gives the gum spontaneously towards the end of June, and in the following months, when the nutritious juice of the plant, thickened by the heat, bursts most of the vessels it is contained in.

This juice coagulates in threads, which make their way into the pores of the bark, where being pushed forwards by new juice, they get through the bark, and are at length hardened in the air, either into little lumps, or into twined pieces in form of little worms, more or less long, according to the quantity of the matter they are formed of.

It should seem too that the contraction of the fibres contributes to the expression of the gum: those fine fibres, like the fibres of hemp, laid bare and trampled under foot by men and horses, contract themselves, and facilitate the expression of the extravasated juice.—The plant grows also in several places of the Levant, particularly about Aleppo.

The gum is of different colours and qualities, some being white, other some greyish, some redish, and some almost black. The white is the best: it must be chosen clear, smooth and twisted, or vermicular.

It dissolves easily in any aqueous menstruum, which it will give the consistence of a syrup to, in the small proportion of a dram to a pint. It is smooth and softening, and therefore is good to obtund the acrimony of any humours, which makes it of service in such coughs as proceed from catarrhs and fluxions of rheum. It is also very strengthening in some femal weaknesses, and is prevalent against the whites in women.

TRAGEA, in pharmacy, an aromatic powder grossly beaten and mixed with sugar; taken by way of carminative.

TRAGEDY, a dramatic poem, representing some signal action performed by illustrious persons, and which has generally a fatal issue, or end.

Aristotle more scientifically defines *tragedy*, the imitation of one grave and entire action, of a just length, and which, without the assistance of narration, by raising of terror and compassion, refines and purges our passions.

This definition has given the critics some perplexity; and Corneille declares he cannot reconcile Aristotle with himself: the instances Aristotle cites, he thinks, ruin his own definition. He even denies the purging our passions to be the end of *tragedy*.

Our English authors are more favourable to the definition: by the purging our passions, they understand not the extirpating them, but the reducing them to just bounds; for by shewing the miseries that attend a subjection to them, they say it teaches us to watch them more narrowly; and by seeing the great misfortunes of others, it lessens the sense of our own.

Tragedy, in its original, M. Hedelin observes, was only a hymn sung in honour of Bacchus by several persons, who, together, made a chorus of music with dances and instruments.

As this was long, and might fatigue the fingers, as well as tire the audience, they bethought themselves to divide the singing of the chorus into several parts, and to have certain recitations in the intervals.

Accordingly, Thespis first introduced a person to speak upon the stage with this view: Æschylus finding one person insufficient, introduced a second to entertain the audience more agreeably by a kind of dialogue: he also clothed his persons more decently, and first put them on the bulkin.

The persons who made these recitations on the scene, were called *actors*; so that *tragedy* at first was without many actors. And what they thus rehearsed, being things added to the singing of the chorus, whereof they were no necessary part, were called *episodes*.

Sophocles found that two persons were not enough for the variety of incidents, and accordingly he introduced a third: and here the Greeks seem to have stopped, at least it is very rare that they introduce four speakers in the same scene.

Tragedy and comedy were at first confounded with each other, but they were afterwards separated; and the poets in general applied themselves to the cultivating of *tragedy*, neglecting comedy.

TRA

When *tragedy* was got into a better form, they changed the measure of its verse, and endeavoured to bring the action within the compass of a day, or of a revolution of the sun.

For the several parts of *tragedy*, See ACT, SCENE, ACTION, FABLE, CHARACTER, and MANNERS.

The English received the first plan of their drama from the French, among whom it had its first rise towards the end of the reign of Charles V. under the title of the *chant-royal*, which consisted of pieces in verse composed in honour of the virgin, or some of the saints, and sung on the stage: they were called by the title *chant-royal*, because the subject was given by the king of the year, or the person who had bore away the prize the year preceding.

The humour of these pieces took wonderfully among the people, inasmuch that in a little time there were formed several societies, who began to vie with each other in them: and one of these, to engage the town from the rest, began to intermix various incidents or episodes, which they distributed into *acts*, and *scenes*, and had as many different persons as were necessary for the representation.

Their first essay was in the Bourg St. Maur, and their subject the passion of our Saviour. The prevot of Paris prohibiting their continuing of it, they made application to court; and to render it the more favourable to them, erected themselves into a friary, or fraternity, under the title of *brothers of the passion*; which title has given some occasion to suspect them to have been an order of religious.

The king, on seeing and approving some of their pieces, granted them letters of establishment in 1402; upon which they built a theatre, and for an age and a half acted none but grave pieces, which they called *moralities*; till, the people growing weary of them, they began to intermix farces or interludes taken from prophane subjects.

This mixture of farce and religion displeasing many, they were re-established by an arrest of parliament in 1548, on condition of their acting none but profane, yet lawful and decent subjects, without intermeddling with any of the mysteries of religion; and thus were the brothers of the passion depolled of their religious character: upon which they mounted the stage no more in person, but brought up a new set of comedians, who acted under their direction.

Thus was the drama established, and on this foundation arrived in England. In process of time, as it was improved, it became divided into two branches, agreeable to the practice of the ancients, and the nature of things, viz. into *tragedy* and comedy properly so called; and this last again was subdivided into pure comedy and farce. See each under its proper head. COMEDY, &c.

Hilaro Tragedy. See the article *HILARO Tragedia*.

TRAGI-COMEDY, kind of dramatic piece, representing some action passed among eminent persons, the event whereof is not unhappy or bloody, and wherein is sometimes admitted a mixture of less serious characters.

The ancients, M. Dacier observes, knew nothing of such compositions, wherein the serious and comic are blended; nor does the epithet M. Corneille gives them of heroic comedies, excuse their irregularity.

Their foundation is certainly bad; for, endeavouring both to make us laugh and cry in their turns, they endeavour at contrary emotions, which the heart can never undergo; every thing that disposes for the one, indisposes for the other.

The *tragi-comedy* was formerly very common on the English Stage: there was scarce such a thing in the 17th century as a pure tragedy without a spice of comedy or farce to make the people laugh. Now, that the stage and our tastes are brought nearer to the model of nature and the ancients, the *tragi-comedy* is disused.

Tragi-comedy is the only case, wherein comedy is allowed to introduce kings and heroes.

TRAGUS, ΤΡΑΓΟΣ, in anatomy, one of the protuberances of the auricle, or external ear; called also *hircus*, because usually hairy.

The *tragus* is that protuberance next the temple:—that on the opposite side, to which the soft lobe of the ear is annexed, is called the *antitragus*.

TRAJAN Column, a famous historical column, erected in Rome, in honour of the emperor *Trajan*.

It is of the Tuscan order, though somewhat irregular: its height is eight diameters, and its pedestal Corinthian; it was built in a large square there, called the *forum romanum*.

Its base consists of 12 stones of an enormous size, and it is raised on a socle or foot of eight steps. Within-side is a staircase, illuminated with 44 windows. It is 140 foot high, which is 35 foot short of the Antonine column; but the workmanship of the former is much more valued.

It is adorned from top to bottom with basso relievo's, representing the great actions of that emperor against the Dace.

Several learned men have explained the bas-reliefs of the *Trajan* column, and among others Ciaconius and Fabretti. — The late king of France, Lewis XIV. had models of all the bas-reliefs taken off in plaster of Paris.

TRAJECTORY of a comet, is its path or orbit, or the line it describes in its motion.

TRA

This Hevelius, in his *Cometographia*, will have to be very nearly a right line; but Dr. Halley rather concludes it to be a very excentric ellipsis.

Sir Isaac Newton, in prop. 41. of his third book, shews how to determine the *trajectory* of a comet from three observations; and in his last proposition, how to correct a *trajectory* graphically described.

TRAIL-BOARD, in a ship, is a carved board on each side of her beam, which reaches from the main stem to the figure, or the brackets.—See *Tab. Ship. fig. 2. n. 4*.

TRAIN, the attendance of a great person, or the trail of a gown, or robe of state.

In falconry, it denotes the tail of an hawk.

TRAIN is likewise used for the number of beats which a watch makes in an hour, or any other certain time. See *WATCH-Work*, &c.

TRAIN is also used for a line of gun-powder laid to give fire to a quantity thereof, in order to do execution, by blowing up earth, works, buildings, &c.

TRAIN, or TRAIL of artillery, includes the great guns and other pieces of ordnance belonging to an army in the field. See CANNON.

TRAIN OIL, the oil procured from the blubber of whales, by boiling. See OIL, and WHALE.

TRAIN-bands, or TRAINED-bands, a name given to the militia of England. See MILITIA.

TRAINING a load, among miners, is the searching for and pursuing a vein of ore. See VEIN.

TRAITOR. See the article TRAYTOR.

TRAITTE. See the article FOREIGN *Traitte*.

TRAMBLING of tin ore, among miners, is the washing it very clean: which is done with a shovel, and in a frame of boards. See TIN.

TRAMEL, an instrument or device, sometimes of leather, more usually of rope, fitted to a horse's legs, to regulate his motion, and form him to an amble.

It is also taken in many places for an iron moveable instrument in chimnies, to hang pots over the fire.

TRAMEL-NET,* is a long net wherewith to take fowl by night in champain-countries, much like the net used for the low-bell both in shape, bigness, and meshes.

* The word comes from the French, *tremail*, formed of the Latin, *tremulus*, or *tremolus*; of *tres* and *macula*, by reason it is composed of three rows of meshes.

To use it, they spread it on the ground, so as the nether or further end, fitted with small plummets, may lie loose thereon: then the other part being bore up by men placed at the fore-ends, it is thus trailed along the ground. At each side are carried great blazing lights, by which the birds are raised: and as they rise under the net, they are taken. See *Low-Bell*.

TRAMONTANE,* or TRAMONTAIN, something beyond or on the further side, the mountains.

* The word is formed from the Italian, *tra*, of the Latin, *trans*, which signify *beyond*; and *mons* or *mont*, mountain.

The term is particularly applied by the Italian painters, to all such as live on the other side the Alps, i. e. all out of Italy; as the Germans, Flemish, French, &c.

The French lawyers give the same title of *tramontane*, or *ul-tramontane* doctors to the Italian canonists, Gomez, Hostiensis, Panormi, &c. who go upon rules and maxims too favourable to the court of Rome, and contrary to those of France, &c. On the Mediterranean and in Italy, a north wind is called *tramontane*, a *tramontane wind*.

Some also call the pole star, *tramontana*.—Hence the proverb, to *lose the tramontane*; that is, to be out of one's aim, to be disconcerted.

TRANCHE, or TRENCH, is used by the French armorists, to express that manner of partition called among us, *party per bend dexter*.

A scutcheon is said to be *tranché*, cut, when it is divided in two diagonally, the division coming from the dexter angle of the chief to the sinister angle of the point:—when it is divided contrarywise, it is said to be *taille*, or *party per bend sinister*.

TRANGLE, in heraldry, the diminutive of a felle, commonly called a *bar*.

TRANSACTION, TRANSACTIO, in the civil law, an accommodation of some business or dispute between two parties, by a mutual and voluntary agreement or contract between them. See ACCOMMODATION.

Philosophical TRANSACTIONS, are a kind of journal of the principal things that come before the royal society of London.

The *transactions* contain the several discoveries and histories of nature and art, made by the members of the society, or communicated by them from their correspondents, with the several experiments, observations, &c. made by them, or transmitted to them, &c.

They were first set on foot in 1665 by Mr. Oldenburg, secretary of the society, and were continued by him till the year 1679. After his death Dr. Hook, the succeeding secretary, continued them under the title of *philosophical collections*: but Dr. Crew, appointed to the same office in 1683, returned the former title of *philosophical transactions*, which was retained by his successor Dr. Platts, and subsists to this day.

They

They were published every month with great care by Mr. Oldenburg, and the first secretaries; but after Dr. Plot, they were frequently interrupted. In the year 1700 Dr. Sloan restored their regular publication monthly; but in time they relapsed, and only came out once in two months; from that they fell to 3, 4 and 6 months. They were afterwards published more frequently and regularly by the care of Dr. Jurin; but even after that they again were printed in an irregular manner, tho' now they are published without much interruption.

TRANSCENDANT, or **TRANSCENDENTAL**, something raised, or elevated beyond other things; or which passes and *transcends* the nature and circumstances of other inferior beings, so as not to be intimately and essentially included under them.

The term is particularly applied to the object of metaphysics, which considers being in general, or *transcendental* beings, as God and angels, and truths confiding in pure speculation.

Logicians and metaphysicians give the name *transcendental terms* to those which are so general, and of a signification so extensive and universal, that they pass through all the categories, and agree to all kinds of things:—such are the terms *ens, unum, verum, bonum, res*. See **ENS**, &c.

TRANSCENDENTAL Art

TRANSCENDENTAL Perfection, } See { **ART**.

TRANSCENDENTAL Quantities, among school-men. See the

article **QUANTITY**.

TRANSCENDENTAL Quantities, among geometricians, are indeterminate ones; or such as cannot be expressed or fixed to any constant equation.—Such is a *transcendental* curve, or the like.

M. Leibnitz has a dissertation in the *acta erud. Lips.* wherein he endeavours to shew the origin of such quantities, viz. why some problems are neither plain, solid nor fur-solid, nor of any certain degree, but do *transcend* all algebraical equations. See **PROBLEM**.

He also shews how it may be demonstrated without calculus, that an algebraic quadratrix for the circle or hyperbola is impossible: for if such a quadratrix could be found, it would follow, that by means thereof any angle, ratio or logarithm, might be divided in a given proportion of one right line to another, and this by one universal construction; and consequently the problem of the section of an angle, or the invention of any number of mean proportionals, would be of a certain finite degree.

Whereas the different degrees of algebraical equations, and therefore the problem, understood in general of any number of parts of an angle or mean proportionals, is of an indefinite degree, and *transcends* all algebraical equations. See **EQUATION**.

TRANSCENDENTAL Curve, in the higher geometry, is such a one as cannot be defined by any algebraic equation; or which, when it is expressed by an equation, one of the terms thereof is a variable quantity. See **CURVE**.

These curves are the same with what Des Cartes, and after him Example, several others, call *mechanical curves*, and which they would have excluded out of geometry; but Sir Isaac Newton and M. Leibnitz are of another sentiment. For, in effect, in the construction of geometrical problems, one curve is not to be preferred to another, as it is defined by a more simple equation, but as it is more easily described than that other. See **GEOMETRICAL Line**.

And some of these *transcendental* or *mechanical* curves are found of greater use than all the algebraical ones together, except the circle. See **MECHANICAL**.

Add that M. Leibnitz, in the *acta eruditor. Lips.* gives us a kind of *transcendental* equations, whereby these *transcendental* curves are actually defined, and which are of an indefinite degree; that is, are not always the same in all the points of the curve.

Whereas algebraists use to assume some general letters or numbers for the quantities sought, in these *transcendental* problems M. Leibnitz assumes general or indefinite equations for the lines sought; e. gr. putting x and y for the absciss and ordinate, the equation he uses for a line sought, is $a + b \cdot x + c \cdot y + e \cdot x \cdot y + f \cdot x \cdot x + g \cdot y \cdot y$, &c. = 0. By the help of which indefinite equation, which in reality is finite, for it may always be determined how far soever it is necessary to raise it, he seeks the tangent; and that which results, comparing with the given property of tangents, he finds the value of the assumed letters a, b, c , &c. and thus defines the equation of the line sought.

If the comparison above-mentioned does not proceed, he pronounces the line sought not to be an algebraical, but a *transcendental* one.

This supposed, he goes on to find the species of transcendence: for some *transcendentals* depend on the general division or section of a ratio, or upon the logarithms, others upon the arcs of a circle, and others on more indefinite and compound inquiries.

Here therefore besides the symbols x and y , he assumes a third, as v , which denotes the *transcendental* quantity, and of these

three forms a general equation for the line sought, from which he finds the tangent according to the differential method, which succeeds even in *transcendental* quantities. What he finds, he compares with the given properties of the tangent, and so discovers not only the values of a, b, c , &c. but also the particular nature of the *transcendental* quantity.

And though it may sometimes happen that the several *transcendentals* are so to be made use of, and these of different natures too one from another; also though there be *transcendentals* or *transcendentals*, and a progression of these in *infinitum*: yet we may be satisfied with the most easy and useful one, and for the most part may have recourse to some peculiar artifices for shortening the calculus, and reducing the problem to as simple terms as may be.

This method being applied to the business of quadratures, or to the invention of quadratrices, in which the property of the tangent is always given, it is manifest not only how it may be discovered, whether the indefinite quadrature may be algebraically impossible, but also how, when this impossibility is discovered, a *transcendental* quadratrix may be found; which is a thing which had not before been shewn. So that it seems that geometry is by this method carried infinitely beyond the bounds to which Vieta and Des Cartes brought it; since by this means a certain and general analysis is established, which extends to all the problems which are of no certain degree, and consequently not comprehended within algebraical equations.

Again, in order to manage *transcendental* problems (wherever the business of tangents or quadratures occurs) by a calculus, there is hardly any that can be imagined shorter, more advantageous or universal, than the differential calculus, or analysis of indivisibles and infinites.

By this method we may explain the nature of *transcendental* lines by an equation, e. gr. Let a be the arc of a circle,

and x the versed sine: then will $a = \int dx$ and if the ordinate of the cycloid be y , then will $y = \sqrt{2x - x \cdot x} + \int dx$ which equation perfectly expresses the relation between the ordinate y and the abscissa x , and from it all the properties of the cycloid may be demonstrated.

Thus is the analytical calculus extended to those lines which have hitherto been excluded, for no other cause, but that they were thought incapable of it.

TRANSCOLATION, in pharmacy, the same with filtration, or percolation. See **FILTRATION**, &c.

TRANSCRIPT, a copy of any original writings, particularly that of an act, or instrument, inserted in the body of another.

In this sense, we say, *transcript of a fine*, &c. See **FINE**, and **DUPLICATE**.

TRANSCRIPTO recognitionis factæ coram iudicariis itinerantibus, &c. is a writ for certifying a recognition into chancery, taken before the justice in eyre. See **RECOGNIZANCE**.

TRANSCRIPTO pedis finis levati mittendo in cancellariam, is a writ for certifying the foot of a fine levied before justices in eyre, &c. into chancery. See **FINE**.

TRANSEAT, in the schools, &c. a term purely Latin, signifying, *let it pass*, or suppose a proposition to be true, without granting it.

Hence the proverb, *transseat, grecum est, non legitur*: the phrase is said to have taken its rise from some ancient commentators, or glossographers of the civil law, who, not understanding Greek, passed over all the words that occurred in that language, without explaining them.

In the Roman chancery, a *nil transit* is a kind of opposition made to the sealing of a bill, or to the delivery of some other instrument, till the parties against whose interest it is directed, have been heard against it.

TRANSELEMENTATION, in the schools, a change of the elements or principles of one body into those of another.

Such is that which Roman catholics contend for in the eucharist, where the elements of bread and wine they say are changed into those of flesh and blood. See **TRANSUBSTANTIATION**.

Trans-elementation, where-ever it happens, is always allowed miraculous, or an effect beyond the ordinary powers of nature.

TRANSFER, in commerce, &c. an act whereby a person surrenders his right, interest or property in any thing moveable, or immovable, to another.

The sale or donation of an inheritance, &c. transfers the property, rights, &c. thereof.

The term is principally used in the commerce of stocks; for the assigning and making over subscriptions or shares therein, to such as purchase them of the proprietors. See **SUBSCRIPTION**, &c.

In the South-Sea company, the Bank, East-India, &c. *transfers* are made, by erasing the former proprietors name, and entering the stock under the name of the purchaser, under his proper letter of the alphabet.

In order to a *transfer*, it is required the party bring another with him to swear he is the same person to whom the stock is entered. A counterfeit in this case is by act of parliament made a capital crime.

TRANSFIGURATION, among divines, that miraculous change wrought by Jesus Christ, in presence of St. Peter, St. James, and St. John, on mount Thabor, where he appeared in his glory, in the middle of Moses and Elias. See the description thereof in St. Matthew, chap. xvii.

The term is also applied to a feast held in the Romish church on the 6th of August, in commemoration of that miracle.

TRANSFORMATION, a metamorphosis, or change of form.

The chymists have been a long time seeking the *transformation* of metals, that is, their *transmutation*, or the manner of changing them into gold.

Among the mystics, by *transformation*, is understood a change of the contemplative soul, whereby it is in some measure deified or converted into the substance of God, and wherein it is, as it were, lost and swallowed up in the divinity, so as not to perceive its own distinction from God.

The word *transformation* is very liable to be abused; and, in effect, the Quietists and Quakers have abused it. But many of the mystics use it innocently enough; meaning no other by it than what St. Paul did when he said, *Vivo ego, jam non ego, vivit vero in me Christus*.

TRANSFORMATION is also sometimes used for what we more properly call *transubstantiation*. See **TRANSUBSTANTIATION**.

TRANSFUSION, * **TRANSFUSIO**, the act of pouring a liquor out of one vessel into another.

* The word is compounded of the Latin preposition *trans*, beyond, farther, and *fundo*, I pour.

In the preparations of chymistry and pharmacy, there are frequent *transfusions* of liquors, syrups, &c.

TRANSFUSION of the Blood, is particularly used for the letting out the blood of one animal, so as to be immediately received into the body of another.

Dr. Lower is usually accounted the inventor of this *transfusion*, and the experiment is said to have been first publicly made by him at Oxford in 1665, and the description thereof published in his excellent book *de Cordis*.

Yet we are informed from good hands, that it had been proposed at Paris in 1658; that another of our countrymen had had the idea before, and that it had been known in Germany several years.—It is certain there is a passage in Libavius, wherein the *transfusion* is exactly described as since practised: it is true, he disapproves it; and only mentions it to ridicule it.

The use most naturally expected from the operation, is, that one animal may live by the blood of another; so that those which want blood, or have corrupt, morbid blood, may be supplied from others with a sufficient quantity, and of such as is good and laudable.

However, it is certain, the operation has no place in the present practice of physic; but whether that be the fault of the operation itself, or only owing to the indolence and averfeness of people to run into new methods, we will not undertake to say. The method of *transfusing*, Dr. Lower gives us to the following effect: take up the carotid artery of the dog, or other animal whose blood is to be *transfused* into another of the same, or a different kind; separate it from the nerve of the eighth pair, and lay it bare above an inch. Make a strong ligature on the upper part of the artery; and an inch nearer the heart another ligature with a running knot, to be loosened and fastened as occasion requires. Draw two threads between the two ligatures; open the artery, put in a quill, and tie up the artery again upon the quill by the two threads, and stop the quill by a stick.

Then make bare the jugular vein of the other animal, for about an inch and half in length, and at each end make a ligature with a running knot; and in the space between the two knots, draw under the veins two threads, as in the other. Open the vein, and put into it two quills, one into the descending part of the vein, to receive the blood from the other dog, and carry it to the heart: the other quill put into the other part of the jugular, towards the head, through which the second animal's own blood is to run into dishes. The quills thus tied fast, stop them up with sticks till there be occasion to open them.

Things thus disposed, fasten the dogs on their sides towards one another, in such manner, as that the quills may go into each other: then unstop the quill that goes down into the second dog's jugular vein, as also that coming out of the other dog's artery; and by the help of two or three other quills put into each other, as there shall be occasion, insert them into one another.

Then slip the running knots, and immediately the blood runs through the quills as through an artery, very impetuously.

As the blood runs into the dog, unstop the quill in the upper part of his jugular, for his own blood to run out at, though not constantly, but as you perceive him able to bear it, till the other dog begin to cry, and faint, and at last die. Lastly, take out both quills out of the jugular, tie the running knot fast, and cut the vein afunder, and sew up the skin: the dog thus dismissed, will run away as if nothing ailed him.

In the *Philosophical Transactions* we have accounts of the success of various *transfusions* practised at London, Paris, in Italy, &c. Sir Edmund King *transfused* 49 ounces of blood out of a calf into a sheep; the sheep after the operation appearing as well and as strong as before.

Mr. Cox *transfused* 14 or 16 ounces out of a mangy into a found dog: the effect was, that no alteration was observed in the found dog, but the mangy one was cured.

M. Gayat *transfused* the blood of a young dog into the veins of an old one almost blind with age, and scarce able to stir; which yet, two hours afterwards, leaped and frisked about.

Mr. Denis *transfused* the blood of three calves into three dogs, which all continued brisk, and eat well as before.—The same person *transfused* the blood of four weathers into a horse 26 years old, which thence received much strength, and a more than ordinary appetite.

At St. Griffoni's at Udine, the blood of a lamb was *transfused* into the veins of a spaniel 13 years old, which had been quite deaf for three years, and so feeble as scarce to be able to walk at all.—After the operation he leaped from the table, and went about the house to seek his master.—Two days afterwards he ran up and down the streets with other dogs; and his stomach grew strong, and he recovered his hearing.

TRANSGRESSION, * **TRANSGRESSIO**, an offence against some law; or a breach, or violation thereof.

* The word is compounded of *trans*, beyond, and *gradiri*, to go.

The term is chiefly used in respect of the laws of God. In the doctrine of original sin, all mankind are supposed to share with Adam in the guilt of his first *transgression*.

Moses threatens the *transgressors* of his law with abundance of temporal punishments.

TRANSGRESSION, in our law, a writ usually called a *writ* or *action* of *trespass*.

Of this, Fitzherbert has two sorts: one *vicuntiel*, thus called because directed to the sheriff, and not returnable, but to be determined in the country.—Its form differs from that of the other, as wanting the words *quare vi & armis*, &c. See **VICOUNTIEL**.

The other is termed a *writ* of *trespass*, and to be sued in the Common Pleas, and King's Bench. See **TRESPASS**.

TRANSIENT ACTION, } See the articles } **ACTION**.

TRANSIENT AIR, }

TRANSIRE, in *stat. anno 14 Car. II. c. 11.* is used for a custom-house warrant, or let-pass—from the verb, *transire*, I pass forth.

TRANSIT, * **TRANSITUS**, in astronomy, signifies the passage of any planet, just by, or over a fixed star, or the sun; and of the moon, in particular, covering or moving over any other planet.

* The word comes from the Latin, *transire*, to pass over; formed of *trans*, and *eo*, I go beyond.

Mercury and Venus, &c. in their *transits* over the sun, appear like dark specks.

TRANSITION, in music, is when a greater note is broken into lesser, to soften the roughness of a leap, by a gradual passing to the note next following.

This is commonly called the *breaking of a note*. See **NOTE**.

TRANSITION, in rhetoric, a kind of connexion in discourse, whereby the several different parts and members thereof are joined, so as to constitute one regular whole.

Some place *transition* in the number of figures; others, with Quintilian, exclude it that rank.

F. de Colonia makes two kinds of *transitions*; the one *perfect*, the other *imperfect*.

Perfect TRANSITION, is that wherein we briefly intimate what is said, and what remains to be said—as, *Now that we have spoke of war, there remains something to be said of peace.*—*Satis multa de turpitudine: dicam deinceps, quod proposui, de periculo.*—*Uni epistola respondit: venio ad alteram.*—*Sed hæc cetera; illud recens: Cæsarem meo consilio interfecit.*

Imperfect TRANSITION, is that wherein only one of these is expressed—as, *Let us now consider the consequences of,* &c.—*Perilaret hic locus ut dicere de—sed finis sit; neque enim præ lachrymis jam loqui possum; & hic se lachrymis defendi negat.*

TRANSITIVE, in grammar, an epithet given to such verbs as signify an action which passes from the subject that does it, to, or upon, another subject which receives it.

Under the head of verbs *transitive*, come what we usually call verbs active and passive: other verbs, whose action does not pass out of themselves, are called *neuters*, and by some grammarians *intransitive*.

In the Hebrew, the verb *הוֹבִיחַ*, *hobah*, in the Greek *ἡμ*, and in the Latin, *sum*, are verbs purely neuter or intransitive; or, as the Latin and Greek grammarians more usually express it, verbs substantivæ, signifying the mere existence of the thing, without the active or transitive conjugations.

TRANSITORY, in common law, stands opposite to local. — Thus actions are said to be *transitory* which may be laid in any county or place. See **ACTION**.

TRANSITORY Chose } See the articles } **CHOSE**.
TRANSITORY Trespass } **TRESPASS**.
TRANSLATION,* the act of transferring or removing a thing from one place to another.

* The word is formed of *trans*, beyond, and *latio*, of ferre, to carry.

We say, the *translation* of a bishop's see, a council, a feat of justice, a parliament; the *translation* of the relics of a saint; the *translation* of the empire, &c.

The *translations* of bishops from one see to another, are prohibited by the council of Nice, which declares them null, and appoints the *translated* bishop to return to his former church. — The council of Cardica excludes *translated* bishops from communion. It has been observed, that no bishop was ever removed from a greater church to a lesser; and that those who thus quitted their churches, only did it out of ambition or avarice.

This discipline was generally observed for 900 years; and the first instance of any translation of note, was that of pope Formosus, who was bishop of Porto. One of his successors took hold of this pretence to have him dug out of his grave; and a council, held soon after, forbade this *translation* to be made a precedent.

However, the same church allowed of some legitimate causes of *translations*; as, the apparent advantage of the church; under which pretence, *translations* soon became so frequent, that for 500 or 600 years last past, they have been esteemed a kind of common law.

The *translation* of a religious from one order to another, cannot be effected without the consent of the pope: it is added, that it is not allowed to *translate* from a severer rule to a laxer one.

TRANSLATION is also used for the version of a book, or writing out of one language into another.

Translators frequently endeavour to excuse themselves at the expense of their language; and so speak for it, as if it were not rich and copious enough to express all the force and beauties of the original.

Thus is the English tongue accused of the poverty and dryness which is in the *translator's* own genius; and the faults are charged on the former, which should only lie at the latter's door. — The Italians have a proverb, *traduttore, traditore*.

TRANSMARINE, **TRANSMARINUS**, something that comes from, or belongs to, the parts beyond sea.

TRANSMIGRATION, the removal or translation of a whole people into another country, by the power of a conqueror.

Some translate the leading of the children of Israel captive into Babylon, the *transmigration* of the Israelites, &c. See **MIGRATION**.

TRANSMIGRATION is particularly used for the passage of a soul out of one body into another: the same with what we otherwise call **METEMPSYCHOSIS**.

The Samek, F. Tachard informs us, from a belief of the *transmigration* of souls into other bodies, forbear killing any beasts; lest, by that means, they should dispossess the souls of their deceased relations.

IONIC TRANSMIGRATION. See the article **IONIC**.

TRANSMISSION, in optics, &c. the act of a transparent body passing the rays of light through its substance, or suffering them to pass; in which sense the word stands opposed to reflection.

Transmission is also frequently used in the same sense with reflection, by reason most bodies, in *transmitting* the rays, do also reflect them.

For the cause of *transmission*, or the reason why some bodies *transmit*, and others reflect the rays, see **TRANSPARENCY**, and **OPACITY**.

The rays of light, Sir Isaac Newton observes, are subject to fits of easy *transmission* and each reflection. See **LIGHT**.

TRANSMUTATION, the act of transforming or changing one nature into another.

The term is chiefly used in chymistry and medicine: it is greatly questioned, whether the *transmutation* of silver into gold, and of tin into silver, so much sought by the chymists, be possible or not?

The purest and subtlest parts of the food are *transmuted* or assimilated into the proper substance of the body. For the manner how this is done, see **NUTRITION**.

Nature, Sir Isaac Newton observes, seems delighted with *transmutations*: he goes on to enumerate several kinds of *natural transmutations*; gross bodies and light, he suspects, may be

mutually *transmuted* into each other; and adds, that all bodies receive their active force from the particles of light which enter their composition.

For all fixed bodies, when well heated, emit light as long as they continue so; and again, light intermingles itself and inheres in bodies as often as its rays fall on the solid particles of those bodies.

Again, water, which is a fluid, volatile, tasteless salt, is by heat *transmuted* into vapour, which is a kind of air; and by cold into ice, which is a cold, transparent, brittle stone, easily dissolvable; and this stone is converted again into water by heat, as vapour is by cold.

Earth, by heat, becomes fire; and by cold, is turned into earth again: dense bodies, by fermentation, are rared into various kinds of air; and that air, by fermentation also, and sometimes without it, reverts into gross bodies.

Quicksilver sometimes puts on the form of a fluid metal; sometimes it appears in shape of a pellucid, fragile salt, called *sublimate*; sometimes of a pellucid, volatile, white, tasteless earth, called *mercurius dulcis*; by distillation it becomes vapour, and by agitation in vacuo, it shines like fire, &c.

All bodies, beasts, fishes, insects, plants, &c. with all their various parts, grow and increase out of water, and aqueous and saline tinctures; and by putrefaction, all of them revert into water or an aqueous liquor again.

Farther, water exposed a while to the open air, puts on a tincture, which in process of time has a sediment and a spirit; and before putrefaction, yields nourishment both for animals and vegetables.

TRANSMUTATION, in alchymy, denotes the act of changing or exalting imperfect metals into gold or silver.

This is also called the *grand operation*, and they say it is to be effected with the philosophers' stone. See **PHILOSOPHERS' Stone**.

Some alchymists hold, that the *transmutation* should rather be called the *perfection* of imperfect metals; as holding all metals intended by nature to arrive equal, at the perfection of gold, inasmuch as they are composed of the same matter; and that it is only the impurity of their matrices, that is, of the place wherein they are formed by nature, that has prevented their arriving thereat.

The elixir being projected on any of those metals, it is supposed to purge, and separate the impure parts from the pure, and to join itself wholly to the mercury (which is the pure part) as being of the same nature.

Whether or no metals are *transmutable* into one another, is a point strongly disputed among the philosophers; the alchymists strenuously asserting the affirmative. — Some metals, it is commonly supposed, may be changed into others; e. g. iron into copper, and lead into tin; but Cardan and some others deny even this, and argue farther, that though iron and brass, as being nearly alike in weight and tenacity, &c. provided their colour and hardness could be changed, might be converted into another, either really, or, at least, apparently; yet would the *transmuting* or ripening of other metals into gold or silver be still not the less impossible; both as those metals are all to be first calcined, after which they can never be brought again to their pristine purity; and as there is a generation required, which is not the work of art, but of nature.

Cardan *de Metall.* Lemery, Dickenfon, and others, give us accounts of the various impostures of Adepti in the business of *transmutation*; some, for instance, fixing mercury with verdigrise, and then heightening the colour with cadmia, &c. But this, if tried with the coppel, all goes off in fumes; and, in effect, nothing produced this way ought to be adjudged true gold, unless it endure copelling, cementation, purification, with antimony, and the depart.

Add, that it must have the malleability, extreme ductility, and specific gravity of gold, which is to water as 18 and a half to 1.

The trick of *transmuting* cinnabar into silver is thus: the cinnabar being bruised grossly, is stratified in a crucible with granulated silver, and the crucible placed in a great fire; and after due time for calcination, taken off: then the matter being poured out, is found to be cinnabar turned into real silver, though the silver grains appear in the same number and form as when they were put into the crucible; but the mischief is, coming to handle the grains of silver, you find them nothing but light friable bladders, which will crumble to pieces between the fingers. Mr. Boyle, in his *Septet Chymist.* tells us, that two friends of his did, by urging mercury in a skilfully managed fire, turn it almost weight for weight into water; but he does not say what was the specific gravity of the produced water, nor of the remaining *untransmuted* mass of mercury. — He likewise assures us, that rain-water being distilled and re-distilled by a friend of his, near 200 times, did, after distillation, leave, at the bottom of the glass body, a considerable quantity of a white earth; and that more plentifully in the latter distillations than the former.

This he believed to be a certain quantity of water actually *transmuted* into earth; adding, that it was above twice as heavy specifically as common water, and of so fixed a nature, that it lay a considerable time in a red-hot crucible, without losing any thing of its weight, or even emitting any smoke.

TRANSMUTATION, in geometry, denotes the reduction or change of one figure, or body into another of the same area, or solidity, but of a different form; as a triangle into a square, a pyramid into a parallelepiped, &c.

TRANSMUTATION, in the higher geometry, is used for the converting a figure into another of the same kind and order, whose respective parts rise to the same dimensions in an equation, admit the same tangents, &c.

If a rectilinear figure be to be *transmuted* into another, it is sufficient that the intersections of the lines which compose it be transferred, and lines drawn through the same in the new figure.

If the figure to be *transmuted* be curvilinear, the points, tangents, and other right lines, by means whereof the curve line is to be defined, must be transferred.

TRANSMUTATION of Plants. See the articles SEED, and DEGENERATION.

TRANSOM, among builders, the piece that is framed across a double light window.

TRANSOM, among mathematicians, denotes the vane of a cross-staff; or a wooden member fixed across it, with a square whereon it slides, &c. See CROSS-STAFF.

TRANSOM, in a ship, is a piece of timber which lies athwart the stern, between the two fashion pieces, directly under the gun-room-port.—See *Tab. Ship. fig. 2. n. 109.*

TRANSPARENCY, *Diaphaneity*, in physics, a quality in certain bodies, whereby they give passage to the rays of light.

The *transparency* of natural bodies, as glass, water, air, &c. some have imputed to the great number, and size of the pores or interfaces between the particles of those bodies: but this account is exceedingly defective; for the most solid and opaque body in nature, we know, contains a great deal more pores than it does matter; a great deal more, sure, than is necessary for the passage of so infinitely fine and subtle a body as light.

Aristotle, Des Cartes, &c. place *transparency* in the rectitude or straightness of the pores; by means of which, say they, the rays are enabled to make their way through, without striking against the solid parts, and being reflected back again: but this account, Sir Isaac Newton shews, is lame; the quantity of pores in all bodies being sufficient to transmit all the rays that fall on them, howsoever those pores be situated with respect to each other.

The cause, then, why all bodies are not *transparent*, must not be ascribed to their wanting rectilinear pores; but either to the unequal density of the parts, or to the pores being filled with some foreign matters, or to their being quite empty; by means of which, the rays in passing through, undergoing a great variety of reflections and refractions, are perpetually diverted this way and that, till at length falling on some of the solid parts of the body, they are extinguished and absorbed.

Thus, cork, paper, wood, &c. are opaque; when as glass, diamonds, &c. are *transparent*: the reason is, that in the neighbourhood of parts equal in density, such as those of glass, water, diamond, &c. are with respect to each other; the attraction being equal on every side, no reflection or refraction ensues; but the rays which entered the first surface of the bodies, proceed without interruption quite through the body; those few only excepted which chance to meet with the solid parts. But in the neighbourhood of parts, that differ much in density, such as the parts of wood and paper are both in respect of themselves, and of the air or the empty space in their pores; as the attraction will be very unequal, the reflections and refractions must be very great; and therefore the rays will not be able to make their way through such bodies, but will be properly deflected, and at last quite stopped.

TRANSPARENT Column. See the article COLUMN.

TRANSPIRATION, the insensible, or almost insensible passage of an excrementitious matter through the pores of the skin; called also *perspiration*.

There are an infinity of these *transpiratory* pores in the skin; the most considerable whereof are the orifices of the ducts arising from the milky glands.

The cause of *transpiration* is the circulation and heat of the blood.—Insensible *transpiration* is found very much to exceed all the sensible evacuations put together. Sanctiorius even shews, in his *Medicina Statica*, that a person loses more in one day by *transpiration*, than by all the other outlets in fifteen. He adds, that if the food taken by one day weigh eight pounds, the *transpiration* will be five of them.

Cold prevents *transpiration*, by its constricting the pores of the skin, and thickening the liquors circulating in the cutaneous glands: heat, on the contrary, augments *transpiration*, both

by its opening the excretory ducts of the glands, and by its increasing the fluidity and velocity of the humours.

M. Dodart, from a number of experiments made for 34 years together, affirms us, that we *transpire* much more in youth than in age.—In some persons, the *transpiration* is so copious, that they void but very little of the coarser excrements, though they eat very heartily.

Transpiration is absolutely necessary in the animal oeconomy, to purify the mass of blood, and discharge it of a number of useless heterogeneous particles which might corrupt it. Hence it is, that upon a stoppage of the usual *transpiration*, there arise so many indispositions, particularly fevers, agues, rheums, &c.

Transpiration is also of use to the organ of feeling, in that it prevents the papillæ of the skin from being dried, either by the air, or by the continual touches of external bodies.

TRANSPIRATION is also used by some authors, for the ingress or entrance of the air, vapours, &c. through the pores of the skin into the body.

Cardan, by this kind of *transpiration*, accounts for the prodigy of a woman, whose daily urine weighed 27 pounds; though all the foods she took, both dry and liquid, did not exceed four pounds.—Dr. Baynard also suspects some such *transpiration* to be the case in hydropical persons.

TRANSPLANTATION, in agriculture and gardening, the act of removing trees or plants from the places where they were sowed or raised, and planting them in others. See PLANTING.

In the *TRANSPLANTING of forest-trees*, care is to be taken to preserve the roots, and even the fine hairs or filaments thereof, with the earth that sticks thereto; these filaments being the mouths that suck the nourishment, and transmute it to the tree.

The pits or fosses, into which trees are *transplanted*, should be left open for some time before-hand, that the rain, frost, and sun may dissolve the compacted salt, render the earth friable, and qualify it for nourishing the tree.—The same may be effected, in some measure, by burning straw in the new pits, and drenching the mould with water in dry seasons, and by enriching the ground with manure.

Pliny was of opinion, no tree should be removed under two, or above three years old. Cato would have none *transplanted* when less than five fingers in diameter: but we are, now, able to *transplant* trees of all ages and sizes, without danger.

To *transplant* old trees was reckoned so difficult, that *veterem arborem transplantare* was become a proverb for a difficult enterprise; and yet we are informed of a grove of 600 coco-trees of 80 years growth, and 60 foot high to the lowest bough, *transplanted* by count Maurice, to his paradise of Friburg: and a great person in Devonshire, Mr. Evelyn tells us, *transplanted* oaks, as big as twelve oxen could draw, to supply a defect in an avenue: and the thing is now indeed become quite common.

For the *transplantation* of grown trees, Mr. Evelyn gives the following method, as practised with good success by the lord Fitzharding: choose trees about the thickness of a man's thigh; remove the earth from about them; cut through all the side roots, till the tree may be, by force, brought down on one side; so that the tap-roots may be conveniently come at to be cut off with the ax: then redies the tree, and let it stand covered with the mould from which it was loosened, till the next year, or longer; and by that time it will have shot new tender roots fit for *transplanting*, and may be taken up at a fit season.

Otherwise, for very large trees, before the hard frosts come on, make a trench about the tree, at such distance from the stem, as you judge sufficient for the root; dig so deep, as almost to undermine it; place blocks, and quarters of wood to sustain the earth, and cast in as much water as may fill the trench, or sufficiently wet it, unless the ground were very moist before. Thus let it stand till some hard frost bind it firmly to the roots, and then convey it to its new station, which may be preserved from freezing, by placing store of warm litter in it: so close the mould the better to the straggling fibres, and place the earth taken out of the pit about the root of the new-planted tree.

The common rules for *transplanting* are, 1°. The lighter the soil is, the deeper are the trees to be planted. 2°. If the soil be gravel, or sand, mix clay with it, and *vice versa*. 3°. The best season is either October or February; in warm, moist, clear weather. 4°. The large roots are to be abated, to prevent the necessity of digging too deep: but the small fibrous ones to be spread. 5°. In taking up the trees to observe how the roots grow, and in *transplanting* to dispose them in the same order, and place the tree to the same aspect. 6°. To defend young trees after *transplantation*, both from the wind and sun, till the roots be fixed, and they begin to shoot. 7°. If the soil you *transplant* into be good, do not top the trees, but lop all the boughs to a single one, the most upright and promising among them: but if the soil be poor, top them, and when they are shot out again, lop off all the branches to one.

TRANS-

TRANSPLANTING of fruit-trees.—After a summer's growth of fruit seedlings in the nursery, such are pulled up as are above a foot high, and *transplanted* into a nursery; the rest are to be left in the seed-plot till another year.

When drawn up, the *spurs* are to be cut off, from about the top, the sprigs from the roots, and the extremities, both of the top, that it may not run too fast upwards, and of the tap or heart-root, that it may not pass directly downwards; left it go beyond the good soil. The holes or pits are to be so deep, as that the plants may stand somewhat deeper in the ground, than when in the seed-plot; close the mould about them, and if it be a dry time, water them the first day, and cover the soil with old fern.

Mr. Bradley gives us a new method of *transplanting* trees of all kinds and ages with safety, either while they are in blossom, or with fruit upon them, thus: the holes to receive the trees, are to be prepared before the trees are taken up; and the earth which comes out of the holes is to be made very fine, and put into large tubs and mixed with water, till it be about the consistence of thin batter. Then the holes wherein the trees are to be planted, are to be filled with this thus-tempered earth, before the earthy parts have time to settle.

The advantage hereof is, that the trees thus planted have their roots immediately closed and guarded from the air; and the warm season of the year disposing every part of the tree for growth and shooting, it will lose very little of its vigour.—In winter this method does not succeed.

The same author adds, that in consideration of the circulation of the sap, it is as necessary to preserve the vessels of trees entire, as those in animal bodies: and therefore, in *transplanting* trees in the summer seasons, it is not proper to cut off any of the branches, or wound any of the vessels, till they have renewed their roots, which it is of absolute necessity to wound in *transplanting* them. For the wounded roots, he has provided a plaister of a mixture of gums, to prevent the canker and rot, and promote their healing.

TRANSPLANTATION, in natural magic, is used for a method of curing diseases, by transferring them from one subject to another; which was much in vogue among certain chymical, or rather sympathetic physicians some ages ago.

This *transplantation* is effected, either by the use of a certain medium, called on that account a *magnet*; or without that, only by simple contact.

The first kind, which is that most properly called *transplantation*, is when the patient's excrement being mixed up with earth, the disease is by that means *transplanted* into a vegetable, arising from a seed sown in the said compost; or, when the parings of the nails, *e. gr.* of a gouty person, are inclosed in an augur-hole made in a plant, particularly in an oak.

Here the patient's excrement is the magnet, and the vital spirit of the plant arising from the seed is the mummy which the magnet they say receives; and the case is the same, in the parings of the nails, and the vital spirit of the other plants.

The second kind of *transplantation*, properly called *approximation*, is, when a finger seized with a parais, or whit-low, is cured by rubbing it in a cat's ear, which is supposed to receive the pain.

In this case, the sound subject receives the vital spirits, unites with them, and corrects their morbid state: and, as certain diseases are got by approximation, the infected spirits of a diseased body, insinuating themselves into a sound one, and thus infecting the same: so according to these philosophers they are cured by approximation; when the spirits of a diseased person entering a sound body, the latter corrects and retrieves the morbid state of the former.

Transplantation, by means of the magnet, is of five kinds, *viz.* *infestation*, *implantation*, *imposition*, *irrotation*, and *infection*; each whereof see under its proper article; but the whole practice is now deservedly laughed out of the world.

TRANSPORT-Ship, is a vessel whereto convey provisions, warlike stores, soldiers, &c.

TRANSPORTATION, the act of conveying or carrying a thing from one place or country to another.

In matters of commerce, *transportation* is of equal import with re-exportation, *viz.* the taking up of commodities in one foreign state or kingdom, bringing them hither, and paying duties for them; and then conveying them into some other foreign state: by which it is distinguished from *importation*, and *exportation*, where the commodities are either carried originally out of, or brought finally into, our own kingdom.

Our *transportation* or re-exportation of wool, butter, hides, tallow, herrings, beef, and salmon, which we *transport* from Ireland to other provinces, being the concerns of our merchants, and paying duties to his majesty, have been reckoned at 300,000 *l.* per annum.

It would be tedious to enumerate the value of our *transportations* from Denmark, Sweden, Spain, Portugal, the Straights, Turkey, Guinea, &c. the most considerable is from the East-Indies. In the infancy of that trade, *viz.* in the year 1613, of pepper only, beside what we consumed at home, we *trans-*

ported in one year to other countries, after it had paid duty here, to the value of 200,000 *l.* and of late years our exportation of what we bring from thence, after we have supplied ourselves, is computed at 500,000 *l.* sterling.

TRANSPORTATION is also a kind of punishment, or, more properly, an alleviation or commutation of punishment, for criminals convicted of felony, who, for the first offence, unless it be an extraordinary one, are ordinarily *transported* to the plantations, there to bear hard labour for a term of years, within which if they return, they are executed without farther trial.

TRANSPOSITION, in algebra, the bringing any term of an equation over to the other side.

Thus, if $a + b = c$, and you may make $a = c - b$; b is said to be *transposed*. See EQUATION.

TRANSPOSITION, in grammar, a disturbing or dislocating of the words in a discourse; or a changing of their natural order of construction, to please the ear, by rendering the contexture more easy, smooth, and harmonious.

A *transposition*, which renders the sense perplexed, is vicious.—The construction of the ancient languages being much more artful than that of the modern ones, allowed of much greater and more frequent *transpositions*. The English, French, &c. scarce ever allow of them but in oratory and poetry; in which cases they serve to give a force and energy to the discourse or the verse, and to prevent their languishing.

TRANSPOSITION, in music, is a changing of the notes of a piece of music, or the shifting a song from its former situation, to set it either higher or lower, or in another octave.

Of this there are two kinds; the first with respect to the clef, the second with respect to the key.

TRANSPOSITION with respect to the clef, consists in changing the places or seats of the notes or letters among the lines and spaces; but so as that every note is set at the same letter.

This is done either by removing the same clef to another line, or by using another clef, but with the same signature, by reason the piece is still in the same key.

The practice is easy in either case: in the first, you take the first note at the same distance above or below the clef-note, in its new position as before; and all the rest of the notes in the same relations or distances from one another; so that the notes are all set on lines and spaces of the same name.

In the second, or setting the music to a different clef, it is to be observed, the places of the three clef notes are invariable in the scale, and are to one another in these relations, *viz.* the mean a 5th above the bass, and the treble a 5th above the mean. Now to *transpose* to a new clef, *e. gr.* from the treble to the mean, where-ever that new clef is set, we suppose it the same individual note, in the same place of the scale, as if that piece were that part in a composition to which this new clef is generally appropriated; that so it may direct to the same notes we had before *transposition*: now, from the fixed relations of the three clefs in the scale, it will be easy to find the seat of the first *transposed* note; and then all the rest are to be set at the same mutual distances they were at before. See SCALE.

Suppose, *e. gr.* the first note of a song be *d*, a 6th above the bass-clef; where-ever that clef is placed, the first note must be the greater 2d above it, because a greater 2d above the mean is a greater 6th above the bass-clef, the relation of these two being a 5th.—So that the first note will still be the same individual *d*.

The use of this *transposition* is, that if a song be set with a certain clef, in a certain position, the notes go far above or below the system of five lines; they may, by the change of the place of the same clef in the particular system, or by taking a new clef, be brought more within the compass of the lines.

TRANSPOSITION from one key to another, is a changing of the key, or a setting all the notes of the song at different letters, and performing it, consequently, in different notes upon an instrument. See KEY.

The design hereof is, that a song which being begun in one note, is too high or low, or otherwise inconvenient for a certain instrument, may be begun in another note, and from that carried on in all its just degrees and intervals.

The clef and its position here remain the same; and the change is of the notes themselves, from one letter, and its line or space, to another.

In the former *transposition*, the notes were expressed by the same letters, but both removed to different lines, and spaces: in this, the letters are unmov'd, and the notes of the song transferred to, or expressed by other letters, and consequently set upon different lines and spaces, which, therefore, requires a different signature of the clef.

TRANSUBSTANTIATION, **TRANSUBSTANTIATIO**, in theology, the conversion or change of the substance of the bread and wine in the eucharist into the body and blood of Jesus Christ.

Transubstantiation, taken in its general and literal sense, implies any change of one substance into another; thus the change of Moles's rod into a serpent; of the waters of the Nile into blood; of Lot's wife into a pillar of salt, were preter natural *transubstantiations*; and the change of the food we eat, into the substance of our bodies, is a natural *transubstantiation*.

But the word, in its proper and technical sense, is restrained to the miraculous change which the Romish church holds is wrought in the sacrament, by the consecration of the priest. One of the great articles of that church, rejected by the reformed, is that of *transubstantiation*; the latter maintaining the *transubstantiation* to be only figurative, and the former affirming it to be real.

The reformed interpret *est, is*, in the text *hæc est corpus meum, this is my body*, by *significat*; q. d. *this signifies my body*: but the council of Trent stand up strenuously for the literal sense of the verb: thus in *can. 1. sess. 13.* of that council, it is expressly decreed, that in *transubstantiation*, the body and blood of our Lord Jesus Christ are truly, really, and substantially under the species of bread and wine.

It is added, that by *truly*, we mean *properly*, and not only by signification, as if the eucharist were no more than a sign of the body and blood of Jesus Christ; that by *really*, we mean *in fact*, and not only in figure, as if the eucharist were only a figure and representation of the body and blood of the Saviour of the world; and that by *substantially*, we mean *in substance*, and not only in virtue and energy.—This is truly opposed to a simple *sign*, *really* to a figure, and *substantially* to energy, or virtue.

TRANSMUPTION, TRANSMUTATIO, in the schools, a syllogism by concession or agreement, used where a question proposed is transferred to another, with this condition, that the proof of this latter shall be admitted for a proof of the former.

Thus Aristotle, in his book *de celo*, undertaking to shew that all the stars are round, transfers the question to the moon, and proves her roundness from her increasing and waning, supposing it a thing admitted by his opponents, that the stars are all alike.

TRANSVERSALIS, in anatomy, a name given to several muscles, &c. in respect of their situation, progress, &c. as the *TRANSVERSALIS abdominis*, a muscle which lies under the obliquus, and arises from the cartilago xiphoides, from the extremities of the false ribs, from the transverse apophysis of the vertebrae of the loins, is fixed to the inner side of the spine of the ilium, and inserted in the os pubis and linea alba.—See *Tab. Anat. (Myol.) fig. 2. n. 29. fig. 7. n. 39.*

This, with the obliquus, unites its tendons, as it approaches the linea alba, and is the only muscle that is cut in the operation of the bubonocoele: it has a fine and thin membrane that closes exactly its ring or hole through which the vessels pass. See **OBLIQUUS**.

TRANSVERSALIS colli, is a part of the *transversalis dorsii*, which some divide into three, viz. the facer, semi-spinatus, and *transversalis colli*.

It arises from the os sacrum, and from all the transverse processes of the vertebrae of the loins, back and neck, except the two first, and is inserted by so many distinct tendons into all their superior spines: it moves the whole spine obliquely backwards.

TRANSVERSALIS pedis plantarum comes from the bone of the metatarsus, that sustains the toe next the little toe, and passing across the other bones, is inserted into the os sesamoides of the great toe: its use is to bring all the toes close to one another.

TRANSVERSALIS penis arises from the ischium just by the erectors, and runs oblique to the upper part of the bulb of the urethra.

It helps to press the veins upon the back of the penis, against the os pubis, which is the cause of erection. See **ERECTION**.

TRANSVERSALIS Lumborum, } See } **SACER**.

TRANSVERSALIS Femoris, } See } **QUADRATUS**.

TRANSVERSALIS is also a name given a suture of a cranium, because of its transverling or crossing the face from one side to the other.

It arises at one of the lesser angles of the eye, and passing along the bottom of its orbit, and the root of the nose, terminates in the other lesser angle.

TRANSVERSE, something that goes across another from corner to corner.

Thus bands and bars in heraldry are *transverse* pieces or bearings. The diagonals of a parallelogram or a square are *transverse* lines.

Lines which make intersections with perpendiculars, are also called oblique or *transverse* lines.

TRANSVERSE axis, or *diameter*, called also the *first* or *principal axis*. See **AXIS**, **DIAMETER**, and **LATUS transversum**.

The *transverse axis* of an ellipsis, is the longer axis, or that

which *traverses* it lengthwise, in contra-distinction from the conjugate one. See **ELLIPSIS**, and **CONJUGATE**.
The *transverse axis* of the hyperbola, is the line D K. *Tab. Conicæ, fig. 17* cutting the curve in the points D and K. See **HYPERBOLA**.

TRANSVERSUM Latus, } See } **LATUS**.
Septum TRANSVERSUM, } See } **SEPTUM**.

TRANSVERSE Muscles, in anatomy, are certain muscles arising from the *transverse* processes of the vertebrae of the loins.

TRANTRY, in some customs, denotes the money arising by amerciaments of ale-sellers and victuallers for breaking the assize of bread and ale; particularly at Luston, and other manours in Herefordshire.

TRAPEZIUS. See **CUCULARIS**.

TRAVERSE, or **TRANVERSE**, something that goes athwart another, i. e. that crosses, and cuts it obliquely.

TRAVERSE is particularly used for a piece of wood or iron placed transversely, to strengthen and fortify another: such are those used in gates, windows, &c.

To plane a board against the grain, is also called among joiners, &c. to *traverse* it.

TRAVERSE, in gunnery, signifies to turn or point a piece of ordnance, which way one pleases upon her platform.

The laying or removing a piece of ordnance or a great gun, in order to bring it to bear, or lie level with the mark, is also called *traversing the piece*. See **GUNNERY**.

TRAVERSE, in fortification, denotes a trench with a little parapet, sometimes two, one on each side, to serve as a cover from the enemy that might come in flank.

Traverses are sometimes covered over-head with planks, and loaded with earth.—They are very commodious for stopping an enemy's way, and to prevent being enfiladed. They likewise make a good defence in a dry foss, in making the parapet on the side next the opposite flank.

TRAVERSE, in a wet foss, is a sort of gallery, made by throwing fascines, joists, fascines, stones, earth, and other things into the foss, over-against the place where the miner is to be put to the foot or the wall, in order to fill up the ditch, and make a passage over it. See **GALLERY**.

TRAVERSE also denotes a wall of earth or stone raised across a work which is commanded, in order to cover the men.

TRAVERSE also signifies any retrenchment, or line fortified with fascines, barrels or bags of earth, or gabions.

TRAVERSE, in navigation, is the variation or alteration of a ship's course, occasioned by the shifting of the winds, currents, &c.

Traverse sailing is used when a ship having set sail from one port towards another whose course and distance from the port sailed from is given or known, is, by reason of contrary winds, or other accidents, forced to shift and sail on several courses, which are to be brought into one course, to learn, after so many turnings and windings, the true course and distance made from the place sailed from, and the true point or place where the ship is; that so the wind coming fair, it may be known how afterwards to shape a course for the place intended.

This may be performed geometrically two ways: the first, by drawing new meridians, through the extremity of every course, parallel to the first meridian, or north and south line at first made, and setting off every course with a sweep of 60, as if it were a question in plain sailing. You may also let fall perpendiculars to every new meridian, from the point that the ship sailed to upon that course, by which you have the course, distance, difference of latitude, and departure to every course.

To illustrate this by an example: a ship being bound for a port distant 120 miles N. E. $\frac{1}{2}$ E. sails S. S. E. 30 miles, then N. E. by N. 40, then E. by N. 25, then N. N. E. 44; it is required to find the course and distance made good, and also the course and distance to the port bound for?

Draw the line H K (*Tab. Navigation, fig. 17.*) at pleasure for a meridian, or north and south line, and therein assume a point, as A, for the port sailed from; then with 60 of the chords, and one foot in A, draw the arch L m, upon which set off two points (because the course is S. S. E.) from L to m, and draw the line A m, upon which set off the distance 30, from A to B; then is the ship at B: thus letting fall the perpendicular B K, A K $27^{\circ} 7'$ is the difference of latitude, and B K $11^{\circ} 5'$, the departure of the first course.

For the second course, with the distance K B, draw the parallel B N, and thereby with the chord of 60, as before, set off the second course and distance, N. E. by N. 40, from B to C, and let fall the perpendicular C L, then is the ship at C, the difference of latitude upon the course is B L 33: 3, and departure C L 22: 2.

Proceed in the same manner for the third course, with the parallel C O, set off E. by N. 25, from C to D, and draw the line D P, from which set off the last course, N. N. E. 44, then is your ship at E.

Since

Since then the ship came from A, and is now at E, the line A E measured on the same equal parts upon which all the other distances were taken, will be found 91 miles, and the arch R Q measured on the rhumbs, five points, viz. N. E. by E. so that the ship is now 91 miles N. E. by E. from the port failed from.

To find her course and distance to the port bound for, set off 4 half points upon the arch R Q from R to S, and from A through S draw the line A S F; upon which set off 120, the distance from the port failed from to the port bound for, from A to F; then is F the port bound for: now the port bound for being at F, and the ship being but at E, the line E F measured on the same equal parts that the rest was taken from, will be found to be 31, and the arch T V measured on the chords, is $35^{\circ} 12'$, or N. E. by N. somewhat easterly, &c.

This method is useful, where the courses tend generally one way, without intersecting one another; but if they often cross, it is best to have recourse to the second method, which is without new meridians.

In order to this, observe how many points are between the point next to be laid down, and the point opposite to the course last laid down; for that is the point for laying down: then, with the chord of 60, and one foot in the point the ship is last come to, describe an arch; upon which set off the points found by the above said rule, and through that draw the line for the next course, &c. For an example:

Draw a north and south line, as in the former, as the line R M, fig. 17, n^o. 2. in which assume a point, as at A, for the port failed from; then from A set off the first course and distance, viz. N. N. W. 68, from A to B; and for the second course, with the chord of 60, and one foot in B, draw the arch T W, upon which to set off the next course S. S. W. 70, observe the rule above delivered, viz. to take the number of points between the point opposite to the last course failed, and the point you are next to fail on. The reason of which rule is this: if from A to B your course be N. N. W. then back from B to A, must needs be S. S. E. the opposite point; and then if you were to fail S. by E. it must be one point to the southward of that S. S. E. line; if south, it is two points, and consequently the next course being S. S. W. you are to set off 4 points, upon which set off 70 miles, from B to C, and then is your ship at C: for the third course, if from B to C be S. S. W. then from C to B is N. N. E. but the next course being E. half N. the points between N. N. E. and E. half N. are five points and an half, and therefore with the chord of 60 and one foot in C, draw the arch X Y, upon which set off five points and an half from X to Y, and through Y draw the line C D, upon which set off 90 miles from C to D: then is your ship at D.

After the same manner lay down all the rest, as D E, which is W. N. W. half N. 70, then E F south 25, then F G, E. half S. 45; then lastly G H, south 30, which is the last course.

Thus your ship being at H, and the port failed from at A, the line A H 28 miles, is the distance made good; and the angle at A is four points, viz. S. E. but the port intended for, being S. W. 55. set it from A to K, and the ship being at H, the line H K, 62 miles, is the distance from the ship to the port bound for; and the course is found by measuring the angle at H $71^{\circ} 48'$ or W. S. W. more than a quarter westerly, &c.

To work a TRAVERSE by the tables of difference of latitude and departure.—This is the principal use those tables are intended for; and the way of working a traverse hereby, is equal to the best for exactness, and superior in point of expedition.

Make a little table with six columns, the first for the course, the second for the distance, the third for the northing, the fourth for the southing, the fifth for the easting, the sixth for the westing. Then find the difference of the latitude and the departure to every course, and set them in their proper columns; as where the course is northerly, set the difference of the latitude under northing, or in the north column; and where the course is southerly, set the difference of latitude in the south column.

Again, where the course is easterly, set the departure in the east column, and when westerly, set it in the west column: then adding up each column by itself, subtract the north and south columns, the lesser from the greater, the remainder is the northing or southing made good. Also subtract the east and west columns, the lesser from the greater, the remainder is the easting or westing made good; then have you the difference of latitude and departure given to find the course and distance.

In the first example above specified, the first course is S. S. E. 30 miles, or two points 30 miles; for which I find the difference of latitude 27 : 7. Now the course being between south and east, I place my difference of latitude in the south column, and my departure 11 : 5 in the east column, leaving the north and west columns blank.

Then for the second course N. E. by N. or three points 40 miles, my difference of latitude, 33 : 3 is to be placed in the north column, and the departure 22 : 2 in the east column, because the course is between the north and east.

Then the third course being E. by N. or seven points, 25 miles, I place my difference of latitude 4 : 9 in the north column, and departure 24 : 5, in the east column.

And so for the fourth course N. N. E. or two points 44 miles, I place my difference of latitude 10 : 6, in the north column, and my departure 16 : 8, in the east column; then adding up each column, the sum of the northing column is 78 : 8, and the sum of the easting column is 27 : 7, which subtracted from the northing 78 : 8, the remainder 51 : 1, is the difference of latitude made good, which is northing, because the northing was the greater number.

Again, the sum of the easting column is 75 : 0, which, because there is no westing to subtract from it, is the easting made good. Thus you have the northing 51 : 1, and the easting 75 : 0 given, to find course and distance; and though you cannot find in the table the exact number of 51 : 1, and 75 : 0 together, yet find the nearest you can, which is 75 : 4, and 50 : 9, over which at the top, you find 34 degrees for the course, which is N. E. by N. $0^{\circ} 15'$ easterly, and the distance is 91 miles.

TRAVERSE, in law, denote the denial of some matter of fact, alleged to be done in a declaration, or pleadings; upon which the other side coming and maintaining that it was done, issue is joined for the cause to proceed to trial.

The formal words of a traverse are in the law French, *sans ces*, in Latin *absque hoc*, in English, *without that*, &c.

An Answer, says West (speaking of bills in chancery) is that which the defendant pleads or saith in bar to avoid the plaintiff's bill or action, either by confession and avoiding, or by denying and traversing the material parts thereof. A replication is the plaintiff's reply to the defendant's answer, which must affirm and pursue his bill, and confess and avoid, deny or traverse the defendant's answer.

A plea is nought which neither traverses nor confesseth the plaintiff's title, &c. Every matter of fact alleged by the plaintiff, may be traversed by the defendant, but not matter of law, or what is part matter of law, and part matter of fact; nor may a record be traversed, as this is not to be tried by a jury.

If a matter be expressly pleaded in the affirmative, which is expressly answered in the negative, no traverse is necessary, there being a sufficient issue joined: also where the defendant hath given a particular answer in his plea, to all the material points contained in the declaration, he need not take a traverse; for that when the thing is answered, there needs no further denial.

TRAVERSE of an indictment or presentment, is the contradicting or denying some chief point of it, and taking issue thereon. See INDICTMENT, and PRESENTMENT.—Thus, in a presentment against a person for a highway overflowed with water, for default of scouring a ditch, &c. he may either traverse the matter, by alleging that there is no highway, or that the ditch is sufficiently scoured; or he may traverse the cause, viz. by alleging that he hath not the land, or that he and they whose estate, &c. have not used to cleanse the ditch.

TRAVERSE of an office, is the proving that an inquisition made of lands or goods is defective, and untrue made.

No person shall traverse an office, unless he can make to himself a good right and title: and if one be admitted to traverse an office, this admission of the party to the traverse, supposes the title to be in him, or else he could have no cause to traverse.

TRAVERSE is sometimes used in heraldry, for a partition of an escutcheon, of the figure represented in Tab. Herald. fig. 90. which they blazon parti per pal, traverse, argent and gules.

TRAVERSE Tyle. See the article TYLE.

TRAVESTY, or TRAVESTI, a term which some late authors have introduced into poetry: it is originally French, being a participle of the word *travestir*, to disguise one's self, or to appear in masquerade.—Hence *travesty* comes to be applied to the disguising of an author, or the translating him into a style and manner different from his own; by which means it becomes difficult to know him.

G. Battista Lalli has travestied Virgil, or turned him into Italian burlesque verse. Scarron has done the same in French, and Cotton and Phillips in English verse.

Castalis is, by some, charged with having travestied the sacred Text, by reason of the difference of an *a* and *i* style between his version and the original.

TRAUMATICS, TRAUMATICA, *Vulnaries*, or medicines good for the healing of wounds. See VULNERARY, and AGGLUTINANT, HEALING, and CONSOLIDATION.

TRAYL-BASTON, or TRAIL-BASTON.—Edward I. in his 32d year, sent out a new writ of inquisition, under this denomination, against the intruders on other men's lands, who, to oppress the right owner, would make over their lands to great men; against batterers hired to beat men, breakers of peace, ravishers, incendiaries, fighters, false Assors, and other malefactors: which inquisition was so strictly executed, and such fines taken, that it brought in a world of treasure to the king.

TRE

Hence also *justices of trayl-baſon*, a denomination given to the judges appointed to execute this commiſſion, either by reſon of their ſevere and ſummary way of proceeding, or becauſe a ſtaff was delivered them as the badge of their office, and the offenders were dragged before this juſtification.

TRAYTOR, TRAITOR, TRAITOR, a betrayer of his king and country, or one guilty of high treaſon. See **TREASON**.

TRAYTEROUS, or **TRAITEROUS Poſition**, is particularly underſtood of a tenet, which ſome formerly held, of the legality of taking arms by the king's authority againſt his perſon, and thoſe commiſſioned by him: which is condemned by ſtatute 14 Car. II. c. 3.

TREACLE, in pharmacy, &c. See **THERIACA**.

TREACLE Water, Aqua Theriacalis, a compound cordial or ſpirituſ water, diſtilled with a ſpirituſ menſtruum from many cordial and ſuſorick drugs and herbs, with a mixture of ſome of the *Theriaca Andromachi*, or *Venice treacle*, whence its name.

TREASON, TREACHERY, the act or crime of infidelity to one's lawful ſovereign.

Treaſon, in our laws, is of two ſorts, *high* and *petty*.

HIGH TREASON, or **TREASON paramount**, is an offence committed againſt the ſecurity of the king or kingdom, whether by imagination, word, or deed.—Such are, to compaſs or imagine the death of the king, queen, or prince; or to deſtroy the king's wife, or his eldeſt daughter unmarried, or his eldeſt ſon's wife, or to levy war againſt the king in his realms, to adhere to his enemies, counterſeit his great ſeal, or money, to kill the king's chancellor, *treafurer*, juſtices of either bench, juſtices in eyre, of aſſize, or of oyer and terminer, being in their place during their office, diminiſhing or impairing current money: and ſaying that the king is a heretic or papist, or intends to introduce popery, *anno* 13 Car. II.

It is a maxim, that *in majoriſſimione, omnes ſunt principales*, there are no accessories in *high treaſon*, all are accounted principals.

Alſo, that *voluntas non reputabitur pro facto, niſi in cauſa proditionis*, the will is never taken for the deed in any caſe, but in that of *high treaſon*.

Though ſome *high treaſons* are much more heinous than others, yet the puniſhment appointment by law is the ſame in all (clipping and coining only excepted) which is, that the traitor be laid upon a hurdle or ſledge, drawn to the gallows, there hanged, but cut down while alive, the entrails pulled out and burnt before the criminal's face, then his head and quarters cut off, and impaled where the king ſhall judge meet.—Add to this, that he forfeits all his lands and goods whatever to the king, his wife loſes her dowry, and his children their nobility, and all right of inheriting.

Even an idiot or lunatic, though judged incapable of moſt crimes, ſhall be puniſhed as a traitor, if he go about to kill the king.

For Petit or Petty TREASON. See **PETTY Treason**.

This kind gives forfeiture of lands by eſcheat to the lord of the fee.

There is alſo mention made of *accumulate and conſtructive treaſon*, in the ſtatute 14 Car. II.

MISPRISON of TREASON. See the article **MISPRISON**.

TREASURE, Theſaurus, Scurus, a ſtore or ſtock of money in reſerve.

TREASURE-Trove, q. d. *treasure found*, in law, is when money, gold, ſilver, plate, or bullion, is found in the ground, in any place, and none knows to whom it belongs.

This ſhould naturally fall to the finder, but particular nations have made particular proviſions for it.—The Jews gave it the proprietor of the place where it was found: the Roman juſtprudence was various with regard hereto; ſometimes it was given to the maſter of the grounds, ſometimes to the finder, and ſometimes it was adjudged to the public treaſury.

In France and England the general uſage is to have ſuch *treasure* ſequeſtered to the king, unleſs where the benefit thereof is expreſſly granted or made over by the king to ſome other, as the lord of the manour.

In ſome places in France, it is divided into three parts, one for the king, one for the proprietor of the land, and one for the finder.

Briton ſays, it is every ſubject's part, as ſoon as he hath found any *treasure* in the earth, to make it known to the coroner of the county, &c.

The puniſhment for concealing *treasure* found in England, is imprifonment and fine; but if any mine of metal be found in any ground, it always appertains to the lord of the ſoil, except it be a mine of gold or ſilver, which anciently always belonged to the king, in whole ground ſoever it were found: but by an act of parliament, the king now hath only the pre-emption.

TREASURER, an officer to whom the treaſure of a prince or corporation is committed to be kept, and duly diſpoſed of in payment of officers, and other expences. See **TREASURY**. Of this there is a great variety.—His majeſty of Great-Britain, quality of elector of Brunſwic, is an *elector* of the Ro-

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man Empire.—In the ſtates of Poland are two *grand treaſurers*, that of the kingdom of Poland, and that of the grand-duchy of Lithuania.

In England the principal officers under this denomination are the *lord high treaſurer*, the *treaſurer of the hanſards*, *treaſurer of the navy*, of the *wardrobe*, of the *king's chamber*, &c. See **CHAMBERLAIN**, &c.

Anciently we had likewiſe a *treaſurer of the exchequer*, *treaſurer of war*, &c.—In the Romiſh countries the title *treaſurer* is alſo given ſomewhat abuſively to an eccleſiaſtic, who has the keeping of the relics, and of the charters and archives of a church or monaſtery.

This dignity ſucceeds, in ſome meaſure, to that of the ancient deacons, who had the like charge in the primitive church.

Lord High TREASURER of England, is the third great officer of the crown; under whole charge and government is all the king's revenue kept in the exchequer.

He receives the office by delivery of a white ſtaff to him from the king, and holds it during the king's pleaſure: anciently he received it by delivery of the golden keys of the treaſury.

He has the check of all the officers any way employed in collecting impoſts, cuſtoms, tributes, or other revenues of the crown. He has the gift of all the cuſtomers, comptrollers and ſearchers places in all the ports of London, and the nomination of the eſcheators in every county.

He alone, (or others in commiſſion with him,) lets leaſes of all the crown lands, gives warrants to certain perſons or quantity to have the wine cuſtom free, &c.

The ancient ſalary was 333*l.* but of late is ſaid to have been 800*l.* a-year. The office of *lord treaſurer* is now in commiſſion.

Under TREASURER of England. See **UNDER-Treasurer**.

TREASURER of the Hospital is an officer who, in the abſence of the lord high *treasurer*, he poſſeſſes, with the comptroller and other officers of the green cloth, and the ſtewards of the Maſtiffes, to hear and determine treaſons, felonies and other crimes committed within the king's palace.

TREASURER of the Navy, is an officer who receives money out of the exchequer, by warrant from the lord high *treasurer*, or the lords commiſſioners executing that place, and pays all charges of the navy, by warrant from the principal officers of the navy.

TREASURY, the place wherein the revenues of a prince are received, preſerved, and diſburſed.

In England the *treasury* is a part of the Exchequer, by ſome called the *lower exchequer*.

The officers of his majeſty's *treasury*, or the *lower exchequer*, are the lord treaſurer, a chancellor, a ſecretary, two chamberlains, an auditor, four tellers, a clerk of the pells, uſhers of the receipt, a tally-cutter, &c. See each officer under his proper article, **CHANCELLOR**, **TELLER**, **TALLY**, &c.

At Rome, under the emperors, there were two kinds of *treasuries*, the one called *ararium*, wherein the monies deſtined to ſupport the charges of the government were kept; the other *ſiculus*, wherein were preſerved thoſe intended for the particular ſuſtenance of the emperor and his court. In effect the *ararium* belonged to the people, and the *ſiculus* to the prince. See **ARARIUM**, and **FISCUS**.

We have ſtill a reſemblance of this difference among us, but it is confounded in France, &c. where the king diſpoſes abſolutely of the public treaſure, &c.

Lords of the TREASURY.—In lieu of one ſingle director and adminiſtrator of his majeſty's revenues, under the title of lord high *treasurer*; it is frequently thought proper to put that office in commiſſion, i. e. to appoint ſeveral perſons to diſcharge it with equal authority, under the title of lords commiſſioners of the *treasury*.

TREAT, in our old law-books, ſignifies as much as *taken out*, or *withdrawn*.—Thus a juror was challenged, becauſe he could not diſpend *4*cl.** and therefore was *treat* by the ſtatute, or diſcharged. *Old Nat. Br.*

TREATISE, TRACTATUS, a ſet diſcourſe in writing on any ſubject.

A *treatiſe* is ſuppoſed more expreſs, formal, and methodical than an eſſay; but leſs ſo than a ſyſtem.

TREATY, a covenant between ſeveral nations; or the ſeveral articles or conditions ſtipulated and agreed upon between foreign powers.

There are *treaties* of peace, of marriage, of confederacy, of neutrality, of capitulation, and of commerce and navigation. The celebrated *treaties* are thoſe of Nimetzer, of Utrecht, of the Pyreneans, of Weſtphalia, of Ruitwick, of Utrecht, of Hanover, of Vienna, &c.

Treaties of commerce are uſually followed by various tariffs, to adjust the duties of exportation and importation of merchandizes into the reſpective dominions of the contracting powers.

The great *treaty* of peace, commerce, navigation, &c. between England and France, was ſigned at Utrecht the 11th of April 1713, and conſiſts of 39 articles.

Guarantee of a TREATY. See the article **GUARANTEE**.

TREBELLIANICA, or **TREBELLIAN Fourth**, in the Roman juſtprudence, a right belonging to an heir inſtituted by teſta-

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ment.—If the testator, after appointing a full and general heir, spent and disposed of all his effects in legacies; or if he went *ultra aduentum*, beyond three fourths thereof, in that case the heir was all *owed* to retrench and detain one fourth part of the legacies to his own use.—This was called the *Trebellianica*.

In like manner, if the testator charged his heir with a coiffe-ment of trust, and to restore the inheritance to another; in that case, the heir might likewise retain a fourth of the whole succession, that the quality of heir might not be rendered wholly vain and fruitless.

TREBLE, in music, the highest or acutest of the four parts in symphony, or that which is heard the clearest and thickest in a concert.

In the like sense we say, a *treble* violin, *treble* hautboy, &c.

In vocal music, the *treble* is usually committed to boys and girls.—Their part is the *treble*.

The *treble* is divided into first or highest *treble*, and second or base *treble*.—The half *treble* is the same with the counter-tenor.

TREBUCHET, TREBUCHETUM, a tumbler, ducking or cucking-stool. See CUCKING-SPOOL.

TREBLE, See the article ASPECT.

TREDDLE, or TREADLE, *Chalaza*, in natural history, a part of an egg. See the article CHALAZA.

TREE, *Arbor*, the first and largest thing of the vegetable kind, consisting of a single trunk, out of which spring forth branches and leaves.

Standards, or TREES *in full air*, are such as naturally rise a great height, and are not topped.—For the choice of trees of this kind to be transplanted out of a nursery, Quintiney recommends us to such as are straight, six foot high at least, and five or six inches thick at bottom, and three or four at top; the bark pretty smooth and shining, as a token of their youth, and of the good soil they grew in.

Dwarf TREES, are such as are kept low, and never suffered to have above half a foot of stem.—These are used to be kept vacant or hollow in the middle, that the branches spreading round about the sides may form a kind of round bowl or bush.

Wall TREES, are those whose branches are stretched out, and nailed against walls.

For dwarf and wall trees, such are to be chose out of the nursery for transplantation, as are straight, and consist of a single stem, and a single graft, rather than two or three grafts in several branches: their thickness at bottom, when remov'd, should be two or three inches.

Fruit TREES, are such as bear fruit. See the article FRUIT.

Timber TREES, are those whose trunks are tall and straight, whereof beams, masts, &c. are used to be made.

Coniferous TREES, are those whose fruit is of a conical figure, as the pine, fir, larch, &c.—These are also called *resiniferous*, by reason that *coniferous trees* are generally covered with a bark that abounds in resin.

Mr. Ray, and other authors, speak of several trees of prodigious bulk.—The jesuit d'Acosta, in his history of the Indies, lib. 4. c. 3. mentions a hollow tree at Tacacharaya, three leagues from Gauxa in New Spain, nine fathom within-side near the ground, and sixteen without-side. He adds, that it is under this tree the barbarians assembled to perform their religious ceremonies, dance round their idols, &c.—Herrera mentions another, which sixteen men, joining hands, could not fathom.—And F. Kircher, in his *Latum*, p. 50. affirms, he has seen a tree near Gonzano which would lodge a whole family of 25 persons in its cavity. The common people had a tradition, that this was planted by Augustus.

In the Indies there are very large forests consisting only of a single tree, whose branches falling to the ground, take root, and put forth new trees: the Indian fig tree and pareutiver are of this kind.

M. Louvillers mentions trees in Peru, one part of whose branches produce fruit one half the year, and the other part the other half.—In China there is a tree which bears tallow, whereof that nation make their candles. See TALLOW.

There are two or three very remarkable phenomena in the growth of trees, which have escaped the observation of the naturalists of all ages, except those of our own: these are the perpendicularity of their trunks, or stems, to the horizon, and the parallelism of their tufts to the spot of earth they grow on. An account of each, see under the articles PERPENDICULARITY, and PARALLELISM.

For the planting, transplanting, fennation, pruning, felling, grafting, throwing, barking, &c. of trees; see the respective articles, PLANTING, TRANSPLANTING, SEMINATION, PRUNING, ENGRAFTING, &c.

Mr. Ray distinguishes the trees and shrubs of our native growth in England, into, I. Such as have their flower disjointed, and remote from the fruit:—which are,

1°. The *Nuciferous* TREES, or such as bear nuts: as the walnut tree, the hazel-nut tree, the beech, the chestnut, and the common oak.

2°. *Coniferous* TREES, or such as bear a squamitous or scaly fruit, of a conical figure, and a woody or hard substance, in which are many seeds, which, when they are ripe, the cone opens or gapes, and lets several cells or parcels pass, and less than drop out of this kind are the Scotch pine, male and female; the pine, which, in our gardens is called the Scotch fir, the common alder tree, and the birch tree.

3°. *Bacciferous* TREES, or such as bear berries; as the juniper and yew-tree.

4°. *Livigens* TREES, or such as bear a woody, downy substance: as the black, white, and trembling poplar, and willows, and osiers, &c. all kinds.

5°. TREES which bear their seeds, (having an imperfect flower,) in leafy membranes and cups: as, the horn-bean, or hart-beam, called in some places the horn-beech.

II. Such as have their fruits and flowers *conjugate*; which are either with the flower placed on the top of the fruit, or adhering to the base or bottom of the fruit.

Of the former kind, some are *perispermous*, as apples and pears; and some *bacciferous*, as the haw or service tree, the white thorn or haw-thorn, the wild rose, sweet brier, currants, the great bilberry bush, honey-suckle, &c.

The latter kind are either such as have their fruit moist and soft when ripe, as:—1°. *Possiferous* ones, whose fruit is pretty large and soft, with a stone in the middle; as the black thorn or sloe-tree, the black and white bullace tree, the common wild cherry, the black cherry, &c.

2°. *Bacciferous* TREES, as the strawberry tree, common in the west of Ireland, milletoe, water elder, the dwarf or spurge-laurel, the viburnum or waning-berry, the dogberry tree, the sea black thorn, the berry-bearing elder, the privet, barberry, common elder, the holly, the buckthorn, the berry-bearing hawthorn, the bismole, and the spindle tree or prickwood. Or such as have their fruit dry when ripe; as the bladder-nut tree, the box tree, the common elm and ash, the maple, the gaul or sweet willow, common heath-broom, dyers weed, furze or gorse, and the lime tree.

Heart of a TREE, } See { HEART.

Parallelism of rows of TREES, } See { PARALLELISM.

Diana's TREE, *arbor Dianæ*, among the chymists, is a kind of metalline vegetation, which shoots out into branches, with the appearance of leaves, and even flowers. See Supplement, article DIANE ARBOR.

TREE of Mars, *arbor Martis*, is another very singular vegetation, first discovered accidentally by the younger Lemery.

See Supplement, article MARTIS ARBOR.

Dormant-TREE, } See { DORMANT.

Roof-TREES, } See { ROOF.

TREFOIL. See the article TRIFOLIUM.

TREMOR, TREMBLING, in medicine, a disease nearly akin to a convulsion, wherein there is something of a convulsive motion or shivering, accompanying a voluntary or natural motion.

A tremor is frequently found to arise upon the more violent passions, particularly anger, gluttony, venery, &c. but this is accidental and transitory.

A tremor is sometimes apt to degenerate into other worse diseases, viz. palsy, apoplexy, lethargy, spasmus, &c. In old men it is incurable.

The medicine commonly made use of in tremors, and other nervous distempers, by the name of *polydipsy*, is no other than the compound spirit of lavender. The most successful way of using it, is by taking 30 or 40 drops twice or thrice a day, drop on loaf sugar or a little bread. It is supposed, that by this way the most spirituous and efficacious parts make their way directly by the nerves, to the palate, &c. without undergoing the course of the circulation, as it must do when taken in a liquid vehicle.

TREMOR of the heart. See the article PALPITATION.

TRENCH, a ditch cut, or dug in the ground, to drain off the waters in a meadow, a morass, or the like; or to divert the course of a river.

Many of the bogs in Ireland have been drained, and made good ground, by only digging trenches around them.

TRENCHES, in fortification, are ditches which the besiegers cut to approach more securely to the place attacked; whereas they are also called *lines of approach*.—See Tab. Fortif. fig. 21. n. 11, &c.

They say, *mount the trenches*, that i. go upon duty in them.—To *relieve the trenches*, is to relieve such as have been upon duty there.

The enemy is said to have *cleared the trenches*, when they have driven away, or killed the soldiers who guarded them.

Tail of the TRENCH, is the place where it was begun.—And the head that to which it was carried.

Trenches are of several sorts, according to the nature of the soil: if the adjacent territory be rocky, the trench is only an elevation of bawns, gabions, wool-packs, or epaulements of earth, cast round about the place—but where the ground may be easily opened, the trench is dug therein, and bordered with a parapet on the side of the besieged.

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The breadth of the *trenches* is from eight to ten foot, and the depth from six to seven; they are cut in talus, or aloope.

The *trenches* are to be carried on with winding-lives, in some manner parallel to the works of the fortress, so as not to be in view of the enemy, nor to expose their length to the enemy's shot: for then they will be in danger of being enfiladed, or scoured by the enemy's cannon: this carrying of the *trenches* obliquely, they call carrying them by *coudées*, or returns.

Opening the TRENCHES, is when the besiegers begin to work upon the line of approaches; which is usually done in the night; sometimes within musket-shot, and sometimes within half, or only whole cannon-shot of the place, if there be no rising ground about it, the garrison strong, and their cannon well served.

The workmen that open the *trenches* are always supported by bodies of men against the sallies of the besieged; and sometimes those bodies lie between them and the place, as also on their right and left.

The pioneers sometimes work on their knees: and the men that are to support them lie flat on their faces, in order to avoid the enemy's shot; and the pioneers are likewise usually covered with mantelets, or fauchcons.

To *TRENCH the ballast*, is a sea phrase, signifying to divide the ballast into several *trenches* in a ship's hold.

TRENCHÉ, in heraldry. See the article *TRANCHE*.

TRENCHING-Plough, is an instrument for cutting out the sides of *trenches* and drains, or the sides of turf, &c. See *Plough*.

TRENTAL, *TRIGINTAL*, or *TRICENNAL*, a Romish office for the dead, consisting of thirty masses, rehearsed for thirty days successively after the party's death.

The *trental* is thus called from the Italian, *trenta*, *triginta*, *thirty*.—It is mentioned *anno primo Ed. VI. Et volo, & ordino, quod executores mei ordinent seu ordinare faciant unum trental pro salute anime mee*.

TREPANUM, *TREPAN* a chirurgian's instrument, serving to perforate a bone, especially that of the cranium, and used in the operation of *trepanning*.

It is also called *abapiston*, *anabapiston*, *modulus*, *terebra*, *terebellum*.—*Abapiston*, from a privative, and *basileus*, to dip; as having a broad circle over its point, to prevent it, in the operation of trepanning, from penetrating through the membranes that invest the brain.—*Modulus*, from *modus*, a measure; being contrived to enter only to a certain depth.—*Terebra*, &c. from *terere*, to bore.

It is in form of a terebellum, or small wimble, only that it is indented, and made somewhat in manner of a round saw.

It serves for the cure of wounds, contusions and fractures of the cranium, when they do not go beyond the second table; for by means hereof, an amputation or exfoliation is made of what part, or quantity of a bone one pleases, and a way is open'd for the raising depressions.

It has usually a sharp point in the middle of its circumference, serving to keep it firm and steady during the operation.—It should also have a kind of cope to rise and fall as occasion requires, that it may not go deeper than is necessary.

There are also two-pointed *trepans*, others triangular, quadrangular, and hexagonal made for the cure of a caries of the bones.—There are also perforative *trepans*, and exfoliative ones. See *EXFOLIATION*.

TREPANNING, in chirurgery, the operation of relieving cuts, contusions, caries's, and fractures in the skull, by means of an instrument called the *trepandum*.

Trepanning is a very dangerous and difficult operation; and is not to be used, unless when the chips and prominences of the bones prick the tender parts; when the upper table is entire, but depressed, and the lower broken; and when the extravasated blood would endanger the person's being suffocated.

The manner of *trepanning* or opening the skull, is thus: the hairs being shaven off, the skin is to be cut through to the pericranium, avoiding, as much as possible, the muscles of the temples, and the sutures of the skull: and for this time the wound is to be bound up, unless there be so little blood spilt, that the pericranium may at the same time be pulled up from the bone.

After a few hours, stop the patient's ears, and take one of the instruments called a *male trepanum*, or *modulus*; fix its point in the skull, but so far off the fracture, that it touch it not, much less the future, with its teeth; though some surgeons do not mind to avoid the futures, but assure us, they have perforated them as successfully as any other part.

Then hold the instrument fast with the left hand, turn it round with the right, till you have cut a pretty deep hole: after this take a *female trepanum*, which has no point in the middle, or take the point out of the other, and turn it round as before: in the mean time, take away the dust or chips that proceed from the perforation, and moisten the instrument in oil and water to make it cool and slippery.

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The blood appearing, will shew when you are gone as deep as to the dura mater; in which case you must pierce very gently, lest that membrane be unadvisedly hurt.

When the bone begins to move, put something in between the sides of the wound; loosen it, and take it out with a pair of surgeon's pincers, or forceps.

After the operation is over, the part is to be washed gently with weak red wine, and proper dressings are to be applied thereon, as honey of roses, arceus liniment, oil of St. John's wort, &c.—If the dura mater be corrupted, add, as occasion requires, spirit of wine, tincture of myrrh and aloes, Venice turpentine, mel *Aegyptiacum*, &c.

Mr. Cheselden takes notice, that the sinus's and spine of the os frontis, make it very dangerous, if not impracticable, to apply a *trepandum* to the middle and lower part of the forehead.

TREPIDATION, in medicine, a tremor, or trembling of the nerves and members of the body. See *TREMOR*.

The first symptom of madness in dogs, is a *trepidation* of the limbs.

TREPIDATION, in the ancient astronomy, denotes what they call'd a libration of the eighth sphere; or a motion which the Ptolemaic system attributed to the firmament, to account for certain almost insensible changes and motions observed in the axis of the world; by means whereof the latitudes of the fixed stars come to be gradually changed, and the ecliptic seems to approach reciprocally, first towards one pole, then towards the other.

This motion is also called the motion of the first libration. See *LIBRATION*, and *TITUBATION*.

TRESPASS, in law, signifies any transgression of the law, under treason, felony, or misprision of treason.

For a lord of parliament to depart from thence without the king's licence, is neither treason, nor felony, but it is *Trespas*. *Staundford, Pl. Cor.*

TRESPASS, however, is most commonly used either for that wrong or damage which is done to the king in his forest, or by one private man to another.

In this sense it is of two sorts: *trespas general*, otherwise called *trespas vi & armis*, where force or violence is used—and *trespas special*, otherwise called *trespas upon the case*; which should be that done without force. See *ACTION on the case*.—But the two species are sometimes confounded.

In an action of *trespas*, the plaintiff always sues for damages, or the value of the hurt done him by the defendant.

Trespas is also divided into *local* and *transitory*.

TRESPASS local, is that which is so annexed to the place certain, that if the defendant join issue upon a place, and traverse the place mentioned in the declaration, and aver it; it is enough to defeat the action. See *LOCAL*.

TRESPASS transitory, is that which cannot be defeated by the defendant's traverse of the place, because the place is not material.

The action of *trespas*, *quare clausum fregit*, ought to be local.

TRESSURE, in heraldry, a diminutive of an orle, usually supposed to be half the breadth thereof.

It is usually borne flory, and counter-flory; and sometimes double, as in *Tab. Herald. fig. 85*, and sometimes triple.

TRESTLE, *TRESSSEL*, or *TRUSSEL*, is explained by Minshieu to be a three-footed stool; or more particularly a wooden frame or stand to bear up tables scaffolds, or the like.

TRET, in commerce, an allowance made for the waste, or the dust that may be mixed with any commodity; which is always 4 pounds in every 104 pounds weight. See *TARE*.

TREUGA Dei, *TREVE de Dieu*. See *TRUCE of God*.

TRIA prima, among chymists, the three hypostatical principles, viz. salt, sulphur, and mercury; of which they hold all bodies to be primarily made, and into which they are all held resolvable by fire.

TRIAD, *TRIAS*, *TRIAE*, a term sometimes used for a trinity. See *TRIAS*, and *TRINITY*.

TRIAL, in law, the examination of any cause, whether civil or criminal, according to the laws of the realm, before a proper judge.

Of this there are divers kinds: matters of fact, *e. gr.* being to be tried by the jurors; matters of law by the justice; and matters of record by the record itself.

A lord of parliament, indicted of treason or felony, shall be *tried*, without any oath, by his peers, upon their honours and allegiance; but in appeal, at the suit of any subject, they shall be *tried* per bonas & legales homines.

If ancient demesne be pleaded of a manour, and denied, this shall be *tried* by the record of demesday.

Bastardy, excommunication, lawfulness of marriage, and other ecclesiastical matters, shall be *tried* by the bishop's certificate.

Before *trial* in a criminal case, it is usual to ask the criminal how he will be *tried*; which was anciently a very pertinent question,

question, though not so now; in regard there were formerly several ways of trial, viz. by battle, ordeal, and jury. When the criminal answered, by God and his country, it shewed he made choice to be tried by a jury.—But there is now no other way of trial.—This is also called *trying per pais*, or *per patriam*.

For the ancient manner of trial by combat, and great assize, see COMBAT.

TRIANGLE, in geometry, a figure comprehended under three lines, or sides, and which of consequence has three angles.

If the three lines or sides of the triangle be all right, it is said to be a *plain* or *rectilinear triangle*.

If all the three sides of the triangle be equal (as ABC, *Tab. Geometry*, fig. 68.) it is said to be *equilateral*.

If only two of the sides of the triangle be equal (as in DEF, fig. 69.) it is called an *isosceles*, or *equicrural triangle*. See ISOSCELES, &c.

If all the sides of the triangle be unequal to each other (as in ACB, fig. 70.) the triangle is said to be *scaleneus*. See SCALENEUS.

If one of the angles as K, (fig. 71.) of a triangle KML be a right angle, the triangle is said to be *rectangular*.

If one of the angles as N, (fig. 72.) be obtuse, the triangle is said to be *obtusangular*, or *obvigenous*.

If all the angles be acute, as in ACB (fig. 68.) the triangle is said to be *acutangular*, or *oxvigenous*.

If the three lines of the triangle be all curves, the triangle is said to be *curvilinear*.

If some of the sides be right, and others curve, the angle is said to be *mixtilinear*.

If the sides be all arches of great circles of the sphere, the triangle is said to be *spherical*. See each under its proper head, RECTILINEAR, &c.

Similar TRIANGLES, } See the articles {
Base of a TRIANGLE, } SIMILAR.
Canon of TRIANGLE, } BASE.
Legs of a TRIANGLE, } CANON.
 } LEGS.

Construction of TRIANGLES.—1. Two sides, as AB and AC, fig. 73. being given in numbers, or otherwise, together with the quantity of the angle intercepted between them, A; to construct a triangle—Assume AB as a base; and in A make the given angle: on the other leg set off the other given line AC; lastly, draw BC: then will ABC be the triangle required.

Hence, two sides with the intercepted angle being determined, the whole triangle is determined.—Wherefore, if in two triangles ACB and acb; $a=A$; and $a.b::A.B::A.C$, the triangles are determined in the same manner, and are therefore similar; consequently $c=C$ and $b=B$, $a.b::b.c::A.B::B.C$, &c.

2. Three sides, AB, BC, and CA, fig. 68. being given, any two whereof, as A C, A B, taken together, are greater than the third, to construct a triangle.—Assume AB for a base; and from A, with the interval A C, describe an arch y; and from B, with the interval B C, describe another arch x: draw the right lines A C and B C. Thus is the triangle constructed. Hence, as of any three given right lines, only one triangle can be constructed; by determining the three sides, the whole triangle is determined.

Wherefore, if in two triangles ACB and acb (fig. 73.) $A.B::A.C::a.b::A.C::a.c::b.c$; the triangles are determined in the same manner, and consequently are similar, and therefore mutually equilateral.

3. A right line, as AB, and two adjacent angles A and B, which, taken together, are less than two right ones, being given; to describe the triangle ABC.—On the given line AB, make the two given angles A and B: continue the sides A C and B C till they meet in C. Then will ABC be the triangle required.

Hence, one side and two angles being given, the whole triangle is determined.—Wherefore, if in two triangles $A=A$ and $B=B$, the triangles are determined after the same manner, and therefore are similar.

Measurement of TRIANGLES.—To find the area of a triangle, multiply the base AB, fig. 74. by the altitude C d; half the product is the area of the triangle ABC.

Or thus: multiply half the base AB by the altitude C d; or the whole base by half the altitude; the product is the area of the triangle.

E. gr. $A.B=342$	$A.B=342$	$\frac{1}{2}A.B=171$
$C.d=234$	$C.D=117$	$C.d=234$
1368	2394	684
1026	342	513
684	342	342
2)80028(40014	40014 area
are as 40014		

Or, the area of any triangle is had by adding all the three sides together, and taking half the sum; and from that half sum, subtracting each side severally, and multiplying that half sum and the remainder continually into one another, and extracting the square root of the product.

Hence, 1. If between the base, and half the altitude; or between the altitude, and half the base, be found a mean proportional; it will be the side of a square equal to the triangle.

2. If the area of a triangle be divided by half the base, the quotient is the altitude.

Properties of plain TRIANGLES.—1. If in two triangles ABC and abc (fig. 73.) the angle $A=A$; and the sides $A.B::a.b$, and $A.C::a.c$; then will the side $B.C::b.c$, and the angles $C=C$, and $B=B$; and therefore the whole triangles will be equal and similar.

2. If one side of a triangle ABC (fig. 75.) be continued to D, the external angle DAB will be greater than either of the internal opposite ones B or C.

3. In every triangle, the greatest side is opposed to the greatest angle, and the least to the least.

4. In every triangle, any two sides taken together are greater than the third.

5. If in two triangles, the several sides of the one be respectively equal to the sides of the other, the angles will likewise be respectively equal; and consequently the whole triangles will be equal and similar.

6. If any side, as BC (fig. 76.) of a triangle ACB be continued to D, the external angle DCA will be equal to the two internal opposite ones A and B taken together.

7. In every triangle, as ABC, the three angles A, B, C, taken together, are equal to two right ones, or 180° .

Hence, 1. If the triangle be rectangular, as KML (fig. 71.) the two oblique angles M and L, taken together, make a right angle, or 90° ; and therefore are half right, if the triangle be isosceles.—2. If one angle of a triangle be oblique, the other two taken together are oblique likewise.—3. In an equilateral triangle, each angle is 60° .—4. If one angle of a triangle be subtracted from 180° , the remainder is the sum of the other two; and if the sum of two be subtracted from 180° , the remainder is the third.—5. If two angles of one triangle be equal to two of another, either together or separately, the third of the one must be likewise equal to the third of the other.—6. Since in an isosceles triangle DFE (fig. 69.) the angles at the base y and v are equal; if the angle at the vertex be subtracted from 180° , and the remainder be divided by 2, the quotient is the quantity of each of the equal angles: in like manner, if the double of one of the angles at the base be subtracted from 180° , the remainder is the quantity of the angle at the vertex.

8. If in two triangles, ABC, and abc (fig. 73.) $A.B::a.b$, $A=a$ and $B=b$; then will $A.C::a.c$, $B.C::b.c$, $C=C$, and the triangle ACB equal and similar to the triangle abc.—Hence, if in two triangles, ACB and acb, $A=A$, $B=B$, and $B.C::b.c$; then will $C=C$; consequently $A.C::a.c$, $A.B::a.b$; and the triangle $ACB=a.c.b$.

9. If in a triangle DFE the angles at the base y and v, fig. 69. be equal, the triangle is isosceles: consequently, if the three angles be equal, it is equilateral.

10. If in a triangle ABC (fig. 77.) a right line DE be drawn parallel to the base, then will $BA:BC::BD:BE::AD:EC$. And $BA:AC::BD:DE$. Consequently the triangle BDE similar to BAC.

11. Every triangle is inferible in a circle. See CIRCLE.

12. The side of an equilateral triangle, infered in a circle, is in power triple of the radius. See RADIUS.

13. Triangles on the same base, and having the same height, that is, being between the same parallel lines, are always equal. See PARALLEL.

14. Every triangle, as CFD (fig. 41.) is one half of a parallelogram ACDB on the same, or an equal base CD, and of the same altitude, or between the same parallels; or a triangle is equal to a parallelogram upon the same base, but half the altitude; or half the base, and the same altitude. See PARALLELOGRAM.

15. In every triangle, as well plain as spherical, the sines of the sides are proportional to the sines of the opposite angles.

16. In every plain triangle, as the sum of two sides is to their difference, so is the tangent of half their difference. See TANGENT.

17. If a perpendicular be let fall upon the base of an oblique angled triangle, the difference of the squares of the sides is equal to double the rectangle under the base, and to the distance of the perpendicular from the middle of the base.

18. The sides of a triangle are cut proportionally, by a line drawn parallel to the base.

19. A whole triangle, is to a triangle cut off by a right line, as the rectangle under the cut sides, is to the rectangle of the other two sides.

20. In a right lined triangle, a line drawn from the right angle at the top perpendicular to the hypotenuse, divides the triangle into two other right lined triangles, which are similar to the first triangle, and also to one another.

21. In every right-angled triangle, the square of the hypothenuse is equal to the sum of the squares of the other two sides. See **HYPOTHENUSE**.

22. If any angle of a triangle be bisected, the bisecting line will divide the opposite side, in the same proportion as the legs of the angle are to one another. See **BISECTION**.

23. If the vertical angle of any triangle be bisected, the difference of the rectangles, made by the sides and the segments of the base, is equal to the square of the line that bisects the angle.

24. If a right line BE (fig. 78.) bisect an angle ABC of a triangle, the square of the said line BE = AB + BC - AE + EC. *Newt. Arith. Univers.*

To divide a triangle into any given number of equal parts, divide the base CD (fig. 77. n. 2.) into as many equal parts as the figure is to be divided into; and draw the lines A 1, A 2, &c.

Resistance of a TRIANGLE. See **RESISTANCE**.

Characteristic TRIANGLE. See **CHARACTERISTIC**.

Properties of spherical TRIANGLES. See **SPHERICAL TRIANGLE**.

TRIANGLE, in trigonometry.—The solution or analysis of triangles, is the business of trigonometry. See **TRIGONOMETRY**.

The several cases thereof are reducible to the following problems.

Solution of plane TRIANGLES.—I. Two angles A and C (*Tab. Trigonometry*, fig. 27.) being given, together with side AB opposite to one of them, C; to find the said BC opposite to the other, A.—The rule or canon is this: as the sine of the angle C, is to the given side AB, opposite to the same; so is the sine of the other angle A, to the side required. The side BC, therefore, is commodiously found by the logarithms, from the rule given for finding a fourth proportional to 3 numbers given. See **LOGARITHM**.

For an example: suppose C = 48° 35', A = 57° 28', AB = 74. The operation will stand thus:

Log. of sine of C 9.850142
Log. of A B 1.867317
Log. of sine of A 9.9258681

Sum of log. of A B } 11.7950993
and of sine of A }

Log. of B C 1.9200856. The number corresponding to which, in the table of logarithms, is 83, the quantity of the side sought.

2. Two sides AB and BC, together with the angle C, opposite to one of them given; to find the other angles A and B.—The rule is this: as one side AB is to the sine of the given angle opposite thereto C; so is the other side BC, to the sine of the angle required opposite thereto.

E. gr. suppose AB = 94, BC = 69, C = 72° 15'.

Log. of A B 1.9731279
Log. of sine of C 9.9788175
Log. of B C 1.8398491

Sum of log. of sine } 11.8176666
of C and of B C }

Log. of sine of A 9.9444387. The number corresponding to which, in the table of logarithms, is 61° 37'. Now the given angle C being 72° 15', the sum of the two 133° 52' subtracted from 180, the sum of the three, gives 46° 8' for the other angle sought B.

In like manner, suppose, in a right angled triangle, (fig. 28.) that beside the right angle, A, is given the hypothenuse BC, 49, and the cathetus AC, 36, to find the angle B; then will the operation stand thus:

Log. of B C 1.6901961
Log. of whole sine 10.0000000
Log. of A C 1.5563025

Log. of sine of B 9.8661064. The corresponding number to which, in the table of logarithms, is 47° 16'; consequently, C = 42° 44'.

3. Two sides BA and AC, together with the included angle A being given; to find the two remaining angles.—I. If the triangle ABC be rectangular; take one of the sides including the right angle, as AB, for radius; then will CA be the tangent of the opposite angle B: the rule then is.—As one leg AB, is to the other AC; so is the whole sine to the tangent of the angle B.

E. gr. suppose BA 79, and AC 54;
Log. of B A 1.8976271
Log. of A C 1.7323938
Log. of whole sine 10.0000000

Log. of tang. of B 9.8347667; the corresponding number to which, in the table of logarithms, is 34° 21'; consequently the angle C is 55° 39'.

II. If the angle A be oblique (fig. 27.) the rule is; as the sum of the given sides AB and AC (fig. 29.) is to their difference; so is the tangent of half the sum of the sought angles C and B, to the tangent of half the difference. Adding, therefore, the half difference, to the half sum; the aggregate will be the greater angle C; and subtracting the half difference from the half sum; the remainder is the less angle B.

E. gr. suppose AB = 75, AC 58, A 108° 24'; then will
A B 75 A B 75 A + B + C 179° 60'
A C 58 A C 58 A 108 24

Sum 133 differ. 17 B + C 71 36
1/2 (B + C) 35 48

Log. of AB + AC 2.1238516
Log. of AB - AC 1.2304489
Log. of tang. 1/2 (B + C) 9.8580694

Sum of logg. 12.085183
Log. of tang. 1/2 (C - B) 8.9646667. The corresponding number to which is 5° 16'.

1/2 (B + C) = 35° 48' 1/2 (B + C) = 35° 48'

1/2 (C - B) = 5° 16' 1/2 (C - B) = 5° 16'

C = 41 4 B = 30 32
4. The three sides, AB, BC and CA (fig. 30.) being given, to find the angle A, B and C.—From the vertex of the angle A, with the extent of the least side AB, describe a circle; then will CD be the sum of the legs AC and AB; and CF their difference.—The rule then is, As the base BC is to the sum of the legs CD; so is the difference of the legs CF, to the segment of the base CG.—This segment, thus found, being subtracted from the base CB, the remainder is the chord GB. Then, from A to the chord GB let fall the perpendicular AE; thus will BE = EG = 1/2 GB.

Thus in a rectangular triangle, AEB, the sides AB and BE being given; or, in an obliquangled triangle, AEC the sides AC and CE being given: the angles B and A are found.

E. gr. suppose AB = 36, AC = 45, BC = 40.

A C = 45 A C = 45
A B = 36 A B = 36

A C + A B = 81 F C = 9

Log. of B C = 1.6020600

Log. of A C + A B 1.9084850

Log. of F C = 0.9542425

Sum of logg. = 2.8627275

Log. of CG = 1.2606675; the corresponding number to which, in the table, is 18.

B C = 4000 E G = 1089

CG = 1822 CG = 1822

BG = 2178 CE = 2911

BE = 1089

Log. of A B = 3.5563025

Log. of whole sine = 10.0000000

Log. of E B = 3.0370279

Log. of sine of EAB = 9.4807254, the corresponding number to which in the tables is 17° 36'. Consequently the angle ABE 72° 14'.

Log. of A C = 3.6532125

Log. of whole sine 10.0000000

Log. of C E = 3.4640122

Log. of sine of EAC = 9.8101237; to which the corresponding number in the tables is 40° 18'; therefore ACE 49° 42'; and CAB 57° 54'.

Solution of right-angled spherical TRIANGLES, by the common rules.—I. In a right-angled spherical triangle, any two parts beside the right-angle, being given, to find any of the rest.

1. Consider whether the parts, which come to the question, be conjunct or disjunct. (See **PART**.) If the disjunct be opposite to each other; as, if the hypothenuse BC, and the angle C (fig. 31.) be given, to find the opposite leg AB; then the rule is.—As the whole sine is to the sine of the hypothenuse BC; so is the sine of the angle C, to the sine of the opposite leg AB. 2. If the disjunct parts be not opposite to each other; as, if AB, and the adjacent angle B be given for the opposite angle C; the sides of the triangle are to be continued one way, till they become quadrants, that you may thus have a new triangle, wherein the parts that come into the question are mutually opposite to each other; as, in our case, the triangle EBF, wherein we have given BF, the complement of the leg AB, and the angle B for EF, the complement of the angle C. The rule then is.—As the whole sine is to the sine of BF; so is the sine of the angle B to the sine EF, or co-sine of C.

3. If the hypothenuse be not among the conjunct parts, as if the legs AB and AC be given for an angle opposite to one of them; the rule is.—As the sine of AC, is to the whole sine; so is the tangent of AB, to the tangent of C.

4.—But if the hypothenuse be found among the conjunct parts, as if the hypothenuse BC and the angle C be given to find the adjacent side AC; the sides of the triangle are to be continued one way till they become quadrants, that we may have a new triangle, wherein the hypothenuse is not among the parts that come into the question; e. gr. in our case, the triangle EBF, wherein

wherein are given the complement $E B$ of the hypotenuse BC , and the complement of the angle C , and the angle F the complement of the leg AC . Since then, in the triangle EFB , the hypotenuse does not come in the question, the rule is as before:

As the sine of EF , or co-sine of C , is to the whole sine; so is the tangent of EB , or co-tangent of BC , to the tangent of F , or co-tangent of AC .

5. When the sides of a triangle are to be continued, it is the same thing which way soever they be produced, provided no acute angle come into the question, otherwise the sides are to be continued through the other oblique one. And if both be in the connection, the sides are to be continued through that adjacent to the side in question.

By this means a triangle is always obtained wherein the thing required is found, either by the rule of sines or tangents.

Solution of right-angled spherical TRIANGLES, by one catholic rule.—Consider, as before, whether the parts that come in question be conjunct or disjunct. See PART.

If either one, or both the sides, including the right angle, come into the question; for it, among the data, write its complement to a quadrant.—Since then by the catholic rule, delivered under the article trigonometry, the whole sine, with the sine complement of the middle part, must be equal to the sines of the disjunct parts, and the co-tangents of the conjunct parts; from the sum of those data subtract the third datum; the remainder will be some sine or tangent, the side or angle corresponding to which, in the artificial canon of triangles is the side or angle sought.

This universal rule being of great service in trigonometry, we shall apply it to the various cases thereof, and illustrate it with examples; which examples, in the case of disjunct or separate parts will at the same time illustrate the common method, but in the case of contiguous parts they admit of other solutions.

1. Given the hypotenuse BC 60° and the angle C $23^\circ 30'$, to find the opposite leg AB (fig. 22).—Since AB is the middle part, C and BC are disjunct (See PART); the whole sine, with the co-sine of the complement $A B$, *i. e.* with the sine itself of $A B$, is equal to the sines of C and BC .

Therefore from line of C 96006997
Sine of BC 99375306

Sum 195382303
Subtract whole sine 100000000
Remain sine of AB 95382303. The corresponding number to which, in the canon, is $20^\circ 12' 6''$.

2. Given the hypotenuse BC 60° and the leg AB $20^\circ 12' 6''$ to find the opposite angle C .—'Tis evident from the preceding problem, that from the sum of the whole sine, and the sine of the leg AB , the sine of the hypotenuse BC is to be subtracted, the remainder is the sine of the angle C . The example therefore of the former case is easily converted into an example of this.

3. Given the leg AB $20^\circ 12' 6''$ and the opposite angle C $23^\circ 30'$, to find the hypotenuse BC .—'Tis evident from the first case, that from the sum of the whole sine, and the sine of $A B$ is to be subtracted the sine of the angle C , and the remainder is the sine of the hypotenuse BC .

4. Given the hypotenuse BC 60° , and one leg AB $20^\circ 12' 16''$ to find the other leg.—Since BC is a mean part, and $A B$ and $A C$ are disjunct parts, the whole sine, with the co-sine of the hypotenuse BC , are equal to the sine of the complements; *i. e.* to the co-sines of the legs AB and $A C$.

Therefore from the whole sine 100000000
Co-sine of BC 96989700

Sum 196989700
Subtract co-sine of AB 99724279

Remains co-sine of $A C$ 97265421. The corresponding number to which, in the canon, is $32^\circ 11' 34''$; therefore $A C$ $57^\circ 48' 26''$.

5. Given the legs AC $57^\circ 48' 26''$ and AB $20^\circ 12' 6''$, to find the hypotenuse BC .—'Tis evident from the preceding case, that the whole sine is to be subtracted from the sum of the co-sines of the legs AB and AC ; the remainder is the co-sine of the hypotenuse BC . The example, therefore, of the preceding case is easily applied to this.

6. Given the leg AC $57^\circ 48' 26''$ and the adjacent angle C $23^\circ 30'$ to find the opposite angle B .—Since B is a middle part, and A and C disjunct parts; the whole sine, with the co-sine of B , is equal to the sine of C , and the sine of the complement, *i. e.* to the co-sine of $A C$;

Therefore from the sine of C 96006997
Co-sine AC 97265421

Sum 193272418
Subtract whole sine 100000000

Remains co-sine of B 93272418. The number corresponding to which, in the canon, is $12^\circ 15' 56''$; therefore B $77^\circ 44' 4''$.

7. Given the leg AC $57^\circ 48' 26''$ and the opposite angle B $77^\circ 44' 4''$ to find the adjacent angle C .—'Tis evident from the preceding case, that the co-sine of $A C$ is to be subtracted from the sum of the whole sine, and the co-sine of B ; the remainder is the sine of C . The former example, therefore, is easily accommodated to the present case.

8. Given the oblique angles B $77^\circ 44' 4''$ and C $23^\circ 30'$, to find the leg adjacent to the other, $A C$.—From problem the sixth, 'tis evident that the sine of C is to be subtracted from the sum of the whole sine, and the co-sine of B ; and that the remainder is the co-sine of $A C$. The example of the sixth problem may be easily applied to this.

9. Given the leg AC $57^\circ 48' 26''$ and the adjacent angle C $23^\circ 30'$, to find the opposite leg AB .—Since $A C$ is a mean part, and C and $A B$ conjunct parts; the whole sine, with the sine of $A C$, is equal to the co-tangent of C , and the tangent of $A B$.

Therefore from the whole sine 100000000
Sine of AC 99275039

Sum 199275039
Subtract co-tangent of C 103616981

Remains tangent of AB 95658058. To which the corresponding number in the canon, is $20^\circ 12' 6''$.

10. Given the leg AB $20^\circ 12' 6''$ and the opposite angle C $23^\circ 30'$, to find the adjacent leg AC .—From the sum of the co-tangent of C , and the tangent of AB , subtract the whole sine; the remainder is the sine of AC .

11. Given the legs AB $20^\circ 12' 6''$, and AC $57^\circ 48' 26''$, to find the angle C , opposite to one of them.—From the sum of the whole sine, and sine of AC , subtract the tangent of AB ; the remainder is the co-tangent of C .

12. Given the hypotenuse BC 60° , and the oblique angle C $23^\circ 30'$, to find the adjacent leg AC .—Since C is a middle part, and BC and AC conjunct parts; the whole sine, with the co-sine of C , will be equal to the co-tangent of AC .

Therefore from the whole sine 100000000
Co-sine of C 99623978

Sum 199623978
Subtract co-tangent of BC 97614394
Remains tangent of AC 102009584. The number corresponding to which, in the tables, is $57^\circ 48' 26''$.

13. Given the leg AC $57^\circ 48' 26''$, and the adjacent angle C $23^\circ 30'$, to find the hypotenuse BC .

From the sum of the whole sine, and the co-sine of C , subtract the tangent of AC ; the remainder is the co-tangent of BC .

14. Given the hypotenuse BC 60° , and the leg AC $57^\circ 48' 26''$, to find the adjacent angle C .—From the sum of the co-tangent of BC , and tangent of AC , subtract the whole sine; and the remainder is the co-sine of C .

15. Given the hypotenuse BC 60° , and one angle C $23^\circ 30'$, to find the other, B .

Since BC is the middle part, and B and C disjunct parts, the whole sine, with the co-sine of BC will be equal to the co-tangents of B and C .

Therefore from whole sine 100000000
Co-sine of BC 96989700

Sum 196989700
Subtract co-tangent of C 103616981
Remains co-tangent of B 93372719; the corresponding number to which, in the canon, is $12^\circ 15' 56''$; therefore B is $77^\circ 44' 4''$.

16. Given the oblique angles B $77^\circ 44' 4''$ and C $23^\circ 30'$, to find the hypotenuse BC .—From the sum of the co-tangents of C and B , subtract the whole sine; the remainder is the co-sine of BC .

Solution of oblique-angled spherical TRIANGLES.—I. In an oblique-angled spherical triangle ABC (Tab. Trigonometry, fig. 32.) two sides AB and BC being given, together with an angle A , opposite to one of them, to find the other C : the rule is,

As sine of the side BC , is to the sine of the opposite angle A ; so is the sine of the side AB , to the sine of the opposite angle C .

Suppose, for example, BC $39^\circ 29'$; A $43^\circ 20'$; BA $60^\circ 45'$; then will

Sine of BC 98033572
Sine of A 98364771
Sine of BA 99632168

197996939
Sine of C 99963367. The corresponding number to which, in the tables, is $82^\circ 34' 7''$.

2. Given two angles C $82^\circ 34' 7''$, and A $43^\circ 20'$, to gether with the side AB $60^\circ 45'$, opposite to one of them C ; to find the side BC opposite to the other of them A ; say, as sine of angle C is to sine of the opposite side $A B$;

to sine of angle A to sine of opposite side B C.—The former example may suffice for the present case.

3. Given two sides AB $60^{\circ} 45'$, and BC $39^{\circ} 29'$, together with an angle opposite to one of them A $45^{\circ} 20'$; to find the angle included by them B.—Suppose the angle C to be acute, since the other, A, is also acute, the perpendicular BE falls in with the triangle. In the rectangled triangle ABE, therefore, from the given angle A, and side AB, find the angle ABE. Since BE is assumed as a lateral part in the triangle ABE, the angle EBC is a middle part, and the side BC must be a conjoint part: the co-sine of the angle EBC will be found by subtracting the co-tangent of AB from the sum of the co-sine of the angle ABE, and the co-tangent of BC. If then the angles ABE and EBC be added together, or in case the perpendicular fall without the triangle, be subtracted from each other, you will have the angle required B.

<i>E. gr.</i> whole sine	10000000
Co-sine of AB	95963154
Sum	195963154
Co-tang. of A	100252825

Co-tang. of ABE 95710349. The number corresponding to which, in the tables, is $20^{\circ} 25' 35''$. AB therefore is $69^{\circ} 34' 25''$.

Co-sine of ABE	95428300
Co-tang. of BC	100141529

Sum	196269829
Co-tang. of AB	96330085

Co-sine of EBC 99938544. The number corresponding to which, in the tables, is $80^{\circ} 24' 26''$. Therefore ABC is $79^{\circ} 9' 59''$.

4. Given two angles A $45^{\circ} 20'$, and B $79^{\circ} 9' 59''$, together with the adjacent side AB $66^{\circ} 45'$, to find the side BC opposite to one of them.

From one of the given angles B, let fall a perpendicular EB, to the unknown side AC; and in the rectangled triangle ABE from the given angle A, and hypotenuse AB, find the angle ABE; which subtracted from the angle ABC, leaves the angle EBC. But if the perpendicular should fall without the triangle, the angle ABC should have been subtracted from ABE. Since as the perpendicular BE is taken for one of the lateral parts, the middle part in the triangle ABE, is the angle B, and the conjoint part AB; in the triangle EBC the middle part is the angle B, and the conjoint part BC; the co-tangent of the side BC is found by subtracting the co-sine of EBA, from the sum of the co-tangent of AB, and the co-sine of EBC.—The example of the preceding case is easily applied to this.

5. Given two sides AB $66^{\circ} 45'$, and BC $39^{\circ} 29'$, with the angle A opposite to one of them, $43^{\circ} 20'$; to find the third side AC.

Letting fall, as before, the perpendicular BE; in the rectangled triangle ABE, from the given angle and hypotenuse AB, find the side AE. Since assuming BE for a lateral part in the triangle ABE, AB is the middle part, and AE is the separate part; and in the triangle BEC, BC is the mean part, and EC a disjunct part; the co-sine of EC is found by subtracting the co-sine of AB from the sum of the co-sines of AE and CB. If then the segments AE and EC be added together, or in case the perpendicular fall without the triangle, be subtracted from each other, the side AC will be had.

6. Given two sides AC $65^{\circ} 30' 46''$, and AB $66^{\circ} 45'$, together with the included angle A $43^{\circ} 20'$; to find the third side BC opposite thereto.

Letting fall the perpendicular BE, find, in the rectangled triangle, the segment AE; which subtracted from AC, leaves EC. If the perpendicular fall without the triangle, AC is to be subtracted from AE. Since by assuming the perpendicular BE for a lateral part in the triangle ABE, AB becomes a middle part, and AE a separate part: in the triangle EBC, CB is the middle part, EC a separate part: the co-sine of BC is found by subtracting the co-sine of AE from the sum of the co-sines of AB and EC.

7. Given two angles A $43^{\circ} 20'$, and B $79^{\circ} 9' 59''$, together with the side CB $39^{\circ} 29'$, opposite to one of them; to find the side AB adjacent to both.

Letting fall the perpendicular CD from the unknown angle C, to the opposite side AB; and that falling within the triangle; from the given angle B, and the hypotenuse BC, seek in the rectangled triangle BCD for the segment BD. Since assuming the perpendicular CD for a lateral part in the triangle CDB, DB is the mean part, and the angle B a conjoint part; and in the triangle CDA, AD is the middle part, and the angle A a conjoint part: the sine of the segment AD is found by subtracting the co-tangent of the angle B from the sum of the sine of DB, and the co-tangent of the angle A. If then the segments AD and DB be added, or in case the perpendicular fall without the triangle, be subtracted from each other, the result will be side AB required.

8. Given two sides AB $66^{\circ} 45'$, and BC $39^{\circ} 29'$, with the

included angle $79^{\circ} 9' 59''$; to find the angle A opposite to one of them.

Letting fall the perpendicular CD, find the segment BD, as in the preceding problem. This subtracted from AB leaves AD. If the perpendicular fall without the triangle, AB is to be added to DB. And since by assuming the perpendicular CD for a lateral part in the triangle CDB, BD is the middle part, and the angle B a conjoint part; and in the triangle CDA, AD is the middle part, and the angle A a conjoint part: the co-tangent of the angle A is found by subtracting the sine of DB from the sum of the co-tangent of the angle B, and of the sine of AD.

9. Given two angles A $43^{\circ} 20'$, and B $79^{\circ} 9' 59''$, together with the adjacent side AB $66^{\circ} 45'$; to find the angle C opposite to the same.

From one of the given angles B, letting fall the perpendicular BE, to the opposite side AC; in the rectangled triangle ABE, from the given angle A, and hypotenuse AB, we find the angle ABE; which subtracted from ABC, leaves the angle EBC. In case the perpendicular fall without the triangle, ABC is to be subtracted from ABE. Since by assuming BE for a lateral part in the triangle CEB, the angle C is a middle part, and the angle CBE a disjunct part; and in the triangle ABE, the angle A is the middle part, and the angle ABE the disjunct part: the co-sine of the angle C is found by subtracting the sine of the angle ABE, from the sum of the co-sine of the angle A, and the sine of EBC.

10. Given two angles A $43^{\circ} 20'$, and C $82^{\circ} 34'$, together with a side BA $60^{\circ} 45'$, opposite to one of them; to find the other angle.

From the sought angle B, let fall a perpendicular BE; and in the right-angled triangle ABE, from the given angle A, and hypotenuse BA, find the angle ABE. Since assuming the perpendicular EB for a lateral part in the triangle ABE, the angle C is the middle part, and the angle CBE a disjunct part; and in the triangle ABE, the angle A is the middle part, and the angle ABE a disjunct part: the sine of the angle EBC is found by subtracting the co-sine of A from the sum of the co-sine of C, and of the sine of ABE. If then ABE and EBC be added, or in case the perpendicular fall without the triangle, be subtracted from each other, the result will be angle required ABC.

11. From the three sides, to find an angle opposite to one of them.—I. If one side AC, (fig. 16.) be a quadrant, and the leg AB be less than a quadrant, find the angle A. Continue AB to F, till AF become equal to a quadrant; and from the pole A draw the arch CF, to cut the arch BF at right angles in F. Since in the rectangled triangle CBF, we have given the hypotenuse BC, and the side of FB, or its complement AB to a quadrant; we shall find the perpendicular CF, which being the measure of the angle CAB, that angle is found of course.

II. If one side AC be a quadrant, and the other AB greater than a quadrant, seek again the angle A: from AB subtract the quadrant AD, and from the pole A describe the arch CD, cutting the arch CD at right angles in D. Since in the rectangled triangle CDB, the hypotenuse BC, and the side DB, or excess of the side AB beyond a quadrant, is given, the perpendicular CD will be found as before, which is the measure of the angle A required.

III. If the triangle be isosceles, and AC=CF, and the angle ACF be required; bisect AF in D, and through D and C draw the arch DC. Since DC is perpendicular to AF, the angles A and F, and ACD and DCF are equal; from the hypotenuse AC, and leg AD, given in the rectangled triangle ACD, we find the angle ACD; the double whereof is the angle required ACF: and from the same data may the angle A or F be found.

IV. If the triangle be scalenous, and the angle A, (fig. 30.) be required; from C let fall the perpendicular CD, and seek the semi-difference of the segments AD and DB, by saying, as the tangent of half the base AB, is to the tangent of half the sum of the legs AC and CB; so is the tangent of their semi-difference to the tangent of the semi-difference of the segments AD and DB: add then the semi-difference of the segments to the half base, to find the greater segment; and subtract the same from the same for the less. Thus having in the rectangled triangle CAD, the hypotenuse AC, and the side AD, the angle A is found thence. After the same manner is B found in the other CDB, from CB and DB given.

12. Given the three angles A, B and C, to find any of the sides.—Since in lieu of the given triangle, another may be assumed, whose sides are equal to the given angles, and the angles to the given sides; this problem is resolved after the same manner as the preceding one.

TRIANGLE, TRIANGULUM, in astronomy, a name which is common to two constellations; the one in the northern hemisphere, called simply *triangulum*, or *triangulum caeleste*; the other in the southern hemisphere, called *triangulum australe*.

TRI

The stars in the northern triangle in Ptolemy's catalogue are 4; in Tycho's as many; in the Britannic 24: the longitudes, latitudes, magnitudes, &c. whereof, are as follow:

Names and Situation of the Stars.	Longitude	Latitude.	Magn.
	Suns 28	o 1 2	
That preceding the vertex	0 05 17	17 39 08	6
Vertex of the triangle	2 30 51	16 48 23	4
That following the vertex	6 50 25	19 28 00	6
Full of three in the base	7 09 44	20 34 17	4
	7 18 45	17 06 18	7
5			
Fifth of 3 inform. under triangle	6 52 35	15 59 02	6
Contig. to the last of the base	8 42 40	18 34 12	6
Middle one of the base	9 09 43	19 21 32	5
Last of the base	9 10 21	18 50 07	4
8. of inform. under the triang.	7 38 31	13 55 26	6
10			
Last of these informers	10 32 52	16 16 32	7
A smaller contiguous to it	9 59 15	14 13 08	6
	10 12 15	14 24 24	7
	15 08 28	20 00 37	6
	15 15 01	18 26 13	7
15			
Informers between the triangle and the rain's tail, which are also numbered among the Stars of Arcturus.	<div><div>28th</div><div>31st</div><div>33d</div><div>40th</div><div>48th</div><div>60th</div><div>51st</div><div>54th</div><div>55th</div></div> <div>of Arcturus.</div> <div><div>10 14 15</div><div>11 43 01</div><div>12 35 47</div><div>13 51 45</div><div>10 13 53</div><div>16 22 25</div><div>10 39 24</div><div>18 37 50</div><div>18 41 07</div></div> <div><div>8 49 48</div><div>10 51 52</div><div>11 17 13</div><div>10 25 37</div><div>8 51 55</div><div>8 59 42</div><div>7 20 04</div><div>10 54 20</div><div>8 58 28</div></div>	<div>7</div> <div>5</div> <div>4</div> <div>3</div> <div>7</div> <div>6</div> <div>7</div> <div>7</div> <div>6</div>	

TRIANGULAR Compasses, are such as have three legs or feet, whereby to take off any triangle at once, these are much used in the construction of maps, globes, &c. See COMPASSES.

TRIANGULAR Numbers, are a kind of polygonal numbers; being the sums of arithmetical progressions, the difference of whose terms is 1.

Thus—Of arithmetical progress 1 2 3 4 5 6
are formed triang. numb. 1 3 6 10 15 21.

TRIANGULAR Quadrant, is a sector furnished with a loose piece, whereby to make it an equilateral triangle. See SECTOR.

The calendar is graduated thereon, with the sun's place, declination, and other useful lines; and by the help of a string and a plummet, and the divisions graduated on the loose piece, it may be made to serve for a quadrant. See QUADRANT.

TRIANGULAR Winding Stairs. See STAIR.

TRIANGULARIS, in anatomy, a name given to two muscles, in respect of their figure. See MUSCLE.

The *triangularis pectoris*, which has sometimes the appearance of three or four distinct muscles, arises from the inside of the sternum, and is implanted into the cartilages which join the four lowest true ribs to the sternum.

The action of this muscle is very obscure, since both the origination and insertion are at parts not moveable, but together.—Dr. Drake conjectures it may conduce towards forming the necessary incurvature of the sternum, and by its over-tension in children, while the cartilages are soft, may occasion that morbid acuminatum of the sternum seen in rickety children.—Others suppose it may contract the cavity of the thorax in expiration.

TRIANGULARIS labii. See DEPRESSOR labii superioris.

TRIARI, in the Roman militia, a kind of infantry, armed with a pike, a shield, a helmet and a cuirass; they were thus called, because they made the third line of battle.

The *trarii* were also called *pilifigiani*, because ranged behind the principes who bore the standard in a legion.

Polybius distinguishes four kinds of forces in the Roman army: the first, called *pilati*, or *velites*, he says were a raw soldiery, lightly armed.—The *hastati* or spear-men were a degree older, and more experienced. The third called *principes*, princes, were still older, and better soldiers than the second.—The fourth were the eldest, the most experienced, and the bravest: these were always disposed in the third line, as a corps de reserve, to sustain the other two, and to restore the battle, when the others were broken or defeated.

Hence their name of *trarii*: and hence the proverb *ad triarios ventum est*, to show that one is at the last, and hardest struggle.

TRIAS Harmonica, or the *Harmonical TRIAD*, in music, a compound of three radical sounds, heard altogether; two whereof are a fifth and a third above the other, which is the fundamental. See CONCORD, &c.

The *triad* is properly a consonance formed of a third and a fifth; which, with the base, or fundamental fund, makes three different terms, whence the name *triad*.—That of *harmonic* is doubtless given it from that wonderful property of the fifth, which divides itself naturally into two thirds, but excellent, and perfectly harmonical; so that this one found, divided between two others, makes two thirds at once, and of consequence a double harmony. See FIFTH.

TRI

Hence it is, that in *trials*, particularly, this concord is preferred to that which divides the octave into a fifth and a fourth; in regard here, if there be a concord on one side, there is a discord on the other; whereas in the former case the harmony is complete on both sides.

Of the three sounds which compose the harmonical *triad*, the gravest is called the *fundamental*, or *base*; the acutest, *i. e.* that which makes the fifth, and which terminates the concord upwards, is called the *excluded* or *highest* found; and that which divides the fifth so agreeably into two thirds, is called the *harmonical mean*.

The division of the fifth into two thirds, may be performed two ways, *viz.* 1. Harmonically, when the greater third is lowest, and the less above; in which case the *triad* is perfect and natural.

2. Arithmetically, when the less third is lowest, and the greater above; in which case the *triad* is imperfect and flat. Both are good; but the latter is not to be often used.

TRIBE, *tribus*, in antiquity, a certain quantity or number of persons; when a division is made of a city or people into quarters, or districts.

The city of Athens was divided into ten *tribes*.—The Jewish nation into twelve tribes, the descendants of the twelve sons of Jacob, *viz.* the tribes of Judah, of Reuben, Gad, Asher, Dan, Naphthali, Ephraim, Manasseh, Simeon, Levi, Issachar, Zebulun, and Benjamin.

These, in effect, gave rise to thirteen tribes, from the twelve patriarchs; by reason the posterity of Joseph was divided into two tribes, that of Manasseh, and that of Ephraim.

There were ten of these tribes that revolted and followed Jeroboam.

The Roman people was at first only divided into three tribes; and from this number three, *tres*, it was that the word *tribe*, *tribus*, took its rise.—This division was accommodated by Romulus, to the several nations he had united: the first consisted of the Albans, the second of the Sabines, and the third of a mixture of fugitives, who came to seek an asylum at Rome.

Servius Tullus, fearing this partition should occasion seditions, divided the inhabitants of Rome by cantons, not by nations, accordingly, he distributed the city into four quarters, or *tribes*; and by reason a great number of citizens had retired into the country about, of those he composed 26 other *tribes*; so that from this time the Roman people consisted of 30 *tribes*.

In after-times, the number of *tribes* was increased to 35; but they then ceased to be ranged according to the quarters of the city.—The distribution depended on the censors, who formed their list at discretion, frequently confounding the country *tribes* with those of the city.

A man was never absolutely a Roman citizen, unless he had the *jus tribus*, *i. e.* till he were intitled to the honours of the magistrature, as also to a right of voting in assemblies of the people; and this is what they called *jus quiritium*.—Hence, the inhabitants of the municipal cities were only imperfect citizens, as being of no *tribe*.

The freed-men were obliged to purchase this *right of tribes*, which did not otherwise belong to them, though they were citizens of Rome.

The names of the 35 tribes were, 1. the Palatina; 2. the Suburana; 3. the Collina; 4. the Esquilina; 5. the Romula; 6. the Fimilia; 7. the Crustumina; 8. the Cornelia; 9. the Fabia; 10. the Galeria; 11. the Lemonia; 12. the Mentina, or Menenia; 13. the Ocriculana; 14. the Papiria; 15. the Pollia; 16. the Popilia; 17. the Pupina; 18. the Sergia; 19. the Veientina; 20. the Volturna; 21. the Claudia; 22. the Stellatina; 23. the Tromentina; 24. the Arnenfis; 25. the Sabatina; 26. the Pomptina; 27. the Publilia; 28. the Marcia; 29. the Scaptia; 30. the Ostentina; 31. the Falerina; 32. the Anienfis; 33. the Terentina; 34. the Velina; 35. the Quirina. In ancient authors, and inscriptions, we meet with the names of others, *viz.* the Pinaria, Sappinia, Camilia, Cestia, Cluentia, &c.

TRIBRACHYS,* in the ancient prosody, a foot of verse, consisting of three syllables, and those all short—*as, Athlus*.

* The word is formed from the Greek *τρεῖς*, three, and *βραχύς*, short.

Some of the ancients call this foot *trachemys*.

TRIBUCH, and **TREBUCHET**, a tumbrel, dicking or cuck-in-foot. See CUCKING-STEAD.

TRIBUNAL, *judicium*, the seat of a judge. See JUDGE.

The *tribunal* in a court of justice, is properly the seat or bench wherein the judge, and his assistants are placed, for the administration of justice. See BENCH, JUSTICE, &c.

The word is Latin, and takes its origin from a seat raised from the ground, wherein the *tribune* of the Roman people was placed to administer justice.

TRIBUNAL, among the ancients, was also a place from whence the people were harangued.

Among the Romans it was an eminence in a temple, or the forum, as that called *procuratoris*, where the people were harangued in *tribes*.

The French architects likewise use the word *tribune* for a gallery or eminence in a church, or any other place, wherein the music is placed for a symphony or concert.

TRIBUNE of the people, *TRIBUNUS plebis*, in antiquity a Roman magistrate, chosen out of the commons, to protect them against the oppressions of the great, and to defend the liberty of the people against the attempts of the senate, and consuls.

The *tribunes of the people*, were first established in the year of Rome 259. The first design of the creation was to shelter the people from the cruelties of usurers, and to engage them to quit the Aventine mount, whither they had retired in displeasure.

Their number, at first, was but two; and the next year, under the consulate of A. Posthumus Aruncius and Cassius Viscellinus, there were three more added; and this number of five was afterwards increased by L. Trebodius to ten.

The appellation *tribune* was given them, by reason they were at first chosen out of the *tribunes* of the army. See the article following.

The *tribunes* were, as it were, the heads and guardians of the people.—They called assemblies of the people when they pleaded; and in those assemblies they frequently annulled the decrees of the senate. Nothing could be concluded without their consent, which they expressed by subscribing the letter T at the bottom of the decree. They had it also in their power to prevent the execution of any decree, without giving any reason for it, and merely by subscribing *veto*.—They sometimes even called the consuls and dictator to account for their conduct before the people.

Augustus himself was *tribune* for 37 years; Tiberius assumed the same quality; as likewise did his successor, signifying the year of their *tribunate* on their medals and coins: but their design, herein, was only to possess themselves of all the authority, that there might be no body to oppose them.

TRIBUNE of the soldiers, *TRIBUNUS militum*, or *militaris*, an officer in the Roman army, who commanded in chief over a body of forces, particularly a division of a legion; and was much the same with our colonel, or the French *meistre de camp*.

There is a distinction of the *tribunes*, into *latiulavii* and *angustilavii*: those born of noble families were allowed, after they were made *tribunes* of a legion, to take the *latus clavus*. The rest were only to wear the *angustilavus*; whence Suetonius takes care to inform us, that his father was *tribunus latilavus* of the 13th legion.

Over these *tribunes* of legions and cohorts, there were other *tribunes* who commanded in the absence of the consuls, and who were invested with a consular authority.—Budeus will have these to be much the same as the marshals of France, or, at least, as our lieutenants-general.

Romulus likewise established a *tribune* of the cavalry, *tribunus equitum*, who was the same with the *magister equitum* under the dictators, the first officer after the kings.

The *tribunes* of the soldiery were of an elder standing than those of the people; those latter being elected out of the former.—Varro will have it, they were called *tribunes*, because at first, they were only three in number in each legion, when the legion consisted of three hundred men, taken out of the three tribes then on foot.—In proportion as the legion was increased, the number of *tribunes* was likewise increased to the number of six.

At first, the nomination lay in the general of the army; but in the year of Rome 391, it was appointed, that the people should nominate one part, and the general another: the latter were called *Rufuli*, from Rutilius Rufus, who passed that law.

Those chose by the people in the comitia, were called *comitiiati*: they were indifferently either patricians or plebeians, and they had the same marks of honour as the consuls themselves.—The *tribune of the praetorian cohorts* was the captain of the guards.

TRIBUNE was also an appellation given to various other officers; as the *tribuni aerarii*, *tribunes of the treasury*.—*Tribune of the claves*, the officer who commanded them.—*Tribuni fabricarum*, those who had the direction of the making of arms.—*Tribuni marinorum*, *tribuni nalarum*, and *tribuni voluptatum*, mentioned in the Theodosian Code, as intendants of the public shews and other diversions.

The title of **TRIBUNE**, *TRIBUNUS*, was also given to the chief of each tribe.

TRIBUNICIAN, *TRIBUNICIUS*, a term among antiquaries and medallists.—The *tribunician power* was the dignity, office, or authority of a *tribune* of the people.

This power was assumed by the emperors, and makes one of the chief titles they bear on their medals: the quality was first introduced by Augustus, to keep the sovereign authority over the other magistrates, without either taking that of dictator or king. Indeed it was offered to Julius Cæsar, but he despised it. Augustus is the first who used it, and his successors followed his example.—They reckon the years of their empire on their medals by those of their *tribunician power*.

This power was sometimes given them for a certain number of years, and sometimes for ever. Sometimes the emperors would communicate the power to such as they associated, or

as they intended to succeed them: and Tiberius held it fifteen years with Augustus. But this practice only obtained till the time of Valerian and Gallienus. After them we only find TR. P. II. in Claudius; TR. P. V. in Aurelian; and TR. P. in Probus.—This, however, is only to be understood of medals; for in inscriptions we find it after that time.

Cardinal Noris and F. Pagi have disputed about this *tribunician power*, wherein it consisted.—The first maintains, that it did not at all differ from that of the ordinary *tribunes*, which consisted in three things: 1. In the right of opposing all the acts and resolutions of the other magistrates. 2. In that it rendered their persons sacred and inviolable. 3. In a power of making edicts and laws.

F. Pagi asserts, that it made an addition to the power of the *tribunes*; that the privilege it conferred of making edicts, was more ample than that of the ordinary *tribunes*; besides, that it carried with it a power of convening the senate at pleasure.

M. Spanheim is of F. Pagi's opinion: he believes, that the *tribunician power* had much the advantage of the *tribunate*: 1. In that it was peculiar to the patricians, and did not reduce the person who held it to the degree of a plebeian. 2. In that it was not confined to the city of Rome alone, like the other, but that it extended throughout the empire, as well as the proconful power, which was usually annexed to it. 3. That the dignity of the *tribunes* was inferior to that of the pretors; whereas the *tribunician power* of the Cæsars conferred, according to Tacitus, a sovereign authority over all magistrates, and rendered such as it was communicated to, equal to the emperors, and even made them their colleagues in the empire: besides the power of opposing the enterprises of all the other magistrates, and that it rendered their persons sacred, and gave them a right to assemble and dismiss the senate, which were privileges the *tribunician power* had in common with the *tribunes*.

F. Hardouin thinks we should distinguish two *tribunician powers*; the one civil, the other military; but the proof he brings thereof is very weak.—M. Spanheim says, his distinction is only founded on vain conjectures, none of which deserve notice.

The learned are greatly divided as to the month and day whereon the *tribunician power* commenced: Sigonius and Petavius will have it begin on the 1st of January; others, as Perizonius, on the 5th of the calends of July: M. Toinard on the 4th of the ides of December: Onuphrius, cardinal Noris, F. Pagi, &c. on the day of the emperor's accession to the empire; with this difference, that F. Pagi takes it to be on the 5th of the calends of the month wherein the emperor was proclaimed; and that this day was, for this reason, held sacred among the Romans.

F. Hardouin thinks, that on medals the *tribunician power* commences on the anniversary of the building of Rome, viz. the 11th of the calends of May; excepting on the Greek medals, where it begins in September, in regard this month, which began the Greek year, was near the time when the *tribunician power* was first conferred.

Of all these sentiments the most probable is that of Onuphrius, &c. setting aside the restriction of F. Pagi. See M. Spanheim, *Dissert.* 12. tom. 2. p. 429.

TRIBUTA Comitia. See the article **COMITIA**.

TRIBUTARY, *TRIBUTARIUS*, one who pays tribute to another, in order to live in peace with him, or to share in his protection. See **TRIBUTE**.

The republic of Ragusa is *tributary* to the grand Turk; so also is the cham of Little Tartary, &c.

TRIBUTE, *TRIBUTUM*, a tax, or impost, which one prince or state is obliged to pay to another, as a token of dependance; or in virtue of a treaty, and as a purchase of peace. The Romans made all the nations they subdued, pay them *tribute*.—Mahomet laid it down as a fundamental of his law, that all the world should pay him *tribute*.

In the states of the grand Signior, Christian children are taken in way of *tribute*, to make agemogians, janizaries, &c. See **AGEMOGIAN**.

TRIBUTE is sometimes also used for a personal contribution, which princes levy on their subjects by way of capitation, or poll-money.

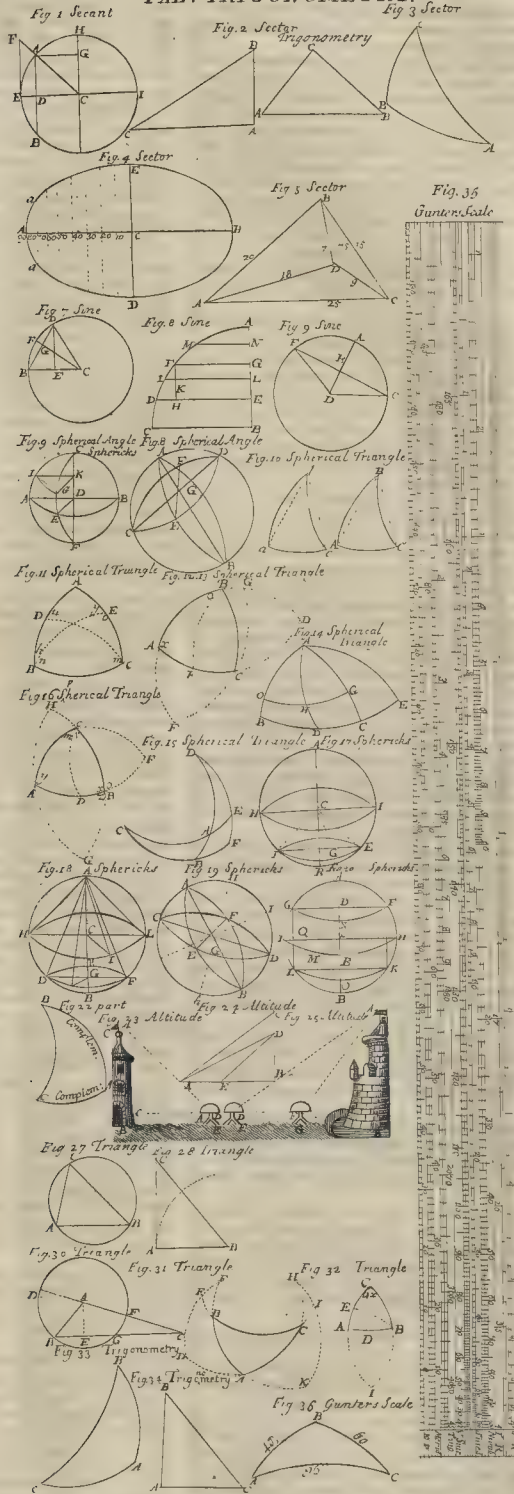
In this it differs from an *impost*, which is properly what is laid on merchandises.

TRICENNAL. See the article **TRENTAL**.

TRICEPS, in anatomy, a muscle of the thigh, having three origins, and as many insertions; and which may therefore be conveniently divided into three muscles, all arising from the os pubis, and inserted into the linea aspera of the thigh-bone, whereof they possess the greatest part.—See *Tab. Anat. (Myol.) fig. 1. n. 53. fig. 2. n. 36. fig. 6. n. 36. fig. 7. n. 26.*—They also serve as adductores, and draw the thighs together.

TRICUSPIDES, in anatomy, an epithet given to three valves, situate at the entrance of the vena cava into the heart. They open from without inwards, so as to let the blood of the cava pass into the heart, but prevents its reflux into the cava.

TAB: TRIGONOMETRY.



They are thus called from their figure, which is triangular; for which reason they are also called by the Greeks *τρίγωνος*.

TRIDENT, *TRIDENS*, an attribute of Neptune; being a kind of scepter which the painters and poets put in the hands of that god. It is in form of a spear or fork with three teeth; whence the word. See *SEPTER*.

The poets tell us, that Neptune makes the earth open, whenever he strikes it with his *trident*.

TRIDENT, among mathematicians, is used for a kind of parabola, by which Des Cartes constructed equations of six dimensions. See *PARABOLA*.

TRIEMIMERIS, *TRIIMIMEPHE*, *Semiteritaria*; a kind of caesura in Latin verse, wherein, after the first foot of the verse, there remains an odd syllable, which helps to make up the next foot.—As in, *Ille latus niveum molli fultus hyacintho*.

TRIENNIAL, an epithet applied chiefly to offices or employments which last for three years.

Thus we say, a *triennial* government: most regular monasteries have *triennial* superiors; that is, they elect new ones at the end of each three years.

In 1695, an act was made for *triennial* parliaments, i. e. for parliaments which should be dissolved, and the members be elected anew, every three years. Till that time, the king had it in his power to prorogue and continue his parliaments as long as he pleased.—This opened a door to corruption, which the *triennial* bill was intended to prevent.

The *triennial* act has, from some other views, been since repealed: for the great struggles usual at elections, the great ferment it usually puts the nation into, the great expences upon that occasion, with other considerations, determined the legislature, in 1717, to change *triennial* parliaments for septennial ones.

TRIENS, in antiquity, a copper-money, of the value of one third of an as, which on one side bore a Janus's head, and on the other a water-rat.

This was the piece of money used to be put in the mouths of the deceased, to pay Charon his fare for their passage into another world.

TRIENS, or **TRIENTAL**, was also used for a drinking cup; and that which was ordinarily used.—It contained four cyathi.

TRIERS. See the article *TRIOURS*.

TRIFOLIUM, *TREFOIL*, denotes several three-leaved plants. That most used in medicine is the *trifolium palustre*, or buck-bean, which is very detergent, and is used with success in scorbutic, rheumatic and scrophulous habits.

The ordinary way of using it is by making a pretty strong infusion of the dried herb, in form of tea.

TRIGA, in antiquity, a kind of car, or chariot, with three horses.

The *triga*, in reality, was only drawn by two horses; so that it was properly a biga; but it had, besides, a third horse tied to the others, like a led horse, for change. See *BIGA*.—Statius calls the third horse, *equus finalis*; Helychius, *καρπυσιος*; and Dionysius Halicarnassensis, *οπισθος*.

We do not find the *triga* on any ancient monument; but it was a long time in use among the Romans, at their ludi circenses.—The Greeks, who first introduced it, soon abandoned it.

TRIGAMY, a third marriage; or the state of a person who had been married three times.

In the ancient church, *trigamy* was only allowed to such as had no children by their former marriages.

If having children by one or both the former, they married again, after 40 years of age, they were excluded from communion for five years.—If they were only 40 years old, the penance was but four years. See *BIGAMY*.

TRIGINTAL. See the article *TRENTAL*.

TRIGLYPHS,* in architecture, a sort of ornaments repeated at equal intervals in the Doric frieze. See *FREEZE*.

* The word is formed from the Greek, *τρίγλυφος*, q. d. three engravings, from *γλυφω*, *sculpo*.

Each *triglyph* consists of two entire gutters, or channels, cut to a right-angle, called *glyphes*, and separated by three interstices, called by Vitruvius *femora*, from each other, as well as from two other half channels which are at the sides.—See *Tab. Archit. fig. 28. lit. y*.

The ordinary proportion of *triglyphs*, is to be a module broad, and one and a half high.—But this proportion, M. le Clerc observes, sometimes occasions ill-proportioned intercolumniations in the porticos; for which reason he chuses to accommodate the proportion of his *triglyphs* to that of the intercolumniation. See *INTERCOLUMNATION*.

The intervals between the *triglyphs* are called *metopes*.—Under the channels, or *glyphes*, are placed guttæ, or drops.

The *triglyphs* make the most distinguishing character of the Doric order.—Some imagine them originally intended for the conveyance of the guttæ that are underneath them: others

fancy they bear some resemblance to a lyre, and thence conjecture the ornament to have been originally invented for some temple sacred to Apollo. See *DORIC*.

Capital of a TRIGLYPH. See the article *CAPITAL*.

TRIGON,* **TRIGONUS**, in geometry, a triangle.

* The word is formed from the Greek, *τρίγωνον*, *triangle*.

TRIGON, in astronomy, denotes an aspect of two planets, wherein they are 120 degrees distant from each other; this is called also *trine*.

The *trigons* of Mars and Saturn are by astrologers held malefic aspects.

TRIGON, **TRIGONON**, was also a musical instrument, used among the ancients.

The *trigon* was a kind of triangular lyre, and was invented by Ibycus.

TRIGONOMETRY, the art of finding the dimensions of the parts of a triangle unknown, from the other parts known: or the art whereby, from any three parts of a triangle given, all the rest are found. See *TRIANGLE*.

Thus, e. g. from two sides AB and AC and an angle B, we find by *trigonometry*, the two other angles A and C with the third side BC, *Tab. Trigonometry, fig. 2*.

The word literally signifies the *measuring of triangles*, formed from the Greek, *τρίγωνον*, *triangle*, and *μετρον*, *measure*.—Yet does not the art extend to the measuring of the area or surface of triangles, which comes under geometry: *trigonometry* only considers the lines, and angles thereof.

Trigonometry is of the utmost use in various mathematical arts:—it is by means hereof that most of the operations of geometry and astronomy are performed; without it the magnitude of the earth and the stars, their distances, motions, eclipses, &c. would be utterly unknown.—*Trigonometry*, therefore, must be owned an art, whereby the most hidden things, and those remotest from the knowledge of men, are brought to light. A person ignorant hereof can make no great progress in mixed mathematics; but will often be gravelled, even in natural philosophy; particularly in accounting for the phenomena of the rainbow, and other meteors.

Trigonometry, or the solution of triangles, is founded on that mutual proportion which is between the sides and angles of a triangle; which proportion is known, by finding the proportion which the radius of a circle has to certain other lines, called *chords*, *sines*, *tangents*, and *secants*.

This proportion of the sines and tangents to their radius, is sometimes expressed in common or natural numbers, which constitute what we call the *tables of natural sines*, and *tangents*, &c.—Sometimes it is expressed in logarithms, and in that case constitutes the *tables of artificial sines*, &c.

Lastly, sometimes the proportion is not expressed in numbers; but the several sines, tangents, &c. are actually laid down upon lines of scales; whence the *line of sines*, *tangents*, &c.

Trigonometry is divided into *plain* and *spherical*: the first considering rectilinear triangles; and the second spherical ones.—The first is of obvious and continual use in navigation, measuring, surveying, and other operations of geometry. See *MEASURING*, *SURVEYING*, *SAILING*, &c.

The second is only learned, with a view to astronomy and its kindred arts, geography and dialling.—It is generally esteemed exceedingly difficult, by reason of the vast number of cases wherewith it is perplexed; but the excellent Wollius has removed most of the difficulties. That author has not only shewn how all the cases of rectangled triangles may be solved the common way, by the rules of sines and tangents; but has likewise laid down an universal rule, whereby all problems, both in plain and spherical rectangled triangles, are solved: and even obliquangular triangles he teaches to solve with equal ease.—His doctrine, see under the article *TRIANGLE*.

Plain TRIGONOMETRY, is an art whereby, from three given parts of a plain triangle, we find all the rest.

The great principle of *plain trigonometry*, is, that in every plain triangle, the sides are, as the sines of the opposite angles.—See this principle applied to the solution of the several cases of plain triangles, under the article *TRIANGLE*.

Spherical TRIGONOMETRY, is the art whereby, from three given parts of a spherical triangle, we find the rest. E. g. whereby from two sides and one angle, we find the two other angles, and the third side.

The principles of *spherical trigonometry*, as reformated by Wollius, are as follow: 1. In every rectangled spherical triangle, ABC, rectangular at A, the whole sine is to the sine of the hypothenuse, BC (*Tab. Trigonometry, fig. 53*.) as the sine of either of the acute angles, C, is to the sine of the leg, opposite thereto AB; or, the sine of the angle B, to the sine of its opposite leg AC; whence we deduce, that the rectangle of the whole sine into the sine of one leg, is equal to the rectangle of the sine of the angle opposite thereto, into the sine of the hypothenuse.

2. In every right angled spherical triangle ABC , (fig. 31.) none of whole sides is a quadrant; if the complements of the legs AB and AC to a quadrant, be considered as the legs themselves; the rectangle of the whole sine into the co-sine of the middle part, is equal to the rectangle of the sines of the disjunct parts, or extremes.

Hence, 1. If the sines be artificial, that is, the logarithms of the natural ones; the whole sine, with the co-sine of the middle part, will be equal to the sines of the disjunct parts.—

2. Since, in the rectilinear triangle ABC , (fig. 34.) the whole sine is to the hypotenuse BC , as the sine of the angle B or C to the sine of the opposite leg AC or AB : if, instead of the sines of the sides, we take the sides themselves; here, too, the whole sine, with the co-sine of the middle part AC or AB , will be equal to the sine of the disjunct parts B or C and BC ; *i. e.* to the sine of B or C , and BC itself.

This, Wolfius calls *regula sinuum catholica*, or the first part of the catholic rule of trigonometry; by means whereof all the problems of either trigonometry are solved, when the thing is effected by sines alone.—My lord Napier had the first thought of such a rule; but he used the complements of the hypotenuse BC (fig. 22.) and the angles B and C for the hypotenuse, and angles themselves: so that the tenor of his catholic rule of sines is this:

The whole sine, with the sine of the middle part, is equal to the co-sines of the disjunct, or, as he calls them, opposite parts.—But, in this, that harmony between plain and spherical trigonometry, visible in Wolfius's rule, does not appear.

3. In the rectangled spherical triangle ABC (fig. 31.) none of whole sides is a quadrant; as the whole sine is to the sine of the adjacent leg AC ; so is the tangent of the adjacent angle C to the tangent of the leg AB .

Hence, 1. as the co-tangent of the angle C , is to the whole sine, as the whole sine is to the tangent of the angle C , so is the sine of AC to the tangent of AB ; therefore the co-tangent of the angle C , will be to the whole sine, as the sine of the leg adjacent thereto, AC is to the tangent of the opposite one AB . 2. The rectangle, therefore, of the whole sine, into the sine of one leg AC , is equal to the rectangle of the tangent of the other leg AC , into the co-tangent of the angle C , opposite to the same. And, in like manner, the rectangle of the whole sine, into the sine of the leg AB , is equal to the rectangle of the tangent of the leg AC into the co-tangent of the angle B .

4. In every right-angled spherical triangle, ABC , none of whole sides is a quadrant; if the complements of the legs AB and AC to a quadrant, or their excesses beyond a quadrant, be considered as the legs themselves; the rectangle of the whole sine, into the co-sine of the middle part, will be equal to the rectangle of the co-tangents, and the conjunct parts. Hence, 1. If the sines and tangents be artificial; the whole sine, with the co-sine of the middle part, is equal to the co-tangents of the contiguous parts. 2. Since in the rectilinear, right-angled triangle, we use the tangents, when from the legs AB and AC (fig. 34.) given, the angle C is to be found; and in that case the whole sine is to the co-tangent of C , *i. e.* to the tangent of B , as AB to AC ; therefore, also, in the rectilinear triangle, if for the sines and tangents of the sides be taken the sides themselves; the whole sine, with the co-sine of the middle part, *i. e.* with AC , is equal to the co-tangents of the conjunct parts, *i. e.* to the co-tangent of C , or the tangent of B and the side AB .

This, Wolfius calls *regula tangentium catholica*, and constitutes the other part of the catholic rule of trigonometry; whereby all problems in each trigonometry, where tangents are required, are solved.

My lord Napier's rule to the like effect, is thus:—That the whole sine, with the sine of the middle part, is equal to the tangents of the contiguous parts.

This, therefore, a catholic rule, which holds in all trigonometry; that in a rectangled triangle (*notatis notandis*, *i. e.* the complements of the legs AB and AC , being considered as legs themselves, and in rectilinear triangles, the sides themselves being taken for the sines and tangents of the sides.) The whole sine with the co-sine of the mean and middle part is equal to the sines of the disjunct or separate parts, and the co-tangents of the conjunct and contiguous parts.

For an illustration and application of this rule, in the solution of the various cases of spherical triangles, see TRIANGLE.

Characters in TRIGONOMETRY. See CHARACTER.

TRIHING, THRIVING,* from the Saxon, *Thringa*, an extent containing three, or four hundreds, or the the third part of a shire, or province. See TITHING.

* Mr. Thoresby thinks the word ought to be written *Thringing*. See *Thoresby's Dialects*, p. 85.

The word is also used for a court held within that circuit, which was the same with what we now call a *court-leet*, which is above a court-baron, and inferior to the county-court.

TRILLION, in arithmetic, the number of a billion of billions.

After billions, we reckon by *trillions*, which makes a class of numeration, and is divided, like the other classes, into three

places: thus we say, *trillions*, *was* of a *trillion*; and *hundreds* of *trillions*, &c.

TRIM of a ship, is her best posture, proportion of ballast, and hanging of her masts for sailing.

Hence, to find the best way of making a ship sail swiftly, is to find her trim.

To TRIM a boat, is to set the passengers so as to keep the boat even on both sides.

TRIMACRUS, or TRIMACER, in the ancient profody, a foot in verse, consisting of three long syllables.

TRIMILCHI, a name by which the English Saxons called the month of May; because they always milked their cattle three times a day in that month.

TRIMMERS, in architecture, pieces of timber framed at right angles to the joints, against the ways for chimneys, and well-holes for stairs.

TRINE dimension, or threefold dimension, includes length, breadth, and thickness.

The trine dimension is peculiar to bodies or solids.

TRINE in astrology, is the aspect or situation of one star with regard to another, when they are distant 120 degrees,—as the arch AB (Tab. Astronomy, fig. 3.) which is a third of a circle, and its subtense AB , a side of an equilateral triangle ABC inscribed in the sphere. See ASPECT.

It is also called *trigon*, and is usually signified by the character Δ .

TRINGLE,* in architecture, a name common to several little square members, or ornaments; as reglets, liflets and platbands. See REGLET, LISTEL, &c.

* The word is French, where it signifies the same.

TRINGLE is more particularly used for a little member fixed exactly over every triglyph, under the plat-band of the architrave; from whence hang down the guttae or pendant drops. See TRIGLYPH, and GUTTA.

TRINITARIANS, a term used very variously, and arbitrarily—frequently it stands as a common name for all heretics who have sentiments on the mystery of the Trinity, different from those of the catholic church.

Sometimes it is more immediately restrained to some one or other particular class of heretics.—Thus *trinitarians* are frequently confounded with *unitarians*.

Sometimes it is even applied to the orthodox themselves, in contradistinction to the others who are then called *antitrinitarians*, who deny or impugn the doctrine of the Trinity.—Thus the Socinians and others used to call the Athanasians, *trinitarians*.

TRINITARIANS also denote an order of religious, instituted in honour of the Trinity, for the redeeming of Christian captives from the infidels; vulgarly called *mathurins*, and brothers of the redemption.

They are clothed in white, and bear on the stomach a cross, partly red and partly blue; by which three colours, white, red and blue, is supposed to be represented, the mystery of the Trinity.

The *trinitarians* made it their business to go and ransom Christians held in slavery in the republic of Algiers, Tunis and Tripoly, and the states of Morocco.—They have a rule peculiar to themselves; though several historians rank them among the observers of St. Augustin.

The order had its rise in 1198, under the pontificate of Innocent III. The founders were John de Marha and Felix de Valois: the first of Faucon in Provence; the second, not of the royal family of Valois, as some have imagined, but thus called, in all probability, as being a native of the country Valois.

Gauthier of Chatillon was the first who gave them a place in his lands to build a convent; which afterwards became the chief of the whole order: Honorius III. confirmed their rule. And Urban IV. appointed the bishop of Paris and others to reform them: they did it; and the reform was approved, in 1267, by Clement IV.

This order possesses about 250 convents, divided into thirteen provinces; whereof six are in France, three in Spain, one in Italy, and one in Portugal.—And formerly, there was one in England, another in Scotland, and a third in Ireland.

In the general chapters held in 1573 and 1576, a reform was ordered, and begun sometime afterwards by Julian de Nantonville, and Claude Aleph, two hermits of St. Michael, but now permitted by pope Gregory to take the habit of the Trinity; upon which their hermitage was converted into a house of the order.

In 1609, pope Paul allowed them to build new houses, and to introduce the reform into the old ones. In 1635, Urban VIII. by a brief, appointed the cardinal de Rochefoucault to introduce the reform into all the houses of the order; which was done accordingly, by the sentence containing the reform in eight articles; the principal whereof were, that they should observe the primitive rule approved of by Clement IV. that they should abstain from flesh, use woollen shirts, have masses at midnight, &c. In 1551, there was also a reform made among those of Portugal.

The habit of *trinitarians* is different in different countries; and that of the reformed is different from that of the rest.

Bare-footed TRINITARIANS, are a reform of this order, made in Spain in a general chapter, held in 1594, where it was resolved, that each province should establish two or three houses, where the primitive rule should be observed, and where the religious should live up to a greater austerly, use coarser cloaths, &c. and yet should have the liberty of returning to their ancient convent when they thought fit.

Dom. Alvarez Bafan, intending to found a monastery at Valdepeñas, and desiring to have it occupied by bare-footed religious, it was agreed to add nudity of feet to the reform, that the *trinitarians* might have the benefit of that establishment.—The reform afterwards grew into three provinces, and was at length introduced into Poland and Russia, and thence into Germany and Italy.

There are also *bare-footed trinitarians* in France, established by F. Jerom Halles, who being sent to Rome to solicit the first reform mentioned above; not content therewith, carried it further, and obtained a permission of pope Gregory, to add a coarse habit, and nudity of feet thereto. He began with the convent of St. Dionysius at Rome, and those of Aix in Provence.

In 1670 there were houses enough of this reform to make a province, and accordingly they held their first general chapter the same year.

There are also nuns of the *TRINITARIAN* order, established in Spain by St. John de Matha himself, who built them a convent in 1201.—Those who first took the habit were only oblate, and made no vows; but in 1201 the monastery was filled with real religious, under the direction of the infantia Constantia, daughter of Peter II. king of Arragon, who was the first religious, and the first superior of the order.

There are also bare-footed nuns of this order, established at Madrid about the year 1612, by Frances de Romero, daughter of Julian de Romero, a lieutenant-general in the Spanish army. Her design being to found a monastery of bare-footed Augustine, she assembled a number of maids for that end, lodging them, for the time, in a house belonging to the monastery of bare-footed *trinitarians* in the neighbourhood.

Here, attending at the church of those fathers, and being under the direction of F. John Baptist of the conception, their founder, the knowledge of that father, and the services he did them, made them change their resolution of becoming Augustine, and demand of their director the habit of his order, which he gave them.

But the order opposing their design, and refusing to take them under its jurisdiction, they addressed themselves to the archbishop of Toledo, who allowed them to live according to the rule of that order; so that they took the habit anew in 1612, and began their noviciate.

Lastly, there is a third order of *trinitarians*. See *THIRD Order*.

TRINITY, TRINITAS, TRIAS, TRIAD, in theology, the ineffable mystery of three persons in one God; Father, Son, and Holy Spirit.

It is an article in the christian faith, that there is one God, an unity in nature and essence, and a *Trinity* of Persons.—The term *trinity* implies the unity of three, the unity of three divine persons really different, and the identity of an indivisible nature: the *trinity* is a ternary of divine persons of the same essence, nature, and substance.

Theology teaches, that there is in God one essence, two processions, three persons, four relations, five notions, and the circumcession, which the Greeks call *perichoresis*. On each whereof we shall enlarge a little.

There is, then, one single essence, one divine nature, which is infinite, eternal, spiritual; which sees all things, which knows all things, which is every where, all-mighty, and which created all things of nothing.

In this God there are two processions, or emanations, *viz.* that of the Son, and that of the Holy Spirit: the first is called *generation*, and the second *spiration*.

The Son proceeds from the Father by way of knowledge; for God in knowing himself eternally, necessarily, and infinitely, produces a term, an idea, notion or knowledge of himself, and all his adorable perfections, which is called his *Word*, his *Son*, who is equal to him in all things, eternal, infinite, and necessary as his Father.—The Father regards the Son as his Word, and the Son has a regard to the Father as his principle: and in thus respecting each other eternally, necessarily, and infinitely, they love each other, and produce an act of their mutual love: the term of that love is the Holy Spirit, who proceeds from the Father and the Son by way of spiration, love, and impulsion; who is also equal in every thing to the Father and to the Son.

Each divine procession establishes two relations: the one on the side of the principle, or that from whence; and the other on that of the term, or that to which.—Hence, as there are two processions in God, there must be four relations, the paternity, the filiation, the active spiration, and the passive.

The *paternity* is a relation founded in what the school divines call the notional understanding; in which the Father stands related to the second person, the Son.—The *filiation* is the relation wherein the second person, *viz.* the Son, refers to the Father.

The *active spiration*, is the relation founded in the notional act of the will, whereby the first and second persons regard or refer to the third:—the passive spiration or procession, taken in its strict sense, is the relation whereby the third person regards, and is referred to the first and second.—Hence it appears, that there are in God, four relations, as we have already said, and five notions, as we shall shew hereafter.

Person is defined an individual, reasonable, or intellectual substance; or an intellectual and incommunicable substance.

The hypostasis, or substance, is what constitutes the person.—

There are then in the holy *trinity* three persons, Father, Son, and Holy Spirit, which have all things in common, except their relations; whence that axiom in theology comes to have place, in the divine persons there is no distinction where there is no opposition of relation: and hence it follows, that if power be sometimes attributed to the Father, wisdom to the Son, and goodness to the Holy Spirit; or if sins of infirmity or weakness be said to be against the Father, sins of ignorance against the Son, and sins of malice against the Holy Spirit, it is only spoke by way of appropriation, and not of propriety; for all those things are in common: whence that axiom, the works of the holy *Trinity* are common and undivided, (*i. e.* they agree to all the divine persons) but not their productions *ad intra* (as they are called) by reason they are relative.

By appropriation we mean the giving of some common attribute to a certain divine person, on account of some suitability or agreement. Thus, in the scriptures, in the apostles, and in the Nicene creed, omnipotence is attributed to the Father, because he is the first principle, and a principle without origin, or higher principle.—Wisdom is attributed to the Son, because he is the term of the divine understanding, to which wisdom belongs: goodness is attributed to the Holy Spirit, as being the term of the will, to which goodness belongs.

Some divines give other reasons of such kinds of attributions and appropriations, *viz.* that it is to flave off those imperfections from the divine persons which are found in the creatures: for created fathers are weak, drooping, and impotent; wherefore to ward off this imperfection from the first person, he is peculiarly said to be *almighty*.

Again, created sons are generally imprudent; wherefore, to remove this imperfection from the second person, he is said to be *wise*, or to be *eternal wisdom*.

Lastly, great minds or spirits, among created beings, are frequently wicked; wherefore to remove this imperfection from the third person, *goodness* is attributed to him.

The Father is the first person in the holy *trinity*, *ay* reason the Father alone produces the Word by the way of *understanding*: and with the Word produces the Holy Spirit, by way of *will*.

Here is to be observed, that the Holy Spirit is not thus called from his spirituality, that being common and essential to all the three Persons, but from the passive spiration which is peculiar to him alone.

Add, that when one Person in the holy *trinity* is called *first*, another *second*, and another *third*, it must not be understood of a priority of time, or of nature, which would imply some dependance; but of a priority of origin and emanation, which consists in this, that one person produces the other in such manner, as that the person which produces cannot be, or be conceived, without that produced.

From these things it follows, that in the holy *trinity* there are five notions (understanding by *notion* the peculiar manner whereby one divine person is distinguished from another.) The notions then whereby the Father is distinguished from the Son and Holy Ghost, are innascibility, and paternity.—That whereby the Son is distinguished from the two other divine persons, is filiation.

Active spiration distinguishes the Father and the Son from the Holy Spirit, and passive spiration is that whereby the Holy Spirit is distinguished from the Father and the Son.

The circumcession or perichoresis, is the intimate in-existence of the divine persons, or their mutual in-dwelling in each other: for though they be really distinct, yet are they consubstantial, whence it is that Jesus Christ says in St. John, cap. xiv. *Believe ye not that I am in the Father, and the Father in me?* Identity of essence, which the Greeks call *homoousion*, and consubstantiality, with a circulation of persons, are necessary to this circumcession. See *CIRCUMCESSION*.

Many of the heathens seem to have had a notion of a *Trinity*.—Steuch. *Enchiridion de Person. Philo.* lib. 1. cap. 3. observes, that there is nothing in all theology more deeply grounded, or more generally allowed by them, than the mystery of the *trinity*. The Chaldeans, Hebrews, Phœnicians, Greeks, and Romans, both in their writings and their oracles, acknowledged that the supreme being had begot another being from all eternity, which they sometimes called the *Son of God*, sometimes the *Word*, sometimes the *Mind*, and sometimes the

Wisdom of God, and asserted it to be the Creator of all things.

Among the sayings of the Magi, the descendants of Zoroaster, this is one; Πατρις ἑστὶν ὁ πατὴρ καὶ ὁ υἱὸς καὶ τὸ ἅγιον πνεῦμα; *the Father finished all things, and delivered them to the second Mind.*—The Egyptians called their *trinity*, *hemphtha*, and represented it by a globe, a serpent, and a wing disposed into one hieroglyphic symbol.—Kürcher, Gale, &c. suppose the Egyptians learned their doctrine of the *trinity* from Joseph, and the Hebrews.

The philosophers, says St. Cyril, owned three hypostases or persons; they have extended their divinity to three persons, and even sometimes used the term *trias*, *trinity*: they wanted nothing but to admit the consubstantiality of the three hypostases, to signify the unity of the divine nature, in exclusion of all triplicity with regard to difference of nature; and not to hold it necessary to conceive any inferiority of hypostases.

In effect, Plato, and some of his followers, speak of a *trinity* in such terms, that the primitive fathers have been accused of borrowing the very doctrine from the Platonic school; but F. Mourguet, who has examined the point, asserts, that nothing can be more stupid, than to suppose the Platonic *trinity* brought into the church; and to have recourse to the Platonism of the fathers to discredit their authority with regard to this dogma.

Friary or Fraternity of the Holy TRINITY, is a society instituted at Rome by St. Philip Neri in 1548, to take care of pilgrims coming from all parts of the world to that capital, to visit the tombs of St. Peter and St. Paul.

In order to this, they had a house wherein they entertained them for the space of three days, and not only them, but also poor people who were on the recovery, and who being turned too hastily out of the hospital, were exposed to relapses.

It was first set on foot in the church of St. Saviour in Campo, and consisted only of fifteen poor persons, who met in that church the first Sunday of each month, to practise the exercises of piety prescribed by the founder, and to hear the exhortation he there gave.

In 1558 pope Paul IV. gave the fraternity the church of St. Benedic, to which they gave the title of the *Holy Trinity*. Since that time, they have built close by it a very ample hospital for pilgrims, and persons on the recovery.

The fraternity is now very considerable, and most of the nobles of Rome, of either sex, have done it the honour to be members of it.

Congregation of the Holy TRINITY, is a congregation of twelve priests established in the hospital of the fraternity just mentioned, to take care of pilgrims and others entertained therein.

The frequent change of priests in the hospital occasioning a deal of diversity in the spiritual conduct and instruction of the pilgrims, to render it more uniform, the guardians and administrators established a congregation of twelve priests, who lodge in a quarter of the hospital, as in a monastery, and live there in community.

Order of the Holy TRINITY. See TRINITARIAN.

TRINITY Sunday, is the next Sunday after Whit-sunday; thus called, because on that day was anciently held a festival (as it still continues to be in the Romish church) in honour of the *Holy Trinity*.—The observation of this festival was first enjoined by the council of Arles in 1260.

TRINITY House, is a kind of college at Deptford, belonging to a corporation of sea-faring persons, who have power, by the king's charter, to take cognizance of such as destroy sea-marks, to correct the faults of sailors, &c. and to take care of several other things belonging to navigation and the seas, the examination of young officers, &c. anno 8^o Eliz.

TRINITY Term. See the article TERM.

TRINIUM GELD, or *THRINIUM GILD*, a compensation used among our Saxon ancestors for great crimes, which were not absolved but by paying a fine thrice nine times. See GELD.

TRINODA necessitas, in our ancient customs, a three-fold necessary tax, to which all lands were liable, viz. *expeditio*, & *reparatio pontis*, & *artis*; going to the wars, and repairing of bridges, and of castles.

These were the three exceptions anciently inserted in the king's grants of lands to the church, after the words that freed them from all secular service.

TRINODA, or *TRINODIA terræ*, in some ancient writers, denotes a quantity of land containing three perches.

TRINOMIAL, or *TRINOMIAL Root*, in mathematics, is a root consisting of three parts, or monomes, connected together by the signs +, or —

Such is $x + y + z$, or $a + b - c$.

TRIO, in music; a part of a concert wherein three persons sing; or more properly a musical composition consisting of three parts.

Trios are the finest kind of composition, and these are what please most in concerts.

TRIOCTILE, in astrology, an aspect or situation of two planets with regard to the earth, when they are three octants,

or eight parts of a circle, i. e. 135 degrees distant from each other.

This aspect, which some call the *syzygial aspect*, is one of the new aspects super-added to the old ones by Kepler.

TRIONES, in astronomy, a sort of constellation, or assemblage of seven stars, in the ursa minor, popularly called *Charles's Wain*.

From the *septem triones* the north pole takes the denomination *septentrio*.

TRIOURS, or *TRIEURS*, in law, such as are chosen by the court to examine whether a challenge made to the pannel of jurors, or any of them, be just or no. See *JURY*.

TRIP, a sea term. A ship is said to bear her *top-sails a-trip*, when she carries them hoisted up to the highest.

TRIPARTITE, *TRIPARTITUS*, something divided into three parts, or made by three parties; as, an indenture *tripartite*, &c. See *INDENTURE*.

TRIPARTITION, is a division by three, or the taking the third part of any number, or quantity.

TRIPHTEHONGUE, in grammar, an assemblage or concurrence of three vowels in the same syllable; as in *Quæ*.

Quintilian, lib. I. cap. 6. denies the existence of *triphthongues*, and asserts, that there never was any syllable of three vowels, but that one of them was always turned into a consonant: Scioppius asserts the contrary:—However this may be in the Latin and Greek, which were the only languages Quintilian understood, it is certain there are several languages in Europe, wherein *triphthongues* are in use.

TRIPLE, three-fold. See *RATIO*, and *SUB-TRIPLE*.

TRIPLE, in music, is one of the species of measure, or time.

Triple time consists of many different species, whereof there are in general four, each of which has its varieties.—The common name of *triple* is taken hence, that the whole or half measure is divisible into three equal parts, and is beaten accordingly.

The first species is called the *simple triple*, wherein the measure is equal to three semibreves, three minims, three crotchets, three quavers, or three semiquavers; which are marked thus, $\frac{3}{2}$, or $\frac{3}{4}$, $\frac{3}{8}$, $\frac{3}{16}$; but the last is not much used, except in church music.

In all these, the measure is divided into three equal parts or times, called thence *triple time*, or the measure of *three times*, whereof two are beat down, and the third up.

The second species is the *mist triple*: its measure is equal to six crotchets, or six quavers, or six semiquavers, and accordingly it is marked $\frac{6}{4}$, or $\frac{6}{8}$, or $\frac{6}{16}$; but the last is seldom used.

The measure here is usually divided into two equal parts or times, whereof one is beat down, and one up; but it may also be divided into six times, whereof the first two are beat down, and the third up; then the next two down, and the last up, i. e. each half of the measure is beat like the *simple triple* (on which account it may be called the *compound triple*) and because it may be thus divided either into two or six times (i. e. two *triples*) it is called *mixed*, and by some the *measure of six times*.

The third species is the *compound triple*, consisting of nine crotchets, or quavers, or semiquavers, marked $\frac{9}{4}$, $\frac{9}{8}$, $\frac{9}{16}$, the first and last are little used; some also add $\frac{9}{32}$, which are never used.

Some authors add other two, viz. six semibreves, and six minims, marked $\frac{6}{2}$ or $\frac{6}{4}$; but these are not in use.

This measure is divided either into three equal parts or times, whereof two are beat down, and one up; or each third part may be divided into three times, and beat like the *simple triple*; on which account it is called the *measure of nine times*.

The fourth species is a compound of the second species, containing twelve crotchets, or quavers, or semiquavers, marked $\frac{12}{4}$, $\frac{12}{8}$, $\frac{12}{16}$, to which some add $\frac{12}{32}$ and $\frac{12}{64}$, which are never used; nor are the first and third much used, especially the latter.

The measure here may be divided into two times, and beat one down, and one up; or each half may be divided, and beat as the second species, either by two or three; in which case it will make in all twelve times, and hence is called the *measure of twelve times*.

The French and Italian authors make a great many more species and divisions of *triple time*, unknown, or at least, unregarded by our English musicians, and therefore not so necessary to be dwelt upon here.

TRIPLE quartan fever. See the article FEVER.

TRIPLE Incision. See the article ENGRAFTING.

TRIPPLICATE Ratio, is the ratio which cubes bear to each other.

This ratio is to be distinguished from *triple ratio*, and may be thus conceived.—In the geometrical proportionals 2, 4, 8, 16, 32; as the ratio of the first term (2) is to be the third (8) duplicate of that of the first to the second, or of the second to the third: so the ratio of the first to the fourth is said to be *triplicate* of the ratio of the first to the second, or of that of the second to the third, or that of the third to the fourth, as being compounded of three equal ratios.

TRIPLICATIO, TRIPPLICATION, in civil law, is the same with sur-rejoinder in common law. See **SUR-REJOINDER**.

TRIPPLICITY, or **TRIGON**, among astrologers, is a division of the signs, according to the number of the elements, each division consisting of three signs.

Triplcity is frequently confounded with *trine aspect*; though strictly speaking, the two are very different things: as *triplicity* is only used with regard to the signs; and *trine*, on the contrary, with regard to the planets.

The signs of *triplicity* are those which are of the same nature, and not those which are in trine-aspect.—Thus Leo, Sagittary, and Aries are signs of *triplicity*, because those signs are, by these writers, all supposed fiery.

TRIPLOIDES, a surgeon's instrument, with a three-fold basis, used in the reftoring great depressions of the scull. *Blanc*.

TRIPPOD, **TRIPPOS**, in antiquity, a famed sacred seat or stool, supported by three feet, whereon the priests and sibyls were placed to render oracles.

It was on the *tripos* that the gods inspired the Pythians with that divine fury and enthusiasm, wherewith they were seized at the delivering their predictions.

M. Spanheim observes, that on Roman medals, the *tripod* expresses some priesthood, or sacerdotal dignity.—A *tripod*, with a raven and a dolphin, is also the symbol of the *dumviri*, deputed for keeping of the sibyllin oracles, and for consulting them on occasion.

TRIPPODIUM.—In the laws of Hen. I. occurs this passage—*In quibus vero causis triplicem ladam haberet, erat judicium tripodii, i. e. 60 solidi*. The meaning whereof, according to some, is, that as for a small offence, the composition was twenty shillings; so for a great offence, which was to be purged *triplici lada*, the composition was three times twenty shillings, and this was called *trippodium*.

TRIPOLI, or **TRIPOLY**, *terra TRIPOLITANA*, a kind of dry, soft earth, or chalk, of a citron colour, used in polishing the lapidaries, goldsmiths, copper-smiths, and glass-grinders works.

Some imagine *tripoli* to be only a common soft stone, burnt and calcined by the sulphurous exhalations which happen to be under the quarries where it is found: of these quarries there are a number in divers parts of Europe, particularly in Italy, where the *tripoli* is very good.—Others, with more justice, take it for a native earth. See *Supplement*, article **TRIPPELA**.

TRIPPING, in heraldry, denotes the quick motion of all sorts of deer, and of some other creatures represented with one foot up, as it were on a trot.

In speaking of lions, they say *passant*, instead of *tripping*.

TRIPHTHONGUE. See the article **TRIPHTHONGUE**.

TRIPOTOTES,* in grammar, defective nouns, which have only three cases: such is *fortis, fortis, forte* or *dica, dicam, dicat*.

* The word is compounded of *tripes, three*, and *otus, case*.

TRIREME, or **TRIREMIS**, in antiquity, a galley with three ranks of oars on a side. See *Supplement* article **TRIREMIS**.

TRISSACRAMENTARIANS, or **TRISSACRAMENTARIANS**, an appellation given to a sect in religion, who admit of three sacraments, and no more.

There have been several *trissacramentarians* who allowed of baptism, the eucharist, and absolution, for sacraments.—The English are often misrepresented by foreigners as *trissacramentarians*, from an opinion that they allow ordination a sacrament.

TRISAGION,* or **TRISAGIUM**, in church-history, a hymn wherein the word *holy* is repeated three times. See **HYMN**.

* The word is Greek, *triasion*, compounded of *tripes, three*, and *agios, sanctus, holy*.

The proper *trifagion* is those words *holy, holy, holy, Lord God of sabaoth*, which we read in Isaiah vi. 3. and in the Apocalypse. From these words the church formed another *trifagion*, which is rehearsed in Latin and Greek, in the respective churches, to this effect: *Holy God, holy mighty, holy immortal! have mercy upon us*.

Petrus Fullensis to this *trifagion* added, *Θεοῦ πατρὸς δι' ἡμᾶς, Thou who wast crucified for us—have mercy*, &c. thus attributing the passion not to the son alone, but to all the three persons of the trinity, and he pronounce'd anathema to all such as would not say the same. See **THEOPASCHITE**.

The use of the second *trifagion* (exclusive of the addition of Fullensis) began in the church of Constantinople, from whence it passed into the other churches of the east, and afterwards into those of the west. Damascenus, Codin, Basilicon, and others, say it was in the time of the patriarch Proclus that it was introduced, and that on the following occasion: there being a violent earthquake in the 35th year of the younger Theodosius, the patriarch made a grand procession, wherein, for several hours together, was sung the Kyrie eleison, Lord have mercy upon us. While this was in hand, a child was taken up into the air, where, it seems, he heard the angels singing the *trifagion* just mentioned. He returned soon after, and told

what he had heard: upon which they began to sing that hymn, and the more willingly too, as they attributed the troubles they were then under, to the blasphemies which the heretics of Constantinople uttered against the Son.—Aclepiades, Cedrenus, pope Felix, Nicephorus, &c. relate the same story.

Petrus Fullensis, patriarch of Antioch, and a zealous partisan of Nestorius, endeavoured to corrupt the hymn, by the addition above-mentioned, *who suffered for us*; but in vain: it still subsists in its primitive purity, both in the Latin, Greek, Ethiopic, and Mozarabic offices.

TRISECTION, or **TRISSECTION**, the dividing a thing into three.

The term is chiefly used in geometry, for the division of an angle into three equal parts.

The *trisection* of an angle geometrically, is one of those great problems, whose solution has been so much sought by mathematicians for these two thousand years; being, in this respect, on a footing with the quadrature of the circle, and the duplicature of the cube angle.

Several late authors have wrote of the *trisection* of the angle, and pretend to have found out the demonstration thereof; but they have all committed paralogisms.

TRISMEGISTUS,* an epithet or surname given to one of the two Hermes's, or Mercuries, kings of Thebes, in Egypt, who was cotemporary with Moses.

* The word is formed from *tripes, three*, and *megistos, greatest*.

Mercury, or Hermes *Trismegistus*, is the latter of the two Hermes's: the former having reigned about the time of the deluge.—They are both of them represented as authors of many of the arts and institutions of the Egyptians.

TRISMOS, **TRIMOS**, or **TRIMOS**, a convulsion of the muscles of the temples, causing the teeth to gnash.

TRISOLYMPIONICA,* *ΤΡΙΣΟΛΥΜΠΙΟΝΙΚΗ*, among the ancients, a person who had thrice bore away the prize at the olympic games.

* The word is composed of *tripes, three*; *Ολυμπια, Olymp c games*; and *νικη, victory*.

The *trisolymphionica*, or *trisolymphionics*, had great privileges and honours allowed them.—Statues were erected to them, of the kind called *iconica*, which were modelled to the size and form of their persons.

They were also exempted from all taxes and incumbrances, and could never be marked with infamy.

TRISPAST,* **TRISPASTON**, in mechanics, a machine with three pulleys; or an assemblage of three pulleys, for raising great weights.

* The word is compounded of *tripes, three*, and *πασας, traho, I draw*.

The *trispaston* is a species of polyspaston. See **POLYSPASTON**.

TRISSACRAMENTARIANS. See the article **TRISSACRAMENTARIANS**.

TRISECTION, *See the articles* **TRISECTION**. *TRISECTING Compasses*, *See* **COMPASSES**.

TRISTRA,* **TRAUSTRA**, or **TRISTA**, in our old law books, an immunity, whereby a man is excused from attending on the lord of the forest, when he is disposed to chafe within the forest; so that he cannot be compelled to hold a dog, follow the chase, nor stand at a place appointed, which otherwise he might be, under pain of amerement. *Manu. P. l. p. 86*.

* *Sint quieti, &c. de Chirogo, Hondenmy, Buckhol, & Trilli, &c. de omnibus misericordis, &c.*—Privileg. de Semplingham.

TRISYLLABLE, or **TRISSYLLABLE**, in grammar, a word consisting of three syllables.

TRITE, **TRITH**, in music, the third musical chord, in the system of the ancients. See **CHORD**.

There are three strings under this denomination in the ancient diagramma; viz. the *trite hyperboleon*, *trite diazeugmenon*, and *trite synemmenon*.

TRITHEISM, the opinion of the *tritheists*; or the heresy of believing three Gods. See **GOD**, and **TRINITY**.

Tritheism consists in admitting not only of three persons in the Godhead; but of three substances, three essences or hypostases, and indeed three Gods.

Several people, out of fear of giving into *tritheism*, have become sabellians; and several others, to avoid sabellianism, have commenced *tritheists*; so delicate and subtle is the distinction.

In the famous controversy between Dr. South and Dr. Sherlock, the first is judged to have run into sabellianism, by a too rigorous asserting the unity of a Godhead; and the latter into *tritheism*, by a too absolute maintaining the trinity.

John the grammarian, surnamed Philoponus, lover of labour, is held the author of the sect of the *tritheists*, under the emperor Phocas; at least it appears, that he was a zealous advocate thereof.—Leontius and Georgius Pantes wrote against him.

TRITON, in poetry, a sea-demi god, held by the ancients to be an officer or trumpeter of Neptune, attending on him, and carrying his orders and commands from sea to sea.

The poets and painters represent him as half man, half fish, terminating in a dolphin's tail, and bearing in one hand a sea-shell, when he used him as a trumpet.

Some of the ancients make him the son of Neptune, and the nymph Salacia; Hesiod, of Neptune and Amphitrite; Neumenius in his book *de piscationibus*, makes him the son of Oceanus and Tethys; and Lycophron, the son of Nereus. But though Hesiod, and the mythologists, only speak of one *triton*, the poets have imagined several; giving some of them for trumpeters to all the sea-gods, particularly to Neptune and Venus: accordingly they were frequently introduced on the ancient theaters, and in the naumachia.

In effect, the *tritons* not only officiated as trumpeters in Neptune's retinue; but were also supposed to draw his chariot, *i. e.* the sea-shell wherein he rode over the waters: as we find in Virgil, *Æneid* X. 209. Ovid, *Metam.* l. 333. and on a medal of Claudius.

The fable of the *tritons*, no doubt, took its rise from what are called the sea-men, or mer-men; for that there are such things as sea-men, has been believed in many ages. See MERMAID. The poets ordinarily attribute to *triton* the office of calming the waves, and of making tempests cease.—Thus in the 11th of the *metamorphosis* we read, that Neptune desiring to recall the waters of the deluge, commanded *Triton* to sound his trumpet, at the noise whereof the waters all retired.

TRITONE, TRITONO, in music, a false concord, consisting of three tones, or a greater third, and a greater tone. Its ratio, or proportion in numbers, is, of 45 to 32. In dividing the octave we find, on one side, the false fifth, and the *tritone* on the other.

The *tritone* is a kind of redundant fourth, consisting of three tones, whence its name; or, more properly, of two tones, with a greater semitone, and a lesser, as of *ut* to *fa*, sharp: of *fa* to *si*, flat, &c.—But it is not, as many imagine, a greater fourth; for the fourth is a perfect interval, which does not admit of any majority or minority: nor must the *tritone* be confounded with the false fifth; for the *tritone* only comprehends four degrees, *viz.* *ut*, *re*, *mi*, *fa*, sharp; whereas the false fifth comprehends five, *viz.* *fa*, sharp, *sol*, *la*, *si*, *ut*: besides, that among the six semitones, which compose the *tritone* chromatically, there are three greater and three lesser; whereas among the six semitones, which compose the false fifth, there are only two lesser, and four greater. See FOURTH, FIFTH, &c.

TRITURATION,* TRITURA, or TRITUS, in pharmacy, grinding; the act of reducing a solid body into a subtiler powder, called also *levigation*, *pulverisation*, &c.

* The word is formed from the Latin, *triturare*, to *trass*; of *tero*, I *wear*, rub, or grind.

The *trituration* of woods, barks, minerals, and other hard and dry bodies, is performed in metalline mortars.

The same term is also applied to the comminuting, bruising, and dividing of humid matters into little parts.—The *trituration* of moist bodies is performed in marble, or stone mortars, with pestles of wood, glass, ivory, &c.

Trituration, Boerhaave observes, has a wonderful power to dissolve some bodies, and will render them as fluid, as if they were fused by the fire.—Thus if you grind the powder of myrrh, and salt of tartar together, they will dissolve each other. By rubbing new and bright filings of iron in a mortar, with double their weight of clean sulphur, the iron will be dissolved, so as by diluting it with water to afford the vitriol of martis.

Gold long ground in a mortar, with salt of tartar, will yield a kind of tincture; and rubbed with mercury, in a mortar of glass, it entirely dissolves into a purple liquor, and becomes a most powerful medicine.

Dr. Langelotte has wrote a curious treatise of the great effects of *trituration* in chymistry; and describes a peculiar way he employed to grind gold, whereby he says he could render it as fluid as the fire does, and make an aurum potable, by the bare motion of a mill.

This author, in the *Philosophical Transactions*, mentions his way of grinding gold, and describes two engines, or philosophical mills for the purpose, with one of which, in the space of fourteen natural days, he reduced a leaf of gold to a dusky powder, and putting it into a shallow retort placed in a sand-heat, he thence obtained, by gradually increasing the fire, and giving a strong one at last, a very few red drops, which, digested *per se*, or with tartarized spirit of wine, afforded a pure and genuine aurum potable.

The success of this operation, the doctor attributes, in a great measure, to the salt of the air, which, in grinding, plentifully mixes and unites itself with the gold.

TRITURATION is also used in medicine, for the action of the stomach, on the food, whereby it is fitted for nutriment. Some physicians maintain that digestion, is performed by *trituration*, and not by fermentation; or that all the stomach does, is to grind and comminute the food into smaller parts to fit it for nutrition, without making any other alteration therein.—See the article DIGESTION, where the doctrine is laid down at large.

This system was much talked of some years ago, being countenanced by Dr. Piccaini, and others; but it seems now much

declined.—The doctrine of *trituration* is not new: Erasistratus maintained it in all its latitude many ages ago; and the moderns have only revived it.

It was first broached in the time of Hippocrates, that is, in a time when anatomy was but little known: and it was then that rendered it current.—An opinion was entertained by some physicians of those times, that the stomach was only the receptacle of the solid or dry foods; that those foods, after having been diluted, and broke in the mouth, were again broke more perfectly in the stomach, and that by this means alone they were converted into a chyle: but that the drink, by reason of its liquidity, not being subject to be broken, went to the lungs, and not to the stomach, where, by reason of its abundance, it would rather have prejudiced the digestion than have aided it.

Hippocrates, we read, in the fourth book of *diseases*, stood up strenuously against an opinion so visibly contrary to reason and experience; and he informs us, that he gave himself this trouble, because the error had already got a good number of partizans.—It could not stand long against the reasons of Hippocrates; and its defeat was followed by the entire ruin of the system of *trituration* for that time, which had its foundation thereon.

But Erasistratus retrieved it again; and the doctrine, after having been supported for some time, fell anew into oblivion; whence some late authors have in vain endeavoured to recover it.

TRIUMPH, TRIUMPHUS, a ceremony, or solemnity, practised among the ancient Romans, to do honour to a victorious general, by affording him a magnificent entry into their city.

The *triumph* was the most pompous spectacle known among the ancients: authors usually attribute its invention to Bacchus; and tell us, that he first triumphed upon the conquest of the Indians; and yet this ceremony was only in use among the Romans.

The *triumph* was of two kinds, the *lesser*, and the *greater*.—The *lesser triumph* was granted upon a victory over some unequal or unworthy enemy; as over pyrates, slaves, &c.—This they called *evatio*; because only sacrifices offered herein were cheap.

The *greater triumph*, called also *curulis*, and simply the *triumph*, was decreed by the senate to a general, upon the conquering of a province, or gaining a signal battle.

The order and œconomy of the *triumph* was thus.—The general having dispatched couriers with tidings of his success, the senate met in Bellona's temple to read the letters:—this done, they sent him the title *imperator*, with orders for him to return, and to bring his victorious troops along with him. When he was arrived near the city, the general and principal officers took oath of the truth of the victory; and the day of *triumph* was appointed.

The day being arrived, the senate went to meet the conqueror without the gate called *capena*, or *triumphalis*; and marched in order before him to the capitol.—He was richly clad in a purple robe embroidered with figures of gold, setting forth his glorious achievements: his bulkins were beset with pearl, and he wore a crown, which at first was only laurel, but afterwards was gold: in one hand he bore a laurel branch, and in the other a truncheon. He was drawn in a car or chariot, adorned with ivory and plates of gold, drawn usually by two white horses, though sometimes by other animals; as that of Pompey, when he triumphed over Africa, by elephants: that of Mark Anthony, by lions; that of Heliogabalus, by tigers; that of Aurelian, by deer; and that of Nero, by hermaphrodite mares, &c.

At his feet were his children, or, sometimes, on the chariot horses.—It is added, that the public executioner was behind him, to remind him from time to time, that these honours were transitory, and would not screen him from the severity of the laws, if he should ever be found delinquent.

The cavalcade was led up by the musicians, who had crowns on their heads: after them came several chariots, wherein were plans of the cities and countries subdued, done in relief: they were followed by the spoils taken from the enemy, their horses, arms, gold, silver, machines, tents, &c. After these came the kings, princes or generals subdued, loaden with chains, and followed by mimicks and buffoons, who insulted over their misfortunes.—Next came the officers of the conquering troops, with crowns on their heads.

After these appeared the *triumphal* chariot; before which, as it passed, they all along strewn flowers; and the music played in praise of the conqueror amidst the loud acclamations of the people, crying, *io triumphe*.

The chariot was followed by the senate clad in white robes, and the senate by such citizens as had been set at liberty or ransomed.

The procession was closed by the priests, and their officers and utensils, with a white ox led along for the chief victim.

In this order they proceeded through the *triumphal* gate, along the *via sacra* to the capitol, where the victims were slain.

In the mean time, all the temples were open; and all the altars loaden with offerings and incense; games and combats

were

were celebrated in the public places, and rejoicings appeared every where.

What was horrible amidst all this mirth, was, that the captives, when arrived at the forum, were led back to prison and strangled; it being a point of religion with them, not to touch the victims till they had taken full revenge of their enemies.—The rites and sacrifices over, the *triumpher* treated the people in the capitol, under the portico's, and sometimes in Hercules's temple.

TRIUMPHAL arch. } See the articles } **ARCH.**
TRIUMPHAL column. } **COLUMN.**

TRIUMPHAL crown or garland. See **CROWN.**—This is said to have been taken from Apollo's crowning his head with a laurel after killing the Delphian serpent.

TRIUMPHAL gown, toga triumphalis.

TRIUMPHANT church. See the article **CHURCH.**

TRIUMVIR, one of three persons who govern absolutely and with equal authority in a state.

The word is little used but in the Roman history.—Cæsar, Crassus and Pompey were the first *triumvirs*, i. e. the first who divided the government of the republic among them.

There were also other officers, called *triumvirs*, *triumviri*; as the *triumviri capitales*, created in the year of Rome 463, to take care of prisoners, and look to the execution of criminals.

Triumviri monetales, who were magistrates created at the same time, to look to the coining of the money; whence that mark still extant on many ancient coins, **IIIVIRI**.—These officers were very considerable, and were chosen out of the knights.—They made part of the *centumviri*. The title they bear on medals is, **IIIVIR AAA FF. triumvir auro, argento, ære fando, feriendo**, which signifies that they had the direction of casting and striking of gold, silver, and brass.

There were also *triumviri ædibus reficiendis*, officers appointed to look to the reparation of temples: *triumviri colonis deducendis*, for the conducting and settling of colonies: *triumviri*, for the raising of troops: *nocturnal triumviri*, to prevent or extinguish fires: *triumviri*, to review the forces, &c.

In the Acilian family, we read of one M. Acilius **IIIVIR VALETU**, that is, *triumvir of health*, or a magistrate of health.—M. Spanheim takes him to have been a magistrate established to perform sacrifice to the gods of health, to dedicate their temples, &c.

Oruphris and Vaillant read *triumvir valetudinis*; Patin, *triumvir valetudinarius*; but M. Spanheim, with much more reason, reads *triumvir valetudo*; in like manner, as on a medal of the Aquilian family, we read **IIIVIR VIRTUS**, signifying, that one M. Aquilius had been made *triumvir*, to repair the temple of virtue, and Acilius that of health.

TRIUMVIRATE, **TRIUMVIRATUS**, an absolute government administered by three persons, with equal authority.

There were two famous *triumvirates* at Rome.—Pompey, Cæsar and Crassus established the first; and Augustus, Mark Anthony, and Lepidus, the second.

This latter *triumvirate* gave the last blow to the liberty of the republic. Augustus having vanquished Lepidus and Anthony, the *triumvirate* sunk into a monarchy. See **MONARCHY**.

TRIUNE, *tres in uno*, three in one; a term sometimes applied to God, to express the unity of the God-head, in a trinity of persons.

TROCHAIC, **TROCHAÏCUS**, in the Latin poetry, a kind of verse consisting of trochees; or wherein that foot predominates; as the iambus does in the iambic.

The 18th ode of the 2d book of Horace's odes, consists of strophes of two verses, the first whereof is *trochaic* diameter catalectic; i. e. *trochaic*, composed of three trochees, and a syllable at the end: which some call the *Euripidean trochaic*.

Non ebur neque aureum—

Largiora fragilis.

TROCHANTER, **TPOXANTHP**, in anatomy, a name given to two apophyses situate in the upper part of the thigh-bone. See **ANATOMY**.

The largest, which is above, is called the *great trochanter*; and the smaller, beneath, the *less trochanter*.—See *Tab. Anat. (Osteol.)* fig. 7. n. 23. fig. 3. lit. t. and lit. u. fig. 7. n. 24. See also the article **FEMUR**.

The word literally signifies *rotator*, or *roller*; formed from the Greek *τροχωω*, *roto*, I turn, I turn round.—That appellation was given them by reason they receive the tendons of most of the muscles of the thigh, among which are the obturators, which move it round. See **OBTURATOR**.

TROCHE, **TROCHISCUS**, in pharmacy, a form of medicine, made to be held in the mouth to dissolve gradually.

The *troche* is properly a dry composition, the chief ingredients whereof, after having been brought into a very fine powder, and mixed with sugar, are incorporated with some proper liquor, as distilled waters, wine, vinegar, or mucilages; and reduced into a mass, which is moulded into little cakes, or

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balls of any form, at pleasure, and dried in the air, far from the fire.

There are *troches* of various kinds, and for various intentions; as, *purgative*, *alterative*, *aperitive*, *corroborative*, &c. *troches*. Latin authors call them *posilli*, *ritulae*, *placintulae*, *cibes*, and *orbiculi*; and the English, frequently, *lozenges*.

The chief *troches* now in use are those of myrrh and liquorice, and those of the testaceous powders for the heart-burn.—Those of coliquintida, are called *troches of albandal*, from the Arabs, who called coliquintida *bandal*.

TROCHEE, **TROCHÆUS**, in Greek and Latin poetry, a kind of foot, consisting of two syllables, the first long, the

latter short:—such as the words *vade* and *musa*.

The *trochee* is the reverse of the iambus, and has just a contrary effect; the latter being light and sprightly, and the former weak and languid, as all those measures are which move from a long to a short syllable.

Some call the *trochee*, *chorœus*, because proper for songs and dances. These give the denomination *trocheus* to the turbachys. *Quint. l. 10. c. 4.*

TROCHILUS, in architecture, a hollow member, more usually called by modern architects, the *soffit*; and by our English workmen, the *casement*.—See *Tab. Archit. fig. 4.* See also the article **SCOTIA**.

TROCHITE, or **TROCHITES**, in natural history, a kind of figured fossil stones, resembling parts of plants; vulgarly called *St. Cutbert's beads*.

They are usually of an opaque, brownish colour, they break like spar, glossy and shining, and are easily dissolved in vinegar.—Their figure is generally cylindrical, sometimes a little tapering, the circumference smooth, and both the flat sides covered with fine radii drawn from a certain hole in the middle to the circumference.—See *Tab. Natural History, fig. 12. n. 1, 2, 3.* Two or three or more of the simple *trochites*, joined together, constitute what the naturalists call an *entrochus*.

In these the *trochiteæ*, or single joints, are so set together, that the rays of one enter into furrows in the other, as in the features of the skull.—They are found in great plenty in the bodies of the rocks at Braughton and Stock, two villages in Craven, at all depths under ground; also in Mendip hills, &c. sometimes only sprinkled here and there, and sometimes in large strata or beds of all magnitudes, from the size of the smallest pin, to two inches about.

They are often found ramous or branchy, several rudiments of large branches arising from the stem, or cylinder, and sometimes still smaller from these. The branches being deeply inserted into the stem, the tearing them off leaves great holes therein.

Dr. Lister has discovered a fort of little fragments among them, which he takes to have been the apices of them; and another sort, which he supposes to have been the roots; for he supposes them to be a sort of rock plants.

Mr. Beaumont, in the *philosophical transactions*, assures us, that he has found that all the cliffs in some mines are made up of these *entrochæ*, some whereof have been converted into a reddish matter; while others becoming white spar, compact bodies of that substance: and considering that all the cliffs for a very large circumference in some places consist almost wholly of these stones, it has been thought by some who suppose them plants, that there have been, and, still are, whole fields or forests of these under ground, as there are of coral in the sea. In the courses between the cliffs, are found of these fossils at all stages and degrees of maturity, growing up in the gritty clay, and rooted in the rake-mold stones, many of them of the form and dimensions of a tobacco-pipe, with the evident beginnings of circles and futures, and others full grown, formed of perfect spar, and at their point of maturity.

The central matter in many continues still white and soft; as the whole substance is by some thought to have been at first; and is continually refreshed by the mineral streams and moisture which have free access to it through five hollow flits or feet in the figured roots, or through the mass of clay usually lying under the plain roots.

From the curiosity of their make, and from this accidental resemblance of plants, many have thought them to be such; and affirm that they may vie with most of the vegetable kingdom, and are shaped and formed like them, having stem, branches, roots, an inward pith, as likewise joints and runnings in their grit, and sometimes cells to supply the place of veins and fibres.

Others have thought it highly probable, these rock-plants are lapides sui generis, and not parts of animals or plants petrified; as many authors have imagined.—If the figured roots, whereon they sometimes grow, give any suspicion they might have belonged to an animal, particularly a species of the steller arborecens, the trunks seem to them to convince the contrary, nor are they reducible to any known species of vegetables. Mr. Beaumont tells us, that he had by him above 20 different species of *trochites*, all or them wonderfully regular, and not to be paralleled by any vegetable

he knows of in nature: and it is inconceivable how so many species diffused through many parts of the earth, should come to be lost. They are certainly, indeed, not vegetable remains, but are truly parts of the *flella arboreifens* petrified. See *supplement*, articles *ENTROCHUS* and *TROCHITES*.

TROCHLEA, ΤΡΟΧΛΙΑ, one of the mechanical powers, usually called a *pulley*.

Hence the cavity in the bone of the arm or shoulder, whereinto, when the arm is stretched forth, the process of the undermost and lesser of the long bones of the cubitus enters, is also called *trochlea*.

TROCHLEARES, in anatomy, a name given to the oblique muscles of the eye; because serving to pull the eye obliquely upwards or downwards, as it is turned like a pulley.

TROCHOID,* ΤΡΟΧΟΙΣ, or ΤΡΟΧΟΙΔΕΣ, in geometry, a curve, whose genesis may be thus conceived.—If a wheel or circle be moved with a two-fold motion at the same time, the one in the right line, and the other circular about its centre: and these two motions be equal, *i. e.* describe two equal lines in the same time: and if in the radius, which at the beginning of the motion, reaches from the centre of the wheel, or the first point of the line which describes the circumference; if, I say, in this radius a point be taken any where except in the centre, this point will describe a curve, one part whereof will be below the line described by the centre, and the other above it.—This line, thus described by the point taken in the radius, is called the *trochoid*.

* The word is formed from the Greek, τροχός, *wheel*, and ὁδός, *form*.

The right line which joins the two extremities of the *trochoid*, and which is either the path the wheel makes, or a line parallel to that path, is called the *basis* of the *trochoid*.

The *axis* of the *trochoid* is the diameter of the wheel, perpendicular to the base in the middle of the motion; or that part of the radius between the *trochoid* and its base.—The point wherein the axis is cut into two parts by the line described by the centre of the wheel, is called the *centre* of the *trochoid*; the uppermost point of the axis, the *vertex* of the *trochoid*; and the plane, comprehended between the *trochoid* and its base, the *trochoidal space*.

The *trochoid* is the same with what we otherwise call the *cycloid*; the properties, &c. whereof, see under the article *CYCLOID*.

TROGLODYTES,* ΤΡΟΓΛΟΔΥΤÆ, in the ancient geography, a people of Æthiopia, said to have lived in caves under ground.

* The word is formed of the Greek, τρογών, *coverna*, and δύνω, *enter*.

Pomp. Mela gives a strange account of the *Trogodytes*.—He says, they did not so properly speak as *thrick*; and that they lived on serpents, &c.—Tzetzes calls them *ichthyophagi*. Montanus takes them to be the same with those called in scripture *Ghananim*. Ptolemy in Strabo will have the name wrote without the *i*, *Trogodite*.

TROGLODYTES is also an appellation given to a sect of Jewish idolaters.

The prophet Ezekiel relates, chap. viii. ver. 8, 9, 10, &c. that God, among other abominations of the Israelites which he set before him, shewed him seventy old men, who with their censers in their hands, adored secretly all kinds of animals and reptiles painted on the wall.

Philastrus, on this vision of the prophet, erects these idolaters into a sect of Israelites, who, hiding themselves under-ground and in caves, adored all kinds of idols: and the editor of Philastrus calls this sect *Trogodytes*, from τρογών, *a cave*, and δύνω, *I penetrate*, as believing, on the credit of Philastrus, that those of this sect hid themselves in caves.

And yet the prophet plainly shews, that it was in secret parts of their house, and not in subterraneous caverns, that these 70 Israelites idolatized.—The name *Trogodytes*, then, is feigned; and so probably is the sect.

TROIA, or **TROJAN games**, ludæ TROJANI, were games instituted by Ascanius, son of Æneas; and which afterwards passed to the Romans, and were celebrated in the circus by the youth of Rome.

One of the number who presided over the solemnity, was was called *princeps juventutis*; and was always of one of the first families in Rome.

At first, it is supposed, they only engaged on foot, and on horseback; because Virgil, who describes these games in the *Æneid*. lib. 5. only speaks of horses and cavaliers, without any mention of bigæ and quadrigæ, which were not in use at Rome, till long after Ascanius.—And yet Dion, speaking of Cæsar's games, says, the youth there combated in chariots: but it is thought by some, that these were not the *Trojan* games, but races and combats of a different kind, proper for young people, of a more advanced age.

TROLLING, among Anglers.—To *troll*, is to fish for pikes with a toad, whole line runs on a reel. See *PIKE FISHING*.

TRONAGE,* ΤΡΟΝΑΓΙΟΝ, an ancient custom or toll paid for the weighing of wool.

* The word comes from *trona*, an old name for a beam to weigh withal. Hence,

TRONATOR, an officer of the City of London, whose business it was to weigh the wool brought into that city.

TRONCONNÉE, or **TRONCONNÉE**, in heraldry, denotes a cross or other thing cut in pieces and dismembered; yet so as all the pieces keep up the form of a cross, though set at a small distance from one another.

TRONE weight, was the same with what we now call *tray-weight*. See **WEIGHT**.

TROOP, a small body of horse, or dragoons, usually about 50; commanded by a captain. answering to a company of foot.

Independent TROOP, is a *troop* that is not imbodyed in, or joined with any regiment.

To beat the TROOP, is the same with beating the assembly. See **ASSEMBLY**.

TROOPS of the *household*. See the article **HOUSEHOLD**.

TROPE, ΤΡΟΠΟΣ, in rhetoric, a word or expression used in a different sense from what it properly signifies.—Or, a word changed from its proper and natural signification to another, with some advantage.

As, when we say an *ass*, for a *stupid person*; *thunderbolt of war*, for a *great captain*; to *wash the black-moor white*, for a *fruitless undertaking*.

This change of sense is never to be used, but where it gives a force and dignity, or renders the discourse more significant, weighty and graceful.

It is called *trope*, τροπος, from the Greek, τρομα, *verbo*, I turn, change, in regard the words are here transferred from the things they properly import, to others which they only import indirectly; and that *trope* only signify the things they are applied to, by reason of the connexion and relation those things have with those others, whose proper names they are.

This change or inversion is performed various ways; but chiefly four; whence arise four principal *trope*s, viz. the metaphora, metonymia, synecdoche and ironia; each whereof, see under its proper article, **METAPHORA**, **METONYMIA**, **SYNECDOCHE**, &c.

Some authors confound *trope*, with figure; but they are very different things.—Most authors, as F. de Colonia, &c. make figure, the genius, and *trope*, a species; defining figure to be an ornament in discourse, whereby it is raised above the common language; and *trope* to be that peculiar kind of ornament which consists in a change of the sense, &c.

But Vossius makes *trope* and figure to be two collateral and independent things; defining *trope* to be the change of the sense, &c. and figure, to be any ornament, except what becomes so by such change, &c. See **FIGURE**.

'Tis in the *trope*s, principally, that the richness and variety of language consists; and yet those should never be used but to express what could only be represented imperfectly, in common and proper terms.—*Trope*s should always be clear; they are vicious, if they be obscure, or too far fetched. The idea of the *trope* should be so connected with that of the proper name, that they should follow each other; so that in exciting the one, the other should be awakened of course.

Besides the four capital *trope*s above-mentioned, there are several inferior ones.—When the *trope* is too bold, it is called an *hyperbole*; when continued, it is an *allegory*; when too obscure, an *enigma*; when it shocks us, or is too remote, a *cataphrasis*.

Add to these, other *trope*s, as the *metalepsis*, *antonomasia* and *litotes*, or *extenuation*. See **METALEPSIS**, &c.

Some also refer the six kinds of scoffing or derision to the *trope*s; viz. the sarcasm, dialysm, charientism, aileism, mycenism and mimetis; but this without sufficient reason. See **SARCASM**, **IRONY**, &c.

TROPHY,* ΤΡΟΠÆΟΝ, among the ancients, a pile or heap of arms of a vanquished enemy, raised by the conqueror in the most eminent part of the field of battle.

* The word is formed from the Latin, *trophæum*, or *tropeum*, which Vossius deduces from the Greek, τρομα, *the sight of an enemy*.

The word is also used for an artificial representation of such a pile in marble, stone, or other matter.—Such were the *trophies* of Marius, and Sylla in the capitol, &c.

The ancient *trophies* consist of Greek and Roman arms; and the modern ones of arms of the various nations now in use; as in those insulated ones near Blenheim, in the Fauxbourg S. Antoine, and in the castle of Versailles.—Some are done in basso-relievo, as those of the Trajan column, and the attic of the court of the Louvre.

Trophies are likewise frequently exhibited on medals of the emperors, struck on occasion of victories; wherein, besides arms and spoils, are frequently seen, one or two captives by the sides of the *trophy*.

Trophies, M. Vaillant observes, were, originally, nothing but trunks of trees, which the victor planted on the most eminent part of the conquered province, and hung them with the spoils of the enemy, to perpetuate the memory of the defeat.

TROPHY money, a duty paid annually by the housekeepers in the several counties of England towards providing harness, drums, colours, &c. for the militia.

TROPICAL year. See **YEAR** and **SOLAR**.

TROPICS, TROPICI, in astronomy, two immoveable circles of the sphere, drawn through the solstitial points, parallel to the equator.

Such are the circles ME and NL, *Tab. Astronomy, Fig. 52.*

The *tropics* may be defined, two circles parallel to the equator, at such distance therefrom, as is equal to the sun's greatest recess from the equator towards the poles; or to the sun's greatest declination; or the obliquity of the ecliptic.

Of the two *tropics* that drawn through the beginning of cancer E, is called the *tropic of cancer*.

And that through the beginning of capricorn, the *tropic of capricorn*.

They have their name from the Greek, *τροπή*, turn, conversion, as being the limits of the sun's way, or declination towards north and south; so that when the sun is arrived at either of them, he turns the other way.

Hence, 1. Since the declination of the ecliptic is the arch EA or LD; EN will be the distance of the *tropics*; which is double the greatest declination.

2. Wherefore if the sun's meridian altitude be observed, both in the winter and summer solstice, and the latter be subtracted from the former, the remainder will be the distance of the *tropics*; half whereof is the greatest declination of the ecliptic.

TROPICS, in geography, are two lesser circles of the globe, drawn parallel to the equator, through the beginnings of cancer and capricorn.

These *tropics* are in the planes of the celestial sphere, and at the distance of 23° 29' from the equator, which is the sun's greatest declination.

TROPISTS, or TROPICI, the name of a sect.—St. Athanasius, in his letter to Serapion, gives this appellation to the Macedonians, who were also called *pneumatomachi* in the east, and *patripassians* in the west.

The reason of the name *tropist* was, that they explained the scripture altogether by tropes and figures of speech.

The Romanists also gave the appellation *tropists* to those of the reformed religion; in regard to their construing the words of the eucharist figuratively.

TROPITES, TROPITÆ, a sect, who, according to Philastrius, maintained that the Word was turned or converted into flesh, or into man.

This opinion they founded on that passage of St. John, misunderstood; *the Word was made flesh*; as if it imported, that the Word was converted into flesh, and not that he was clothed with our flesh, and our nature.

TROT, in the manage, one of the natural paces of a horse, performed with two legs in the air, and two on the ground at the same time, cross-wise, like St. Andrew's cross; and continuing so alternately to raise the hind leg of one side, and the fore leg of the other side at once, leaving the other hind and fore leg upon the ground till the former came down.

In this motion, the nearer the horse takes his limbs from the ground, the opener, the evenner, and the shorter his *trot* will be.—If he takes up his feet slowly, it is a sign of stumbling and lameness; if he tread narrow, or cross, it betokens interfering or falling; if he tread long, it shews over-reaching; if he steps uneven, he bespeaks toil and weariness.

TROBADOURS, a name anciently, and to this day, given to the ancient poets of Provence.

Some will have the word borrowed from *trouver*, to find, by reason of their inventions; though others take them to have been called *troubadours*, by reason they sung their poems on an instrument called a *troupe* or *trump*.

The poetry of the *troubadours* consisted in sonnets, pastorals, songs, lyrventes or satyrs, which were much to their taste; and in tençons, which were love disputes.

Jean de Notre Dame, commonly called Nostradamus, a procurer in the parliament of Provence, wrote an ample discourse of these poets.—He makes their Number seventy-six.

Paquier tells us, he had an extract of an ancient book belonging to cardinal Bembo, entitled, *Les noms daquels qui firent tençons & lyrventes*, which made their number ninety-six, among which was an emperor, viz. Frederic I. and two kings, viz. Richard I. of England, and a king of Arragon, with a dauphin, several counts, &c. Not that all these had composed entire works in provincial; some of them had not brought forth any thing beyond epigrams.

Petrarch speaks with applause of several *troubadours* in the IVth chapter of the triumph of love.—The Italian poets are said to have borrowed their best pieces from the *troubadours*. Paquier declares expressly, that Dante and Petrarch are, indeed, the fountains of Italian poetry; but fountains which have their sources in the provincial poetry.

Bouche, in his history of Provence, relates, that about the middle of the XIIIth century, the *troubadours* began to be esteemed throughout Europe, and that their credit and poetry was at the highest about the middle of the XIVth. He adds,

that it was in Provence that Petrarch learned the art of rhyming, which he afterwards practised, and taught in Italy.

TROVE in law. See **TREASURE** *trove*.

TROVER, in law, an action which a man hath against one that, having found any of his goods, refuseth to deliver them upon demand.

Actions and detainee are frequently turned into actions upon the case *sur trover* and conversion.

TROUGH of the sea, is the hollow or cavity made between two waves or billows in a rowling sea.

When a ship lies down there, they say she lies in the *trough* of the sea.

TROUSSEQUIN, in the manage, a piece of wood cut arch-wise, raised above the hinder bow of a great saddle, and serving to keep the bolsters firm.

TROUT coloured.—A horse is said to be of this colour when he is white, and speckled with spots of black, bay, or sorrel, especially about the head and neck.

TROUT-fishing. See **TROUT-fishing**.

TROY weight, anciently called *trone-weight*. See **WEIGHT**.

TROY-pound. See the article **POUND**.

TRUCE,* **TREUGA**, a suspension of arms; or a cessation of hostilities between two parties at war.

* The word, according to Menage, &c. comes from the Latin, *treuga*, which signifies the fame; and which Caseneuve derives further from the German, *troue*, or *trone*, which signifies *trough*.

Truces are frequently concluded between princes, in order to come to a peace.—*Truces* of many years serve in lieu of treaties of peace between princes, whose differences cannot be finally adjusted.

Truce of God, Treuga Dei, is a phrase famous in the histories of the XIth century, when the disorders and licence of private wars between particular lords and families, obliged the bishops of France to forbid such violences within certain times, under canonical pains.

Those intervals they called *treuga Dei, treve de Dieu*, q. d. *truce of God*, a phrase frequent in the councils since that time.

The first regulation of this kind was in a synod held in the diocese of Eino in Rouffillon, anno 1027, where it was enacted, that throughout that county, no person should attack his enemy from the hour of none on saturday, to that of prime on monday, that saturday might have its proper honour; that no body should attack, at any time, a religious priest walking unarmed, nor any person going to church, or returning from the same, or walking with women; that no body should attack a church, or any house within thirty paces around it.—The whole under penalty of excommunication, which, at the end of three months, was converted into an anathema.

TRUCHMAN, Dragoman, or Drogman, in the countries of the Levant, an interpreter.

TRUCK, in a ship, a square piece of wood at the top of a mast, to put the flag-staff in.—See *Tab. Ship, fig. 1. n. 34, 79, 96, 121, 145. lit. g.*

TRUCKING, in commerce. See **PERMUTATION, EXCHANGE, and COMMERCE**.

TRUCKS, among gunners, round pieces of wood in form of wheels, fixed on the axel-trees of carriages; to move the ordnance at sea, and sometimes also at land.

TRUE, something agreeable to the reality of things, or to truth.

In this sense we say, the *true* God, the *true* religion, *true* gold, &c.—in opposition to *false*, or pretended ones.

TRU, place of a planet, or star, in astronomy, is a point of the heavens shewn or pointed out by a right line drawn from the centre of the earth through the centre of the planet or star. See **PLACE**.

In this sense the word stands opposed to *apparent* place, which is that found by a right line drawn from the observer's eye through the centre of the planet or star.

This point in the heavens is referred to the ecliptic or zodiac, by the planets or stars circle of longitude.

TRUE altitude,	} See the articles	ALTITUDE.
TRUE anomaly,		ANOMALY.
TRUE horizon,		HORIZON.
TRUE asthma,		ASTHMA.
TRUE propoition,		PROPOSITION.
TRUE recovery,		RECOVERY.
TRUE ribs,		RIBS.
TRUE suture,		SUTURE.

TRUFFLES,* *tubera terræ*, in natural history, a sort of subterraneous vegetable production, a kind of mushroom.

* The word is formed from the French *truffe* or *truffe*; of the Latin, *tuber*, or *rabundant*.

The ancient physicians, and naturalists, rank *truffles* in the number of root, bulbs, or cloves; and define them to be a species of vegetables, without stalks, leaves, flowers, &c. Bradley calls them *under-ground edible mushrooms*, or *Spanish truffles*, and *under-ground deer's-balls* or *mushrooms*.

They are produced most in dry sandy grounds, and that, as Pliny says, chiefly after rains and thunder, in autumn.—Duration

duration he limits to a year.—Their colour is uncertain; some being white, others black, &c.

In Italy, France, England, &c. they eat them as a great dainty, either fried in slices with oil, salt and pepper, or boiled thoroughly in their own broth.—The hogs are exceedingly fond of them, and are frequently the means of discovering the places where they are; and whence the common people call them *swine-bread*. The modern botanists rank *truffles* in the number of plants; though they want many of the usual parts thereof.—They are at first no bigger than a pea, reddish without, and within whitish; and as they ripen, the white parts grow more dusky and dark: only there are still left a number of white streaks, which all terminate at the places where the outer coat is cracked, or open: and which, in all probability, are the vessels that convey the nourishment into the *truffles*. In these vessels is found a whitish matter, which, when viewed with a microscope, appears to be a transparent parenchyma, consisting of thin vesiculae; in the middle whereof are perceived little round black grains, separate from each other, which are the seed of the *truffles*.

When the *truffles* rot in the ground with exceeding ripeness, these grains are the only thing that remain of them; and these produce new *truffles*, which grow one after another.

What confirms the opinion of their coming from seed, is, that there have been *truffles* lately discovered in England, and this at first only in Northamptonshire, and even only in one place thereof, viz. near Rushton, a place stocked with trees formerly brought from Languedoc; and it is only since then, that any *truffles* have been there observed: whence it is concluded, that the seed of these *truffles* was brought from France among the roots of the trees brought thence.

These English *truffles* were first discovered by Dr. Hatton.—Dr. Tancred Robinson assures us, they are the true French *truffles*, the Italian *tartuffi* or *tartuffole*, and the Spanish *turmas de tierra*, being not before noted by Mr. Ray as ever known on English ground: indeed, he adds, that he has seen them thrice as large at Florence, Rome, &c.

Those observed in England are all included in a studded bark or coat, and the inner substance is of the consistence of the fleshy part of a young chestnut, of a pale colour, a rank or hircine smell, and unfavoury.

By a chymical analysis, *truffles* are found to abound in a volatile alkali salt mixed with oil, upon which their smell, &c. depends. They never rise out of the ground, but are found usually half a foot beneath the surface thereof.

Dr. Hatton has observed several little fibres issuing out of some *truffles*, and insinuating themselves within the soil, which, in all probability, do the office of roots.—The *truffles* grow tolerably globular, as receiving their nourishment all around them; they being to be considered like sea plants encompassed with their food, which they suck in through the pores of their bark or rind.

They are tenderest and best in the spring, though earliest found in autumn; the wet swelling them, and the thunder and lightning disposing them to send forth their scent, so alluring to the swine: hence some of the ancients called them *cerastia*, q. d. *thunder-roots*.

The depth at which the *truffles* lie, Dr. Robinson observes, is no objection to their being of the vegetable tribe; that being a thing common to several other plants which shoot up stalks, particularly the lathyrus tuberosus, commonly called *chamaecrista* and *terra glans*, in English, *pease-carrion-nuts*, the roots of our bulbocastanum, &c.

The ancients were exceedingly divided as to the use of *truffles*; some affirming them to be wholesome food, and others pernicious; Avicenna particularly, will have them to cause apoplexies.—For my own part, says M. Lemery, I am of opinion they have both good and evil effects; they restore and strengthen the stomach, promote the semen, &c. but when used too freely, they attenuate and divide the juices immoderately, and by some volatile and exalted principles, occasion great fermentations, &c. though the pepper and salt they are ordinarily eaten withal, do doubtless contribute greatly to those effects.—Their rich taste is owing to their not putting forth any stalk; in effect their principles being united, and, as it were, concentrated in a little bulb, must yield a richer and more delicious flavour than if the juices were dispersed by vegetation through the several parts of a common plant.—Some roast the *truffles* under the ashes; and others pulverize and mix them in fauces. See supplement, article TUBERA.

TRUG*, or TRUG-corn, TRUGA frumenti, in our ancient customs, denotes a measure of wheat.

* Tres trug frumenti vel novae faciunt 2 bushels, inter praebendam de Hunderton in ecclesia Heref. M.S. de temp. E. 3.

At Lempster, the vicar has *trug-corn* allowed him for officiating at some chapels of ease, as Stoke and Dockly within that parish.

TRULLIZATION, in the ancient architecture, the art of laying on strata or layers of mortar, gypsum, or the like, with the trowel, in the inside of vaults, ceilings, &c.

TRULLUM, a barbarous word, signifying *dome*; chiefly used in the phrase, *council in trullo*.

This was a council assembled in the year 680, against the Monothelites, in the dome of the palace of Constantinople, called *trullum*; the name whereof it has retained. It was also called the *Quinisextum*.

The *trullum* was properly a hall in the palace of the emperors of Constantinople, where they usually consulted of matters of state.*—This council held in Trullo was the 6th oecumenical or general council.

* The term is formed from the Latin, *trulla*, cap; the place being so called because vaulted.

TRUMPET*, a musical instrument, the most noble of all portable ones of the wind kind, used chiefly in war, among the cavalry, to direct them in the service.

* The word is formed from the French, *trumpette*. Menage derives it from the Greek, *τροπαιον*, *turbo*, a shell anciently used for a trumpet. Du Cange derives it from the corrupt Latin, *trumpa*, or the Italian, *trambia*, or *trambetta*; others from the Celtic, *trumpill*, which signifies the same.

It is usually made of brass, sometimes of silver, iron, tin, and even wood. Moses, we read, made two of silver, to be used by the priests, Numb. x. and Solomon made 200 like those of Moses, as we are informed by Josephus, lib. viii. which shews abundantly the antiquity of that instrument.

The ancients had various instruments of the trumpet kind; as the tube, cornua, and litui.

The modern trumpet consists of a mouth-piece, near an inch broad, though the bottom be only one third so much.—The pieces which convey the wind are called the *branches*; the two places where it is bent, *potences*; and the canal between the second bend and the extremity, the *pavilion*; the places where the branches take a sinder, or are soldered, the *knots*; which are five in number, and cover the joints.

When the found of the trumpet is well managed, it is of a great compass.—Indeed its extent is not strictly determinable; since it reaches as high as the strength of the breath can force it.—A good breath will carry it beyond four octaves, which is the limit of the usual keys of flutes and organs.

In war there are eight principal manners of founding the trumpet: the first, called the *cavalquet*, used when an army approaches a city, or passes through it in a march.—The second the *boute-fille*, used when the army is to decamp or march.—The third is when they found to horse, and then to the standard.—The fourth is the *charge*.—The fifth the *watch*.—The sixth is called the *double cavalquet*.—The seventh the *chamade*.—And the eighth the *retreat*. Besides these there are various flourishes, voluntaries, &c. used in rejoicings.

There are also people who blow the trumpet so softly, and draw so delicate a sound from it, that it is used not only in church music, but even in chamber music: and it is on this account that in the Italian and German music we frequently find parts entitled *tromba prima*, or 1st first trumpet, *tromba II^a*, *figenda*, III^a, *terza*, second, third trumpet, &c. as being intended to be played with trumpets.

There are two very great defects in the trumpet, observed by Mr. Roberts in the philosophical transactions;—The first is, that it will only perform certain notes within its compass, commonly called *trumpet notes*: the second, that four of the notes it does perform, are not in exact tune. The same defects are found in the *trumpet marine*; and the reason is the same in both.

TRUMPET MARINE, is a musical instrument consisting of three tables, which form its triangular body.—It has a very long neck with one single string, very thick, mounted on a bridge, which is firm on one side, but tremulous on the other.—It is struck by a bow with one hand, and with the other the string is pressed or stopped on the neck by the thumb.

It is the trembling of the bridge, when struck, that makes it imitate the sound of a trumpet; which it does to that perfection, that it is scarce possible to distinguish the one from the other.—And this is what has given it the denomination of *trumpet marine*, though, in propriety, it be a kind of monochord.

The *trumpet marine* has the same defects with the trumpet, viz. that it performs none but *trumpet notes*, and some of those either too flat or too sharp.—This Mr. Fr. Roberts accounts for, only premising that common observation of two union strings, that if one be struck, the other will move; the impulses made on the air by one string, setting another in motion, which lies in a disposition to have its vibrations synchronous to them: to which it may be added, that a string will move, not only at the striking of an union, but also of that of an 8th or 12th, there being no contrariety in the motions to hinder each other.

Now in the *trumpet marine* you do not stop close, as in other instruments, but touch the string gently with your thumb, whereby there is a mutual concurrence of the upper and lower part of the string to produce the sound.—Hence it is concluded, that the *trumpet marine* yields no musical sound, but when the stop makes the upper part of the string an aliquot part of the remainder, and consequently of the whole; otherwise the vibrations of the parts will stop one another, and make a found

suitable to their motion, altogether confused. Now these aliquot parts, he shews, are the very stops which produce the trumpet notes.

HARMONICAL TRUMPET, is an instrument which imitates the sound of a trumpet, and which resembles it in every thing, excepting that it is longer, and consists of more branches.—'Tis ordinarily called a *jackboot*. See **SACKBUT**.

Speaking TRUMPET, is a tube from six to fifteen foot long, made of tin, perfectly straight, and with a very large aperture; the mouth-piece being big enough to receive both lips.

The mouth being applied hereto, it carries the voice to a very great distance, so as it may be heard distinctly a mile, or more; whence its use at sea.

The invention of this trumpet is held to be modern; and is commonly ascribed to Sir Samuel Morland, who called it the *tuba stentorophonica*.—But Ath. Kircher seems to have a better title to the invention; for it is certain he had such an instrument before ever Sir S. Morland thought of his.

Kircher, in his *plenum*, says, that the tromba published last year in England, he invented 24 years before, and published in his *musurgia*: he adds, that Jac. Albanus Ghibbifius and Fr. Eschinardus, ascribe it to him; and that G. Schottus testifies of him, that he had such an instrument in his chamber in the Roman college, with which he could call to, and receive answers from the porter.

Indeed, considering how famed Alexander the great's tube was, wherewith he used to speak to his army, and which might be heard distinctly 100 stadia or furlongs, it is somewhat strange the moderns should pretend to the invention; the stentorophonic horn, or tube of Alexander, wherof there is a figure preserved in the Vatican, being almost the same with that now in use. See **STENTOROPHONIC**.

Listening, or Hearing TRUMPET, is an instrument invented by Joseph Landini, to assist the ear in hearing of persons who speak at a great distance, without the assistance of any speaking trumpet.

TRUMPETER, in anatomy. See **BUCCINATOR**.

TRUNCATED **pyramid*, or *cone*, is one whose top or vertex is cut off by a plane parallel to its base. See **PYRAMID**, and **CONE**.

* The word is formed of the Latin, *truncare*, to cut off a part from the whole; whence also *truncus*, *trunchion*, &c. In heraldry they say *trunked*. See **TRUNKED**.

A *truncated cone*, or the *frustum* of that body, is sometimes also called a *curry-cone*. See **FRUSTUM**. See also **GAUGING**.

TRUNCATED roof. See the article **ROOF**.

TRUNCHEON, of the French *troncon*, and the Latin *truncus*; a battoon; or a kind of short staff used by kings, generals, and great officers, as a mark of their command. See **BATTOON**.

COLUMNS in TRUNCHEONS. See the article **COLUMN**.

TRUNDLE, is a kind of carriage with low wheels, wherewith to draw heavy cumbersome burdens.

TRUNDLE shot, is an iron shot about 17 inches long, sharp-pointed at both ends, with a round bowl of lead cast upon it, about a hand breadth from each end.

TRUNK, TRUNKUS, the stem, or body of a tree; or that part between the ground and the place where it divides into branches. See **STEM**, **BRANCH**, and **TREE**.

In lopping of trees, nothing is left but the *trunk*.

TRUNK is also used for the stump, or that part left over the root in felling.—Large trees when felled, shoot out from the *trunk*, and make a copie or underwood.

'Tis by means of the *trunks* left rotting in the ground, that the wastes in forests are discovered.

TRUNK, in anatomy is used for the busto of the human body, exclusive of the head and limbs.

TRUNK, truncus, is also used for the main body of an artery, or vein; in contra-distinction to the branches and ramifications thereof.

The word is particularly applied to certain parts of the aorta and cava.—See *Tab. Anat. (Angiol.) fig. 5. lit. a.*

TRUNK, in architecture, is used for the butt, or shaft of a column.—Also, for that part of the pedestal between the base and the cornice, otherwise called the *dyce*.—See *Tab. Archit. fig. 24. lit. y.*

TRUNK is also popularly used for the snout of an elephant: by naturalists called the *proboscis* thereof. See **PROBOSCIS**.

TRUNK roots, of a plant, are little roots which grow out of the *trunks* of plants.

These are of two kinds, 1. Such as vegetate by a direct descent, the place of their eruption being sometimes all along the *trunks*, as in mints, &c. and sometimes only in the utmost point, as in some other plants and trees.

2. Such as neither ascend nor descend, but shoot forth at right-angles to the *trunk*; which therefore, though as to their office they are true roots, yet, as to their nature, are a medium between a *trunk* and a root.

TRUNKED, among heralds, is applied to trees cut off at each end, which are said to be *trunked*, or *truncated*.

TRUNNIONS or **TRUNIONS**, of a piece of ordnance, those knobs or bunches of the gun's metal, which bear her up on the cleeks of the carriage.

TRUNNION ring, is the ring about a cannon, next before the *trunnions*.

TRUSS, TRUSSA, a bundle or a certain quantity of hay, straw, &c.

A *truss* of hay is to contain fifty-six pounds, or half an hundred weight; thirty-six *trusses* make a load.—In June and August the *truss* is to weigh sixty pounds; on forfeiture of 18s. per *truss*.

A *truss* of forrage, is as much as a trooper can carry on his horse's crupper.

TRUSS, of flowers, is used by florists to signify many flowers growing together on the head of a stalk; as, in the cowslip, *arculica*, &c.

TRUSS is also used for a sort of bandage or ligature, made of steel or the like matter, wherewith to keep up the parts in those who have hernias or ruptures. See **HERNIA**, &c.

TRUSSES, in a ship, are ropes made fast to the parcels of a yard; either to bind the yard to the mast, when the ship rolls, or to hale down the yards in a storm, &c.

TRUSSING, in falconry, is an hawk's raising any fowl or prey aloft, soaring up, and then descending with it to the ground.

TRUST. See the article **CASTUT qui trufit**.

TRUSTEE, one who has an estate, or money put or trusted in his hands for the use of another. See **FIDELI commissum**.

TRUSTRA. See the article **TRISTRATA**.

TRUTH, veritas, a term used in opposition to *falsehood*; and applied to propositions which answer or accord to the nature and reality of the thing whereof something is affirmed or denied.

Thus, when we say that 4 is the fourth part of twice 8; that proposition is true, because agreeable to the nature of those numbers.

Truth, according to Mr. Lock, consists in the joining or separating of signs as the things signified by them do agree or disagree one with another.—Now the joining or separating of signs, is what we call making of propositions.—*Truth* then, properly, belongs only to propositions, whereof there are two sorts, mental and verbal; as there are two sorts of signs commonly made use of, viz. ideas and words.

Mental propositions, are those wherein the ideas in our understanding are put together, or separated by the mind perceiving or judging of their agreement or disagreement.

Verbal propositions, are words put together, or separated, in affirmative or negative sentences.—So that proposition consists in joining or separating of signs; and *truth* consists in putting together or separating those signs, according as the things they stand for agree or disagree.

Truth, therefore, as well as knowledge, may come under the distinction of *verbal* and *real*; that being only *verbal truth*, where terms are joined according to the agreement or disagreement of the ideas they stand for, without regarding whether our ideas are such as really have, or are capable of having any existence in nature.—But it is then they contain *real truth*, when these signs are joined as our ideas agree; and when our ideas are such, as we know are capable of having an existence in nature; which in substances we cannot know, but by knowing that such have existed. See **SUBSTANCE**.

Truth, is the marking down in words the agreement or disagreement of ideas, as it is.—*Falsehood* is the marking down in words the agreement or disagreement of ideas, otherwise than it is: and so far as these ideas, thus marked by sounds, agree to their archetypes, so far only is the *truth* real.

The knowledge of this *truth* consists in knowing what ideas the words stand for, and the perception of the agreement or disagreement of those ideas, according as it is marked by those words.

Besides *truth* taken in the strict sense before mentioned, which is also called *logical truth*, there are other sorts of *truths*; as, *Moral TRUTH*, which consists in speaking things according to the persuasion of our own minds; called also *veracity*.

Metaphysical, or transcendental TRUTH, which is nothing but the real existence of things conformable to the ideas which we have annexed to their names.

In which sense a clock may be said to be *true*, when it answers the idea or intention of the person who made it.

Others will have *metaphysical truth* to consist in the agreement of a thing with the idea thereof in the divine understanding.

TRUTINA, hermetis, is used among astrologers, for an artificial method of examining and rectifying a nativity, by means of the time of conception.

TRUTINATION,* the act of weighing or balancing a thing.

* The word is formed from the Latin *trutina*, a pair of scales.

TUB

TRYAL. See the article **TRIAL**.

To TRY, in the sea language.—A ship is said to *try*, or lie *a-try*, when she has no fails abroad but her main-fail, or millen-fail.

TRYPHERA,* *tryphera*, in pharmacy, a denomination given to divers medicines especially of the opiate kind.—The great *tryphera* is composed of opium, cinnamon, cloves, and several other ingredients: it is used to fortify the stomach, to stop fluxes, and is good for some diseases of the womb.

* The word is formed from the Greek, *tryphos*, delicate, on account of their gentle and pleasant operation, or according to others, because they make those who use them reil.

The Saracenic *tryphera*, and Persian *tryphera*, thus called, because first introduced, the one by the Saracens, and the other by the Persians, were both of them gentle purgatives.

TSCHIRNHÄUSIANA quadratrix. See **QUADRATRIX Tschirnhausiana**.

TUB is used as a kind of measure, to denote the quantity of divers things.—A *tub* of tea, is a quantity of about 60 pounds.—A *tub* of camphire, is a quantity from 56 to 80 pounds.

TUBE, **TUBUS**, pipe, conduit, or canal; a cylinder, hollow within-side, either of lead, iron, wood, glass or other matter, for the air or some other fluid to have a free passage, or conveyance through.

The term is chiefly applied to those used in physics, astronomy, anatomy, &c. On other ordinary occasions, we more usually say *pipe*.

In the memoirs of the French academy of sciences, M. Varignon gives us a treatise on the proportions necessary for the diameters of *tubes*, to give precisely any determinate quantities of water.—The result of his piece turns upon these two analogies; that the diminutions of the velocity of water, occasioned by its friction against the sides of *tubes*, are as the diameters; the *tubes* being supposed equally long; and the quantities of water issuing out of the *tubes*, are as the square roots of their diameters, deducting out of them the quantity each is diminished.

For the *tubes* of barometers and thermometers; see **BAROMETER**, and **THERMOMETER**.—For the ascent of liquors in capillary *tubes*; see **ASCENT**, and **CAPILLARY**.

Alimentary TUBE. See **DUCT**.

Fallopiian TUBE. See the article **FALLOPIAN**.

Stentorophonic TUBE. See **STENTOROPHONIC**.

Toricellian TUBE. See **TORICELLIAN tube**.

TUBE, in astronomy, is sometimes used for *telescope*; but more properly for that part thereof into which the lens's are fitted, and by which they are directed and used. See **TELESCOPE**.

The goodness of the *tube*, being of great importance to that of the telescope, we shall here add its structure.

The construction of a Draw-TUBE for a telescope.—The chief points to be regarded here, are, that the *tube* be not troublesome by its weight, nor liable to warp and disturb the position of the glasses: so that any kind of *tube* will not serve in every case: but

1. If the *tube* be small, 'tis best made of thin brass plates covered with tin, and formed into pipes or draws, to slide within one another.

2. For long *tubes*, brass or iron would be too heavy; for which reason some chuse to make them of paper, thus:—A wooden cylinder is turned, of the length of the paper to be used; and of a diameter equal to that of the smallest draw. About this cylinder is rolled and pasted paper, till it be of a sufficient thickness: when one *tube* is dry, provide others after the same manner; still making the last serve for a mould for the next, till you have enough for the length of the *tube* desired. Lastly, to the extremes of the draws are to be glued wooden ferrils, that they may be drawn forth the better.

3. Since paper draws are apt to swell with moist weather, so as to spoil their sliding; and in dry weather to shrink, which renders them loose and tottering: in both which cases, the situation of the lens's is easily disturbed; the best method of making *tubes*, is as follows: glue parchment round a wooden cylinder, and let the parchment be coloured black, to prevent the reflected rays making any confusion. Provide very thin slits of beech, and bending them into a cylinder, glue them carefully to the parchment: cover this wooden case with white parchment, and about its outer extreme make a little ring or ferril: after the same manner make another draw over the former; and then another, till you have enough for the length of the *tube*.

To the inner extremes of each draw, fit a wooden ferril, that the spurious rays striking against the sides, may be intercepted and lost. In those places where the lens's are to be put, it will be proper to furnish the ferrils with female screws. Provide a wooden cover to defend the object-glass from the dust, and putting the eye-glass in its wooden ferril, fasten it by the screw to the *tube*. Lastly, provide a little wooden *tube* of a length equal to the distance the eye-glass is to be from the eye, and fit it to the other extreme of the *tube*.

TUBER, or **TUBERCE**, in botany, a kind of round turgid root, in form of a knob or turnip.

TUM

The plants which produce such roots, are hence denominated *tuberose* or *tuberous plants*.

TUBER or **TUBEROSITY**, in medicine, is used for a knob or tumor growing naturally on any part; in opposition to tumors which arise accidentally, or from a disease.

The same term is also used for a knot in a tree. See **KNOT**.

TUBERA terra. See the article **TRUFFLES**.

TUBERCULES, **TUBERCLES**, little tumors which suppurate and discharge pus; often found in the lungs.

TUBEROUS, or **TUBEROSE**, an epith. given to such roots as are round, and consist of an uniform fleshy substance: having neither skins, nor shells, as bulbous roots have.

Such are the roots of the iris, piony, and the like.

TUBILUSTRIUM,* in antiquity, a feast or ceremony in use among the Romans.—This denomination was given to the day whereon they purified their sacred trumpets; as also to the ceremony of purifying them.—It was held on the fifth and last day of the feast of Minerva called *quinquatus*, or *quinquatria*, which was performed twice a year.

* The word is compounded of *tubus*, trumpet, and *lustrum*, I purify.

TUBULI lactiferi, in anatomy, is a name used by some writers, for those small tubes through which the milk flows to the nipples of the mammae or breasts.

TUBULI vermiculares, a name sometimes used by naturalists, for certain small oblong and hollow sea-shells resembling worms. See **Supplement**, article **TUBULI**.

TUESDAY. See the article **HUKE Day**.

TUFT, a term used by some authors for the bushy part of trees; or that part set with branches, leaves, &c.

Parallolism of the TUFTS of trees.—All trees are observed naturally to affect to have their *tufts* parallel to the spot of ground they shadow; an account of which phenomenon, see under the article **PARALLISM**.

TUILERIE,* or **TYLERY**, a *tile-work*; a large building with a drying-place, covered a-top, but furnished with apertures on all sides, through which the wind having admittance, dries the tiles, bricks, &c. in the shade, which the sun would crack, before they be put in the kiln.

* The word is pure French, formed from *tuile*, tile.

The garden of the Louvre is called the *Tuileries*, as being a place where tiles were anciently made, &c.—But the term *Tuileries* does not only include the garden; but also a magnificent palace, whose front takes up the whole length of the garden: and hence it is, that they say, the king lodges in the *Tuileries*; the king has quitted the *Tuileries* for a few days, to reside in the Louvre.

The palace of the *Tuileries* is joined to the Louvre by a large gallery, which runs along the banks of the river Seine, and has its prospect thereon.

The *Tuileries* was begun in 1564, by Catherine de Medicis, wife of Henry II. in the time of her regency; it was finished by Henry IV. and magnificently adorned by Louis XIV.—The garden of the *Tuileries* was much improved by Louis XIII.

TUMBLER, a sort of dog, called in Latin, *vertagus*, from his quality of tumbling and winding his body about, before he attacks and fastens on the prey.

These dogs are often less than hounds; being linkier, leaner, and somewhat pricked eared; and by the form of their bodies, they might be called mungrel grey-hounds, if they were a little bigger.

TUMBREL, **TUMBRELLUM**, a ducking, or cucking-stool, an engine of punishment, which ought to retain every liberty, that has a view of frank-pledge, for the correction and cooling of scolds and unquiet women. See **CUCKING stool**.

TUMEFACATION, the act of swelling, or rising into a tumor. See **TUMOR**.

Inflammations and *tumefactions* of the testes, frequently happen in the gonorrhoea; either from the weakness of the vessels, violent motion, unseasonable use of astringents, a neglect of purging, or the like.

TUMOR, or **TUMOUR**, in medicine, &c. a preternatural rising or eminence on any part of the body.

Tumor is defined by the physicians, a solution of continuity, arising from some humor collected in a certain part of the body, which disjoins the continuous parts, insinuates itself between them, and destroys their proper form.

This has given occasion to the Arabs to define a *tumor* to be an indisposition, composed of three kinds of diseases, viz. an intemperature, an ill conformation, and a solution of continuity; all which they comprise under the name *apoplexism*, from the Greek, *apoplexia*.

Tumors may proceed from various causes.—The mass of blood throwing off or discharging itself of any particular humor, as sometimes happens in the crisis of a fever, pleurisy, empyema, bubo, &c. will give rise hereto.—And according to the nature of the humor so discharged, whether sanguinous, watery, bilious, &c. the *tumor* is different.

TUM

TUN

Other tumors there are, occasioned by flatulency, as the tympany, after the same manner as hydropical tumors are occasioned by a collection of the lymph, or serum, in a particular part.—Ruptures of the intestines, or their starting from their places, will likewise cause a tumor.

External injuries are another general cause of tumors.—Thus a contusion, or a violent stricture of any part, a wound, fracture, dislocation, &c. will make it swell, or rise above its natural level. And the same thing may likewise happen from the bites of venomous creatures, &c.

Tumors, properly so called, *i. e.* humoral tumors, or those which contain a fluid matter, arise either from a stagnation, *i. e.* an obstruction of the passage of some fluid, occasioning a slow concretion, or from the translocation or fluxion of an humor from some other part; or from the generation of some new humor.

Tumors of the first kind are very numerous, and are usually divided, with regard to the particular humors they are filled with, into *phlegmons*, which come from the blood. Erysipelas's, which come from the bile. Oedema's, fill'd with pituita. And scirrhus's. To which may be added, flatulencies, filled with wind. See FLATUS, &c.

Of the second kind, are critical tumors.

And of the third kind, are cancers, ganglions, and all tumors contained in a cystis or bag.

Tumors also frequently acquire peculiar denominations from the part affected; as, ophthalmia, if in the eye; parotis, about the ears; paronychia in the fingers, &c.

With respect to the cure, all tumors are divisible into *simple*, and *compound*, *i. e.* into such as are of a kindly nature, and go off, or are cured in a reasonable time, by the use of common means, without the appearance of any violent or dangerous symptoms; and such as are more malignant, or prove difficult of cure, and are attended with bad symptoms and affect the adjacent parts, or the whole body.—When a tumor is formed by fluxion, a sudden pain, heat, tension and pulsation are felt in the part, and manifest signs of a fever appear.

In those formed by congestion, the swelling rises slowly, and the pain and other symptoms come on gradually, and prove less violent; unless it happen in the joints, and other of the more sensible parts.

All tumors, except those from ruptures, terminate or are removed, either by discission, suppuration, putrefaction, induration, or translocation.

When a tumor is disscussed, the part that was affected, appears relaxed, or reduced to its natural size and figure, and is free from pain and hardness.

When a tumor hastens to suppuration, a considerable degree of heat, pain and pulsation is felt in the part; and if the tumor be large, or lie deep, a fever generally comes on: when the matter is formed, these symptoms commonly decrease, and sometimes totally vanish. And now, if the situation of the parts permit it, the tumor appears drawn to a point, or becomes conical in the middle, or most depending part, where the matter collected commonly proves white.—At this time likewise the tumor appears to be more contracted, and the skin of the part more thrivelled or flaccid than before: and now, upon pressure, if the tumor be superficial, or by vibrating it between the fingers, the matter may be felt to quail from side to side.

Tumors in the fleshy parts of the body, tend to their state or suppurate, faster than tumors in the joints, glands, &c.

When a tumor is relieved by induration, the swelling of the part and the pain decrease as the hardness comes on.—When it terminates in putrefaction or mortification, the part grows senseless, and turns black and fetid. See MORTIFICATION. But when a tumor goes off by repulsion, or a return of the matter into the blood, it disappears at once; upon which a fever, or some other acute disease usually ensues.

Windy tumors, M. Littré describes as formed of air, inclosed under some membrane, which it dilates more or less in proportion to the quantity, and from which it cannot escape; at least not for some time.

The difficulty is, to conceive how the air should come to be collected here.—M. Littré thinks that the most ordinary cause of windy tumors, is the gathering of juices in some neighbouring part, wherein there is an obstruction. The air, which is intimately mixed with all the juices of the body, continues to be so while they are in their natural fluidity and motion; but if they be collected in any part, and by consequence have their motion and fluidity diminished, the air gets its liberty, and disengages itself from them. Now the membranes of the part wherein the liquor is collected, becoming dilated by this collection, and their pores enlarged, the disengaged air escapes through them, but the juice is left behind, as being too much thickened by its stay there: it therefore runs under some other neighbouring membrane, which it raises, swells and extends.

TUN*, or TON, originally signifies a large vessel or cask, of an oblong form biggest in the middle, and diminishing towards

its two ends, girt about with hoops, and used to put up several kinds of merchandizes in, for their better carriage; as brandy, oil, sugar, skins, hats, &c.

* Some derive the word from *astumnus*, in regard it is then *tunt* are most needed. Du Cange deduces it from *tunna*, or *tinna*, words used in the late Latin for the same thing; whence also *tannare*, to *tun*.

The term is also used for certain vessels of extraordinary bigness, serving to keep wine in for several years.—In Germany there are many which are scarce ever emptied: the Heidelberg *tun* is famous.

The *tun*, we frequently, tho' improperly, call a *hoghead*.

TUN, or TON, is also a certain measure for liquids, as wine, oil, &c. See MEASURE.

The English *tun* contains two pipes, or four hogheads, or 252 gallons.

The *tun* of Amsterdam contains 6 aems or awms; and the aem 4 ankers, the anker 2 stekans, the stekan 16 mungles; 12 stekans are equal to an English barrel or 63 gallons.

The *tun* of Bourdeaux and Bayonne contains four barrels, equal to three Paris muids.—At Orleans and Berry it is about two Paris muids.

The *tun* of Malaga, Alicante, Sevil, &c. is two bottas, equal to about 36 or 37 stekans.—The *tun* of Lisbon is two Portuguese bottas, and is equal to 25 stekans.

TUN is also a certain weight, whereby the burthen of ships, &c. are estimated.

The *sea tun* is computed to weigh two thousand pounds, or twenty quintals or hundred weights (amounting to 2,400 pounds averdupois) so that when we say a vessel carries two hundred *tuns*, we mean it is able to carry two hundred times the weight of two thousand pounds, *i. e.* four hundred thousand pounds: it being found by a curious observation, that the sea water, whose room the vessel fills when full loaded, weighs so much.

To find the burthen and capacity of a ship, they measure the hold or place where the is loaded; allowing 42 cubic feet to the *sea tun*.

The price of freight, or carriage of merchandizes, is ordinarily settled on the foot of the *sea tun*: and yet though the *tun* is regularly twenty hundred weights, there is some difference made therein, either on account of the cumberfomness, or bulk of the commodities, the space they take up, or the like. See FREIGHT.

Accordingly, at Bourdeaux four barrels of wine are held a *tun*, five barrels of brandy are estimated two *tuns*, three of syrup are one *tun*, four barrels of prunes one *tun*, two dozen of walnut-tree tables one *tun*, a dozen of planks one *tun*; twenty bushels of chestnuts are accounted one *tun*, and the like of wheat or other grain; and ten bales of cork, five bales of feathers, and eight of paper, make each one *tun*.

A *tun* or load of timber is 40 solid feet, if the timber be round: if it be hewed or square 55. See TIMBER.

TUN, TON, in the end of words or names of places, signifies a town, village, or dwelling-place.—From the Saxon, *tun*, *sepe*, *valum*, *villa*, *vicus*, *oppidum*; and this from *ton*, or *sun*, a hill, where they formerly built towns.

TUN-GREVE, a term anciently used for a reeve or bailiff, *qui in villis, & que dicimus maneriis, domini personam sustinet, ejusque vice omnia disponit & moderatur.* Spelman.

TUNE, or TONE, in music, is that property of sounds whereby they come under the relation of *acute* and *grave* to one another. See GRAVITY, &c. See also TONE.

Though gravity and acuteness be mere terms of relation, yet the ground of the relation, the *tune* of the sound, is something absolute; every sound having its own proper tune, which must be under some determinate measure in the nature of the thing.

The only difference then between one *tune* and another is in degrees, which are naturally infinite, *i. e.* we conceive there is something positive in the cause of sound, which is capable of less and more, and contains in it the measure of the degrees of *tune*; and because we do not suppose a least or greatest quantity of this, we conceive the degrees depending on those measures to be infinite. See SOUND.

If two or more sounds be compared together in this relation, they are either equal or unequal in the degree of *tune*.—Such as are equal are called *unisons*. See UNISON.

The unequal constitute what we call *intervals*, which are the differences of *tune* between sounds. See INTERVAL.

Cause and measure of TUNE, or that wherein the *tune* of a sound depends.—Sonorous bodies, we find, differ in *tune*, 1. According to the different kinds of matter: thus the sound of a piece of gold is much graver than that of a piece of silver or the same shape and dimensions; in which case, the *tones* are proportional to the specific gravities.

2. According to the different quantities of the same matter in bodies of the same figure; as a solid sphere of brass, one foot in diameter, sounds acuter than a sphere of brass two feet in diameter;

diameter; in which case the *tones* are proportional to the quantities of matter.

Here then are different *tones* connected with different specific gravities, and different quantities of matter; yet cannot the different degrees of *tune* be referred to those quantities, &c. as the immediate cause. In effect, the measures of *tune* are only to be sought in the relations of the motions that are the cause of sound, which are no-where so discernible as in the vibration of chords.

Sounds, we know, are produced in chords by their vibratory motions; not, indeed, by those sensible vibrations of the whole chord, but by the insensible ones, which are influenced by the sensible, and, in all probability, are proportional to them.—So that sounds may be as justly measured in the latter, as they could be in the former, did they fall under our senses: but even the sensible vibrations are too small and quick to be immediately measured.—The only resource we have, is to find what proportion they have with some other thing: which is effected by the different tensions, or thicknesses, or lengths of chords, which, in all other respects, excepting some one of those mentioned, are the same.

Now, in the general, we find that in two chords, all things being equal, excepting the tension, or the thickness, or the length, the *tones* are different; there must therefore be a difference in the vibrations owing to those different tensions, &c. which difference can only be in the velocity of the courses and recourses of the chords, through the spaces wherein they move to and again.—Now, upon examining the proportion between that velocity, and the things just mentioned, whereon it depends, it is found to a demonstration, that all the vibrations of the same chord are performed in equal times.

Hence, as the *tone* of a sound depends on the nature of those vibrations whose differences we can conceive no otherwise than as having different velocities, and as the small vibrations of the same chord are all performed in equal time; and as it is found true in fact, that the sound of any body arising from one individual stroke, though it grows gradually weaker, yet continues in the same *tone* from first to last; it follows, that the *tone* is necessarily connected with a certain quantity of time in making every single vibration; or that a certain number of vibrations, accomplished in a given time, constitutes a certain and determinate *tone*: for the frequenter those vibrations are, the more acute is the *tone*; and the slower and fewer they are in the same space of time, by so much the more grave is the *tone*; so that any given note of a *tune*, is made by one certain measure of velocity of vibrations, i. e. such a certain number of courses and recourses of a chord or string in such a certain space of time, constitutes a determinate *tone*.

This theory is strongly supported by our best and latest writers on music. Dr. Holder, Mr. Malcolm, &c. both from reason, and experience.—Dr. Wallis, who owns it very reasonable, adds, that it is evident the degrees of acuteness are reciprocally as the lengths of the chords; though, he says, he will not positively affirm that the degrees of acuteness answer the number of vibrations as their only true cause: but his diffidence arises hence, that he doubts whether the thing has been sufficiently confirmed by experiment.—Indeed, whether the different number of vibrations in a given time be the true cause on the part of the object, of our perceiving a difference of *tone*, is a thing which we conceive does not come within the reach of experiment; it is sufficient the hypothesis is reasonable.

TUNICA, a kind of waistcoat or under-garment wore by the ancients, both at Rome and in the east.

The common people ordinarily wore only a *tunica*; but those of better fashion wore a *toga* or gown over it.—The philosophers wore a gown without a *tunica*, as professing to go half naked.

The *tunica* was peculiar to the men, the under-garment of the women not being called *tunica*, but *stola*.

The senators wore their *tunica* enriched with several little pieces of purple, cut in form of large nails; whence it was called *laticlavata*: the knights had lesser nails on their *tunica*, which was hence called *angusticlavata*: the common people wore their *tunica* without any clavis at all.—And it was by these three different sorts of *tunica's*, that the three different orders of the Roman people were distinguished in habit.

Among religious, the woollen shifts, or under-garments, are called *tunica's* or *tuniques*.

TUNICA, **TUNIC**, in anatomy, is applied to the membranes which invest the vessels, and divers others of the less solid parts of the body.—See *Tab. Anat. (Angeiol.) fig. 7. lit. a. a. b. b. c. d.*

The eye consists principally of a number of humors contained in *tunica* ranged over one another: as the *tunica albuginea*, the *tunica cornea*, the *tunica retiformis*, &c.

TUNICA Vaginalis. See the article **VAGINALIS**.

TUNNAGE, or **TONNAGE**, a duty or custom due for merchandize brought or carried in *tons*, and such like vessels, from or to other nations; thus called, because rated at so much *per tun*.

Tunnage is properly a duty imposed on liquids according to their measures; as poundage is that imposed on other commodities according to their weight.

They were both first settled by authority of parliament under king Edward III. they were re-established in 1660, under the reign of king Charles II. for his life, upon abrogating all the laws made under Oliver Cromwell, and re-ordining the execution of the ancient laws and regulations: and have been continued and renewed by the parliaments ever since.—By an act made in the first year of the reign of Queen Anne they were continued for 96 years, expiring in the year 1798.

This duty at first was 4*l.* 10*s.* sterling *per tun*, for French wines brought into the port of London by the English, and only three for that brought into the other ports.—For the same wine imported by strangers to London, this duty was 6*l.* and that brought into the other ports 4*l.* 10*s.* sterling. Rhenish wine, in virtue of the same act, paid 7*l.* 10*s.* sterling; and Spanish, Portuguese, Malmsey, and Greek wines, the same as French wines.

But there have been divers additional duties imposed since.—As the additional duty of the old *subsidy*, *feignorage*, duty of ancient *impost* of tunnage, duty of additional *impost*, *orphans money*, *new subsidy*, &c.

TUNNAGE is also used for a certain duty paid the mariners by the merchants for unloading their ships arrived in any haven, after the rate of so much *per tun*.

TUNNEL, or **FUNNEL**, an instrument through which any liquor is poured into a vessel.

Part of the draught of a chimney, above the mantle-piece, is also called by the same name.

TUNNEL-Net, is a kind of net much used for the catching of partridges; thus called from its form, which is a cone 15 or 18 feet long.

To use it, a covey of those birds being found, a compass is taken, and the net is pitched at a good distance from them, according to the situation of the ground.—Then, with a natural or artificial stalking horse, they are surrounded, and gently driven towards the net, never coming in them in a direct line, but by windings and turnings.

TUNNING, or **TONNING**, a part of the process of brewing, or rather an operation which is the sequel thereof. See **BREWING**.

The *tunning* of beer, &c. is performed various ways; some being of opinion it is best *tunned* as it cools, or begins to come; while others let it stand longer to become riper.

The most regular method is to cleanse and *tun* just as it comes to a due ferment, and gets a good head; for then it has the most strength to clear itself.—What works over is to be supplied with fresh beer of the same brewing.

TURBAN,* **TURBANT**, the head dress of most of the eastern and mahometan nations; consisting of two parts, viz. a cap, and a shawl of fine kinnen, or taffaty, artfully wound in divers plaits about the cap.

* The word is formed from the Arabic *دور*, *dor*, or *دور*, *dur*, or *دور*, *dul*, or *دور*, *dul*, which signifies to encompass; and *دور*, *band* or *band*, which signifies shawl, or scarf, or band; so that *durbant*, or *turbant*, or *turban*, only signifies a scarf, or shawl, tied round; it being the shawl that gives the denomination to the whole *turban*.

The cap is red or green, without any brim, pretty flat, though roundish a-top, and quilted with cotton, but does not cover the ears.—About this is wrapped a long piece of fine thin linen or cotton, in several wreaths variously disposed.

There is a good deal of art in giving *turbans* the fine air; and the making them up constitutes a particular trade, as the making of hats does among us.

The Emirs, who pretend to be descended of the race of Mahomet, wear their *turbans* green: those of the other Turks are ordinarily red, with a white shawl.—The genteel people are to have frequent changes of *turbans*.—M. de Tournefort observes, that the *turban*, all things considered, is a very commodious dress; and that he even found it more easy to him than his French habit.

The grand Seigneur's *turban* is as big as a bushel, and is so exceedingly respected by the Turks, that they dare scarce touch it.—It is adorned with three plumes of feathers enriched with diamonds and precious stones: he has a minister on purpose to look to it, called *tulbentoglan*.

That of the grand vizier has two plumes: so have those of divers other officers, only smaller one than another; others have only one, and others none at all.—The *turban* of the officers of the divan is of a peculiar form, and called *mygenek*.

The shawl of the Turks *turban*, we have observed is white linen, that of the Persians is red woollen. These are the distinguishing marks of their different religions, Sophi, king of Persia, who was of the sect of Ali, being the first who assumed that colour, to distinguish himself from the Turks, who are of the sect of Omar, and whom the Persians esteem heretics.

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TURBARY, **TURBARIA**, a right to dig turf in another man's ground; from *turba*, an old Latin word for a turf. See **TURF**.

Common of TURBARY, is a liberty which some tenants have by prescription to dig on the lord's wastes.

TURBARIA is sometimes also taken for the ground where turfs are digged. See **TURF**.

TURBARIA Brachia, more particularly denotes flaw turf, or heath turf: mentioned in the charter of Hammon de Massly.

TURBINATED, is a term applied by naturalists to shells which are spiral, or wreathed, conically, from a larger basis to a kind of apex.

TURBITH, or **TURPETH**, **TURPETHUM**, a medicinal root, brought from the East-Indies, particularly from Cambaya, Sarat, and Goa; though others will have it, that the true *turbith* comes chiefly from Ceylon.

The *turbith* of the moderns bears so little resemblance to that of the ancients, that it is difficult to suppose them the same.—That fold by our druggists is a longish root about the thickness of the finger, resinous, heavy, and of a brownish hue without, and whitish within.—It is brought to us cloven in the middle, lengthwise, and the heart or woody matter taken out.

When in the ground it shoots out tendrils, some whereof creep along the ground, and the rest wind about the neighbouring trees and shrubs.

Turbith is a strong purgative, and is used in the dropsy, palsy, and apoplexy.—It is commonly supposed to take its name *turbith* from *turbare*, on account of the violence of its operation, as disturbing the whole economy.

It yields a deal of resinous matter in a spirituous menstruum, which Quincy observes, does not affect the larger passages much; but is very active in the smaller vessels, and glandulous constrictions, which it wonderfully clears of all vicid adhesions.

Some apothecaries, either through ignorance or parsimony, substitute white thapsia, which they call grey *turbith*, or *turbith garganicum*, for the true *turbith*; though both as to taste, colour, and qualities, they are very different.

Mineral TURBITH, **TURPETHUM Minerale**, is a name which the chymists give to a yellow precipitate of mercury, which purges violently.

The method of preparing it is thus:—on the dry powder gained by dissolving mercury in oil of vitriol, pour a proper quantity of warm rain water, and the powder will immediately turn of a yellow colour. Continue to wash this powder by repeated affusions of water, till the liquor comes away as insipid and colourless as it was poured on, leaving a beautiful yellow cake at the bottom of the vessel, which being gently dried at the fire, is called by the name of *turbith mineral*.

This powder is called *mineral turbith* from the resemblance it bears to the vegetable *turbith* of the Arabians, in strongly purging the most internal recesses of the body; for though it be insipid upon the tongue, yet it is possessed of very considerable virtues.—Being boiled with water, it loses more of its salts, and thereby grows milder, and more safe; so it does also by being deflagrated twice or thrice, or distilled with spirit of wine.

A very few grains of this *turbith* prove emetic and purgative.—It is also accounted an excellent medicine in the cure of the venereal disease: but as it operates with considerable violence, it ought not to be given, unless the viscera are known to be sound.

This appears to have been the grand secret of Paracelsus, which, in his scarce German book of hospital medicines, he praises so extravagantly for the venereal and all chronic diseases.—Sydenham also commends it in venereal cases, given in the quantity of six or eight grains, in strong habits of body, so as to prove emetic; but when imprudently used, it is apt to bring on a dysentery.

TURBO, in meteorology, a whirlwind.

TURCICA Sella. See the article **SELLA**.

TURCOIS,* or **TURQUOIS**, in natural history, a precious stone of the opake kind, of a beautiful blue colour.

* The Greeks and Latins seem to have known it under the name *chelon*; and it appears to have had a place in the rationale of the high priest of the Jews.

There are *turcoises* both oriental and occidental, of the new rock and of the old. The oriental partakes more of the blue tincture than the green; and the occidental more of the green than the blue.—Those of the old rock are of a finer blue, and those of the new rock are often whitish, and do not keep their colour.

The oriental ones come from Persia, the Indies, and some parts of Turkey; and some even suppose that it is hence they derive their modern name *turcois*.—The occidental are found in various parts of Europe, particularly in Germany, Bohemia, Silesia, Spain, and France.

Turcoises often grow of a round or oval figure: they cut easily, and besides seals, which are frequently engraved on them, some are formed into crucifixes, or other figures near two inches

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high; though de Boot mistakenly affirms, that none have been known to exceed the bigness of a walnut.

The ancients attribute a kind of sympathetic virtue to the *turcois*—It is commonly supposed, that it changes colour, or breaks, at the death, sickness, or even misfortune of the person who wears it; that it diagnoses with married people, and even breaks on their fingers; that it marks all the changes and accidents that happen in the body of the wearer, by correspondent changes in its colour; and that it is for this reason the ladies have forborne the use of it.—And de Boot endeavours to account for all these effects from natural, and even probable causes; but this is all idle and erroneous.

The *turcois* is easily counterfeited; and that often is done so perfectly, that it is impossible to discover the deceit, without taking it out of the collet.

In the memoirs of the academy of sciences, we have a very curious account of the formation of the *turcois*, and the manner of managing its naturally irregular colour, by M. Reaumur.—The *turcois*, he observes, is one of the softest of precious stones, its hardness usually not coming up to that of a crystal, or a transparent pebble; though some are much harder than others: and still the harder, *ceteris paribus*, the more valuable, by reason of the vivacity of the polish, which is always proportionable to the hardness.

Rosnel, a jeweller, and the author of a scarce treatise, called *Morceau Indien*, estimating the several precious stones, sets a hard *turcois*, whose blue is neither bright nor deep, on the foot of the most perfect emeralds, that is, nearly on a level with a diamond, but such are scarce ever met with.—Those with any defect he only values at a French crown the east.

Tavernier affirms, but erroneously, there are but two mines of *turcoises* known in all the earth, and those are both in Persia; the one called the *old rock*, near a town called Nica-bourg, three days journey to the north-east of Meched: the other called the *new rock*, is five days journey from it.—The stones from the latter, he adds, are but little valued; and the king of Persia hath for many years prohibited the digging in the former for any but himself.—M. Reaumur takes the old rock to be now exhausted, in effect, the common division of *turcoises* into the old rock, or oriental, and new rock, or occidental, is very arbitrary and precarious.—All the best, and most perfect, grow they where they will, in India or Europe, are reckoned among the former, and the rest among the latter.

Near Simore, in the lower Languedoc, there are several considerable mines of *turcoises*; but that fine blue colour admired in the *turcois*, is not natural to those of these rocks; the prevailing colour being sometimes white, and sometimes much like that of Tripoli of Venice. Other precious stones are dug out of the mine with all their colour, to the force whereof nothing can be added, though it may frequently be diminished, as we see fire bring down the too deep colour of the sapphire, and quite take away that of a pale sapphire: these *turcoises*, on the contrary, are naturally whitish or yellowish, of a colour as ordinary as that of a free-stone; and by opposing them for some time to the action of the fire, they assume a blue colour.

It seems a paradox, and yet M. Reaumur has made it exceeding probable, that *turcoises* are originally the bones of animals.—In the mines in France, pieces have several times been found in the figure of teeth, bones of the legs, &c. And *turcoises* which are yet imperfect or half formed, are apparently composed of laminae or leaves like those of bones, between which some petrifying juice insinuating itself, binds them close together: and still, the sifter, and more imperfect the stones are, the more distinguishable are the different directions of the fibres and laminae, with their interfections, and the greater resemblance they bear to fractured bones, and the less to any kind of stones known.

To give them a blue colour, they dry them a while in the air, then heat them gradually in a furnace made after a particular manner. If they be heated too hastily, the humidity between the laminae, wanting time to evaporate the whole, will separate into scales or flaws. Some of the stones require a greater degree of heat to bring them to their colour than others; and even in large pieces, the several parts ordinarily require several degrees of heat.

On this account a great deal of care is to be taken in the heating them; for the fire, which gives them their blue by degrees, if they be exposed beyond a certain degree, takes it away again. M. Reaumur accounts for their taking a blue colour by heat very well: when fresh cut out of the rock, it seems, their substance is found sprinkled and streaked all over with spots, veins, little circles, &c. of a dark-blue colour: these he takes to be sources of a deep bluish matter, which the fire rarifying, spreads and diffuses throughout the whole substance of this stone.—This matter, again, he concludes to have been either originally the juice contained in the bones, since mixed and coagulated with the petrifying juice, or some other mineral matter insinuated into the pores of the stone.

The great defect of all *turcoises* is, that in time they lose their blue colour, and become green; and then cease to be of any value. See **Supplement**, article **TURQUOISE**.

TURF, Peat; a blackish, sulphurous earth, used in several parts of England, Holland, and Flanders, as fuel.

In Flanders, their *turf* is dug or pared from off the surface of the earth, and cut in form of bricks.—The sedge, or species of grass growing very thick on the *turf* earth, contributes greatly, when dry, to the maintenance of the fire.

The Dutch take their *turf* from the bottom of the Dikes or canals which run across most of their lands; by which means they not only supply the defect of wood, which is very great in most of the united provinces, but also keep their Dikes clear and navigable: this *turf* earth is very black. As they take it up from the bottom of the dikes, they spread it about the edges, of such a thickness, as that it may be reduced to three inches when moderately dried.—In this condition they cut it into pieces of *turfs* seven or eight inches long, and three broad; and, to compleat the drying, lay them up in heaps, and at last in stacks.

In the north of England, Scotland, &c. *turf* or peat is dug out of soft, moist, rotten earth, called *peat-moss*: for the formation whereof see Moss.

They dig horizontally from the surface, to the depth of about four foot, with a spade, which at once fashions and takes them out in parallelepipeds nine or ten inches long, and three square; which are spread on the ground to drain as fast as dug; and then set up an end three or four against each other, for the wind to blow through them; and at last they are stacked or housed.—The pits or dikes in a few years fill up again, and afford a fresh crop.

TURFING-spade, among husbandmen, is an instrument used to under-cut the *turf*, after it is marked out with a trenching-plough.

TURGESCE, **TURGESCE**, a swelling, or growing bloated.

TURIONES, the first young tender shoots which plants annually put forth.

TURKISH coins,	} See the articles	COIN. MEASURE. MONEY. YEAR. COMPANY. SILK.
TURKISH measures,		
TURKISH money,		
TURKISH year,		
TURKISH company,	} See the articles	COMPANY. SILK.
TURKISH silk,		

TURLUPINADE, a term used chiefly among the French for a low jest, or witticism.—The occasion of the name is derived from a famous comedian at Paris, called *Turlupin*; whose talent, like that of our Penkethman, consisted chiefly in raising a laugh by miserable puns and quibbles.

TURLUPINES, **TURLUPIN**, a sect of heretics, or rather of people who make public profession of impudence, going naked, without so much as covering their privy parts, and having to do with women, like the Cynics, in the open market.

They called their sect the *fraternity of the poor*, and spread themselves over England and France.—They are said by some to have had their name *turlupins*, quod ea tantum habebant loca quæ lupis exposita erant.

They attempted to fester themselves at Paris in 1372, but were a great part of them burnt, with their books; as is related by Gaguin and du Tillet in the life of Charles V.

TURMERIC, Curcuma, a medicinal root, used likewise by the dyers, to give a yellow colour.

It is yellow both within and without side, very hard, and not unlike, either in figure or size, to ginger.—The leaves it produces are like those of white hellebore; its flowers rise in form of a spica or ear; and its fruit is rough like our hulks of chestnuts.

It is brought chiefly from the East-Indies; though the island Madagascar does likewise afford it.—You are to chuse that which is big, new, refinous, hard to break, and heavy. Some people have mistakenly imagined that there was a native red *turmeric*; their error was owing to this, that the yellow root, as it grows old, turns brown; and when pulverised is redish. It is much used by the glovers, &c. to dye their gloves.—The Indians use it to dye their rice, and other foods, of a yellow colour; whence some call it *Indian saffron*.

Our dyers do not find that it gives so steady a yellow as the luteola or weld; but it is admirable to brighten and heighten the red colours died with cochineal or vermilion; as scarlets, &c.

Turmeric is used in medicine by way of decoction, infusion, powder, &c. with other ingredients, in hypochondria, leucophlegmatic, and cachectical constitutions. It is held a sort of specific in the jaundice, and dropsy.

TURN, is used for a circular motion; in which sense it coincides with *revolution*.

TURN, in a clock or watch-work, particularly denotes the revolution of a wheel, or pinion.

In calculation, the number of *turns* which the pinion hath in common arithmetic, thus, 5)60(12, where the pinion 5 playing in a wheel of 60, moves round 12 times in one *turn* of the wheel.—Now, by knowing the number of *turns*, which

any pinion hath in one *turn* of the wheel it works in, you may also find how many *turns* a wheel or pinion has at a greater distance; as the contrat-wheel, 5) 55 (11 crown-wheel, &c. by multiplying together the 5) 45 (9 quotients, and the number produced, is the number of *turns*; as in this example:

The first of these three numbers has 11 *turns*, the next 9, and the last 8. If you multiply 11 by 9, it produceth 99; that is, in one *turn* of the wheel 55, there are 99 *turns* of the second pinion 5, or the wheel 40, which runs concentrical, or on the same arbor with the second pinion 5.—If you multiply 99 by the last quotient 8, it produces 792, which is the number of *turns* the third pinion 5 hath.

TURN, or **TOURN**, is also used for the sheriff's court, kept twice a year in every hundred within his county, viz. a month after Easter, and within a month after Michaelmas.

From this court none are exempted but archbishops, bishops, earls, barons, religious men and women, and all such as have hundreds of their own to be kept.

It is a court of record in all things that pertain to it; and is also the king's seat through all the county, whereof the sheriff is judge; this court being incident to his office.—The attendance on it is called *feltra regalis*, or *suit-regal*.

It is called the *sheriff's turn*, because he takes a *turn* or circuit for this purpose through the shire, holding the same in several places.

TURNADO, or **TORNADO**, a wind which on some coasts blows all night from the shore. See **WIND**, **WHIRLWIND**, **TRADE-WIND**, **MONSOON**, &c.

TURNAMENT, or **TOURNAMENT**, a martial sport or exercise, which the ancient cavaliers used to perform, to shew their bravery and address.

The first *turnaments* were only courses on horseback, wherein the cavaliers tilted at each other with canes, in manner of lances; and were distinguished from *jousts*, which were courses or careers, accompanied with attacks and combats with blunted lances and swords.

Others say, it was a *turnament* when there was only one quadril or troop; and that where there were several to encounter each other, it was a *joust*.—but it is certain the two became confounded together in process of time; at least we find them so in authors.

The prince who published the *turnament*, used to send a king at arms with a safe conduct, and a sword to all the princes, knights, &c. signifying, that he intended a *turnament* and a clashing of swords, in the presence of ladies and damsels: which was the usual formula of invitation.

They first engaged man against man, then troop against troop; and after the combat, the judges allotted the prize to the best cavalier, and the best striker of swords; who was, accordingly, conducted in pomp to the lady of the *turnament*; where, after thanking her very reverently, he saluted her, and likewise her two attendants.

These *turnaments* made the principal diversion of the XIIIth and XIVth centuries.—Munster says, it was Henry the Fowler, duke of Saxony, and afterwards emperor, that first introduced them; but it appears from the chronicle of Tours, that the true inventor of this famous sport, was one Geoffrey, lord of Preuilli, about the year 1066.

From France they passed into England and Germany.—The *Historia Byzantina* tells us, that the Greeks and Latins borrowed the use thereof from the Franks; and we find mention made of them in Cantacuzenus, Gregorius, Bellarion, and others of the late Greek authors.

Budæus derives the word from *trojana agmina*; others from *trojanentum*, quasi *ludus trojæ*. Menage deduces it from the Latin; *turnensis*, or the French, *tourner*, in regard the combatants turned and twisted this way and that. M. Paris calls them in Latin, *holistidia*; Neubrigenis, *meditationes militares*; others *gladiatura*, others *decussiones ludicæ*, &c.

Pope Eugenius II. excommunicated those who went to *turnaments*, and forbade them burial in holy ground.—K. Henry II. of France died of a wound received at a *turnament*.—One Chiauoux, who had assisted at a *turnament* under Charles VIII. said very wisely, *If it be in earnest, it is too little; if in jest, too much*.

It is to the exercise of *turnaments* that we owe the first use of armories; of which the name blazonry, the form of the escutcheons, the colours, principal figures, the mantlings, labels, supporters, &c. are undeniable evidences.

In Germany, it was anciently a custom to hold a solemn *turnament* every three years, to serve as a proof of nobility.—For the gentleman who had assisted at two, was sufficiently blazoned and published; i. e. he was acknowledged noble, and bore two trumpets by way of crest on his *turnament* cask.—Those who had not been in any *turnaments*, had no arms, though they were gentlemen.

TURNESOL, or **TORNESOL**, *Heliotrope*, or the *Sun-flower*; a plant whose flower is said to follow the motion of the sun, and to turn always towards it.

Some

Some say, it is hence it takes its name, and account for the effect, by supposing that its heavy stalk, warmed and softened with the heat which is strongest on that side toward the sun, inclines naturally towards the same; but others take the opinion of its motion to have had its rise from the name, which was given it by reason of its appearance in the time of the greatest heats, when the sun is in the tropic. There is another plant of the name of *turnsole* called *heliotropium*. The principal use of this is in dying: in order to which, the juice is inspissated and prepared with calx and urine, into blue cakes; which are used also with starch, instead of smalt.

Its juice likewise furnishes the colour wherewith the people of Languedoc and some other parts of France, where it grows, prepare what they call the *turnep oil on drapens*, or *turnep oil in rags*. The process whereof we owe to M. Nissolle of the royal academy of sciences, and which is as follows:

The summits or tops of the plants being gathered in the beginning of August, are ground in mills, not unlike our oil-mills: then, being put up in bags, the juice is expressed with presses.

This juice having been exposed to the sun about an hour, they dip linnen rags therein, and hang them out in the air till they be well dried again. When, moistening them for some time, over the vapour of about ten pound weight of quick lime flaked in a sufficient quantity of urine, they lay them out again to the sun to dry; to be again dipped in the juice of the plant.

When they are dried for the last time, they are in their perfection; and are thus sent into most parts of Europe, where they are used to tinge wines and other liquors, to give them an agreeable colour.

The Dutch prepare a kind of *turnep oil* in pastes or cakes, pretended to be the juice of this plant inspissated: but there is reason to think it a cheat, and to be the juice of some other plant, or some other colouring matter prepared after this manner; the *turnep oil* being no plant of their growth.

TURNETUM, in our old law-books, a duty paid to the sheriff for holding his turn, or county-court.

TURNING, a branch of sculpture; being the art of fashioning hard bodies, as brass, ivory, wood, &c. into a round or oval form, in a lathe.

Turning is performed by putting the substance to be turned upon two points, as an axis; and moving it about on that axis; while an edge-tool, set steady to the outside or the substance, in a circumvolution thereof, cuts off all the parts that lie further off the axis, and makes the outside of that substance concentric to the axis.

The invention of *turning* appears to be very ancient.—Some, indeed, to do honour to late times, will have it brought to perfection by the moderns; but if what Pliny, and some other ancient authors relate, be true, that the ancients turned those precious vases, enriched with figures and ornaments in relief, which we still see in the cabinets of the curious; it must be owned, that all that has been added in these ages, makes but a poor amends for what we lost of the manner of *turning* of those times.

The principal instruments used in *turning*, beside the lathe, are chisels and mandrels of various forms; the description whereof see under their proper articles.

TURNING palisades, } See the articles } **PALISADES**.

TURN-UP compasses, } See the articles } **COMPASSES**.

TURNPIKE, a gate set up across a road, watched by an officer for the purpose, in order to stop travellers, waggons, coaches, &c. to take toll of them, or money towards repairing, or keeping the roads in repair.

TURNPIKE is also used in the military art, for a beam stuck full of spikes, to be placed in a gap, a breach, or at the entrance of a camp, to keep off an enemy. See *CHEVAL de Frise*. The *turnpike*, called also *cheval de frise*, is a spar of timber, twelve or fourteen feet long, and about six inches in diameter; of a hexangular form, and bored with holes, one right under another, about an inch diameter; the axis of the holes being six inches one from another.

The spikes or pickets that are driven into the holes, are five or six feet long, pointed with iron; and with wedges or nails they are fastened tight into the holes.

Two of these fastened together with an iron chain and staple, six inches long, are of great use to stop the enemy in the breaches or elsewhere.

Those intended to be thrown into breaches, must be made of oak; and need not be so big, or the pickets so long.

TURPENTINE, **TEREBINTHINA**, a transparent sort of resin, flowing either naturally or by incision, from several unctuous and resinous trees—as the terebinthus, larch, pine, fir, &c.

We distinguish several kinds of *turpentine*s; as that of Chio, that of Venice, that of Bourdeaux, that of Cyprus, that of Strasbourg, &c.

The *turpentine* of Chio, or Sio, which is the finest genuine kind, and that which gives the denomination to all the rest, is a whitish resin, bordering a little on green, very clear and a

little odoriferous; drawn by incision from a tree called *terebintus*, very common in that island, as also in Cyprus, and in some parts of France and Spain.

This resin must be chosen of a solid consistence, almost without either taste or smell, and not at all teracious, which distinguishes it from the thin *turpentine* of Venice, commonly substituted for it, which has a bitter smell, a bitter taste, and sticks much to the fingers.—The *turpentine* of Cno is indeed sparsely the best; but its scarcity occasions it to be little in use.

The *turpentine* of Venice, is falsely so called; for though there was a *turpentine* anciently brought from Venice, yet that now so called comes from Dauphine.—It is liquid, of the consistence of a thick syrup, and yellowish; and flows either spontaneously, or by incision from the larch-tree, chiefly in the wood de Pilatze.

The *turpentine* flowing naturally, and called by the peasants *bijon*, is a kind of balsom, not inferior in virtue to that of Peru. That drawn by incision, after the tree has ceased to yield spontaneously, is also of considerable use in several arts, and it is even of this that varnish is chiefly made.—It must be chosen white and transparent, and care should be taken it have not been counterfeited with some other *turpentine*.

The *turpentine* of Bourdeaux is white and thick as honey.—It does not ooze from the tree in the manner it is sent to us; but is properly a composition, wherein, among other ingredients, is a white hard sort of resin called *galipot*.

The *turpentine* of Strasbourg, the produce of the abies or silver fir, is frequently also used among us; and is preferred, by our people, to that of Venice, which it is distinguished from by its greenish hue, fragrant smell, and citron flavour.

The uses of *turpentine* in medicine are innumerable.—It is a great vulnerary, and very detergent, and as such is prescribed in abscesses and ulcerations, &c. It promotes expectoration, and as such is prescribed in difficulties of the lungs, and breast; but it is most famous for clearing the urinary passages, and as such it is prescribed in obstructions of the reins, in gonorrhoeas, &c.

Oil of TURPENTINE.—There are two kinds of oils drawn from *turpentine* by distillation by the retort; the first white, the second red; both esteemed as balsoms proper for the cure of wounds, chilblains, &c. But they are, so little used among us, that it is not easy to procure either of them.

What is commonly sold under the name of oil of *turpentine*, or *etherial oil*, is distilled by the alembick from the *turpentine* fresh as it is gathered.—It is used with great success in the cure of green wounds and internally as a diuretick, as also by the painters, fairiers, &c.—To be good, it must be clear and colourless as water, of a strong penetrating smell, and very inflammable.

TURPETH, } See the articles } **TURBITH**.

TURQUOIS, } See the articles } **TURCOIS**.

TURUNDA, in medicine and surgery, *trist, pellet, or penecil*; a piece of lint thrust into a wound, ulcer, or other cavity.

TUSCAN, in architecture, the first, simplest, and most massive of the five orders.—See *Tab. Archit. fig. 24*. See also the article **ORDER**.

The *Tuscan order* takes its name from an ancient people of Lydia, who coming out of Asia to people Tuscan, first executed it in some temples, which they built in their new plantations.

Vitruvius calls the *Tuscan* the *rustic order*; with whom agrees M. de Cambray, in his parallel says, it ought never to be used but in country-houses and palaces. M. le Clerc adds, that in the manner Vitruvius, Palladio, and some others, have ordered it, it does not deserve to be used at all. But in Vignola's manner of composition, he allows it a beauty, even in its simplicity; and such as makes it proper not only for private houses, and even for public buildings, as in the piazzas of squares and markets; in the magazines and granaries of cities, and even in the offices and lower apartments in palaces.

The *Tuscan* has its character and proportions, as well as the other orders; but we have no ancient monuments to give us any regular *Tuscan* pillar for a standard.

M. Perrault observes, that the characters of the *Tuscan* are nearly the same with those of the Doric; and adds, that the *Tuscan* is, in effect, no other than the Doric, made somewhat stronger, by shortening the shaft of the column; and simpler, by the small number, and largeness of the mouldings. Vitruvius makes the whole height of the order 11 modules, wherein he is followed by Vignola, M. le Clerc, &c.—Sedulo only makes it 12.—Palladio gives us one *Tuscan* profile, much the same as that of Vitruvius; and another too rich; on which side Scamozzi is likewise faulty. Hence it is, that that of Vignola, who has made the order very regular, is most followed by the modern architects.

Of all the orders, the *Tuscan* is the most easily executed; as having neither triglyphs nor dentils, nor mouldings to cramp its intercolumn.—On this account the columns of this order may be ranged in any of the five manners of Vitruvius, viz.

the pycnostyle, systyle, eustyle, diastyle or areostyle. — For the parts and members of the *Tuscan* order, their proportions, &c. see CAPITAL, BASE, PEDESTAL, FEEZE, &c.

TUSCULAN, in matters of literature, is a term which frequently occurs in the phrase, *tusculan questions*. — Cicero's *tusculan questions*, are disputations on several topics in moral philosophy, which that great author took occasion to denominate from *Tusculanum*, the name of a country-seat or villa, where they were composed, and where he lays the scene of the dispute.

They are comprised in five books: the first on the contempt of death; the second of enduring pain; the third on asswaging grief; the fourth on the other perturbations of the mind; and the last, to shew, that virtue is sufficient to a happy life.

TUSKES or **TUSKS** of a horse. See **TOOTH**.

TUSSIS. See the article **COUGH**.

TUT, in armory, &c. an imperial ensign of a golden globe, with a cross on it.

TUTELARY, **TUTELARIS**, one who has taken something into his patronage, and protection.

It is an ancient opinion, that there are *tutelary* angels of kingdoms and cities, and even of particular persons, called *guardian angels*.

The ancient Romans, it is certain, had their *tutelary* gods, whom they called *penates*. — And the Romish church to this day, hold an opinion not much unlike it: they believe that every person, at least every one of the faithful, has, from the time of his birth, one of those *tutelary* angels attached to his person, to defend him from all temptations; and it is on this, principally, that their practice of invoking angels is founded.

F. Anthony Macedo, a Portuguese jesuit of Coimbra, has published a large work in folio, on the *tutelary* saints of all the kingdoms, provinces and great cities of the christian world: *de iis tutelares orbis christianis*, at Lisbon 1678.

TUTOR, in the civil law, is one chosen to look to the person and estate of children, left by their fathers and mothers in their minority.

By the custom of Normandy, the father is the natural *tutor* of his children. — A person nominated *tutor*, either by testament, or by the relations of the minor, is to decline that office, if he have five children alive; if he have any other considerable *tutorage*; if he be under 25 years of age; if he be a priest or a regent in a university; or if he have any law-suit with the minors, &c.

The marriage of a pupil, without the consent of his *tutor*, is invalid. — *Tutors* may do any thing for their pupils, but nothing against them; and the same laws which put them under a necessity of preserving the interest of the minors, put them under an incapacity of hurting them.

Honourary Tutor. See the article **HONOURARY**.

TUTOR is also used in our universities, for a member of some college or hall, who takes on him the instructing young students in the arts and faculties.

TUTORAGE, **TUTELA**, in the civil law, a term equivalent to guardianship in common law; signifying an office imposed on any one, to take care of the person and effects of one or more minors.

By the Roman law, there are three kinds of *tutorage*. — *Testamentary*, which is appointed by the father's testament. — *legal*, which is given by the law to the nearest relation. — And *dativo*, which is appointed by the magistrate.

But in all customary provinces, as *France*, &c. all *tutorages* are *dativo* and elective; and though the father have by testament, nominated the next relation to his pupil, yet is not that nomination of any force, unless the choice be confirmed by that of the magistrate, &c.

By the Roman law, *tutorage* expires at 14 years of age; but in *France* not till 25 years. A minor quits his *tutorage*, and becomes free by marriage; in which case a curator is given him.

TUTTY, **TUTIA** or **Lapis TUTILÆ**, a kind of metallic recrement, thrown off from brass, in the furnace, and formed into concave flakes of different sizes, and thickness; very hard, greyish, and full of little protuberant grains as big as pins heads.

It is found adhering to rolls of earth suspended on purpose over the furnaces of the foundries in brass, to receive the fumes of the melted metal.

Tutty is now brought chiefly from Germany. Anciently, it came from *Alexandria*. — To prepare the *tutty* for use, they heat it red hot three times in a crucible, among burning coals; and quench it as often in rose-water: then they grind it on a porphyry stone, mixing it with as much rose-water, or plantain-water as is necessary, till it be brought to a very fine powder: then they make it up into little lumps, and thus dry it.

Tutty is very delicate. Its principal use is in diseases of the

eyes, particularly inflammations; in order to which, it is to be diluted with rose-water or plantain-water, and applied in form of a collyrium.

Some also use it incorporated with hog's lard, or fresh butter, in the form of an unguent. — In the *London Dispensatory*, we have a composition called *ointment of tutty*, good for diseases of the eyes; and frequently also used by surgeons with other dryers to cicatrize ulcers. — It is also reputed good in the hæmorrhoids. It is made up with *tutty* calamine, and unguentum rofaceum.

TWA-NIGHTS GEFTE, in our ancient customs. See **THIRD-NIGHT-OWN HYND**.

If the *two-nights-gefte* did any harm to any, his host was not answerable for it, but himself.

TWELF-HIND, in our ancient customs, imports much the same with *thane*.

Among the English Saxons, every man was valued at a certain price; and when an injury was done, either to the person or goods, a pecuniary mulct was imposed, and paid in satisfaction of that injury, according to the worth and quality of the person to whom it was done. — And hence all men were ranked in three classes; which see in **HINDELI**, and **TW-HINDI**.

Those who were worth 1200*s.* were called *twelve-hindi*, and if any injury was done to them, satisfaction was to be made accordingly.

TWELFTH-DAY, or **TWELFTH-TIDE**, the festival of the Epiphany, or the manifestation of Christ to the Gentiles; so called, as being the *twelfth-day*, exclusive, from the nativity or Christmas-day.

TWELVE-MEN, *duodecim homines legales*, otherwise called *jury*, or *inquest*, is a number of *twelve* persons, or upwards as far as twenty-four; by whose oath, as to matters of fact, all trials pass, both in civil and criminal cases, through all courts of the common law in this realm.

In civil cases, when proof is made of the matter in question, the point of fact, whereon they are to give their verdict, is delivered to them; which is called the *issue*. — Then they are put in mind of their oath, and are after the judge's summing the evidence, sent out of court by themselves, to consider on the evidence on both sides; till they be agreed.

In causes criminal, there are two sorts of inquests or juries: the *grand inquest*, and the *inquest of life and death*. — The first is so called, because it consists of sixteen persons at least, or because all causes criminal or penal pass through their hands; whereas the other inquest is especially appointed for one or more matters. Those of the *grand inquest* are called by Bracton, *duodecim milites*, because they were wont to be knights; if so many could be had.

Their function is to receive all presentments of any offence, and accordingly to give their general opinion thereof, by writing either the words *billā vera* upon the bill of presentment, which is an indictment of the party presented: or else *ignoramus*, which is doubting of the fact presented.

Laws of the TWELVE TABLES. See the article **TABLE**.

TWELVE-MONTH, the space of a year, according to the calendar months.

TWIF-FALLOWING of Ground, in husbandry, is the tilling or laying it fallow a second time.

TWI-HINDI, or **TWYHINDI**, among our Saxon ancestors, were men valued at 200*s.* See **TWELFHINDUS**, and **HINDENI**.

These men were of the lowest degree; and if such were killed, the mulct was 30*s.* — Thus in *Leg. H. l. c. 9. de twi-hindi homines interfecti, vera debet reddi secundum legem*. — Where note, that this was not an introduction of a new law, but a confirmation of the old, made in the reign of king Alfred.

TWINS, two young ones delivered at a birth by an animal which ordinarily brings forth but one.

It has been greatly disputed, which of two *twins* is to be esteemed the elder? — The faculty of Montpellier have given it, that the latter born is to be reputed the elder, because first conceived: but by all the laws which now obtain, the first-born enjoys the privileges of seniority; and the custom is confirmed by the scripture instance of Esau and Jacob.

But if two *twins* be born so intermixed, that one cannot distinguish which of the two appeared first, it should seem that neither the one nor the other can pretend to the right of primogeniture, which ought to remain in suspense, by reason of their mutual concurrence.

In such case, some would have the decision left to the father, and others to the chance of a lot. Sometimes there are born three *twins*, as in the instances of the *Horatii* and *Curatii*; and sometimes there have been known four, or even five or more.

TWINS, in astronomy. See the article **GEMINI**.

TWIST of a rope, cord, &c.

TWIST,

Twist, again, is used for the inflexion, or flat part of a man's thigh, upon which a true horseman rests when on horseback.

To **Twist a horse**, is violently to wing or twist his testicles twice about, which causes them to dry up, and deprives them of nourishment, and reduces the horse to the same state of impotency with a gelding.

Twisted Columns, See the article **COLUMN**.

Twisted Silks, See the article **SILK**.

Two thirds Subsidy. See the article **DUTY**.

TYCHONIC System, or *hypothesis*, is an order or arrangement of the heavenly bodies, of an intermediate nature between the Copernican and Ptolemaic, or participating alike of them both.

It takes its name from Tycho Brahe, a noble Dane, of whom some account is hereafter given, under the article **URANIBOURG**.

In this system, the earth is, with Ptolemy, placed in the middle, and supposed immovable; and the sun and moon are supposed to revolve in orbit, respecting the same as a centre: but the other five planets are supposed, with Copernicus, to revolve round the sun as their centre.—So that the orbits of the three superior planets include the earth, but not those of the inferior ones, by reason they are nearer to the sun than the earth is.

Accordingly, the heavens are here supposed to be fluid; and to consist of three different orbs or spheres: the first moveable, supposed to make a revolution in 24 hours; the second the sphere of the planets; and the third the firmament, or region of the fixed stars.—See the disposition of the heavenly bodies in this system, represented in *Tab. Astronomy*, fig. 45.

Some later astronomers finding the Ptolemaic system disagree with phenomena; and not daring to make the earth move; but at the same time disliking the *Tychonic* notion of two centres, one of them moveable, viz. the sun, and the other fixed, the earth; have framed a new system out of the Ptolemaic and *Tychonic*, called the *Semi-Tychonic*; wherein not only the Sun and Moon, but Jupiter also and Saturn, are supposed to move in excentrics or deferents, respecting the earth as a centre, though revolving at the same time in their respective epicycles.—But even here, the inferior planets are still supposed to move round the sun as their centre; their phases, observed with the telescope, being no otherwise accountable for.

TYLE,* or **TILE**, in building, a sort of thin, facitious, laminated brick, used on the roofs of houses; or, more properly, a kind of fat, clayey earth, kneaded and moulded of a just thickness, dried and burnt in a kiln, like a brick, and used in the covering and paving of houses.

* It is thus called from the French *tuile*, of the Latin, *tegula*, which signifies the same.

Tyles are made, says M. Leybourn, of better earth than brick-earth, and something nearer akin to the potter's earth.—According to *Stat. 17 Edw. IV.* the earth for *yles* should be cast up before the first of November, flint and turned ere the first of February, and not made into *yles* before the first of March; and should likewise be tried and leaved from stones, male and chalk.—For the method of burning them, see **BRICK**.

As to the applying of *yles*; some lay them dry, as they come from the kiln, without mortar or any thing else: others lay them in a kind of mortar made of loam and horse-dung.—In some parts, as in Kent, they lay them in moss.

There are various kinds of *yles*, for the various occasions of building; as *plain*, *thack*, *ridge*, *roof*, *creases*, *gutter*, *pan*, *crooked*, *flemish*, *corner*, *hip*, *dorman* or *dormar*, *scallop*, *astragal*, *traverse*, *paving* and *dutch* *yles*.

Plain or thack Tyles, are those in ordinary use for the covering of houses. They are squeezed flat, while yet soft, in a mould.—They are of an oblong figure, and by *Stat. 17 Edw. IV. c. 4.* are to be 10 inches long; 6 broad, and half an inch and half a quarter thick. But these dimensions are not over-strictly kept to.

Ridge, roof, or crease Tyles, are those used to cover the ridges of houses: being made circular, breadth-wise, like a half cylinder.—These are what Pliny calls *laterculi*, and are by statute to be 13 inches long, and of the same thickness with the plain *yles*.

Hip or corner Tyles, are those which lie on the hips or corners of roofs.—As to form; they are first made flat, like plain *yles*, but of a quadrangular figure, whose two sides are right lines, and two ends, arches of circles: one end being a little concave, and the other convex: the convex end is to be about seven times as broad as the concave end: so that they would be triangular, but that one corner is taken off: then, before they are burnt, they are bent on a mule, breadth-wise, like *ridge-yles*.—They have a hole at their narrow end, to nail them on by, and are laid with their narrow end upwards.—By statute, they are to be 12 inches long, and of a convenient breadth and thickness.

Gutter Tyles, are those which fit in gutters or valleys in cross-buildings.—They are made like *corner-yles*, only the corners of the broad end are turned back again with two wings.—

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They have no holes in them, but are laid with the broad end upwards, without any nailing.—They are made in the same mould as *corner-yles*, and have the same dimensions: on the convex side. Their wings are each 4 inches broad and 8 long.

Pan, crooked, or Flemish Tyles, are used in covering of sheds, lean-to's, and all kinds of flat roofed buildings.—They are in form of an oblong parallelogram, as *plain-yles*; but are bent breadth-wise forwards and backwards, in form of an S, only one of the arches is at least three times as big as the other; which biggest arch is always laid uppermost, and the lesser arch of another *tile* lies over the edge of the great arch of the former.—They have no holes for pins, but hang on the laths by a knot of their own earth: they are usually 14 inches long, and 10 broad. By 12 G. 1. c. 25. they are to be, when burnt, not less than 13 inches long, 9 inches wide, and $\frac{1}{2}$ an inch thick.

Dormar, or dorman Tyles, consist of a plain *tile* and a triangular piece of a plain one, standing up at right angles to one side of the plain *tile*, and swept with an arch of a circle from the other end, which end terminates in a point.—Of these *yles* there are two kinds; the triangular piece, in some, standing on the right, in others on the left side of the plain *tile*.—And of each of these, again, there are two kinds; some having a whole plain *tile*, others but half a plain *tile*. But in them all, the plain *tile* has two holes for the pins, at that end where the broad end of the triangular piece stands.

Their use is to be laid in the gutters, between the roof and the cheeks or sides of the dormars, the plain part lying on the roof, and the triangular part standing perpendicularly by the cheek of the dormar.—They are excellent to keep out the wet in those places, and yet they are hardly known any where but in Suffolk.—The dimensions of the plain *tile* part is the same as those of a plain *tile*, and the triangular part is of the same length, and its breadth at one end 7 inches, and at the other nothing.

Scallop or astragal Tyles, are in all respects like plain *yles*, only their lower ends are in form of an astragal, viz. a semicircle, with a square on each side.—They are used in some places for weather *tyling*.

Traverse Tyles, are a kind of irregular plain *yles*, having the pin-holes broke out, or one of the lower corners broke off.—These are laid with the broken end upwards, upon rafters, where pinned *yles* cannot hang.

Flemish or Dutch Tyles, are of two kinds, *ancient* and *modern*.—The *ancient* were used for chimney-top pieces: they were painted with antic figures, and frequently with postures of soldiers, some with compartments, and sometimes with more lively devices; but they came much flatter, both as to the design and colours of the modern ones.

The *modern Flemish-yles* are commonly used, plastered up in the jambs of chimneys, instead of chimney-corner-stones.—These are better glazed, and such as are painted (for some are only white) are much better performed than the *ancient* ones. But both kinds seem to be made of the same whitish clay as our white glazed earthen ware.—The *ancient* ones are five inches and a quarter square, and about three quarters of an inch thick: the *modern* ones six inches and a half square, and three quarters of an inch thick.

TYLER, one that covers or paves with *yles*.

Tylers and *bricklayers* were incorporated 10 Eliz. under the name of Master and wardens of the society or brethren of the mystery and art of *tylers* and *bricklayers*.

TYLERY. See the article **TUILLERIE**.

TYLWITH, in matters of herality and descent, is sometimes used for a tribe or family branching out of another; when the modern speaks more usually call the *posterity* of that house.

TYMBER of Skins. See the article **TIMBER**.

TYMPAN, or **TYMPANUM**, in architecture, the area of a pediment: being that part which is in a level with the nates of the freeze.—Or it is the space included between the four corners of a triangular pediment, or the two corners of a circular one.—See *Tab. Archit.* fig. 36. lit. c.

Sometimes the *tympa*n is cut out, and the part filled with an iron lattice to give light; and sometimes it is enriched with sculpture, in basso relievo, as in the west front of St. Paul's, in the temple of Caesar and Pollux at Naples, &c.

Tympan, is also used for that part of a pedestal, called the *trunk* or *dye*.

TYMPAN, among joiners, is also applied to the panels of doors.

TYMPAN of an Arch, is a triangular space or table in the corners or sides of an arch; usually hollowed and enriched, sometimes with branches of laurel, olive-tree, or oak; or with trefoils, &c. sometimes with flying figure, as flames, &c. or sitting figure, as the cardinal virtues.

TYMPAN, in anatomy, *membrana*, &c. See the article **TYMPANUM**.

TYMPAN, among painters, is a double frame belonging to the pedestal, covered with parchment, on which the pictures are laid, in order to be painted off. See **PARALIP. Pre**.

T Y P

TYMPANITES, or **TYMPANY**, in medicine, a flatulent tumor, or swelling of the abdomen or belly; very hard, equal, and permanent; whereby the skin is stretched so tight, that when struck, it gives a sound like that of a drum.

The *tympantes* is a species of dropsy, by some called a *dry dropsy*; but what the cause and seat of the distase is, or what the morbid matter is that occasions the tumor, physicians are not at all agreed.

Wind certainly makes a principal part of the morbid matter; but this is scarce ever found without water, excepting at the beginning; so that some will not allow of any difference between the *tympany* and the *ascites*.

Some suppose it to arise from a watry humour extravasated and rarified into vapour; and by a property common to it with common air, corrupting the parts.—But this, Boerhaave makes a particular kind of *tympantes*, or wind dropsy; and adds, that it is cured like the *ascites*, or water dropsy, by tapping, &c.

Others will have the *tympantes* to arise from the air's insinuating itself through perforations in the diaphragm intestines.—A *tympantes* from this cause, Boerhaave, who makes it a peculiar class, observes, is almost always incurable.

Willis sets aside this latter cause, and accounts for the disease from an irregularity in the animal spirits belonging to the viscera, which rushing tumultuously into the nervous fibres, bloat them up: thus is the peritoneum inflated, the intestines distended, and the mesentery, and other viscera, rendered turgid; and while this is doing, that the vacuities left in the tumefied viscera may be filled up, a quantity of the humour contained in them is rarified into vapour, which presently spreads in blasts through the vacant places.—Others account for the *tympantes* from a convulsion of the muscles of the abdomen, &c.

M. Linc has proposed a new system of the *tympantes*, built on a great number of observations.—According to him, it does not proceed from any convulsion of the abdominal muscles, nor from any air contained in the cavity thereof, or in the thorax, the mesentery, or epiploon; but from the air enclosed in the stomach and intestines, which swells them excessively.

This air, always carried into those parts with the food, maintains a kind of equilibrium therein; opposing on the one hand, the too great pressure on that long canal when empty of food, and naturally finding, on the other side, in the spring of the coats of the stomach and intestines, an obstacle capable of preventing its too great dilatation.

If this equilibrium chance to be destroyed by the irritation of the fibres, whose spring in that case prevails over that of the air, this latter is expelled either upwards or downwards, or both ways; (whence belching, &c.) But if the equilibrium come to be broke by the force of the air, rendered superior to that of the fibres, by those latter being left destitute of spirits, as from the blood's being impoverished after a long sickness; in that case, the air rarifying itself beyond measure, swells the cavities it is contained in.

If it be demanded, why when the stomach and intestines are so full of wind, none of the wind escapes, either through the anus, or by the mouth, which uses to be expelled by those passages?

M. Linc solves the paradox thus: according to this theory, the fibres, both of the stomach and intestines have lost their spring, at least in part, and are in an imperfect palsy; but the winds evacuated either by the anus or mouth, are winds which those viscera expel out of their cavities, by putting them in a state of contraction capable of surmounting the forces which oppose the egress of the matters contained in those cavities.—These forces are two sphincters, one whereof shuts the upper entrance of the stomach, and the other the anus: but paralytic viscera, i. e. viscera destitute of spirits, in which alone consists the strength of the muscles, cannot overcome the resistance of those two muscles: whence the wind, therefore, cannot escape through its usual outlets.

The *tympantes* rarely kills of itself; but it frequently degenerates into an *ascites*.—Catarrhs rather aggravate than alleviate it: antispasmodics, antispasmodics, chalybeates, and strengtheners are of use, before it be commenced an *ascites*. Equal quantities of leek and elder leaves mixed, is a famed empirical medicine in this disease, which has often proved effectual when every thing else had failed.

It is usual to apply carminatives to the belly, as the emplaister of camomil-seeds, &c. and also to use carminatives mixed with cathartics, i. e. internally; but if the disease proceed from a paralytic cause, destroying the tone of the fibres of the first passages, what is of use in rectifying paralytic disorders, where the tension of the fibres is insufficient, will doubtless for the same reason be of use here.

TYMPANUM, **TYMPHANON**, **drum**; a musical instrument, which among the ancients, consisted of a thin piece of leather or skin, stretched upon a circle of wood or iron, and beat with the hand.

TYMPANUM, **TYMPAN**, in mechanics, is a kind of wheel placed round an axis or cylindrical beam, on the top of which

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are two levers or fixed flaves, for the more easy turning the axis about, in order to raise a weight required. The *tympanon* is much the same with the peritrochium; but that the cylinder of the axis of the peritrochium is much shorter and lesser than the cylinder of the *tympanon*.

TYMPANUM of a machine, is also used for a hollow wheel, wherein one or more people, or other animals, walk to turn it; such as that of some cranes, calenders, &c.

TYMPANUM, in anatomy.—**Membrana TYMPANI**, is a thin tender skin or membrane, stretched upon a bony circle, in the meatus auditorius of the ear, which it shuts; and supposed to be the immediate organ of hearing.—See *Tab. Anat. (Otit.)* fig. 13. lit. c.

The *tympanon*, popularly called the *drum*, with respect to the erect posture of the body, is situate obliquely, facing downwards; whence it is that we hear sounds coming from below, better than those from above.

Its external surface is a little hollow in the middle.—It is composed of two membranes, or as others will have it, of only two or more lamellae of one.—It has a perforation, or at least a disengaged part, which admits of the passage of wind, and, in some, of smoke from the meatus palato.

Behind it, is a cavity of the os petrosum, called *tympani cavitas*, and sometimes simply *tympanon*; wherein are four little bones, viz. the malleolus, incus, stapes, and os orbiculare: which see under their respective articles.

Within the *cavitas tympani*, Visellius has discovered a very fine thin membrane, serving to shut the door of the labyrinth, and prevent the internal air from having any communication with the external.—The *membrana tympani* has a remarkable branch of a nerve passing on its internal surface between the incus and malleolus, called the *chorda tympani*.

The *tympanon*, Dr. Willis takes to be a kind of preparatory instrument to hearing; and its office to be, to receive the first impressions of sounds, or the sensible species, and to convey them duly modified and proportioned to the sensorium.

Its office, in effect, with respect to the sense of hearing, seems to be the same as that of the pupil of the eye with regard to seeing: each of them prevent the ingress of too many rays, temper and soften them, and deliver them, as it were, commensurate to the sensory; upon which, if they should fall immediately, they might be apt to spoil its delicate constitution.

The *tympanon*, it is true, does not hear: but it contributes to the better and safer hearing.—That it may do the office of a porter the better, it is necessary its expanse should, like the pupil, be contracted and relaxed on occasion; and to this purpose serve the four little bones above-mentioned, which have the same use in straining and relaxing, as the braces of the war drum have in that instrument.—By means of this extension and retraction, the *tympanon* is made to correspond to all sounds loud or languid; just as the pupil does to all the degrees of light.

The ingenious Dr. Holder has improved on this theory. He conceives that the action of the muscle, whereby the *tympanon* is stretched and relaxed, does ordinarily and constantly draw it to a moderate tension; but when we have occasion to listen, and give a particular attention to any sound, the action of that muscle is then more intense, and the drum is drawn to a more than ordinary tension, to facilitate the passage of the sound. See **ATTENTION**.

Upon these considerations, that author having a young gentleman, who was born deaf, put into his hands, and perceiving the great defect to lie in the want of a due tension of the *tympanon*, he advised his mother to consult with physicians, whether by some alluring humes, or otherwise, it might not be restored to a due tension.

In the mean time, he thought of a temporary way, by the means of any vehement sound; as of a drum beaten near him: which found, during its continuance, must needs give the *tympanon* a tension, by driving and swelling it outwards, as a fresh gale of wind fills the sails of a ship. And the experiment succeeded according to expectation: for so long as he beat a drum fast and loud by him, he could hear those that stood by him call him gently by his name. But when the drum ceased, he could no longer hear the same persons calling him very loudly. But what makes the use of the *tympanon* appear the less considerable is, that there are instances where the hearing has been perfect, without any use of a *tympanon*.—Mr. Cheselden relates, that he broke the *tympanon* in both ears of a dog, yet it did not destroy his hearing; though for some time afterwards he received strong sounds with great horror: He adds, that Mr. St. Andre assured him, that a patient of his had the *tympanon* destroyed by an ulcer, and the auditory bones cast out, yet without destroying his hearing.

Chorda TYMPANI. See the article **CHORD**.

TYMPANUM, in architecture. See the article **TYMPAN**.

TYMPANY, **TYMPANIAS**, or **TYMPANITES**, in medicine. See the article **TYMPANITES**.

TYPE, * **TYPOS**, a copy, image, or resemblance of some model.

* The word is formed from the Greek, *τυπος*, form, figure. The

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The term *type* is less in use than its compounds *prototype* and *archetype*, which are the originals that are made without models.

Type is also a scholastic term, much used among divines, signifying a symbol, sign, or figure of something to come.

In this sense, the word is commonly used with relation to *antitype*, *antitypos*, which is the thing itself, whereof the other is a *type* or figure.

Thus, Abraham's sacrifice, the paschal lamb, &c. were *types* or figures of our redemption: and the brazen serpent was a *type* of the cross, &c.

Types are not mere conformities, or analogies, which the nature of things holds forth between them; nor arbitrary images arising merely from the casual resemblance of things: but there is further required a particular institution of God to make a *type*; and a particular declaration of his that it is so.

Gale divides *types* into *historical* and *prophetic*.—The first are those used by the ancient prophets in their agitations and visions: the second, those wherein things done, or ceremonies instituted in the Old Testament, prefigure Christ, or things relating to him in the New Testament.

The ancient fathers, as well as the modern critics, have been greatly divided about the nature and use of *types*, and *typical* representations, in the Old Testament; and it is this makes one of the great difficulties in understanding the ancient prophecies, and in reconciling the New and old Testament together.

There is no denying but that there were some *types* which the divine wisdom instituted to be the shadows and figures of things to come; and yet people run into an excess that way: some looking for *types* in every thing; like Origen, who discovered mysteries in the very caldrons of the tabernacle.—A prudent man should be contented with the more sensible and obvious ones; nor propose any without proving them as much as possible, and shewing that they were really intended for *types*, in order to justify the solidity of the reasoning of the apostles, who argued from them.

A late author maintains, that not the fathers only, but St. Paul himself, was of the opinion, that "Christianity was all contained in the Old Testament, and was implied in the Jewish history and law; both which are to be reputed *types* and shadows of Christianity."—In order to which, he quotes Hebrews viii. 5. x. 1. and Colos. ii. 16, 17.—He adds, "That the ritual laws of Moses, being in their own nature no other than *types* and shadows of future good things, are to be considered as having the effect of prophecies."—This is likewise the sense of Mr. Whitton, and others; but the same author even quotes our Saviour speaking in behalf of this *typical* reasoning, in that passage Matth. xii. 13. where he affirms, that "The law prophecies; and that he came to fulfil the law as well as the gospel," Matth. v. 17. *Diss. of the Grounds*, &c.

An ingenious divine takes this occasion to observe, that had the ancients, with the modern retainers to the *typical* way, expressly designed to have expofed Christianity, they could not have done it more effectually than by thus making every thing *types* and prophecies.—It is no wonder, he adds, that atheists and deists scoff at the credulity of Christians, and reject what is supported by such folly and absurdity.

Not that he denies the reality of such things as *types*.—It is manifest, there were many under the Old Testament; such were Zechariah's slaves, beauty and bands, ch. xi. 7, 10, 14; such was Holofer's adulterous wife, ch. i. 2; and such were his children, ver. 4, 6.—The prophets designed by these to prefigure future events; but in these instances the reader is at once, by the declaration of the prophet, made to understand as much, and not left to his own conjectures about them, after the events are over.

In effect, all that is urged from scripture for the *typical* or allegorical interpretations of the Jewish law, history, ceremonies, &c. is asserted, may be set aside, without any violence to the sacred text, which may be explained on more natural and intelligible principles, and more consistently with grammar.

The word *τυπος*, we have observed, literally denotes no more than a copy or impression of any thing; and accordingly, in our translation, we find it sometimes rendered by *print*, sometimes by *figure*, sometimes by *shadow*, and sometimes by *form*.—Hence also the word is figuratively applied to denote a moral pattern; in which sense it signifies no more than *example* and *similitude*.

Again, the word *αντιτυπος*, *antitype*, in scripture, signifies any thing formed according to a model or pattern; and thus in the epistle to the Hebrews, the tabernacle, and holy of holies being made according to the pattern shewn to Moses, are said to be *antitypes* or figures of the true holy places.—In the like sense, St. Peter speaking of the flood and the ark, whereof eight persons were saved, calls baptism an *antitype* thereto; by which he expresses no more than a similitude of circumstances. The other words used in scripture to imply a future event, prefigured by some foregoing act, are—*ὑποδειγμα*, rendered by *imitation* and *example*; and *εἰκων*, *shadow*.

This last word is frequently used by St. Paul, and applied to

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the Jewish law, ceremonies, priests, &c. which are represented as only shadows of things to come, or of heavenly things. It is from such general expressions, that people were led to mistake the apostle's design in these comparisons, and to assert, that all the Mosaic rites were *types* of, or designed to signify future events; and that the gospel is to be found in the pentateuch.—Whereas St. Paul's intent appears no other than to shew the great advantage of the gospel over the law in several particulars, wherein it has as much pre-eminence as the substance has over the shadow.

If the shadow of things to come signify a prefiguration of future events, what are those events to which the Jewish new moons, Col. ii. 16. or the Jewish meats and drinks, have a respect? Or, how did the law of Moses, made of commands about persons, times, places, and sacrifices, prefigure a dispensation where regard to sacrifices, holy persons, times and places, are so far from being enjoined, that they are declared useless? Can a particular holy place in the law be designed a prefiguration of a state where all places are equally holy?

Such being the import of all the terms used in the New Testament writers, seeming to imply any prefiguration of future events under the gospel, we may observe,

1. That to argue from *types*, is only to argue from examples or similitudes; and, consequently, that all inferences drawn from such reasonings, are no farther conclusive, than reasonings from similitudes are.—The intent of similitudes is only to help to convey some ideas more clearly or strongly; so that to deduce consequences from a simile, or infer any thing from other parts of the simile than what are plainly similar, is absurd.

2. It cannot be proved that the ceremonies of the Mosaic law were ever designed to prefigure any future events in the state of the Messiah's kingdom.—No such declared prefigurations are mentioned in the writings of the Old Testament, whatever notions prevailed among the writers who immediately followed. It is granted, that the apostles argued from the rites in the Mosaic institution; but this appears to have only been by way of illustration and analogy.

There is certainly a general likeness in all the dispensations of Providence; an analogy of things in the natural as well as the moral world, from which it is easy arguing by way of parity, and it is very just and usual so to do; but that one of these dispensations was therefore given to prefigure another that was future, can never be proved, unless it be expressly declared.—The Land of Promise, we know, was to be a place where the Jews were to enjoy rest from their labours; God likewise, did, himself, rest the seventh day from his works; yet, whoever imagined God's rest from the creation to be prefigurative of the Jews rest in Canaan? and is it not equally reasonable to say, that God's rest on the seventh day, prefigured the entrance of the Jews into Canaan, as to say, that the Jews rest in Canaan prefigured the rest mentioned by David in the Psalms?

This will equally imply, that all the following events in the uniform course of God's government, similar to any preceding ones, were designed to be prefigured by them; in which sense, it will readily be owned, that the rest of the Jews was *typical* of the rest of the Christians.

It is in the same manner we are to understand St. Paul, where he says, "That Christ our passover is sacrificed for us." And thus we are to understand John the Baptist, when he calls our Saviour the "Lamb of God."—There was this similitude of circumstance, that Christ was slain on the same day with the paschal lamb; that he died about the same time of the day when the priests began their hill; that not a bone of the one or the other was broken. Add, that as the paschal lamb was without blemish, so was Christ without sin.—From these, and other circumstances, the apostle applied the term *passover* to Christ.

Thus, also, we are to account for what St. Paul calls the baptism of the children of Israel in the cloud, and in the sea; and for the comparison betwixt the high priest entering the holy place every year, and Christ entering into heaven.

TYPE,* *TYPOS*, is also a name given to an edict of the emperor Constant II. published in 648, to impose a general silence both on the orthodox and the Monothelites.

* It had the name *type*, as being a kind of formulary of faith; or rather a form whereon men were to regulate their conduct.

The *type* owed its original to Paul, patriarch of Constantinople, who persuaded that Emperor to take away the *ecthesis* compiled and hung up in all the public places by Heraclius; (as occasioning great complaints from the orthodox, by its favouring the Monothelites) and to publish an edict to impose silence on both parties.

But such kinds of pacifications are held inexcusable in matters of religion; accordingly pope Theodore soon procured the patriarch Paul to be deposed: the *type* was examined in the council of Rome in 649, and condemned; and an anathema was pronounced against all such as admitted either the impious *ecthesis* or *typos*.

TYPE, *TYFUS*, is also used to denote the order observed in the intention and remission of fevers, pulses, &c.

TYPHODES,

TYPHODES, ΤΥΦΟΔΗ, in medicine, a kind of ardent or burning fever usually attending on erysipelas of any of the viscera.

TYPHOMANIA,* ΤΥΦΟΜΑΝΙΑ, in medicine, a disease of the brain, wherein the patient not being able to sleep, though greatly inclined thereto, lies with his eyes shut, talks absurdly, and flings himself this way and that.

* The word is formed from the Greek, τυφον, *swollen*, and μανια *mania*.

If he be pulled, or the like, he just opens his eyes, looks about, and sinks again into a kind of dozing, which is interrupted by a train of disagreeable imaginations.

The *typhomania* is a kind of combination of a phrenzy with a lethargy.—It is also called a *coma vigil*. See **COMA**.

TYPOGRAPHY,* the art of printing. See **PRINTING**.

* The word is formed from the Greek, τυπος, and γραφω, *scriptura*, *writing*.

TYRANT, ΤΥΡΑΝΝΟΣ, among the antients, denoted simply a king, or monarch.

But the ill use several persons invested with that sacred character made of it, has altered the import of the word; and *tyrant* now carries with it the idea of an unjust and cruel prince, who

invades the people's liberty, and rules in a more despotic manner than the laws of nature, or the country do allow of.

The term *tyrant*, we are told, became odious among the Greeks, those zealous lovers of liberty, almost as soon as introduced: but Donatus assures us, it was never taken so among the Romans till the latter ages of that empire.

TYRIAN-Purple, } See the articles } **PURPLE**.
TYRO, }
TYROCINIUM,* TYROCINY, a novitiate or apprenticeship in any art or science.

* The word is formed of *tyre*, a *raw beginner*.

We have several writings under the title of *tyrociniums*: *tyrocinium chymicum*, *tyrocinium chirurgicum*, &c. containing the rudiments of those arts, accommodated to the apprehensions of the beginners.

TYROSIS,* ΤΥΡΩΣΙΣ, in medicine, a coagulating or curdling of milk in the stomach; after the manner of cheese.

* The word is formed of the Greek, τυρος, *cheese*, *cheese*.

TYTH, or rather **TITHE**. See the article **TITHE**.

TYTHING and **TYTHING-Man**. See **TITHING**, **DECENNIAL**, **TENMENTALE**, **HUNDRED**, **WAPENTAKE**, &c.



V A C

U, The twentieth letter in the alphabet, and the fifth vowel.

Besides the vowel *u*, there is a consonant of the same denomination, wrote *v*, or *u*.

The pronunciation of the *u*, as now used among the English, French, &c. is borrowed from the ancient Gaulish: for all the other western people, with the Romans, pronounce it *ou*. **V** is also a numeral letter, and signifies *five*; according to the verse,

V, vero quinque dabit tibi, si recte numerabis.

When a dash was added at top, **V**, it signified 5000.

V. R. among the Romans, stood for *ut rogas*, as you desire: which was the mark of a vote, or suffrage for the passing of a law.

VACANCY, or **VACUUM**, in philosophy, an empty interval, or space void of matter.

VACANCY, in law, &c. a post or benefice wanting a regular officer, or incumbent.

The canonists hold, that the kind of *vacancy* is to be expressed in the imputation of a benefice.

A future *vacancy*, or voidance of a spiritual living, some writers call *vacatura*.—*Devolution* is a species of canonical *vacancy*.

VACANT *Efficiat*, *Prædia VACATA*, or *VACUA*, are such as are abandoned for want of an heir, after the death or flight of their former owner.

In our law-books, *vagantes terræ*, for *vacantes*, expresses forsaken, or uncultivated lands.

A Romish benefice is said to be *vacant* in *curia Romana*, when the incumbent dies in Rome, or within twenty leagues thereof; though it be only by accident that he was there.—The pope nominates to all benefices *vacant* in *curia Romana*, excepting those of the neighbouring bishopricks.

VACANT *Cylinder*, in gunnery. See the article **CYLINDER**.

VACATION, *Non-term*, in law, all the time included between the end of one term, and the beginning of the next succeeding one.

This intermission was called by our ancestors *pax Dei*, and *ecclesiæ*; and sometimes, the *time of days of the king's peace*. Among the Romans, it was called *justitium*, or *seriæ*, or *diæ nefasti*.

The time from the death of a bishop, or other spiritual person, till the bishoprick, or other dignity be supplied by another, is also called *vacation*.

Cicero, in his *Orationes*, mentions a law, whereby the priests were exempted from service in all wars, except only in up-
 roars, and civil tumults; which exemptions he calls *vacationes*.

VACUUM, *Vacuitas*, in physics; a space empty or devoid of all matter, or body.

Whether there be any such thing in nature as an absolute *vacuum*; or whether the universe be completely full, and there be an absolute plenum; is a thing that has been controverted by the philosophers of all ages.

The antients, in their controversies, distinguished two kinds; a *vacuum coærvatium*, and a *vacuum interspersum*, or *disseminatum*.

VACUUM Coærvatium, is conceived as a place destitute of matter: Such, *e. gr.* as there would be, should God annihilate all the air, and other bodies within the walls of a chamber.

The existence of such a *vacuum* is maintained by the Pythagoreans, Epicureans, and the Atomists, or Corpuscularians; most of whom assert such a *vacuum* actually to exist without the limits of the sensible world.—But the modern Corpuscularians, who hold a *vacuum coærvatium*, deny that application; as conceiving, that such a *vacuum* must be infinite, eternal, and uncreated.

According, then, to the later philosophers, there is no *vacuum coærvatium* without the bounds of the sensible world; nor would there be any other *vacuum*, provided God should annihilate divers contiguous bodies, than what amounts to a mere privation, or nothing: the dimensions of such a space, which the antients held to be real, being by these held to be mere negations; that is, in such a place, there is so much length, breadth, and depth wanting, as a body must have to fill it.—To suppose, that when all the matter in a chamber is annihilated, there should yet be real dimensions, is to suppose corporeal dimensions without body; which is absurd.

The Cartesians, however, deny any *vacuum coærvatium* at all; and assert, that if God should immediately annihilate all the matter, *v. gr.* in this chamber, and prevent the ingress of any other matter, the consequence would be, that the walls would become contiguous, and include no space at all.—

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They add, that if there be no matter in a chamber, the walls can be conceived no otherwise than as contiguous; those things being said to be contiguous, between which there is not any thing intermediate: but, if there be no body between, there is no extension between; extension and body being the same thing: and if there be no extension between, then the walls are contiguous; and where is the *vacuum*? But this reasoning is built on a mistake, *viz.* that body and extension are the same thing.

VACUUM Disseminatum, or *Interspersum*, is that supposed to be naturally interspersed in, and among bodies, in the pores of the same body, and in the interfaces between different bodies.

It is this kind of *vacuum* which is chiefly disputed among the modern philosophers: the Corpuscularians strenuously asserting it; and the Peripatetics, and Cartesians, as flimsy impugning it.

The great argument the Peripatetics urge against a *vacuum interspersum*, is, that there are divers bodies frequently seen to move contrary to their own nature, and inclination; and that for no other apparent reason, but to avoid a *vacuum*: whence they conclude, that nature abhors a *vacuum*; and give us a new class of motions ascribed to the *fuga vacui*, or nature's flying a *vacuum*.

Such, they say, is the rise of water in a syringe, upon the drawing up the piston; such also is the ascent of water in pumps, and the swelling of the flesh in a cupping-glass, &c.

But since the weight, elasticity, &c. of the air have been ascertained by sure experiments, those motions and effects are universally ascribed to the gravity, and pressure of the atmosphere.

The Cartesians deny not only the actual existence, but even the possibility of a *vacuum*: and that on this principle, that extension being the essence of matter, or body, wherever extension is, there is matter: but mere space, or vacuity, is supposed to be extended; therefore it is material.—Whoever asserts an empty space, they say, conceives dimensions in that space; *i. e.* he conceives an extended substance in it; and therefore he denies a *vacuum*, at the same time that he admits it. On the other hand, the Corpuscular authors prove, not only the possibility, but the actual existence of a *vacuum*, from divers considerations; particularly, from the consideration of motion in general; and that of the planets, comets, &c. in particular; from the fall of bodies; from the vibration of pendulums; from rarefaction and condensation; from the different specific gravities of bodies; and from the divisibility of matter into parts.

1^o. It is argued, that motion could not be effected without a *vacuum*.—This is what Lucretius urged long ago—*Principium quoniam cedendi nulla daret res—undique materiam quoniam stipata fuisset.*

The force of this argument will be increased from the two following considerations, *viz.* first, that all motion is either in a straight line, or in a curve which returns into itself, as the circle, and ellipsis; or in a curve that does not return into itself, as the parabola, &c. And, secondly, that the moving force must always be greater than the resistance.

For, hence it follows, that no force, even though infinite, can produce motion where the resistance is infinite; consequently, there can be no motion either in a straight line, or a non-returning curve; because, in either of those cases, the protrusion, and consequently the resistance, would be infinite.

—There remains, therefore, only the motion in a revolving curve practicable; this must either be a revolution upon an axis, or an annular motion round a quiescent body; both which are, again, impossible in an elliptic curve: and consequently, all motion must be in circles geometrically true; and the revolving bodies must either be spheres, spheroids, cylinders, or portions of them, exactly geometrical; otherwise, the revolutions in a plenum would be impossible: but such motions, or such figured bodies, we do not know in nature. Therefore there is a *vacuum*.

2^o. The motions of the planets and comets, demonstrate a *vacuum*: thus Sir Isaac Newton—“That there is no such fluid medium as æther, (to fill up the porous parts of all sensible bodies, as the air and interstellar parts, and so make a plenum) “seems probable; because the planets and “comets proceed with so regular and lasting a motion, “through the celestial spaces, both from and to all parts: “for hence it appears, that those celestial spaces are void of “all sensible resistance, and consequently of all sensible matter. For the resisting force of fluid mediums, arises partly from the attrition of the parts of the medium, and partly from the inactivity of matter.—Now, that part “of the resistance of any medium, which arises from the

"tenacity, or attrition of its parts, may be lessened by dividing the matter into smaller parts, and by rendering those parts more smooth and slippery: but that part of the resistance which arises from the inactivity of matter, is always in proportion to the density of the matter; nor can it be diminished by dividing the matter, nor by any other means, except by diminishing the density thereof.

"Consequently, if the celestial regions were as dense as water, or as quicksilver, they would resist almost as much as water or quicksilver; but if they were perfectly dense, without any interperfed vacuity, though the matter were ever so fluid and subtle, they would resist more than quicksilver does; a perfectly solid globe, in such a medium, would lose above half its motion, in moving three lengths of its diameter; and a globe not perfectly solid, such as the bodies of the planets and comets are, would be stopped still sooner. — Therefore, that the motion of the planets and comets may be regular, and lasting, it is necessary the celestial spaces be void of all matter, except perhaps some few, and much rarified effluvia of the planets and comets, and the passing rays of light.

3°. The same great author deduces a *vacuum* also from the considerations of the weights of bodies; thus: "All bodies about the earth gravitate towards the earth; and the weights of all bodies, equally distant from the earth's centre, are as the quantities of matter in those bodies. — If the æther, therefore, or any other subtle matter, were altogether destitute of gravity, or did gravitate less than in proportion to the quantity of its matter: because (as Aristotle, Des Cartes, and others argue) it differs from other bodies only in the form of the matter; the same body might, by the change of its form, gradually be converted into a body of the same constitution with those which gravitate most in proportion to the quantity of matter: and, on the other hand, the most heavy bodies might gradually lose their gravity, by gradually changing their form; and therefore the weights would depend upon the forms of bodies, and might be changed with them; which is contrary to all experiment.

4°. The descent of bodies proves that all space is not equally full; for the same author goes on, "If all spaces were equally full, the specific gravity of that fluid, with which the region of the air would in that case be filled, would not be less than the specific gravity of quicksilver or gold, or any other the most dense body; and therefore neither gold, nor any other body, could descend therein. — For bodies do not descend in a fluid, unless that fluid be specifically lighter than the body. — But by the air-pump, we can exhaust a vessel, till even a feather shall fall with a velocity equal to that of gold in the open air: the medium, therefore, through which this feather falls, must be much rarer than that through which the gold falls in the other case.

"The quantity of matter, therefore, in a given space, may be diminished by rarefaction: and why may not it be diminished in infinitum? Add, that we conceive the solid particles of all bodies to be of the same density; and that they are only rarefiable by means of their pores: and hence a *vacuum* evidently follows.

5°. "That there is a *vacuum*, is evident from the vibrations of pendulums: for since those bodies in places out of which the air is exhausted, meet with no resistance to retard their motion, or shorten their vibrations; it is evident there is no sensible matter in those spaces, or in the occult pores of those bodies."

As to what Des Cartes urges of his *materia subtilis*, that its tenuity prevents its resistance from being sensible, and that a small body striking against a greater, cannot in the least move, or resist the motion of that other; but is reflected back again with all its momentum: it is contrary to all experience. For Sir Isaac proves, that the density of fluid mediums, is proportionable to their resistances, very nearly; and that they are exceedingly mistaken, who suppose the resistance of projectiles to be infinitely diminished, by dividing the parts of the fluid, even in infinitum. (*Princip. Lib. II. Prop. 38.*) When, on the contrary, it is clear the resistance is but little diminished by the subdivision of the parts; (*ibid. Prop. 40.*) and that the resisting forces of all fluids are nearly as their densities. — For why should not the same quantity of matter, whether divided into a great number of subtle parts, or into a few larger ones, have the same resisting force? If then there were no *vacuum*, it would follow, that a projectile moving in the air, or even in a space whence the air is exhausted, should move with as much difficulty as it would in quicksilver; which is contrary to experience.

6°. That there are interperfed vacuities, appears from matter's being actually divided into parts, and from the figures of those parts: for, on supposition of an absolute plenitude, we do not conceive how any part of matter could be actually divided from that next adjoining, any more than it is possible

to divide actually the parts of absolute space from one another: for by the actual division of the parts of a continuum from one another, we conceive nothing else understood, but the placing those parts at a distance from one another, which, in the continuum, were at no distance from one another: but such divisions between the parts of matter, must imply vacuities between them.

7°. As for the figures of the parts of bodies, upon the supposition of a plenum, they must either be all rectilinear, or all concavo-convex; otherwise, they would not adequately fill space; which we do not find to be true in fact.

8°. The denying a *vacuum*, supposes what it is impossible for any one to prove to be true; *viz.* that the material world has no limits.

Since then the essence of matter does not consist in extension, but in solidity, or impenetrability, the universe may be said to consist of solid bodies moving in a *vacuum*: nor need we at all fear, lest the phenomena of nature, most of which are plausibly accounted for from a plenitude, should become inexplicable when the plenum is set aside. — The principal ones, such as the tides; the suspension of the mercury in the barometer; the motion of the heavenly bodies, and of light, &c. are more easily and satisfactorily accounted for from other principles. See *TIDES*, &c.

VACUUM, or *Vacuum Boyleanum*, is also used, somewhat abusively, to express that approach to a real *vacuum*, which we arrive at by means of the air-pump.

Thus, any thing put in a receiver so exhausted, is said to be put in *vacuo*: and thus, most of the experiments with the air-pump, are said to be performed in *vacuo*, or in *vacuo Boyleano*. Some of the principal phenomena observed of bodies in *vacuo*, are; that the heaviest and lightest bodies, as a guinea and a feather, fall here with equal velocity: — That fruits, as grapes, cherries, peaches, apples, &c. kept for any time in *vacuo*, retain their nature, freshness, colour, &c. and those withered in the open air, recover their plumpness in *vacuo*: — All light and fire become immediately extinct in *vacuo*: — The collision of flint and steel in *vacuo*, produces no sparks: — No sound is heard, even from a bell rung in *vacuo*: — A square viol, full of common air, well closed, breaks in *vacuo*; a round one does not: — A bladder half full of air, will heave up forty pound weight in *vacuo*: — Cats, and most other animals, readily expire in *vacuo*.

By experiments made in 1704, Mr Derham found, that animals which have two ventricles, and no foramen ovale, as birds, dogs, cats, mice, &c. die in less than half a minute; counting from the first exsuction: a mole died in one minute, a bat lived seven or eight — Insects, as wasps, bees, grasshoppers, &c. seemed dead in two minutes; but, after being left in *vacuo* twenty four hours, they came to life again in the open air: snails continued twenty four hours in *vacuo*, without appearing much concerned.

Seeds planted in *vacuo* do not grow: — Small beer dies, and loses all its taste in *vacuo*: — Lukewarm water boils very vehemently in *vacuo*: — And air, rushing through mercury into a *vacuum*, throws the mercury in a kind of shower upon the receiver, and produces a great light in a dark room.

The air-pump can never produce a precise *vacuum*; as is evident from its structure, and the manner of its working: in effect, every exsuction only takes away a part of the air: so that there will still be some left after any finite number of exsuctions. — Add, that the air-pump has no longer any effect, than while the spring of the air remaining in the receiver, is able to lift up the valves: when the rarefaction is come to that degree, you can come no nearer to a *vacuum*. Sir Isaac Newton, observing that a thermometer suspended in *vacuo*, and in that state removed to a warm or a cold room, receives the heat or cold, and rises, or falls, almost as soon as another in open air; takes thence occasion to suspect, that the heat of the warm room is conveyed through the *vacuum*, by the vibrations, of a much subtler medium than air, which remained in the *vacuum* after the air was drawn out. (*Opt. p. 323.*)

VADARI, in the civil law, denotes a person to pledge, undertake, or give security in behalf of another; that he shall, on a certain day, appear in court, to prosecute, or answer. If he fails, his surety has an action *vadimonii deserti* against him; that is, an action for deserting his bail.

Properly speaking, *vadari reum*, among the Romans, was the act of the plaintiff himself, who here demanded surety, or bail from the defendant, that he would appear before the prætor on a certain day.

VADLECT. See the article *VALECT*.

VAD-MECUM, or a *VENI-MECUM*, a Latin phrase, used in English, to express a thing that is very handy, and familiar; and which any one usually carries about with him: it is chiefly applied to some favourite book.

Some make Virgil, others Horace, their *vade-mecum*; others an Epictetus, others a Thomas à Kempis, &c.

This is what the Greeks call *ὑφαντός*, or *manual*.—The Arabs have a phrase of equal import; viz. *Habib al feir*, comes *itineris*, companion of the journey.—In Latin it is best expressed by *comes*; as *comes theologicus*, *comes rusticus*, &c.

VADIMONIUM, in the civil law, a promise, or bond, given for appearance before the judge upon a day appointed.

VADIUM. See the article *PONE per Vadium*.

VAGABOND *, a person that wanders about, having no certain dwelling; or a sturdy beggar, &c. mentioned in divers statutes.

* *De vagabundis & aliis hominibus mendicantibus qui se nominant*.—Travelling men, &c. Charta 22. Hen. VI.—*Item utemur quod nullus vagabundus vagetur seu deambulet de nocte in villa seu suburbio post pulsationem campanæ nostræ communis, vocatæ Coverseu, & si aliqui ibidem capiatur post pulsationem dictæ campanæ, ducatur ad Castrum domini regis, & ibi morabitur usque in crastinum ad notitia personæ suæ habeatur, &c.* MS. Cod. de Leg. & Stat. Burgi villæ Mountgomer. Temp. Hen. II.

All itinerant beggars, fortune-tellers, collectors for goals, fencers, bearwards, players of interludes, minstrels, jugglers, gypsies, &c. shall be reputed vagabonds, rogues and sturdy beggars, 39 Eliz. c. 4.

VAGINA, a Latin term, literally signifying a *sheath*, or *scabbard*; used on divers occasions.—As,

VAGINA, in architecture, is used for the lower part of a terminus; because resembling a sheath, out of which the statue seems to issue.

The *vagina* is that long part between the base, and the capital; and is formed in divers manners, and with divers ornaments.

VAGINA, in anatomy, denotes a canal, or cavity, leading from the pudendum, to the uterus of women.

The *vagina*, called also *cervix uteri*, is a membranous passage, extended from the rima, or aperture of the labia, to the neck of the womb.—See *Tab Anat. (Splanchn.) fig. 9. lit. b. fig. 11. lit. a.*

It lies upon the rectum, to which it finally adheres; and under the urinary bladder: its length is ordinarily seven or eight inches.

Its inward substance is nervous, and exquisitely sensible; the outer is membranous, and loose: at its orifice it is much narrower than elsewhere; especially in virgins.

Through its whole course it is full of rugæ, or wrinkles; especially in the upper internal surface; which rugæ the use of venery renders less apparent, and frequent parturition almost obliterates: this shews, that they were intended, to render the part more easily defendible for parturition.

Along the whole tract of the *vagina* there are pores, or ostia, or little ducts seen, which, in the act of venery, emit a liquor that has been by many mistaken for seed.

The *vagina* has a constrictory muscle, inserted under the clitoris; which, with a broad series of fibres, embraces and constricts the lower part of the *vagina*, and puts the dimension of the part, in some measure, in the power of the mind.

VAGINÆ Uteri Sphincter. See *SPHINCTER Vaginæ*, &c.

VAGINALIS Gula, in anatomy, a name some anatomists give to the muscular coat of the gula; as supposing it a proper muscle, conspiring with the œsophagus in thrusting the aliment down, when entered.

VAGINALIS Tunica, the same with what we otherwise call *elythroides*.

VAGUM, in anatomy, a name given to the eighth pair of nerves of the medulla oblongata, called the *par vagum*, because dispersed to divers parts of the body.—See *Tab Anat. (Osteol.) fig. 5. lit. q. q.*

VAIR, in heraldry, a kind of fur, or doubling, consisting of divers little pieces, argent and azure, resembling a Dutch U, or a bell-glass.

Vairs, have their point azure, opposite to their point argent, and the base argent to the azure.

When there are only two or three *vairs*, the ancient heralds call it *great vair*; and when there are more, *small vair*.

Vair is intended to represent a kind of skin, used antiently by the kings of France, in lieu of a fur, and wherewith the gowns of the presidents a mortier, the counsellors of the court, the heralds coats, &c. were lined, till the fifteenth century.

It was properly the skin of a kind of squirrel, called also, in French, *vair*, and in Latin, *sciurus*; which was white underneath, and of a dove-colour at top. It is described by Aldrovandus, under the name of *sciurus varia*, and is the same, according to Gesner, with the *mus ponticus* of Aristotle and Pliny; which the Latins call *varus*, or *varius*, from the variety of its colour.—Its two skins joined together, make the figure of the *vairs* in armories; being naturally white and azure.

Vair, Colombiere observes, is the second sort of fur, antient-

ly used as a lining of the garments of great men; consisting of little pieces, sewed by the furriers on white skins: and because these pieces were usually blue, those who first settled the rules of heraldry, decreed, that this fur, in its natural blazon, should always be argent and azure.—So if it be absolutely said, such a family bears *vair*; it is supposed to be argent and azure.

Regularly, there must be but four rows or ranks of *vair* in the shield; if there be either more, or less, the number must be specified.—The smallest number, being three rows, is called *beffroy de vair*; and the most, being five or six, is called *menu*, or *small vair*.

The *beffroy* is also known by the first figure on the dexter side of the escutcheon, being always of metal, and in form of a belt; whereas that of mere *vair* is in shape of a glaive.

VAIRY, VAIRE, VERRY, or VARRY, is applied to a coat, or the bearings of a coat, when charged, or chequered, with *vair*.

When the colours are argent and azure, or white and blue, it is *vairy proper*: if it be otherwise, the colours are to be expressly named; *vairy* of such a colour or metal.—He bears *vairy*, or, and vert: this is particularly called *vair composé*. The bearings are likewise said to be *vairy*, when they are charged with *vairs*.—When chiefs, crosses, pales, fesses, &c. happen to be *vairy*, the number of ranks are to be specified.

Vairy gowns are observed, by Julius Pollux, to have been the habit of the antient Gauls, as ermins were of the Armenians.

VAIRY Cuddy, or VAIRY Taffy, or Potent counterpotent, is a bearing in heraldry, composed of pieces representing the tops of crutches.—See *Tab. Herald. fig. 87.*

In blazon, the colours must be expressed; as, azure, argent, &c.

VALDENSES. See the article *VAUDOIS*.

VALECT, or VADALECT. See the article *VALET*.

VALENTIAM. See the article *CAPE ad Valentiam*.

VALENTINIANS, an antient and famous sect of Gnostics; thus called from their leader *Valentinian*.

VALERE. See the article *PERINDE Valere*.

VALERIAN, VALERIANA, a plant whose root is of considerable use in medicine; thus called, according to some, from one *Valerius*, who first brought it into use; or according to others, from *valere*, to be of great virtue.

There are various kinds of *valerian*; but those chiefly in use, are the large garden *valerian*, *valeriana bortenensis*; called by Dioscorides, *phu, folio olusatris*;—and the *valeriana sylvestris*, or great wild *valerian*.

The former is an ingredient in Venice treacle; its chief use is in disorders of the nerves: in which respect, however, it is held inferior to the latter.

The *wild valerian* is warm, and aromatic, but has somewhat of a fetid scent: its efficacy, as a sudorific, is supported by the testimony of both antient and modern practice.—It has been reckoned by some detergent, so much as to make it diuretic, and good in all obstructions of the viscera.—It is extolled also for strengthening the optic nerves, and restoring decayed sight; but the present practice acknowledges it not in any such intentions.—It sometimes does wonders in hysterical affections; especially where things of the fetid kind are good, and the spirits are too impetuous in their motions, so as to occasion convulsions.—It is also assisted with camphire, and some other things of the like nature, which are very powerful in breaking through the minutest obstructions, to cure obstinate agues.—It is efficacious in all nervous cases; and particularly in the epilepsy: which virtue in it seems to have been first discovered by Fabius Columna, who prescribed it for that purpose in powder.

M. Merchant, in the *Memoirs of the Academy of Sciences*, has confirmed this virtue, by many instances within his own knowledge: and what is very remarkable, is, that in the two observations he enlarges most upon, the patients, on taking it, voided great quantities of worms.—His custom was, always to purge before he administered it. The botanical characters, and several species of this plant, see in the Supplement, article *VALERIANA*.

VALESIANS, VALESIANI, antient sectaries, so called from one *Valesius*, a person unknown to Epiphanius, who however makes mention of this sect, *Har. 58.* though he owns we knew but very little of them; only this, that they admitted none into their society but eunuchs; at least, if any were admitted before castration, they obliged them not to eat any meat till the operation was performed.—For then, being no longer subject to the motions of the flesh, they allowed them to eat any kind of meats.

VALET, or VALECT, a French term, antiently wrote *valet*.

In France, *valet* is a common name for all domestic servants, employed in the lower, and more servile offices; including what we call *grooms, footmen, coachmen, laquais*, &c. But the word is not used among us in this sense, nor any otherwise.

otherwise than in the phrase *valet de chambre*; which is a servant, whose office is to dress, and undress his master, to look to his bed-chamber, wait on him at table, &c. the same with what we otherwise call his *gentleman*. In the history of Lewis XII. by Seifel, we always find *valet de chambre du roi*, *valet de la garde-robe*, &c. But *valet*, like *knave*, and divers other words, is now degenerated into a term of reproach.

Valet, *valet*, *vadelet*, *vadlet*, and *vallat*, Camden observes, were antiently used at our court, for a gentleman of the privy-chamber.

Selden, in his *Titles*, relates, that *valets* antiently signified young gentlemen, and heirs of great estate and quality; especially such as were to be knighted.

In the accounts of the Inner-temple, *valet* is used for a benchers's clerk, or servant.—The butlers of the house still call them *valets*.

VALETUDINARY, VALETUDINARIUS, a term sometimes used by the writers of medicine, for a person of a weak, sickly constitution, who is very frequently out of order, &c. Dr Cheyne, by all means, directs the weakly, the studious, the sedentary, and the *valetudinary*, to allow, spare regimen.

VALID, a term applied to acts, transactions, expeditions, &c. which are clothed in all the formalities requisite to their being put into execution, and to their being admitted in a court of justice.

A contract by a minor is not *valid*, or is *invalid*: a marriage is not *valid*, unless performed with the solemnities enjoined.

VALLAR*, VALLARIS, in antiquity, an epithet given to a kind of crown, which the Roman generals bestowed on him, who, in attacking the enemies camp, first broke in upon the lines, or palisades.

* The word is formed from *vallum*, a stake with branches, whereof they made the palisade of a camp, called *forca*.

The *corona vallaris*, was the same with what was otherwise called *corona castrensis*, from *castra*, a camp.—Aulus Gellius assures us, that it was of gold, as the mural and naval crowns also were: yet tho' they were made of that precious metal, they were not the most valued: for Pliny, lib. xxii. cap. 3. gives the preference to the *corona obdionalis*, which yet was only of grass, or grass.

VALLEY, VALE, in geography. See MOUNTAIN.

VALORE *Maritaggi*, *VALUE* of marriage, a writ which antiently lay for the lord, after having proffered suitable marriage to an infant who refused the same; to recover the value of the marriage.

VALVASOR, or VALVASOUR. See VAVASOR.

VALUE, VALOR, in commerce, the price or worth of any thing.

Intrinsic: *VALUE*, denotes the proper, real, and effective worth of any thing: it is used chiefly with regard to money; the popular *value* whereof may be raised, and lowered at the pleasure of the prince; but its real, or *intrinsic value*, depending wholly on its weight and fineness, is not at all affected by the stamp, or impression thereon.

It is generally on the foot of this *intrinsic value*, that species are received in foreign countries; though in the places where they are coined, and where the sovereign power makes them current, they sometimes pass for much more.

It is, in good measure, on the difference of those two *values*, one whereof is, as it were, arbitrary, and the other, in some fort, natural; that the difference of exchanges depends; and those still rising and falling, as the rate at which a species is current, comes nearer or farther off the just price of the metal whereof it consists.

VALUE, in bills of exchange, is used to signify the nature of the thing, (as ready money, merchandises, bills, debts, &c.) which is given, as it were, in exchange for the sum specified in the bill.

From four different manners of expressing this *value*, some distinguished four kinds of bills of exchange.—The first bears *value received*, simply and purely, which comprehends all kinds of *value*; the second, *value received in money*, or *merchandise*; the third, *value of my self*; and the fourth, *value understood*.

The first is dangerous, and the fourth but little used: accordingly, to have the *value* well expressed, and to prevent the ill consequences of overlooks therein, it is well provided by the French ordonnance of 1673, that bills of exchange shall contain the name of the person to whom the contained sum is to be paid; the time of payment; the name of him who has given the *value*; and whether it was received in money, merchandise, or other effects.

VALUE, VALOR, or VALENTIA, in law.—West gives us a nice difference between *value*, and *price*; the *value* (says he) of things in which offences are committed, is usually comprised in indictments; which seems necessary in theft, to make a difference from petty larceny; and in trespass, to aggravate the fault, and increase the fine.

But no price of things *per se natura* may be expressed, as of deers, hares, &c. if they be not in parks and warrens.—And where the number of things taken is to be expressed in the indictment, as of young doves in a dove-house, there must be said *pretii*, or *ad valentiam*: but of divers dead things, *ad valentiam*, and not *pretii*: of coin not current it shall be said *pretii*; but of coin current, neither *pretii*, nor *ad valentiam*; the price and *value* being certain.

VALVE*, VALVULA, in hydraulics, pneumatics, &c. is a kind of lid, or cover of a tube, or vessel, so contrived, as to open one way; but which, the more forcibly it is pressed the other way, the closer it shuts the aperture: so that it either admits the entrance of a fluid into the tube, or vessel, and prevents its return; or admits it to escape, and prevents its re-entrance.

* The word is formed from the Latin *valvae*, folding doors.

Valves are of great use in the air-pump, and other wind-engines; in which they are ordinarily made of pieces of bladder.

In hydraulic engines, as the emboli of pumps, they are frequently of leather; their figure round, and they are fitted to the bottoms, or other parts of the barrel, &c. to shut the apertures.

Sometimes they are made of two round pieces of leather, inclosed between two others of brass; having divers perforations, which are covered with another piece of brass, moveable upwards and downwards, on a kind of axis, which goes through the middle of them all.

Sometimes they are made of brass, covered over with leather, and furnished with a fine spring, which gives way upon a force applied against it: but upon the ceasing of that, returns the *valve* over the aperture.

VALVE, VALVULA, in anatomy, a thin membrane, applied, like a door or shutter, on divers cavities and vessels of the body; to afford a passage to some humour, or other matter, going one way, and prevent its re-flux towards the part whence it came.

The veins and lymphatics have *valves*, situate from spate to spate, which open towards the heart, but keep close on that side towards the extremities, i. e. they let the blood and lymph pass towards the heart, but prevent their returning to the extreme parts, whence they came.

The heart has also its *valves*, placed at the entrance of the vessels arising out of it.—Those at the entrance of the vena cava, and pulmonary vein, let the blood pass on to the heart, and prevent its return: on the contrary, those at the entrance of the aorta, and pulmonary artery, let the blood pass out of the heart, and prevent its flowing back again.

—See *Tab. Anat. (Angeol.) fig. 1. lit. A.*

“ In the jejunum, and ileum, the inner tunic being larger than the outer, is much corrugated; the loose folds of this have been thought, in some measure, to do the office of *valves*; and have therefore been called *valvulae conniventes*.” Drake, *Anat.* p. 49.

“ The lacteals, opening into the intestines, receive the prepared fluid part of the chyle; and appear at intervals, as it were, girt and straightened; and when pressed, do not admit of a reflux towards the intestines; though the liquor be easily propelled towards the glands: which argues, that there are *valves* in them, though they be too minute to be sensible to the eye.” *Id. ibid.* p. 56.

The colon, has a thick *valve*, to prevent the excrements from passing into the ileon; and several other *valves*, to retard the descent of the excrements.

Constantine Varolius, a Boulognese, and physician of Gregory XIII. who died in 1570, was the first that observed the *valve* in the colon.—Bart. Eustachio, a native of San Severino in Italy, discovered, about the same time, the *valve* at the orifice of the coronary vein; and that remarkable one at the orifice of the lower trunk of the vena cava, near the right auricle of the heart: though he did not take it for a *valve*, but merely for a membrane.

Sig. Lancisi, physician to the late pope, who first published Eustachio's works, takes the use of this *valve* to be to prevent the blood of the upper vena cava from striking with too much violence against that of the lower: and M. Winflow, who has considered it very diligently in the *Memoirs of the Royal Academy of Sciences*, is much of the same opinion.

But as it gradually dwindles in children, and at length becomes quite lost in adults, still diminishing as the foramen ovale does; it should seem to have some other office; and that, chiefly, regarding the circulation of the blood in the foetus.

In effect, by means hereof, M. Winflow reconciles the two opposite systems of the circulation of the blood in the foetus, delivered under the article *circulation*. See *CIRCULATION of the Blood*, and FETUS.

Great VALVE, *Valvula major*, is the upper part, and, as it were,

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were, the lid of the lithmus between the testes, and the first vermicular process of the cerebellum: its substance is medullary.—Its use is to prevent the lymph from falling on the nerves at the base of the cranium.

VAN, VANT, or VAUNT, (of the French *avant*, or *avaunt*, before) is a term used in composition with several words in our language.—As,

VAN-COURIERS, are light-armed soldiers, sent before armies to beat the road, upon the approach of an enemy.

VAN-FOSSE, a ditch dug without the countercarp, and running all along the glacis; usually full of water.

VAN, or VANT, or VAUNT-CORPS. See **CORPS**.

VAN, or VAN-GUARD, is a military term, signifying the first line of an army, drawn up in battalia.

It is the fame with the *front* of an army, and is what gives the first charge upon the enemy.

Every army is composed of three parts, a *van-guard*, *rear-guard*, and *main body*.

VAN-Lay. See the article **VAUNT**.

VANEERING. See the article **VENEERING**.

VANES, on mathematical instruments, are sights made to move and slide upon cross-staves, fore-staves, Davis's quadrants, &c.

VANES, or FANES of Feathers.

Weather VANES.

VANES of Windmills.

VANILLA, or VANELLA, a little black seed, growing in longish pods; used in the West-Indies, France, Spain, &c. as a principal ingredient in the composition of chocolate; to give it strength, and an agreeable flavour.

It is also used to perfume tobacco and snuff withal. It is supposed to strengthen the brain, and stomach; to attenuate viscid humours, provoke urine, and the menses.

VANT, or VAUNT. See the article **VAN**.

VAPORARIUM, or VAPOROSUM Balneum, Vapour-bath, in chymistry, a term applied to a chymist's bath, or heat, wherein a body is placed, so as to receive the fumes of boiling water.

The *balneum vaporosum* consists of two vessels, disposed over one another in such manner, as that the vapour raised from the water contained in the lower, heats the matter inclosed in the upper.

The *vapour-bath* is very commodious for the distilling of odoriferous waters, and the drawing of spirit of wine.

We also use the term *vapour-bath*, when a sick person is made to receive the vapours arising from some liquid matter placed over a fire.

VAPORATION, VAPORATIO, in chymistry, a term applied to the action of a fume, or vapour.

VAPORATION, is a kind of bathing, or rather of fomentation, whereby the warmth, or humidity of a vapour is made to act on some other body, that is to be warmed, or moistened.

VAPOROSUM Balneum. See the article **VAPORARIUM**.

VAPOUR, VAPOR, in meteorology, a thin vesicle of water or other humid matter, filled or inflated with air; which being rarefied to a certain degree by the action of heat, ascends to a certain height in the atmosphere, where it is suspended, till it return in form of rain, snow, or the like. An assemblage of a number of particles, or vesicles of vapour, constitutes what we call a cloud.

Some use the term *vapour*, indifferently, for all fumes emitted, either from moist bodies, as fluids of any kind; or from dry bodies, as sulphur, &c.—But Sir Isaac Newton, and other authors, better distinguished between humid and dry fumes, calling the latter *exhalations*.

For the manner wherein VAPOURS are raised, and again precipitated, see **DEW, RAIN, HEAT, COLD, and BAROMETER**.—For the effect of VAPOUR in the formation of springs, &c. see **SPRING, and RIVER**.

The quantity of vapour raised from the sea by the warmth of the sun, is far greater than one would imagine.—Dr Halley has attempted to estimate it.

In an experiment made with that view, and described in the *Philosophical Transactions*, he found that a quantity of water, no warmer than air in summer lost in vapour, in the space of two hours, no less than one fifty-third part of an inch in depth: now, for one fifty-third part in two hours, taking, for the easier calculation, one sixtieth part; in the twelve hours that the sun is up each day, it will raise one tenth of an inch from the whole surface of the sea.

On this supposition, every 10 square inches of the surface of water, yield in vapour, per diem, a cubic inch of water; and each square foot, half a wine pint; every space of four foot square, a gallon; a mile square, 6914 tuns; a square degree supposed of 69 English miles, will evaporate 33 millions of tuns: and if the Mediterranean be estimated at 40 degrees long, and four broad, allowances being made for the places where it is broader, by those where it is narrower, there will be 160 square degrees in that sea: and consequently the whole Mediterranean must lose in vapour, in a summer's day, at

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least, 5280 millions of tuns.

And this quantity of vapour, though very great, is only the remains of another cause, which cannot be reduced to rule; we mean the winds; whereby the surface of the water is licked up, sometimes much faster than it exhales by the heat of the sun; as is well known to such as have considered those drying winds. See **EVAPORATION**.

VAPOUR Bath. See **VAPORARIUM, and BATH**.

VAPOURS, in medicine, a disease popularly called the *hypo*, or the *hypocondriacal* disease; and in men particularly, the *spleen*.

It is supposed to be owing to a subtle vapour, arising from the lower parts of the abdomen, particularly the hypocondria, to the brain; which it disturbs, and possesses with wild, delirious, but generally disagreeable imaginations.

Vapours, supposed to be emitted from the womb, in women, are what we otherwise call hysterical affections, or suffocations, or fits of the mother. See Supplement, article **HYPOCONDRIACAL**.

VARI, in medicine, little, hard, ruddy tumours, whitish about the tips, and of the size of an hemp-feed; frequently found on the face and neck of young people; chiefly of such as are much addicted to venery.

If the red be very lively, the cure is somewhat difficult; and though the pustules be taken away, the redness remains.—To this, if an inflammation and hoarseness be added, it is a symptom of a leprosy.

VARIABLE, in geometry and analytics, is a term applied by mathematicians, to such quantities as either increase, or diminish, according as some other quantity either increases or diminishes.

Thus, the semiordinates, and abscissas of an ellipsis, &c. are variable quantities; because, if the one increase, the other increases likewise.

They are thus called, in contradistinction to constant, or given, or stable quantities; which are always the same, tho' others change: as the semidiameter of a circle, which remains the same, though the abscissas and semiordinates increase.

Variable quantities, are usually denoted by the last letters of the alphabet, *x, y, z*.

Some authors, instead of variable, and constant quantities, use the terms *fluent*, and *stable* quantities.

The infinitely small quantity whereby a variable quantity is continually increasing, or diminishing, is called the *fluxion*, or *difference*; the calculation whereof, is the subject of the new methodus differentialis, or doctrine of fluxions.

VARIABLE Winds. See the article **WIND**.

VARIANCE, VARIANTIA, in law, an alteration or change of condition in a person, or thing; after some former concern, or transaction therewith.

Thus, if the commonalty of a town make a composition with a lord, and afterwards bailiffs be granted by the king to the same town; there, if the lord commence any suit for breach of the composition, he must vary from the word commonalty, used in the composition; and use bailiffs and commonalty.

VARIANCE is also used for an alteration of something formerly laid in a plea; or where the declaration in a cause differs from the writ, or from the deed upon which it is grounded.

VARIATION, in geography, navigation, &c. a term applied to the deviation of the magnetic needle, or compass, from the true north point, towards either east, or west; called also the *declination*.

The variation or declination of the needle, is properly defined, the angle which a magnetic needle, suspended at liberty, makes with the meridian line on a horizontal plane; or an arch of the horizon, comprehended between the true, and the magnetical meridian.

In the sea language, the variation is usually called *north-easting*, or *north-westing*.

All magnetic bodies, we find, range themselves, in some sort, to the meridian; but it is rare that they fall in precisely with it: in one place, they decline from the north to the east, and from the south to the west; and in another place, on the contrary, from the north to the west, and from the south to the east; and that, too, differently, at different times.

Various are the hypotheses framed, to account for this extraordinary phenomenon: we shall only mention some of the later, and more probable. The first is that of Gilbert, which is followed by Cabeus, &c.

This notion is, that it is the earth, or land, that draws the needle out of its meridian direction; and hence they argue, that the needle varied more, or less, as it was more or less distant from any great continent: consequently, that if it were placed in the middle of an ocean, equally distant from equal tracts of land, on each side, eastward and westward, it would not decline either to the one or the other; but point justly north and south.

Thus, they say, in the Azores islands, which are equally distant from Africa on the east, and America on the west, there is, in effect, found no variation: but, as from the

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Azores you fail towards Africa, the needle begins to decline from the north to the east; and that still more and more, till you reach the shore.

If you still proceed eastward, the declination gradually diminishes again; by reason of the land left behind on the west, which continues to draw the needle.

The same holds till you arrive at a place where there are equal tracts of lands on each side, and there, again, there is no variation.

The observations of our mariners in their East-India voyages, seem to confirm this system: as they proceed towards the cape of Good Hope, the variation is still eastward; at length, arriving at the cape De las Aguillas, *q. d.* of the Needles, the meridian line, then, dividing Africa into two equal parts, there is no variation at all: but as they proceed further, and leave the African coasts on the west, the variation becomes westward.

But the misfortune is, the law does not hold universally: in effect, a great number of observations of the variations, in various parts, made and collected by Dr Halley, overturn the whole theory.

Others, therefore, have recourse to the frame and compasses of the earth, considered as interwoven with rocks and shelves, which being generally found to run towards the poles, the needle comes to have a general tendency that way; but which seldom going perfectly in the direction of the meridian, the needle, of consequence, has commonly a variation.

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Others hold various parts of the earth, to have various degrees of the magnetic virtue; as some are more intermixed with heterogeneous matters, which prevent the free action or effect thereof, than others.

Others ascribe all to magnetic rocks, and iron mines, which, affording more of the magnetic matter than other parts, draw the needle more.

Lastly, others imagine earthquakes, or high tides, to have disturbed and dislocated several considerable parts of the earth, and so changed the magnetic axis of the globe, which originally was the same with the axis of the globe itself.

But still, that great phenomenon, the variation of the variation, i. e. the continual change of the declination, in one and the same place, which the modern observations do abundantly evince, is not accountable for, on any of these foundations; nor even is it consistent with them.

Dr Halley, therefore, gives us a new system; the result of a great number of observations; and even of a great number of voyages made, at the public charge, on this very account; the light that excellent author has let into this obscure part of natural history, is very great; and the consequences thereof in navigation, &c. are very considerable. Add, that he has reduced the divers variations of divers places to a precise rule, or order, which before appeared all precarious, and arbitrary.

His theory, therefore, will deserve a more ample detail. — The observations it is built on, as laid down in the *Philosophical Transactions*, are as follow.

Observations of the Variations of the needle, in divers places, and at divers times.

Names of Places.	Longitude from London.	Latitude.	Year of Observation.	Variation observed.	Names of Places.	Longitude from London.	Latitude.	Year of Observation.	Variation observed.
London	0 0	51 32 N	1580	11 15 E	Cape Aguilas	16 30 E	34 50 S	1662	2 0 W
			1622	6 0 E				1675	8 0 W
			1634	4 5 E	At fra	1 0 E	34 30 S	1675	0 0
			1672	2 30 W	At fra	32 0 W	24 0 S	1675	10 30 E
			1683	4 30 W	S. Helena	6 30 W	16 0 S	1677	0 40 E
Paris	2 25 E	41 51 N	1643	3 0 E	I. Ascension	14 30 W	7 50 S	1678	1 0 E
			1666	0 0	Johanna	44 0 E	12 15 S	1675	19 30 W
			1681	2 30 W	Monafia	40 0 E	4 0 S	1675	10 0 W
Uraniburg	13 0 E	55 54 N	1672	2 35 W	Zocatra	26 0 E	12 30 N	1674	17 0 W
Copenhagen	12 53 E	55 41 N	1649	1 30 E	Aden, in the mouth of the red sea	47 30 E	13 0 N	1674	15 0 W
Danzick	19 0 E	54 23 N	1679	7 0 W	Diego Ruiz	61 0 E	20 0 S	1676	10 30 W
Montpellier	4 0 E	43 37 N	1674	1 10 W	At fra	64 30 E	0 0	1676	15 30 W
Bret	4 25 W	48 23 N	1680	1 45 W	At fra	55 0 E	27 0 S	1676	14 0 W
Rome	13 0 E	41 50 N	1681	5 0 W	Bombay	72 30 E	19 0 N	1676	13 0 W
Bayonne	1 20 W	43 30 N	1680	1 20 W	C. Comorin	76 0 E	8 15 N	1676	3 45 W
Hudson's Bay	79 40 W	51 0 N	1668	19 15 W	Baldia	87 0 E	21 30 N	1680	8 20 W
In Hudson's Straights	57 0 W	61 0 N	1668	19 30 W	Fort S. George	80 0 E	13 15 N	1680	8 10 W
In Baffin's Bay, at Sir Tho. Smith's	80 0 W	78 0 N	1616	57 0 W	West point of Java	104 0 E	6 40 S	1676	3 10 W
At fra	50 0 W	39 40 N	1682	7 30 W	At fra	58 0 E	39 0 S	1677	27 30 W
At fra	31 30 W	43 50 N	1682	5 30 W	I. S. Paul	72 0 E	38 0 S	1677	23 30 W
At fra	42 0 W	21 0 N	1678	0 40 E	At Van Diemen's	142 0 E	42 25 S	1662	0 0
Cape S. Augustine	35 30 W	5 0 S	1670	5 0 E	At New Zealand	170 0 E	40 50 S	1622	9 0 E
At fra off the mouth of R. Plata	53 0 W	19 30 S	1670	20 30 E	Three King life in New Zealand	169 30 E	34 35 S	1662	8 40 E
Cape Frio	41 10 W	22 40 S	1670	12 10 E	I. Rotterdam in the South-sea	124 0 E	20 15 S	1642	6 20 E
East entrance of Magellan Straights	68 0 W	52 30 S	1670	17 0 E	On the coast of New Guinea	149 0 E	4 30 S	1643	8 45 E
West entrance	75 0 W	53 0 S	1670	14 10 E	At the west point of New Guinea	126 0 E	0 26 S	1643	5 50 E
Baldia	73 0 W	40 0 S	1670	8 10 E					

From these observations, the learned author gathers, 1^o. That throughout all Europe, the variation, at this time, is west; and is more in the eastern parts thereof than the western, increasing that way.

2^o. That on the coasts of America, the variation is westerly; increasing all the way as you go northerly along the coast; so as to be above 20 degrees at Newfoundland, nearly 30 degrees in Hudson's Straights, and not less than 57 degrees in Baffin's bay: and that as you fail eastward from this coast, the variation constantly diminishes. Hence, he argues, that somewhere between Europe and the north part of America, there must be an easterly variation, or at least no variation.

3^o. That on the coast of Brazil, there is an east variation; increasing as you go to the southward, so as to be 12 degrees at cape Frio, and 20 degrees and half over-against R. Plata; and thence failing south-westerly, to the Straights of Magellan, it decreases 17 degrees, and at the west entrance about 14 degrees.

4^o. That eastward of Brazil, this easterly variation decreases, so as to be very little at S. Helena and Ascension, and to be quite gone, and the compass point true, about 18 degrees longitude from the cape of Good Hope.

5^o. That to the eastward of the aforesaid places, a westward variation begins and governs in all the Indian sea, rising to 18 degrees under the equator, about the meridian of the northern part of Madagascar; and 27 degrees and a half, in 39 degrees south latitude, near the same meridian: easterly from thence, the west variation decreases, so as to be not much above eight degrees at cape Comorin, and about three

degrees upon the coast of Java; and about the Molucca Islands to be quite gone; as also a little to the westward of Van Diemen's land.

6^o. That to the eastward of the Molucca's, and Van Diemen's land, in south latitude, there arises another easterly variation, which seems not so great as the former, nor of so large extent; for that at the island Rotterdam, it is sensibly less than upon the east coast of New Guinea; and at the rate it decreases, it may well be supposed, that about 20 degrees further eastward, or 225 degrees east longitude from London, in the latitude of 20 degrees south, a westerly variation begins.

7^o. That the variation taken at Baldia, and at the west entrance of the Straights of Magellan, shews, that the east variation, noted in the third observation, is decreasing apace; and that it cannot well extend many degrees into the South sea, from the coast of Peru and Chili; leaving room for a small westerly variation, in that tract of the unknown world, that lies in the mid-way between Chili, and New Zealand, and between Hounds Island, and Peru.

8^o. That in failing north-west from S. Helena, by Ascension, as far as the equator, the variation continues very small east, and, as it were, constantly the same: so that in this part of the world, the course, wherein there is no variation, is evidently no meridian, but rather north-west.

9^o. That the entrance of Hudson's Straights, and the mouth of R. Plata, being nearly under the same meridian, at the one place the needle varies 29 degrees and a half west; at the other 20 degrees and a half east.

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Theory of the VARIATION of the needle.—From the circumstances above rehearsed, the learned author takes occasion to assert, “That the whole globe of the earth is one great magnet, having four magnetical poles, or points of attraction; near each pole of the equator, two; and that in those parts of the world which lie nearly adjacent to any one of these magnetical poles, the needle is governed thereby; the nearest pole being always predominant over the more remote.”

The pole which at present is nearest to us, he conjectures to lie in, or near the meridian of the Lands-end of England, and not above 7 degrees from the arctic pole: by this pole, the variation in all Europe and Tartary, and the North sea, are principally governed; though still with some regard to the other northern pole, whose situation is in the meridian, passing about the middle of California, and about 15 degrees from the north pole of the world; to which the needle has chiefly respect in all the north America, and in two oceans on either side thereof, from the Azores, westwards, to Japan, and farther.

The two southern poles, he imagines, are rather farther distant from the south pole of the world: the one about 16 degrees therefrom, in a meridian some 20 degrees to the westward of Magellan Straights, or 95 degrees west from London: this commands the needle in all south America, in the Pacific sea, and the greatest part of the Ethiopic ocean.—The other seems to have the greatest power, and the largest dominion of all, as it is the most remote from the pole of the world, being little less than 20 degrees distant therefrom, in the meridian which passes through New Holland, and the island Celebes, about 120 degrees east from London: this pole is predominant in the south part of Africa, in Arabia, and the Red sea, in Persia, India, and its islands; and all over the Indian sea, from the cape of Good Hope, eastwards, to the middle of the great South sea, that divides Asia from America.

Such seems to be the present disposition of the magnetical virtue, throughout the whole globe of the earth.—It remains to shew, how this hypothesis accounts for all the variations that have been observed of late; and how it answers to the several remarks drawn from the table.

1°. Then, it is plain, that as our European north pole is in the meridian of the Lands-end of England, all places more easterly than that, will have it on the west side of their meridian; and consequently the needle, respecting it with its northern point will have a westerly variation; which will still be greater as you go to the eastwards, till you come to some meridian of Russia, where it will be the greatest, and from thence will decrease again.—Accordingly, in fact, we find that at Brett the variation is but 1 degree 3 quarters; at London, 4 degrees and an half; and at Dantzick 7 degrees, west (in 1683).—Again, to the westward of the meridian of the Land's-end, the needle ought to have an easterly variation; were it not that by approaching the American northern pole, (which lies on the west side of the meridian, and seems to be of greater force than this other) the needle is drawn thereby westward, so as to counterbalance the direction given by the European pole, and to make a small west variation in the meridian of the Land's-end itself. Yet, about the Isle Terceira, it is supposed our nearest pole may so far prevail, as to give the needle a little turn to the east; though that but for a very little space; the counter-balance of those two poles permitting no considerable variation, in all the eastern part of the Atlantic ocean; nor upon the west coasts of England, and Ireland, France, Spain, and Barbary.—But to the westward of the Azores, the power of the American pole overcoming that of the European, the needle has chiefly respect thereto; and turns still more and more towards it, as we approach it. Whence it comes to pass, that on the coast of Virginia, New England, Newfoundland, and in Hudson's Straights, the variation is westward; that is, it increases as you go from thence towards Europe: and that it is less in Virginia, and New England, than in Newfoundland and Hudson's Straights.

2°. This westerly variation, again, decreases, as you pass over the north America, and about the meridian of the middle of California, the needle again points due north; and from thence westward, to Yuczo and Japan, it is supposed the variation is easterly; and half sea over, not less than 15 degrees: and that this east variation extends over Japan, Yedzo, east Tartary, and part of China, till it meet with the westerly, which is governed by the European north pole, and which is the greatest, somewhere in Russia.

3°. Towards the south pole the effect is much the same; only that here the south point of the needle is attracted.—Whence it will follow, that the variation on the coast of Brazil, at the river of Plata, and so on to the Straights of Magellan, should be easterly, if we suppose a magnetical pole, situate about 20 degrees more westerly than the Straights of Magellan.—And this easterly variation extends eastward over the greatest part of the Ethiopic sea, till it be counter-

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poised by the virtue of the other northern pole; as it is about mid-way, between the cape of Good Hope, and the isles of Triton d'Acunha.

4°. From thence eastwards, the Asiatic south pole becoming prevalent, and the south point of the needle being attracted thereby, there arises a west variation, very great in quantity and extent; because of the great distance of this magnetical pole of the world.—Hence it is, that all the Indian sea, as far as Hollandia Nova, and farther, there is constantly a west variation; and that under the equator itself, it rises to no less than 18 degrees, where it is most.—And, that about the meridian of the island of Celebes, being likewise that of this pole, this westerly variation ceases, and an easterly one begins, which reaches to the middle of the South sea, between the middle of Zelandia Nova, and Chili; leaving room for a small west variation, governed by the American south pole.

5°. From the whole it appears, that the direction of the middle, in the temperate and frigid zone, depends chiefly upon the counterpoise of the forces of two magnetical poles of the same nature; as also why, under the same meridian, the variation should be in one place 29 degrees and a half west, and in another 20 degrees and a half east?

6°. In the torrid zone, and particularly under the equinoctial, respect must be had to all four poles, and their positions must be well considered; otherwise it will not be easy to determine what variations shall be; the nearest pole being always strongest: yet not so, as not to be counter-balanced sometimes by the united forces of two more remote.—Thus, in sailing from S Helena by the Isle of Ascension to the equator in the north-west course, the variation is very little easterly, and in that whole tract is unalterable; because the south American pole (which is considerably the nearest in the aforesaid places) requiring a great easterly variation, is counterpoised by the contrary attraction of the north American, and the Asiatic south pole; each whereof, singly, is, in these parts, weaker than the American south pole: and upon the north-west course, the distance from this latter is very little varied; and as you recede from the Asiatic south pole the balance is still preserved by an access towards the north American pole.—In this case, no notice is taken of the European north pole; its meridian being little removed from those of these places, and of itself requiring the same variations which we here find. After the same manner, may the variations in other places, under, and near the equator, be accounted for: so that the hypothesis must be allowed very adequate, and sufficient for the phenomena.

To observe the VARIATION, or declination of the needle.—Draw a meridian line, as directed under the article MERIDIAN: then, a style being erected in the middle thereof, place a needle thereon, and draw the right line which it hangs over.—Thus will the quantity of the variation appear.

Or thus:—As the former method of finding the declination, cannot be applied at sea, others have been thought of; the principal whereof follow.—Suspend a thread and plummet over the compass, till the shadow pass through the centre of the card: observe the rhumb, or point of the compass, which the shadow touches when it is the shortest.—For the shadow is then a meridian line: consequently the variation is shewn.

Or thus:—Observe the rhumb wherein the sun, or some star rises and sets: bisect the arch intercepted between the rising and setting; the line of bisection will be the meridian line: consequently, the declination is had as before.—The same may be had from two equal altitudes of the same star, observed either by day or night.

Or thus:—Observe the rhumb wherein the sun, or a star rises and sets; and from the latitude of the place, find the eastern or western amplitude: for the difference between the amplitude and the distance of the rhumb observed, from the eastern rhumb of the card, is the variation sought.

Or thus:—Observe the altitude of the sun, or some star, *SI*, (*Tab. Navigation, fig. 16.*) whose declination is known; and note the rhumb in the compass, to which it then corresponds.—Since then in the triangle *ZPS* we have three sides, *viz.* *PZ*, the complement of the elevation of the pole *PR*; *SP*, the complement of the declination *DS*; and *ZS*, the complement of the altitude *SI*; the angle *PZS* is found by spherical trigonometry, the contiguous one to which *viz.* *AZS*, measures the azimuth *HI*.—The difference then, between the azimuth, and the distance of the rhumb observed from the south, is the variation sought.

Note, to have the eastern or western amplitude accurately, regard must be had to the refraction: the laws whereof are delivered under the article REFRACTION.

For the more commodious observing in what rhumb of the compass the sun, or a star is seen, it will be proper to have two little apertures, or glass windows, opposite to each other under the limb thereof; with a telescope-light fitted to one of them, and to the other a fine thread.

VARIATION of the VARIATION, is the change in the declination

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nation of the needle, observed, at different times, in the same place.

This *variation*, which was first, it is said, discovered by Gassendus, is found to observe one and the same law pretty regularly.—It is supposed owing to the difference of velocity of the motions of the internal and external parts of the globe.

Theory of the VARIATION of the VARIATION.—From the observations above recited, under the head *VARIATION*, it seems to follow, that all the magnetical poles have a motion westward: but if it be so, it is evident, that it is not a rotation about the axis of the earth: for then the *variations* would continue the same, in the same parallel of latitude (the longitude only changed) as much as the motion of the magnetical poles: but the contrary is found by experience; for there is no where, in the latitude of 51 and a half north, between England and America, a *variation* of 11 degrees east, at this time; as it was once here at London.—Wherefore, it seems that our European pole is grown nearer the arctic pole than it was heretofore; or else, that it has lost part of its virtue.

But whether these magnetic poles move all together with one motion, or with several; whether equally, or unequally; whether circular, or libratory: if circular, about what centre? if libratory, after what manner? are things yet unknown!

This theory seems yet somewhat obscure, and defective: to suppose four poles in one magnetical globe, in order to account for the *variation*, is a little unnatural; but to conceive those poles to move, and that by such laws as to solve the *variation* of the *variation*, is still more extraordinary.—In effect, the solution appears not much less implicate and arbitrary, than the problem.

The learned author of the theory therefore, found himself under a necessity to solve the phenomena of his solution; and with this view, he presented the following hypothesis. The external parts of the globe, he considers as the shell, and the internal as a nucleus, or inner globe; and between the two he conceives a fluid medium.—That inner earth having the same common centre, and axis of diurnal rotation, may turn about with our earth each 24 hours. Only the outer sphere having its turbinating motion some small matter either swifter or slower than the internal ball; and a very minute difference in length of time, by many repetitions, becoming sensible; the internal parts will, by degrees, recede from the external; and, not keeping pace with one another, they will appear gradually to move, either eastward, or westward, by the difference of their motions.

Now, suppose such an internal sphere, having such a motion, the two great difficulties in the former hypothesis are easily solved: for if this exterior shell of earth be a magnet, having its poles at a distance from the poles of diurnal rotation, and if the internal nucleus be likewise a magnet, having its poles in two other places, distant also from the axis; and these latter, by a gradual and slow motion, change their place, in respect of the external: we may then give a reasonable account of the four magnetical poles aforementioned, as likewise of the changes of the needle's *variation*.

The period of this motion being wonderfully great, and there being hardly an hundred years since these *variations* have been duly observed; it will be very hard to bring this hypothesis to a calculus: especially since, though the *variations* do increase and decrease regularly in the same place, yet in differing places, at no great distance, there are found such casual changes thereof, as can no ways be accounted for by a regular hypothesis; but seem to depend upon the unequal and irregular distribution of the magnetical matter, within the substance of the external shell or coat of the earth, which deflect the needle from the position it would acquire from the effect of the general magnetism of the whole.—Of which, the *variations* at London and Paris, give a notable instance; for the needle has been constantly about $1\frac{1}{2}$ more easterly at Paris than at London: though it be certain, that according to the general effect, the difference ought to be the contrary way; notwithstanding which, the *variations*, in both places, do change alike.

Hence, and from some other things of like nature, it seems plain, that the two poles of the external globe are fixed in the earth; and that if the needle were wholly governed by them, the *variations* thereof would be always the same, with some irregularities, upon the account just now mentioned.—But the internal sphere having such a gradual translation of its poles, does influence the needle, and direct it variously, according to the result of the attractive or directive power of each pole; and, consequently, there must be a period of the revolution of this internal ball; after which, the *variations* will return again, as before. But if it shall in future ages be observed otherwise, we must then conclude, that there are more of these internal spheres, and more magnetical poles than four; which, at present, we have not a sufficient number of observations to determine, and particularly in that vast Mar del Zute, or South sea, which occupies so great a part of the whole surface of the earth.

V A R

If then two of the poles be fixed, and two moveable, it remains to ascertain, which they are that keep their place?

The author thinks it may be safely determined, that our European north pole, is the moveable one of the two northern poles, and that which has chiefly influenced the *variations* in these parts of the world: for in Hudson's Bay, which is under the direction of the American pole, the change is not observed to be near so fast, as in these parts of Europe, though that pole be much farther removed from the axis.—As to the south poles, he takes the Asiatic pole to be fixed, and consequently the American pole to move.

This granted, it is plain that the fixed poles are the poles of this external shell, or cortex of the earth; and the other the poles of the magnetical nucleus, included and moveable within the other.—It likewise follows, that this motion is westward; and, by consequence, that the aforesaid nucleus has not precisely attained the same degree of velocity, with the exterior parts in their diurnal revolutions; but so very nearly equals it, that in 365 revolves, the difference is scarce sensible.—That there is any difference of this kind arises hence, that the impulse, whereby the diurnal motion was impressed on the earth, was given to the external parts; and from thence, in time, communicated to the internal: but not so, as yet perfectly to equal the velocity of the first motion impressed on, and still conveyed by, the superficial parts of the globe.

As to the precise period, we want observations to determine it; though the author thinks we may, with some reason, conjecture, that the American pole has moved westward 46 degrees in 90 years; and that the whole period thereof is performed in about 700 years.

Mr Whiston, in his *New laws of Magnetism*, raises several objections against this theory; which see under the article *MAGNETISM*.

VARIATION of Quantities, in algebra. See *CHANGE*, and *COMBINATION*.

VARIATION, in astronomy.—The *variation of the moon*, called by Bullialdus, the *reflexion of her light*, is the third inequality observed in the moon's motion; whereby, when out of the quadratures, her true place differs from her place twice equated. See *PLACE*, *EQUATION*, &c.

Sir Isaac Newton takes the moon's *variation* to arise partly from the form of her orbit, which is an ellipsis; and partly from the inequality of the parts of space, which the moon describes in equal times, by a radius drawn to the earth.

To find the greatest *variation*, observe the moon's longitude in the octants; and for the time of observation, compute the moon's place twice equated: the difference between the computed, and the observed place, is the greatest *variation*. Tycho makes the greatest *variation* $40' 30''$. Kepler makes $51' 49''$; Sir Isaac Newton makes the greatest *variation* at a mean distance between the sun and the earth, to be $35' 9''$; at the other distances, the greatest *variation* is in a ratio compounded of the duplicate ratio of the times of the moon's synodical revolution directly, and the triplicate ratio of the distance of the sun from the earth inversely. *Phil. Nat. Princ. Math. Prop. XXXIX. Lib. iii.*

VARIATION, in the Italian music, is understood of the different manners of playing, or fingering a tune, or song; whether by subdividing the notes into several others of lesser value, or by adding graces, &c.—This is to be done in such manner, however, as that one may still discern the ground of the tune through all these enrichments; which some call *embroideries*.

Thus, e. gr. the divers couples of chacons, Spanish folies, gavots, French pascallies, &c. are so many *variations*: so also many diminutions of courants, gavots, and other pieces for the lute, harpichord, &c. are real *variations*.

VARICIFORMES Parasitæ, in anatomy, a name which some authors give to two vessels near the bladder; by reason of their many turnings; serving to work and prepare the feed the better. See *PARASTATÆ*, and *DEFERENTIA Vasa*.

VARICOSUM Corpus, in anatomy, the same as *corpus pyramidale*. See *PYRAMIDALE Corpus*.

VARICOUS Ulcus. See the article *ULCER*.

VARIATION, among botanists and florists, the act of streaking or diversifying the leaves, &c. of plants and flowers, with several colours.

Variation is either *natural*, or *artificial*.—Of *natural variation* there are four kinds; the first shewing itself in yellow spots, here and there in the leaves of plants; called by gardeners the *yellow blotch*.

The second, called the *white blotch*, marks the leaves with a greater number of white spots, or stripes; the whitest lying next the surface of the leaves, usually accompanied with other marks of a greenish white, that lie deeper in the body of the leaves.

The third, and most beautiful, is, where the leaves are edged with white, being owing to some disorder or infection in the juices, which stains the natural complexion or verdure of the plant.

The fourth kind is that called the *yellow edge*.

Varia-

V A R

All *Variation* is, in itself, a disease; and these are only fo many species, or rather degrees thereof.—In the yellow, the disease is the slightest: but the white is a sure sign of a deep infection, and weakness in the plant: which is further evinced by this; that no two leaves are ever marked exactly alike.—The former sometimes degenerate into the third, or edge kind; which is a total and immovable disease, that lays hold not only of the leaves, but of the wood, and even the fruit, seed, &c.

In the two first kinds, when accidental, there is a possibility of recovering the plants to their native verdure, by inarching them into a healthful stock of the same species, and letting the stock stand a year or two joined together; by which means the juices of the strong stock overpowering the distemper, throw off the morbid humours by perspiration: but the third kind is incurable; no art can recover the edged plant to produce plain green leaves again.

Artificial Variation, is performed by inarching, or inoculating a striped, or variegated plant into a plain one of the same sort; as a variegated common jessamin, into a plain, common, Spanish, Brazil, or Indian jessamin.

A single bud, or eye, Mr Bradley observes, being placed in the scutcheon of a distempered tree, where it can only receive nourishment from the vitiated juices, will become *variegated*, proportionably to the nourishment it draws; and will partake more of the white or yellow juice, than if a branch should be inarched: the bud having nothing to nourish it, but the juices of the plant it is inoculated on; whereas, a cyon inarched, is fed both by the striped plant, and the healthful one.

As to the natural stripes, or *variegations*, there are some particular circumstances to be observed: 1^o. That some plants only appear *variegated*, or blotched in the spring and autumn; the stains disappearing as they gather strength in summer: instances of this kind are seen in rue, thyme, and pot marjoram.

2^o. Some plants are commonly blotched in the spongy part of their leaves; the sap-vessels, all the time, remaining or a healthful green: such are the alternus, orange-mint, &c. which, being strengthened by rich manure, or being inarched into healthful plants, always throw off the distemper.

3^o. In other plants, the disease is so rooted and inveterate, that it is propagated with the seed: such are the archangel, water betony, bank cress, borrag, striped selay, and lycamur; the seeds of all which produce striped plants.

VARIOLÆ*, or **VARIOLI**, a contagious disease, popularly called the *small-pox*. See *Small-Pox*.

* It is called *varioles*, as shewing itself in pustules, or little tumours like *varices*; or as variegating the skin. See *VARI-*, &c.

VARIORUM*, in matters of literature, a term or phrase of abbreviation, used for an edition of a classic author, printed in Holland, with the notes of divers authors thereupon: *Cum notis variorum*, or *cum selectis variorum observationibus*. In this sense, we say, *Plautus variorum*; a set of Dutch *variorums*, &c.—The *variorums*, for the generality, are the most valued editions.

* The word is the genitive plural of the Latin *varius*, different, divers.

VARIX*, in medicine, a dilatation of a part of a vein, so as to make it bulge out, and form a little, soft, knotty, but painless tumour.

* The word is pure Latin, formed from the verb *variare*; by reason of the turns and meanders of the veins, which the tumour sometimes follows.

Sometimes it is confined to one single branch of a vein; and sometimes it extends to several: and sometimes runs crooked, and bent, in various knots and circumsolutions.

It happens ofteneft to the crural and hæmorrhoidal veins; sometimes, also to those in the testes, and frequently to those in the abdomen and breasts of pregnant women, and such as give suck. It is supposed owing to the great abundance, or thickness of the blood; or to the relaxation of the membranes of the veins; immoderate labour, sprains, cramps, to great pressure or stricture by bandages. Stagnations of the blood, from a plethora, cacochymia, &c. may also give occasion thereto.

Melancholic persons, and those who feed on coarse meats, are most subject to them: the generality of women with child, have *varices* on their thighs and legs, occasioned by the fætus compressing the iliac veins; and by that means, preventing the reflux of blood to the heart.

Varicæ happening spontaneously, and proving of a moderate size, are rarely dangerous; they are even allowed serviceable in the case of hæmorrhoids.—When immoderate, they sometimes occasion a cachexy, dropsy, or consumption.

The cure is to be attempted by evacuations, as phlebotomy, and cathartics; external applications, as discutient fomentations, cataplasms, embrocations, bandages, &c. Or, lastly, where the case grows dangerous, by incision.

Hernia VARICOSA, the same with *varicæle*. See *CIRSOCELE*.

VOL. II.

V A S

The *hernia varicosa* is known by the situation of the tumor, the course of the vein, the relaxation of the part, or its appearing inflated, and distended, and very painful.

It is remedied by a proper truss, or bandage, with the medicines abovementioned.

VARLET. See the article *VALET*.

VARNISH, or **VERNISH**, **VERNIX**, a thick, viscid, glossy liquor; used by painters, gilders, and various other artificers, to give a gloss and lustre to their works, as also to defend them from the weather, dust, &c.

There are divers kinds of *varnishes*, all made of gums dissolved in spirit of wine.

White VARNISH is usually made of gum sandarach and gum mastic dissolved in spirits, left to settle two days, then strained through a linen cloth, and after standing some time, the clear poured off, and bottled for use.

The more curious artists dissolve the two gums separately; and having made a separate *varnish* of each, mix them occasionally, as their work requires a stiffer or a softer *varnish*. But for the *best white varnish*, more gums are required, viz. Venice turpentine, gum copal, elemi, benzoin, animæ, and white rosin.

Lacc-VARNISH, is made of gum laccæ and spirit of wine, frequently shaken till the gum be dissolved, then strained, and the clear liquor decanted off, as above.

The lacc ought to be of the kind called feed-lacc.—Though for varnishing ordinary woods, shell lacc is often used.—But this will not stand against the weather.

Besides these, there are *hard*, and *soft varnishes*, or grounds, used by the etchers, and engravers.

VARNISH, is also used for a kind of glossy coat, wherewith potters ware, Delft ware, China ware, &c. are covered, to give them a smoothness, and lustre.—Some preparation of lead, is the *varnish* ordinarily used for the first; and earths for the second.

The true *varnish* used by the Chinese, and Japanese, to give that inimitable lustre to their porcelain, is one of the grand secrets in that manufacture; and is one of the great things wanting, to make Delft and French ware vie with the Chinese. Several have described the preparation thereof, particularly Kircher: but none ever succeeded in the trial.

VARNISH, is also a term applied to the colours which antique medals acquire in the earth.

The value of a medal is heightened by a beauty, which nature alone is able to give, and art has never yet attained to counterfeit: we mean, the colour or *varnish*, which certain soils tinge the medal withal; some with a blue, almost as beautiful as that of a turquois; others with an inimitable vermilion colour; and others with a glossy shining brown, infinitely beyond any of our figures in bronze.

The most usual *varnish*, however, is a fine green, which hangs to the most delicate strokes without effacing them: much more accurately than the finest enamel does on metals. Brass alone is susceptible of it; for as to silver, the green rust that gathers on it, always spoils it; and it must be covered off with vinegar, or lemon juice.

There is also a *falsè*, or *modern varnish*; which the falsifiers of medals give to their counterfeits, to give them the air of antiquity: it is discovered by its being softer than the natural *varnish*, which is as hard as the metal itself.

Some lay their spurious medals under ground, where they contract a degree of *varnish*, that may impose on the less knowing: others use sulphur armoniac, mixed with vinegar, others the acid spirits of nitre, &c.

VAROLI Pens. See the article *PONS*.

VAS, *Vessel*. See *VESSEL*, *VESICULA*, and *ANGIOLOGY*. Hence (in the file of anatomists) the *Vasa adiposa*, *preparantia*, &c.

VAS Breve, *Short VESSEL*, in anatomy, a vessel at the bottom, of the stomach, thus called from its shortness. See *STOMACH*. It sends divers little branches from the bottom of the stomach to the spleen; or, according to the use the ancients imagined it to be of, from the spleen to the stomach: for their notion was, that, by means of this vessel, the spleen supplied the stomach with an acid juice: which acting on the inner nervous membranes of the stomach, caused the sensation of hunger; and at the same time mixing with the foods contained therein, assisted, by its acid quality, in the dissolution thereof.

But upon examining the little branches of this vessel more accurately, we find, they do not pierce into the stomach, and that they are no more than branches of veins, serving to return the blood into the splenic vein; whence it passes into the vena porta.

VASA Conducitæ, among hydraulic authors, are two vessels, so constructed, as that one of them, though full of wine, will not run a drop; unless the other, being full of water, do run also.—Their structure and apparatus may be seen in Wolfius, *Element. Mathes. T. II. Hydraul.*

VASCULAR, **VASCULARIS**, in anatomy, is applied to any thing consisting of divers vessels, veins, arteries, &c.

We say, the *vascular* and *valvular* texture of the lungs.—All the flesh in an animal body, is found to be *vascular*, none of it parenchymous, as the ancients imagined.

VASCULAR Glands. See the article **GLAND**.

VASCULAR, VASCULARIUS, in antiquity, was the denomination of a kind of artificers, among the ancient Romans; who made silver and gold vessels without relievo's, or figures imbossed thereon.

Hence, according to Salmastius, it is, that Cicero, in his sixth oration against Verres, distinguished *vascularius* from *celator*, engraver.

In the art called by the Greeks *υφανισμος*, which was the art of superadding ornaments of precious stones, or rich metals, to vases of other metals; the *vascularii* and *celatores* were different; the first being the goldsmiths who made the vase, the second, the sculptors who added the ornaments.—But in the art called *τορυση*, or the art of cutting bas reliefs, or stamping figures on metal; the *vascularii* were also *celatores*, or engravers: that is, they who made the vase, made also the reliefs or figures, wherewith it was enriched.

VASCULIFEROUS Plants, among the botanists, such as have a peculiar vessel or cafe to contain the feed; which is sometimes divided into cells.

These have commonly a monopetalous flower; either uniform or difform.

The former have all their seeds divided; either, 1°. Into two partitions, as the *hyssygamus*, *nicotiana*, and the *gentiana*. 2°. Into three partitions, as the *convolvulus*, *speculum veneris*, *trachelium*, *rapunculus* or *campanula*, *rapunculus*, *coriiculatus*, &c. 3°. Into four partitions; as the *stramonium*. Those of the latter kind, which have a difform monopetalous flower, are the *linaria*, *pinguicula*, *antirrhinum*, *aristolochia*, *scrophularia*, *digitalis*, *pedicularis*, *melampyrum*, *euphrasia*, &c. See Supplement, **LINARIA**, &c.

VASE, a term of equal import with the Latin *vas*, whence it is formed; and with the English *vessel*. See **VESSEL**.

It is applied to the ancient vessels, dug from under ground, or otherwise found, and preserved in cabinets, &c. as vessels of sacrifice, urns, &c. and to other more modern vessels, which are rather of curiosity and shew, than use; as those of crystal, porcelain, &c.

VASES, in architecture, are ornaments of sculpture, placed on socles, or pedestals; representing the vessels of the ancients; particularly those used in sacrifice, as the præfæriculum, simpulum, incense pots, flower-pots, &c. and occasionally enriched with baso reliefs.

They are commonly placed there to crown, or finish facades, or frontispieces.—They are frequently also called *acroteria*; and are usually insulate.

Vitruvius mentions a kind of *theatrical vases*, made of brass, or earthen ware, called *ecchea*, *αχαια*; which they disposed in private places, under the steps and seats of the theatres, to aid and increase the reflection and resonance of the actors voices, &c. It is said, there are also *vases* of this kind in the cathedral church of Milan.

VASE is particularly used in architecture, to signify the body of the Corinthian and composite capital; called also the *tambour*, or *drum*; and sometimes the *campana*, or *bell*.—See **Tab. Archit.** fig. 21. lit. c. c.

VASE is also sometimes used among florists, for that they otherwise call the *calyx*.

The *vase*, or rather calyx of a tulip, is the top or head of a tulip; the leaves whereof form a kind of *vase*, or cup. Goldsmiths, braisers, &c. also use *vase* for the middle of a church candlestick; which is usually of a roundish figure, bordering somewhat on that of a *vase*.

VASSAL*, **VASSALLUS**, in our ancient customs, a person who vowed fidelity and homage to a lord, on account of some land, &c. which he held of him, in fee.

* Du Cange will have the word to come from *vassus*, which antiently signified a *servant*, or *domestic* of a prince, and sometimes also the *comites*, or *assessores* in public trials.—Menage, after Cujas, takes *vassal* to have been formed of *gessal*, an antient German word, signifying *companion*.—Caleneuve derives it from the Gaulish *gessus*, a brave man, from *gess*, or *gessum*, or *jesum*, a kind of javelin used among them.—Vollius derives *vassal* from *vas*, *vasis*, pledge; whence also he will have it to be, that they are sometimes called *fideles*.

The *vassal* was also called *piratus*, *lord's-man*, and *fee-man*; but now the denomination is changed into that of *tenant in fee*.

They sometimes also used the term *vassour* for *vassal*; whence *vivasour*.

If a *vassal* offended his lord grievously, either in person, or in honour, he committed the crime of felony; which carried with it a confiscation of his fee.

A **Rear VASSAL**, is he who holds of a lord, who himself is *vassal* of another lord.

VASSAL was also antiently used for soldier; by reason fees, at first, were given to none but military men.

VASSALAGE, the state of a vassal; or a servitude and dependency on a superior lord.

Antiently, they distinguished between *liege vassalage*, and *simple vassalage*.

Liege vassalage only belonged to the king; as carrying with it an obligation on the side of the vassal, to serve his lord in war, against all persons whatever. See **LIEGE**.

In all *simple vassalage*, the fealty, or *liege vassalage*, was still reserved to the king.

Some also distinguish *active vassalage*, and *passive*: the first is the right of fealty residing in the lord; the second, the service and duties incumbent on the tenant.

VASTO, in law, a writ that lies against the tenant for life, or years, for making waste.

VASTUS, in anatomy, a name common to two muscles of the leg, distinguished into *internal* and *external*; thus called from their largeness: both of them serving to extend the leg.

VASTUS Externus, springs from the root of the great trochanter, and from the linea aspera; outwardly tendinous, and inwardly fleshy; and defending obliquely forwards, becomes, *vice versa*, tendinous inwardly, and fleshy outwardly; till meeting the tendon of the rectus, it grows quite tendinous, and is inserted together with it.—See **Tab. Anat.** (*Myol.*) fig. 1. n. 60. fig. 2. n. 41. fig. 6. n. 35.

VASTUS Internus, arises likewise partly tendinous, and partly fleshy, from the linea aspera, immediately below the less trochanter, upon the outside of the tibia; and is continued almost to the lower apophysis thereof, on the inside: whence it descends obliquely; and growing tendinous, is inserted with the former.—See **Tab. Anat.** (*Myol.*) fig. 1. n. 55. fig. 2. n. 39. fig. 7. n. 42.

VAT, or **FAT**, a kind of vessel, used to hold wine, ale, beer, cyder, or any other liquor, in the time of its preparation.

VATICAN*, **VATICANUS**, is properly the name of one of the seven hills whereon Rome stands: on the foot hereof is the famous church of S. Peter, hence called the *Vatican*; and a magnificent palace of the pope, which has the same denomination.—Hence arise divers figurative expressions; as the *thunderbolt of the Vatican*, &c. d. the pope's anathema, &c.

* The word, according to Aulus Gellius, is derived from *vaticinium*, prophecy; by reason of the oracles and predictions which were used to be delivered there by the inspiration of an antient deity, called *Vaticanus*; who was supposed to unbind the organs of speech in new-born children; and whom others will have to be no other than Jupiter, considered in that capacity.

The **Library of the VATICAN**, is one of the most celebrated in the world: it is particularly remarkable for its manuscripts.—Towards the beginning of the last century, it was greatly augmented by the addition of that of the elector Palatine.—It is open to all the world three or four times a week.—In it are shewn a *Virgil*, *Terence*, &c. above a thousand years old; as also the manuscript whereon the edition of the *Septuagint* was made; and abundance of rabbinical manuscripts.

VATICINATION, **VATICINATIO**, the act of prophesying, or divining. See **DIVINATION**, and **PROPHECY**.

VAVASOR, **VALVASOR**, **VAVASOUR**, or **VALVASOUR**, in our antient customs, a diminutive of *vassal*, or *vassour*; signifying a *vassal of a vassal*, or one who held a fee of another vassal.

Yet Camden, and others, holds *vavasor* to be a dignity, next below that of a baron: he adds, that the word is formed of *vas sortitum ad valetudinem*, a vessel chosen for safety, and health.—Others derive it à *valvis*, *quasi obligatus sit ad stare ad valvas domini, vel indignus sit eas intrare*; as being a person obliged to wait at his lord's door, or as unworthy to enter thereat: but this etymology is ridiculous enough.

Du Cange distinguishes two sorts of vassals under this denomination:—The *great*, called *valvasores*, who held of a king: such were counts and barons.—And the *lesser*, called *valvasini*, who held of the former.

VAVASORY*, **VAVASORIA**, the quality of the land, or fee held by a vavasor. See **VAVASOR**.

* *Quod dicitur de baronia non est observandum in vavatoria, vel alius minoribus feodis quam baronia, quia caput non habent sicut baronia.* Bract. Lib. II. cap. 39.

There are *base vavasories*, and *frank*, or *noble vavasories*; according as it has pleased the lord to make his *vavasor*.—*Base vavasories*, are those for which the lord of the fee owes summage, light-horse, rents, or other services.—*Free vavasories*, are such as are exempt from these services.

VAUDOIS, **VALDENSES**, or **WALDENSES**, a name given to a sect of reformers, who made their first appearance about the year 1160; or, as others will have it, about the year 1118.

The occasion of their rise is thus delivered:—"In an assembly

"sembly of several of the more considerable citizens of Lyons, one of them fell down suddenly dead in the middle.—Upon which, Pierre Valdo, who was one of the number, being struck with the accident, distributed a large sum of money among the poor on the spot.—This drawing a great number of people to follow him, he exhorted them to embrace a voluntary poverty, after the example of Jesus Christ, and his apostles: and as he was a man of some learning, he expounded to them the New Testament in the vulgar tongue.

The clergy soon began to cry out on him as a rash intruder: but he, despising their reprimands, still held on; and even went further.—For the accusations of the priests having exasperated him, he began to declaim against them; exposed their corrupt lives and morals; and even, by degrees, came to censure some of the corruptions in the discipline and doctrine of the church."—And this paved some of the way to the Reformation.

The *Paudois* had their name from this Valdo, whose retainers they were.—They were also called *Lyonists*, and *Sabatetz*, or *Infabatetz*.

VAULT, *Formix*, in architecture, an arched roof, so contrived, as that the several stones whereof it consists, do, by their disposition, sustain each other.

Vaults are to be preferred, on many occasions, to soffits, or flat ceilings, as they give a greater rise and elevation; and besides, are more firm and durable.

The antients, Salmastius observes, had only three kinds of vaults: the first, the *formix*, made cradle-wise; the second, the *testudo*, tortoise-wise, called by the French *cul de four*, or oven-wise; the third, the *concha*, made shell-wise.

But the moderns subdivide these three sorts into a great many more, to which they give different names, according to their figures, and use: some are circular, others elliptical, &c.

The sweeps of some, again, are larger, and others less portions of a sphere: all above hemispheres are called *high*, or *surmounted vaults*; all that are less than hemispheres, are *low*, or *subdued vaults*, &c.

In some, the height is greater than the diameter; in others, it is less: there are others, again, quite flat, only made with haunses; others oven-like, or in form of a cul de four, &c. and others growing wider, as they lengthen, like a trumpet. Of vaults, some are *single*, others *double*, *cross*, *diagonal*, *horizontal*, *ascending*, *descending*, *angular*, *oblique*, *pendent*, &c.—There are likewise *Gothic vaults*, with *pendentives*, &c.

MAJESTY VAULTS, are those which cover the principal parts of buildings; in contradistinction to the *lesser*, or subordinate vaults, which only cover some little part; as a passage, a gate, &c.

DOUBLE VAULT, is such a one as, being built over another, to make the exterior decoration range with the interior, leaves a space between the convexity of the one, and the concavity of the other: as in the dome of S. Paul's at London, and that at S. Peter's at Rome.

VAULTS with Compartments, are such whose sweep, or inner face is enriched with panels of sculpture, separated by platbands: these compartments, which are of different figures, according to the vaults, and are usually gilt on a white ground, are made with stucco, on brick vaults; as in the church of S. Peter's at Rome; and with plaster, on timber vaults.

THEORY OF VAULTS.—A semicircular arch, or vault, standing on two piers, or imposts, and all the stones that compose it, being cut and placed in such manner, as that their joints, or beds, being prolonged, do all meet in the centre of the vault; it is evident, all the stones must be in form of wedges, i. e. they must be wider and bigger at top than at bottom: by virtue of which, they sustain each other, and mutually oppose the effort of their weight, which determines them to fall.

The stone in the middle of the vault, which is perpendicular to the horizon, and is called the *key of the vault*, is sustained on each side by the two contiguous stones, just as by two inclined planes: and of consequence, the effort it makes to fall, is not equal to its weight.

But still, that effort is greater, as the inclined planes are less inclined; so that, if they were infinitely little inclined, i. e. if they were perpendicular to the horizon, as well as the key, it would tend to fall with its whole weight, and would actually fall, but for the mortar.

The second stone, which is on the right or left of the key-stone, is sustained by a third; which, by virtue of the figure of the vault, is necessarily more inclined to the second, than the second is to the first; and of consequence, the second, in the effort it makes to fall, employs a less part of its weight than the first.

For the same reason, all the stones, reckoning from the key-stone, employ still a less and less part of their weight to the last; which, resting on a horizontal plane, employs no part of its weight; or, which is the same thing, makes no effort to fall; as being intirely supported by the impost.

Now, in vaults, a great point to be aimed at is, that all the several stones, make an equal effort in order to fall: To effect this, it is visible, that as each (reckoning from the key to the impost) employs a still less and less part of its whole weight; the first, for instance, only employing one half; the second, one third; the third, one fourth, &c. there is no other way to make those different parts equal, but by a proportionable augmentation of the whole, i. e. the second stone must be heavier than the first; the third, than the second, &c. to the last; which should be vastly heavier.

M. de la Hire demonstrates what that proportion is, in which the weights of the stones of a semicircular arch must be increased, to be in equilibrio, or to tend with equal forces to fall; which gives the firmest disposition a vault can have.

Before him, the architects had no certain rule to conduct themselves by; but did all at random. Reckoning the degrees of the quadrant of the circle from the key-stone to the impost; the extremity of each stone will take up so much the greater arch, as it is farther from the key.

M. de la Hire's rule is, to augment the weight of each stone above that of the key-stone, as much as the tangent of the arch of the stone exceeds the tangent of the arch of half the key.—Now, the tangent of the last stone, of necessity becomes infinite, and of consequence its weight should be so too: but as infinity has no place in practice, the rule amounts to this, that the last stones be loaded as much as possible, that they may the better resist the effort which the vault makes to separate them; which is called the *fores*, or *drift of the vault*.

M. Parent has since determined the curve, or figure which the extrados, or outside of a vault, whose intrados, or inside, is spherical, ought to have, that all the stones may be in equilibrio.

KEY of a VAULT, is a stone, or brick, in the middle of the vault, in form of a truncated cone, serving to bind or fasten all the rest.

Reins, or Fillings up of a VAULT, are the sides which sustain it.

Pendentive of a VAULT, is the part suspended between the arches or ogives. See PENDENTIVE.

IMPOST of a VAULT, is the stone whereon the first voussoir, or arch-stone of the vault is laid.

VAULT, or VOLT, in the manage. See VOLT.

VAUNT, or VANT. See the article VAN.

VAUNT-LAY, among hunters, a setting of hounds, or beagles, in a readiness where the chase is to pass; and casting them off before the rest of the kennel come in.

VAYVODE, or VAIVODE. See the article WAYVODE.

UBIQUISTS*, UBIQUITARIES, or UBIQUITARIANS, a sect of Lutherans, which rose and spread itself in Germany; and whose distinguishing doctrine was, that the body of Jesus Christ is every where, or in every place.

* The word is formed from the Latin adverb, *ubique*, every where.

Brentius, one of the earliest reformers, is said to have first broached this error, in 1560.—Melancthon immediately declared against it; maintaining that it introduced, with the Eutychians, a kind of confusion into the two natures of Jesus Christ; and protested, that he would oppose it as long as he lived.

On the other hand, Andrew and Flacius Illyrius, Osiander, &c. espoused Brentius's party; and asserted the body of Jesus Christ to be every where.

The universities of Leipzig and Wirtemberg, and the generality of Protestants, set themselves against this new heresy, but in vain: the *Ubiquitarians* grew stronger and stronger.—Six of their leaders, Schmiedelin, Selnecker, Musculus, Chemnitius, Chytræus, and Cornerus, having a meeting in 1577, in the monastery of Berg, they there composed a kind of credo, or formula of faith; wherein the ubiquity was established as an article.

All the *Ubiquitists*, however, are not agreed: some of them, and among the rest the Swedes, hold that Jesus Christ, even during his mortal life, was every where: others maintain, that it is only since his ascension that his body is every where.

G. Hornius only allows Brentius the honour of being the first propagator of *Ubiquitism*; its first inventor, according to him was John of Westphalia, a minister of Hamburg, in 1552.

UBIQUIST, in the university of Paris, is a term applied to such doctors in theology, as are not restrained to any particular house; either to that of Navarre, or Sorbonne.

The *Ubiquists* are called, simply, *doctors in theology*; whereas the others add, *of the house of Sorbonne, or Navarre, &c.* See SORBONNE, DOCTOR, &c.

UBIQUITY, omnipresence; an attribute of the Godhead, whereby he is always intimately present to all things: gives the esse to all things; and knows, preserves, and does all in all things.

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For since God cannot be said to exist in all places, as placed therein, (because, then, he would need something to his existence, viz. place; and would have extension, parts, &c.) he must be conceived to be every where, or in all things, as a first, universal, efficient cause, in all his effects.

He is present, therefore, to all his creatures, as a pure act, or an exercise of an active virtue, which knows, preserves, governs, &c. every thing.—Nor are, even finite minds, present otherwise than by operation.

UDDER, UBER, in comparative anatomy, that part in brutes wherein the milk is prepared; answering to the mammary, or breasts in the human kind.

VECTIS, in mechanics, one of the powers; more usually called the lever.

Heterodromus VECTIS. See the article HETERODROMUS.

VECTOR, in astronomy, a line supposed to be drawn from any planet moving round a centre, or the focus of an ellipse to that centre, or focus.

This, by some writers of the new astronomy, is called *vector*, or *radius vector*, because it is that line by which the planet seems to be carried round its centre; and with which it describes areas proportional to the times.

VEDETTE, in the military art, a sentinel on horseback, detached from the main body of the army, to discover and give notice of the enemy's designs.

VEER, a sea term, variously used.—*Veering out the rope*, denotes the letting it go by hand, or letting it run out of itself: thus, they say, *Veer more cable*; that is, let more run out.

But they do not use the word for the letting out of any running rope, except the sheet.

VEER, is also used in reference to the wind: for when it changes often, and suddenly, they say, *the wind veers*.

When a ship under sail, has her sheet *veered* out, they say, *she goes veering*; that is, at large; neither by a wind, nor directly before it, but between both: which they also call *quaranting*.

VEGETABLE, VEGETABLE, in physiology, a term applied to all plants, considered as capable of growth; i. e. to all natural bodies which have parts organical formed for generation, and accretion, but not sensation. See PLANT.

In *vegetables*, there is supposed to be a principle of life, commonly called the *vegetative soul*.

Boerhaave very scientifically defines a *vegetable* to be a body generated of the earth; to which it adheres, or is connected, by parts called *roots*, through which it receives the matter of its nourishment, and increase; and consisting of juices, and vessels, sensibly distinct from each other. Or, a *vegetable* is an organical body, composed of vessels and juices, every where distinguishable from each other; to which grow roots, or parts, whereby it adheres to some other body, from which it derives the matter of its life, and growth.

This definition furnishes a just and adequate idea of a *vegetable*: for by its consisting of vessels and juices, it is distinguished from a *fossil*; and by its adhering to another body, and deriving its nourishment therefrom, it is distinguished from an *animal*.

A *vegetable* is defined an organical body, because consisting of different parts, which jointly concur to the exercise of the same function.

Adhering by some of its parts to another body—for we know of no plant that is so absolutely vague and fluctuating, but has still a body it adheres to; though that body may be various, e. g. earth, as in our common plants; stone, as in rock-plants; water, as in sea-plants; and air, as in some mucilages.

As to those few plants which appear to float with the water, their manner of growth is somewhat anomalous: M. Tournefort has affirmed, that all plants do not arise strictly from solid seeds; but that some, instead of a solid semen, deposit, or let fall a little drop of juice, which sinking in the water, by its gravity reaches the bottom, or some rock, &c. in its way; to which it sticks, strikes root, and shoots into branches: Such is the origin of coral.

Add, that the root of a plant may have any situation at pleasure, with respect to the body thereof; nor needs it either be lowest, or highest, &c.—Accordingly, in aloes, coral, mosses, fungus's, &c. the root is frequently uppermost, and the growth downwards.

The vascular structure of *vegetables*, is rendered very apparent, by an experiment of Mr Willughby.—Cutting off some pretty big branches of birch, and making a sort of bason, or reservoir on the end thereof with soft wax; upon filling this with water, and holding the branch upright, the water, in a few minutes, sunk into the vessels of the wood, and running quite through the length, dropped out considerably fast at the other end; continuing so to do, as long as the water was poured on.—The same succeeds in the sycamore, walnut tree, &c. though the flux here is

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not so copious. *Philosoph. Transact.* No 70.

There are secrets whereby the growth of *vegetables* is surprisingly promoted.—Mr Boyle mentions a virtuosus, who entertained his friends at the end of their meal with a salad of lettuces, which he sowed in their presence, immediately before they sat down to table.

The chymists also furnish us with an extraordinary sort of what they call *vegetables*: as, the arbor Diana, arbor Martis, &c.—In effect, gold, silver, iron, and copper, being prepared in aqua fortis, there rises out of them a kind of tree, which vegetates, or grows, before the naked eye, and spreads into branches, leaves, &c. the whole height of the water; till all the matter is spent therein. See ARBOR Diana, &c.

The water used by many in this process, the chymists call *flint water*; the secret whereof has been communicated by Rhodocanaffes, a Greek chymist.

VEGETABLE Oil. See the article OIL.

VEGETATION, VEGETATIO, the act whereby plants, and other living bodies, receive nourishment and grow.

Plants, we learn from the microscope, consist of different parts, vessels, &c. analogous to those of animals: and each kind of vessel is supposed to be the vehicle of a different humour, or juice, secreted from the mats of sap; which is considered as the blood, or common fund of them all.

Dr Grew assigns the offices of the several vessels: those placed on the inner verge of the bark, he calls *lymphæducts*, and supposes them destined for the conveyance of the most aqueous, or watery liquor; these Mr Bradley calls the *new forming vessels*, which are annually produced, and help to increase the bulk of the tree.

Those in the middle of the bark, Dr Grew calls *latiferrous*, or *respiriferous* vessels; their use, according to Bradley, is to return the superfluous sap: These vessels, Grew observes, are the principal viscera of plants; and adds, that as the viscera of animals are but such vessels conglomerated; so the vessels of a plant are viscera drawn out at length.

To the nutrition of plants, as well as that of animals, it seems necessary that there be a concurrence of two specifically distinct fluids; and a learned author maintains an intermixture of two such humours in every part of a tree, like that which we observe in linsey-woolsey: every part of sap being impregnated with other tinctures, and continually filtered from fibres of one kind to those of another. And from this mixture, many of the phenomena of the ripening, odours, colours, &c. are accounted for.

Theory of VEGETATION.—The process of nature in the *vegetation* of plants, is very accurately delivered by the excellent Malpighi, to the effect following.

The egg (or seed) of the plant being excluded out of the ovary, (called *pod*, or *husk*) and requiring further fostering and brooding; is committed to the earth.

There, that-kind mother having received it into her bosom, not only does the office of incubation, by her own warm vapours and exhalations, joined with the heat of the sun; but, by degrees, supplies what the seed requires for its further growth: as abounding every where with canals and linus's, wherein the dew, and rain-water, impregnated with fertile salts, glide, like the chyle and blood in the arteries, &c. of animals.

This moisture meeting with a new deposited seed, is percolated, or strained through the pores or pipes of the outer rind, or husk, (corresponding to the secundine or fœtus's) on the inside whereof lie one or more, commonly two, thick femal leaves, (answering to the placenta in women, and the cotyledons in brutes.)

These seed-leaves consist of a great number of little vesiculae, or bladders; with a tube, corresponding to the navel-string in animals.

In these vesiculae is received the moisture of the earth, strained through the rind of the seed; which makes a slight fermentation into the proper juice before contained therein.

This fermented liquor is conveyed by the umbilical vessel to the trunk of the little plant; and to the germ, or bud, which is contiguous thereto: upon which, a *vegetation* and increase of the parts succeeds.

Such is the procedure in the *vegetation* of plants; which the illustrious author exemplifies in a grain of wheat; as follows.

—The first day the grain is sown, it grows a little turgid; and the secundine, or husk, gapes a little in several places: and the body of the plant, being continued by the umbilical vessel to a conglobated leaf, (which is called the *pulp* or *sheath* of the seed, and is what constitutes the flower) swells; by which means, not only the gem, or sprout, (which is to be the future stem) opens, and waxes green; but the roots begin to bunch out; whence the placenta, or seed-leaf, becoming loose, gapes.

The second day the secundine, or husk, being broke through; the stem, or top of the future straw, appears on the outside thereof, and grows upwards by degrees. in the mean time, the

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the seed-leaf guarding the roots, becomes turgid with its vesicle; and puts forth a white down. And the leaf being pulled away, you see the roots of the plant bare; the future buds, leaves, and rest of the stalk still lying hid. — Between the roots, and the ascending stem, the trunk of the plant is knit, by the navel-knot, to the flower-leaf; which is very moist, though it still retains its white colour, and its natural taste.

The third day, the pulp of the conglobated, or round leaf, becomes turgid with the juice which it has received from the earth, fermenting with its own.

Thus the plant increasing in bigness, and its bud or stem becoming taller, from whitish, it turns greenish: the lateral roots also break forth greenish, and pyramidal from the gaping sheath, which adheres closely to the plant; and the lower root grows longer, and hairy, with many fibres shooting out of the same.

Indeed there are hairy fibres hanging all along on all the roots, except on their tips; and these fibres are seen to wind about the saline particles of the soil, little lumps of earth, &c. like ivy; whence they grow curled. Above the lateral roots, there now also break out two other little ones.

The fourth day, the stem mounting upwards, makes a right angle with the femoral leaf: The last roots put forth more; and the other three, growing larger, are clothed with more hairs, which straightly embrace the lumps of earth; and where they meet with any vacuity, unite into a kind of network. — The conglobate, or flower-leaf, is now softer; and, when bruised, yields a white sweetish juice, like barley cream. — By stripping it off, the root and stem of the plant are plainly seen, with the intermediate navel-knot, whose outer part is solid, like a bark, and the inner more soft, and medullary.

The fifth day, the stalk still rising, puts forth a permanent, or stable leaf, which is green, and folded; the roots grow longer, and there appears a new tumor of a future root: the outer, or sheath-leaf is loosened; and the seed-leaf begins to fade.

The sixth day, the stable-leaf being loosened, the plant mounts upwards; the sheath-leaf still cleaving about it like a bark. — The seed-leaf is now seen sinuous, or wrinkled, and faded: and this being cut or freed from the secundine, the flesh, or pericarpium, is found of a different texture; the outer part, whereby the outside of the seed or grain is heaved up, being more solid; but the inside vesicular, and filled with moisture, especially that part next the navel-knot. — All the leaves being pulled off, the roots torn, and the flower-leaf removed, the trunk appears; wherein, not far from the roots, the navel-knot bunches out, and is solid, and hard to cut: above, there is the mark of the sheath-leaf, which was pulled off; and underneath, as in an angle, the gem is often hid. — The hind part of the plant, shews the breaking forth of the roots, and likewise the faded placenta, &c.

After the eleventh day, the seed-leaf, as yet sticking to the plant, is crumpled, and almost corrupted; within it is hollow; and about the secundine, the mucous, and white substance of the seed, being continued to the navel-knot, forms a cavity. All the roots now becoming longer, put forth new branches out of their sides: the seed-leaf withers, and its vessels are emptied: the internodes, or spaces between the knots, grow stronger; new gems appear; and the middle root grows several inches long.

After a month, the roots and stalk being grown much longer, new buds break out at the first knot, and little tumors bunch out, which, at length, break into roots. — *For other circumstances of Vegetation, see GENERATION, JUICE, SEED, RADICLE, PLUME, PERPENDICULARITY, PARALLELISM, &c.*

As to the Vegetable Matter, or the food whereby plants grow, there is some doubt about it: the common opinion among naturalists, is, that water is the great vegetable food; which seems confirmed by an easy experiment.

A sprig of balm, mint, or the like plant, is set in a phial of pure water, without any mixture of earth; yet the sprig grows, and puts forth roots, leaves, and branches.

Agreeable to which, is another famed experiment of Van Helmont; who drying 200 pounds of earth, and planting a willow which weighed 5 pounds therein, watered it only with rain, or distilled-water; and to secure it from any other earth, covered it with a perforated tin cover: at 5 years end, weighing the tree, with all the leaves it had born in that time, he found it to weigh 169 pounds 3 ounces; yet the earth was only diminished 2 ounces.

To ascertain this point, Dr Woodward has made some very good experiments; which, at the same time, give light to many other circumstances of vegetation. — His experiments were most of them made with sprigs of mint, and some other plants, nicely weighed, and inclosed in equal glass phials, well covered up with parchment; leaving room for the stems to ascend through it; and filled with water: some with spring-water, others with rain-water, others with Thames-water.

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At the end of 77 days he took them all out again; and weighed them, as also the water left; and computed the weight of water expended on them, and the proportion of the increase of the plant, to the expense of the water.

The next year, viz. 1692, he made fresh experiments with the same phials, and the same sort of plants, weighed as before, only some were filled with Hyde-Park conduit-water alone, others with the same water and a certain proportion of garden-earth dissolved in it; and others in the same water distilled.

At the end of 56 days, he weighed the plants, water, &c. and computed what each plant had gained, what quantity of water was expended on them, and the proportion of the increase of the plant, to the decrease of the water.

The result of all which experiments, he gives us in the following observations, and reflections. — 1°. In plants of the same kind, the less they are in bulk, the smaller quantity of the fluid mass, in which they are set, is drawn off. — The consumption, where the mass is of equal thickness, being pretty nearly proportional to the bulk of the plant.

In effect, the water seems to ascend up the vessels of plants, in much the same manner as up a filtre: and it is no great wonder, that the larger filtre should draw off more water than the smaller; or that a plant, that hath more and larger vessels should take up a greater share of the fluid, in which it is set, than one that has fewer can: nor is this noted as a thing very considerable in itself, but chiefly with regard to what follows.

2°. Much the greater part of the fluid mass thus drawn off, and conveyed into the plants, does not settle or abide there; but passes through their pores, and exhales up into the atmosphere. — That the water, in these experiments, ascended only through the vessels of the plants, is certain; since some glasses, which had no plants in them, though disposed in like manner as the rest, remained at the end of the experiment as at first, without any diminution of water: and that the greatest part of it flies off from the plant, into the atmosphere, is as certain.

The least proportion of the water expended, was to the augment of the plant, as 46 or 50 to 1; and in some as 100, 200, nay, in one, as 700 to 1.

This continual an emission of water, in so great plenty, from the parts of the plant, affords a manifest reason, why countries that abound with trees, and the larger vegetables especially, should be very obnoxious to damps, great humidity in the air, and more frequent rains, than others that are more open and free. — The great moisture in the air, was a great inconvenience, and annoyance to those who first settled in America; which, at that time, was overgrown with woods and groves: but as these were burned and destroyed, to make way for habitations, and culture of the earth; the air mended, and changed into a temper much more serene and dry than before.

Nor does this humidity go off pure, and alone, but it usually carries with it many parts of the same nature, with those whereof the plant, through which it passes, consists: the crasser, indeed, are not so easily born up into the atmosphere, but are usually deposited on the surface of leaves, flowers, and other parts of the plants; whence our mannas, our honies, and other gummy exudations of vegetables: but the finer and lighter parts, are with greater ease sent up into the atmosphere; thence they are conveyed to our organs of smell, and by the air we draw in respiration; and are pleasant or offensive, beneficent or injurious to us, according to the nature of the plants from which they arise — And since these owe their rise to the water that ascends out of the earth, through the bodies of plants; we cannot be far to seek for the cause, why they are more numerous in the air in wet summers, and a greater quantity of odours is found exhaling from vegetables, in warm humid seasons, than in any others.

3°. A great part of the terrestrial matter that is mixed with water, ascends up into the plant, as well as the water. — There was much more terrestrial matter, at the end of the experiment, in the water of the glasses that had no plants in them, than in those which had plants. — The garden-mould dissolved in some of the glasses, was considerably diminished, and carried off; nay, the terrestrial and vegetable matter, was born up in the tubes filled with sand, cotton, &c. in that quantity, as to be evident, even to sense: and the bodies in the cavities of the other tubes, that had their lower ends immersed in water, wherein saffron, cochineal, &c. had been infused, were tinged with yellow, purple, &c. — To look abroad a little towards our shores, and parts within the verge of the sea, these will present us with a large scene of plants, that, along with the vegetable, take up into them mere mineral matter also, in great abundance; such is our sea-purslain, the several sorts of algas, of samphires, and other marine plants: these contain common sea-salt, which is the same as the fossil, in such plenty, as not only plainly to be distinguished on the palate, but it may be drawn out of them in considerable quantity; nay, some affirm, there

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are plants found that will yield nitre, and other mineral salts.

The vegetable matter being very fine and light, is surprizingly apt, and disposed to attend water in all its motions, and follow it into each of its recesses; as appears not only from the instances above alledged, but from many others: percolate it with all the care imaginable, filtre it with never so many filtrations, yet some terrestrial matter will remain.—Dr Woodward has filtered water through several sheets of thick paper, and after that, through very close fine cloth, twelve times doubled; and this over and over, and yet a considerable quantity of this matter discovered itself in the water, after all.—Now if it thus passes interstices that are so very small and fine, along with the water, it is the less strange, that it should attend it in its passage through the ducts and vessels of plants: it is true, filtering and distilling the water, intercepts, and makes it quit some of the earthy matter it was before impregnated withal; but then, that which continues with the water after this, is fine and light, and such, consequently, as is, in a peculiar manner, fit for the growth and nourishment of vegetables.—And this is the case of rain-water: the quantity of terrestrial matters it bears up into the atmosphere, is not great; but what it does bear up, is chiefly of that light kind, or vegetable matter, and that too perfectly dissolved, and reduced to single corpuscles, all fit to enter the tubules, and vessels of plants: on which account it is, that this water is so very fertile and prolific.

The reason why all the terrestrial matter mixed with the water, does not ascend into the plant, is, that the mineral matter makes a great deal of it, which is not only gross and ponderous, but scabrous and inflexible; and so not disposed to enter the pores of the roots: besides, a great many of the simple vegetable particles, by degrees, unite, and form small clods, or molecules, which stick to the extremities of the roots of those plants; and others of them, entangled in a looser manner, form the nubeculae, or green bodies so commonly observed in stagnant water: these, when thus conjoined, are too big to enter the pores, or ascend up the vessels of plants; which singly they might have done.

Hence it is, that in agriculture, be the earth never so rich, good, and fit for the production of corn, or other vegetables; little will come of it, unless the parts of it be separated and loose: and it is on this account, such pains are bestowed in the digging, tilling, ploughing, fallowing, harrowing, and breaking the clodded lumps of earth: and it is the same way that sea-salt, nitre, and other salts, promote vegetation.

Some authors imagine nitre essential to plants; and that nothing in the vegetable kingdom is transacted without it: but Dr Woodward assures us, that by all the trials he has been able to make, the thing seems to him quite otherwise: and that when contiguous to the plant, nitre rather destroys than nourishes it.—But nitre, and other salts, certainly loosen the earth, and separate the concreted parts thereof; by that means, fitting and disposing them to be assumed by the water, and carried up into the feed or plant, for its formation and increase.—It is every body's observation, how apt all sorts of salts are to be wrought upon by moisture, how easily they run with it; and when these are drawn off, and have deserted the lumps wherewith they were incorporated, those must moulder immediately, and fall asunder of course: the hardest stone we meet with, if it happen, as it frequently doth, to have any sort of salt intermixed with the sand of which it consists, upon its being exposed to a humid air, in a short time dissolves and crumbles all to pieces; and much more will clodded earth, or clay, which is not of so compact and solid a constitution.

The same way is lime likewise serviceable in vegetation: the husbandmen say, it does not fatten, but only mellows the ground: by which they mean, it doth not contain any thing in itself, that is of the same nature with the vegetable mould, or afford any matter fit for the formation of plants, but merely softens, and relaxes the earth; by that means, rendering it more capable of entering the seeds of vegetables set in it, in order to their nourishment, than otherwise it would have been.—The properties of lime are well known, and how apt it is to be put in a ferment, and commotion by water; nor can such commotion ever happen, when lime is mixed with earth, however hard and clodded that may be, without opening and loosening it.

4°. The plant is more or less nourished, in proportion, as the water in which it stands, contains a greater or smaller quantity of proper terrestrial matter in it.—The truth of this proposition, is discernable through the whole process of this author's experiments.—The mint in one of his glasses, was of much the same bulk and weight with that of two or three others: but the water in which the first was, being river-water, which was apparently stored more copiously than the others with terrestrial matter, than the spring or rain-water, wherein the others stood, occasioned it to ar-

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rive at almost double the bulk that either of them had, and with a less expence of water too: so likewise the mint in another glass, in whose water was dissolved a small quantity of good garden-mould; though it had the disadvantage to be less, when first set, than either of the mints in two other glasses, whose water was the very same with the first, only that it had none of the earth mixed with it; yet, in a short time, the plant not only overtook, but much outstripped the others.

The reason why the proportion of the increase of the plant is limited to the quantity of proper terrestrial matter in the water, is, that all, even vegetable matter, is not proper for the nourishment of every plant: nor do there want good indications, that every kind of vegetable requires a peculiar and specific matter for its formation and nourishment; nay, each part of the same vegetable: and that there are very many and different ingredients to go to the composition of the same individual plant.—If, therefore, the soil wherein any vegetable or feed is planted, contains all, or most of these ingredients, and those in due quantity, it will grow and thrive there; otherwise it will not: if there be not as many sorts of corpuscles, as are requisite for the constitution of the main, and more essential parts of the plant, it will not prosper at all; if there are these, and not in sufficient plenty, it will never arrive to its natural stature: or, if there be any the less necessary and essential corpuscles wanting, there will be some failure in the plant; and it will be defective in taste, smell, colour, or some other way.

Indeed, it is inconceivable how one uniform, homogeneous matter, having its principles, or original parts of the same substance, constitution, magnitude, figure, and gravity, should constitute bodies so unlike in all those respects, as vegetables of different kinds are; nay, even as the different parts of the same vegetable: that one should carry a refinous, another a milky, a third a yellow, a fourth a red juice in its veins; and one afford a fragrant, another an offensive smell; one be sweet to the taste, another acid, bitter, acerb, austere, &c., that one should be nourishing, another poisonous; one purging, another astringent.—And this argument makes equally strong against those who suppose mere water the matter out of which all bodies are formed.—A cataputia in one of the glasses received but little increase, only $3\frac{1}{2}$ grains all the while it stood, though 2501 grains of water were spent upon it: but this might possibly be owing, not to the water's wanting matter fit for the nourishment of that particular plant, but to the water's being an improper medium for it to grow in: too much of that liquor, in some plants, may probably hurry the terrestrial matter through the vessels too fast for them to lay hold of it.

But a farther proof of this doctrine is, that the soil once proper for the production of some sort of vegetable, does not always continue to be so; but, in tract of time, loses its property; and this sooner in some lands, and later in others: If wheat, for example, be sown upon land proper for that grain, the first crop will succeed very well, and perhaps the second, and the third, as long as the ground is in heart, as the farmers call it; but in a few years it will produce no more, if sowed with that corn: some other grain it may, as barley; and after this has been sown so oft, that the land can bring forth no more of it, it may afterwards yield some good oats; and perhaps pease after them.—At length it becomes barren; the vegetative matter that at first it abounded with, being reduced by the successive crops, and most of it born off: each sort of grain takes forth that peculiar matter, that is proper for its own nourishment.

It may be brought to bear another series of the same vegetables; but that not till it is supplied with a new fund of matter, of the like sort with what it first contained; either by the ground's lying fallow for some time, till the rain has poured a fresh stock upon it; or by the manuring it.—That this supply is of the like sort, is evident from the several manures found best to promote the vegetation; which are, chiefly, either parts of vegetables, or of animals: of animals, we say, which either derive their own nourishment immediately from vegetable bodies, or from other animals that do so; in particular, the blood, urine, and excrements of animals; shavings of horn, and hoofs; hair, wool, feathers, calcined shells, lees of wine and beer, ashes of all sorts of vegetable bodies, leaves, straw, roots, and stubble, turned into earth by ploughing, or otherwise, to rot and dissolve there.—These are our best manures; and being vegetable substances, when refunded back again into the earth, they serve for the formation of other like bodies.

The like is observable in gardens, where the trees, shrubs, and herbs, after their continuing in one station, till they have derived thence the greater part of the matter fit for their increase, will decay, and degenerate; unless either fresh earth, or some fit manure be applied to them: it is true they may maintain themselves there for some time, by feeding forth

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roots farther and farther, to an extent all around, to fetch in more provision; but, at last, they must have a fresh supply brought to them, or they themselves must be removed or transplanted to some place better furnished with matter for their subsistence.—And accordingly, gardeners observe, that plants that have stood a long while in a place, have longer roots than usual; part of which they cut off, when they transplant to a fresh soil, as not now of any farther use to them.

All these instances point forth a peculiar terrestrial matter, and not water, for the subject to which plants owe their increase: were it water only, there would be no need of manures, or transplanting; the rain falls in all places, in this field and that, indifferently; and on one side of an orchard or garden, as well as another: nor could there be any reason, why a tract of land should yield wheat one year, and not the next, since the rain showers down alike on each.

5°. Vegetables then are not formed of water, but of a certain peculiar terrestrial matter.—A little distillation shews, that there is a considerable quantity of this matter contained both in rain, spring, and river-water: and the experiments above-mentioned shew, that the much greatest part of the fluid mafs that ascends up into plants, does not settle or abide there, but passes through the pores of them, and exhales into the atmosphere; and that a great part of the terrestrial matter, mixed with the water, passes up into the plant along with it; and that the plant is more or less augmented, in proportion, as the water contains a greater or smaller quantity of that matter: from all which, we may reasonably infer, that earth, and not water, is the matter that constitutes vegetables.

One of the sprigs of mint drew up into it 2501 grains of the fluid mafs, and yet had received but $\frac{3}{4}$ grains of increase from it: a second, though it had at first the disadvantage to be much less than the third, yet, being set in water wherewith earth was plentifully mixed, and the other in water without any such earth, it had vastly outgrown it; weighing, at least, 145 grains more than the former: a fourth plant, though at first a great deal less than the fifth, yet being set in the foul crass-water, that was first in the still, after that in which the last was set was drawn off, had gained in weight, at the end, above double what that in the finer and thinner water had.—The proportion of the augment of that plant which thrived most, was to the fluid mafs spent upon it, but as 1 to 46; in others, as 1 to 60, 100, 200; and in the cataputa, but as 1 to 714.—One of the sprigs took up 39 grains of water a day, one day with another; which was much more than the whole plant weighed originally, and yet it gained not $\frac{1}{4}$ of a grain a day in weight; and another took up 253 grains a day, which was near twice as much as its original weight; and after all, the daily increase of the plant was no more than $\frac{1}{2}$ grains.

6°. Spring and rain-water contain near an equal charge of vegetable matter; and river-water more than either of them.—These proportions hold in the main, but a strict and just comparison is hardly to be expected; inasmuch as in all probability, the water that falls in rain, contains at some times a greater share of terrestrial matter, than that which falls at other times; a more powerful and intense heat, of necessity, hurrying up a larger quantity of that matter, along with the humid vapours that form rain, than one more feeble and remiss possibly can.—The water of one spring may flow forth with an higher charge of this matter, than that of another: this depending partly upon the quickness of the ebullition of the water, and partly upon the quantity of that matter latent in the strata, through which the fluid passes, and the greater or less laxity of those strata: for the same reason the water of one river may abound with it, more than that of another; nay, the same river, when much agitated, and in commotion, must tear up more of it, than when it moves with less rapidity, and violence.—That there is a greater quantity of this matter in rivers, and that it contributes vastly to the ordinary fertility of the earth, we have an illustrious instance in the Nile, the Ganges, and other rivers, that yearly overflow the neighbouring plains: their banks producing the fairest and largest crops of any in the world.

7°. Water serves only for a vehicle to the terrestrial matter which forms vegetables, and does not itself make any addition to them.—Where the proper terrestrial matter is wanting, the plant is not augmented, though never so much water ascend into it: water, then, is not the matter that composes vegetable bodies; it is only the agent that conveys that matter to them, and distributes it to their several parts for their nourishment: that matter is sluggish and inactive, and would lie eternally confined to its beds of earth, without advancing up into plants; did not water, or some like instrument, fetch it forth, and carry it into them.

This fluid is capacitated for the office here assigned it, several ways: by the figure of its parts, which, as appears from many experiments, is exactly and mathematically spherical; their surfaces being perfectly polite, and without any the least

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irregularities. It is evident, corpuscles of such a figure are easily susceptible of motion, and far above any others whatever; and consequently are the most capable of moving and conveying other matter that is not so active: then, the intervals of bodies of that figure, are, with respect to their bulk, of all others, the largest, and so the most fitted to receive and entertain foreign matter in them; besides, as far as the trials hitherto made inform us, the constituent corpuscles of water are each, singly considered, absolutely solid, and do not yield to the greatest external force: this secures their figure against any alteration, and the intervals of the corpuscle, mult, for this reason, be always alike.—By the latter, it will be ever disposed to receive matter into it; and by the former, when once received, to bear it along with it.—Water is farther capacitated to be a vehicle to this matter, by the tenuity and fineness of the corpuscles of which it consists: we hardly know any fluid in all nature, except fire, whose constituent parts are so exceeding subtle, and small, as those of water are: they will pass pores and interstices, that neither air, nor any other fluid will.—This enables them to enter the finest tubes and vessels of plants, and to introduce the terrestrial matter, conveying it to all parts of them: whilst each, by means of organs it is endowed with for the purpose, intercepts, and assumes into itself such particles, as are suitable to its own nature, letting the rest pass on through the common ducts.

8°. Water is not capable of performing this office to plants, unless assisted by a due quantity of heat.—This must concur, or vegetation will not succeed.—The plants set in the glasses in October, and the following colder months, had not near the quantity of water sent up into them, or so great an additional increase by much, as those that were set in June, July, and the hotter months.—It is plain, water has no power of moving itself, or rising to the vast height it does, in the more tall and lofty plants; so far from it, that it doth not appear from any discovery yet made, that even its own fluidity consists in the intestine motion of its parts, whatever the Cartesians think.—Indeed, we need nothing more to solve all the phenomena of fluidity, than such a figure, and disposition of parts, as water has: spherical corpuscles must stand so very ticklish upon each other, as to be susceptible of every impression; and though not perpetually in motion, they must be always ready and liable to be put into it, by any the slightest force imaginable: it is true, the parts of fire, or heat, are not capable of moving themselves, any more than those of water; but they are more subtle, light, and active, than those are, and so are more easily put into motion.

That the concurrence of heat in this work is really necessary, appears not only from the experiments before us, but from all nature; from the fields and forests, gardens and orchards: we see in autumn, as the sun's power is gradually less and less, so its effect on plants is remitted, and vegetation slackens by little and little.—Its failure is first discernible in trees; which being raised highest above the earth, require a more intense heat, to elevate the water, charged with nourishment, to their tops; so that for want of fresh support and nutriment, they shed their leaves, unless secured by a firm and hard constitution indeed, as our ever-greens are: next, the shrubs part with theirs; and then the herbs, and lower tribes: the heat, being, at length, not sufficient to supply even these, though so near the earth, and the fund of their nourishment.—As the heat returns the succeeding spring, they all recruit again, and are furnished with fresh supplies and verdure: but first, those which are lowest and nearest the earth, and that require a lesser degree of heat to raise the water with its earthy charge into them: then the shrubs, and high vegetables, in their turns; and lastly, the trees.—As the heat increases, it grows too powerful, and hurries the matter with too great rapidity, through the finer and more tender plants; these, therefore, go off, and decay; and others that are more hardy and vigorous, and require a greater degree of heat, succeed in their order.—By which mechanism, provident nature furnishes us with a very various and differing entertainment; and what is best suited to each season all the year round.

As the heat of the several seasons affords us a different face of things, so the several distant climates shew the different scenes of nature, and productions of the earth.—The hotter countries ordinarily yield the largest and tallest trees, and those, too, in a much greater variety than the colder; even those plants common to both, attain to a much greater bulk in the southern, than the northern climes: nay, there are some regions so cold, that they raise no vegetables at all to any considerable size; this we learn from Greenland, Iceland, and other places of like cold situation and condition: in these there are no trees, and the shrubs are poor, little, and low.—Again in the warmer climates, and such as do nourish trees, and the large vegetables, if there happen a remission, or diminution of the usual heat, their productions are always impeded in proportion: our cold summers give us proof enough of this; for though, at such times, the heat

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we have is sufficient to raise the vegetative matter into the lower plants, our corns, wheat, barley, peas, and the like; and we have plenty of strawberries, raspberries, gooseberries, currants, and the fruits of such vegetables as are low and near the earth, and a moderate store of cherries, mulberries, plums, &c. and some others that grow at somewhat greater height; yet our apples, pears, walnuts, and the productions of the taller trees, have been fewer, and those not so thoroughly ripened, and brought to that perfection, as they are in more benign and warm seasons: and indeed, in trees of the same kind, those that keep close to the earth, always produce the most and best fruit: for which reason it is, that the gardeners check and restrain the growth of their better fruit-trees, and prevent their running up to too great a height. — As to our grapes, apricots, peaches, nectarines, and figs, they being transplanted hither out of hotter countries, it is the less wonder we have a failure of them in cold summers. — Nor is it the sun, or the ordinary emission of the subterranean heat only, that promotes vegetation, but any other indifferently, according to its power and degree; as we find from our stoves, and hot-beds.

VEGETATIVE, VEGEATIVUS, a term applied to that principle, or part in plants, by virtue whereof they receive nourishment, and grow, or vegetate.

The philosophers speak of three kinds of souls, the *vegetative*, *sensitive*, and *rational*.

The *vegetative* soul, is that principle whereby trees and plants live, grow, and produce their kinds.

This *vegetative* principle is differently seated in different plants: an ingenious author observes, that generally speaking, its place is exactly between the trunk, and root; at least, this appears to be the place in most of the annual tribe; which, if cut down near this place, rarely shoot again.

In other vegetables, as the elm, and many edible plants, it seems to reside wholly in the roots; which, if cut into ever so many parts, yet, those being planted in the ground, soon grow.

In others, as the willow kinds, it seems to be diffused all over, both root, trunk, and branches; inasmuch, that if cut into a thousand pieces, there is no destroying them without splitting them in the middle; and scarcely then.

Lastly, in others, as the cereus's, ficus's, &c. it is seated in the body, branches, and leaves; any of which being put into the ground, strike root immediately, and grow.

The office of this *vegetative* principle, is to concoct the indigested earth and salts which ascend through the roots; and to assimilate them to the nature of the plant.

VEHICLE, VEHICULUM, in its literal sense, signifies somewhat that carries, or bears a thing along. See **CARRIAGE, WAGON, WHEEL, &c.**

Thus, in anatomy, the serum is said to be the *vehicle* that conveys the globules of the blood.

In pharmacy, any liquid serving to dilute another with, or to administer it in, more agreeably to a patient, is called a *vehicle*.

Water is thus the *vehicle* of the nutritious matter of vegetables.

VEIL, VELUM, a piece of stuff, serving to hide, or prevent the sight of any thing.

In this sense, we read of a large *veil*, or curtain, in the temple of Jerusalem, miraculously rent at the passion of our Saviour. — In the Romish churches, in time of Lent, they have *veils*, or curtains over the altar, crucifix, images of the saints, &c.

VEIL, is also used for a large piece of crape, wore on the head by nuns; as the badge of their profession. — Whence, to *take the veil*, signifies to commence religious. The novices wear white *veils*; and those who have made the vows, black ones.

The prelate before whom the vows are made, blesses the *veil*, and gives it the religious.

VEIN, VENA, in anatomy, a name given to several vessels, or canals, which receive the blood from the divers parts of the body, to which the arteries had conveyed it from the heart; and carry it back to the heart again. — See *Tab. Anat. (Angiol.)* fig. 6, 7.

The *veins* are only a continuation of the extreme capillary arteries, reflected back again towards the heart.

In their progress, uniting their channels as they approach the heart, they, at last, all form three large *veins*, or trunks, *viz.* The *vena cava descendens*; which brings the blood back from all the parts above the heart. — The *vena cava ascendens*; which brings the blood from all the parts below the heart. — And the *porta*, which carries the blood to the liver.

The anastomosis, or inoculation of the *veins* and arteries, was first seen by the microscope, in the feet, &c. of frogs, and other amphibious animals, by Leewenhoeck; but has since been observed in other animals, particularly the omentum of a cat, by Mr Cowper, &c.

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The coats of the *veins* are four, the same with those of the arteries; only the muscular coat is thin in all the *veins*, as it is in the capillary arteries; the pressure of the blood against the sides of the *veins*, being less than that against the sides of the arteries, because the force of the heart is much broke in the capillaries. — See *Tab. Anat. (Angiol.)* fig. 7. a. a. b. b. c. c. d.

In the *veins* there is no pulse, because the blood is thrown into them with a continual stream, and because it moves from a narrow channel to a wider. — But they have a peristaltic motion, which depends on their muscular coat.

The *capillary veins* unite with one another, as has been said of the capillary arteries; only their course is directly opposite to that of those: for instead of a trunk distributed into branches and capillaries, a *vein* is a trunk, formed out of a concurrence of capillaries.

In all the *veins*, which are perpendicular to the horizon, excepting those of the uterus, and the porta, there are small membranes, or valves; sometimes there is only one, sometimes there are two, and sometimes three, placed together, like so many half thimbles stuck to the sides of the *veins*, with their mouths towards the heart.

These, in the motion of the blood towards the heart, are pressed close to the sides of the *vein*; but shut the *veins*, against any reflux of the blood that way from the heart, and thereby they sustain the weight thereof in the great trunks.

The *veins* are distinguished, with respect to their situation, into *superior*, and *inferior*, *ascending*, and *descending*; *right*, as the mesenteric, and *left*, as the splenic branch; *internal*, as the basilica; and *external*, as the humeral.

Many of them, likewise, acquire denominations from the parts wherein they are found; as, the *jugulars*, *phrenic*, *renal*, *iliac*, *hypogastric*, *epigastric*, *axillary*, *crural*, *umbilical*, *sciatica*, *saphena*, *mediana*, *cephalic*, *thoracic*, *subclavian*, *intercostal*, *coronal*, *diaphragmatic*, *haemorrhoidal*, *corvidal*, *thymal*, *mammillary*, *gastric*, *stomachic*, *epiploic*, *splenic*, &c.

They are also distinguished, from their particular offices, into *spermatic*, *emulgent*, &c. all which see exhibited in *Tab. Anatom. (Angiol.)* — and their particular descriptions under their proper articles.

VEIN is also applied to the streaks, or waves of divers colours, appearing on several sorts of woods, stones, &c. as if they were really painted; and which the painters frequently imitate in painting wainscots, &c.

Marble is generally full of such *veins*.

Lapis lazuli has *veins* like gold — Ovid, speaking of the metamorphoses of men into stones, says — *Lucæ mæo vena fuit, sub eodem nomine manifest*.

Veins, in stones, are often a defect, proceeding usually from an inequality in their consistence, as to hard, and soft; which makes the stone crack, and shiver in those parts.

VEIN is also applied, in the same sense with *stratum*, to the various dispositions and kinds of earth met withal in digging.

Thus, we say, a *vein* of sand, another of rock, &c. a *vein* of ochre, vitriol, allom, calamine, coal, &c. — Mineral waters acquire their different qualities, by passing through *veins* of vitriol, sulphur, &c.

In the same sense, we say, a *vein* of gold, silver, quicksilver, &c. meaning certain parts of the earth, wherein the ore or globe of those metals is found; and which is distributed into divers branches, like the *veins* in the body.

Tavernier gives us a description of the *veins* in the diamond mines in Golconda, with the manner of digging them.

In digging of coal-pits, they meet with a variety of *veins*, the order, &c. of which, is different, in different places: in the *Philosophical Transactions*, No. 360. the *veins* in those famous coal-mines at Mendip, in Somersetshire, are observed to be, (below the turf, or loam, or malm,) a reddish fire-stone; the coal clives, which is blackish rock, the *sinking vein*, a hard coal for mechanic uses; five feet below which, is the *cathead vein*, 22 feet thick, intermixed with lumps of stone; at a like distance below which, is the *three-coal vein*, divided into three kinds of coal, and about three feet thick.

The *veins* hitherto mentioned, are frequently worked in the same pit. — The next is the *peaw vein*, which is intermixed with cockle-shells, and fern-branches, usually wrought in a separate pit: though its depth below the *three-coal vein* be only about five feet, yet the cliff between is very hard, and liable to water: this *vein* is about a yard thick; and at the like distance below it, is the *Smith's-coal vein*: beneath which, is the *shelly vein*; and under that, a *vein* of 10 inches, which is little worth, and seldom wrought.

The same *veins* are found in a place 7 or 8 miles distant. — All the *veins* lie obliquely, or shelving, like the side of a house: the obliquity, or *pitch*, as they term it, is about 22 inches in a fathom; which, when it rises to the land, is called *crop*, and in some places *buffing*.

In digging to the south-west, they oft met with ridges, which cause the *vein* to *trap up*; i. e. being cut off by the ridges, they

they find it over their heads, when they are through the ridge: on the contrary, working through a ridge to the north-east, they say, it *traps down*, i. e. they find it under their feet.

VEJOURS, VISORES, in law, are persons sent by the court, to take view of any place in question, for the better decision of the right.

It is also used for those sent to view such as effoin themselves *de malo lecti*; whether, in truth, they be such as that they cannot appear, or whether they counterfeit.

VELAMEN, is used by some surgeons, for the bag, skin, or bladder of an imposthume, or swelling.

VELAMENTUM *Bombycinum*, a name which some anatomists give to the velvet membrane, or inner skin of the intestines.

VELARIUS, in antiquity, an officer in the court of the Roman emperors; being a kind of usher, whose post was behind the curtain, *vela*, in the prince's apartment; as that of the chancellors, *cancelli*, was at the entry of the balustrade; and that of the *esiaril* at the door.

The *velarii* had a superior, of the same denomination, who commanded them; as we find in two inscriptions, quoted by Salmatus, in his notes on Vopiscus; and by a third in Gruter.—The first is,

D. M.
T. CL. HALLUS
PRÆPOSITUS VELARIORUM
DOMUS AUGUSTANÆ
FEC. SIBI ET FILIIS SUI L. L.
POST. EORUM.

Salmatus, and others, for HALLUS, which is in the stone whereon the inscription is at Rome, put THALLUS: though we find mention of the same Hallus, as a Samaritan by nation, and Tiberius's freedman, in Josephus; which shews that the *velarii*, and their chief, were very ancient officers, and in use among the first emperors.

VELITES, in the Roman army, a kind of ancient soldiery, who were armed lightly with a javelin, a cask, cuirass, and shield.

VELLEITY, VELLEITAS, in the school philosophy, is usually defined a languid, cold, and remiss will.

Others say, it implies an impotency of obtaining what we require.—Others will have it, a slight desire for something, which a person does not matter much, or is too indolent to seek: *as, catus amat piscem, sed non vult tangere lympham.*

VELLICATION, among physicians, the act of twitching.—The word is more particularly applied to a sort of sudden convulsions, that happen to the fibres of the muscles.

VELOCITY, in mechanics, *swiftness*; that affection of motion, whereby a moveable is disposed to run over a certain space in a certain time.

It is also called *celerity*; and is always proportional to the space moved.—The greatest velocity wherewith a ball can descend, by virtue of its specific weight, in a resisting medium, is that which the same ball would acquire by falling in an unresisting medium, through a space which is to four thirds of its diameter, as the density of the ball to the density of the fluid.

Huygens, Leibnitz, Bernoulli, Wolfius, and the foreign mathematicians, hold, that the momenta, or forces of falling bodies, at the end of their falls, are as the squares of their velocities into the quantity of matter; the English mathematicians, on the contrary, maintain them to be as the velocities themselves, into the quantity of matter.

Velocity is conceived, either as *absolute*, or *relative*: the velocity we have hitherto considered, is *simple*, or *absolute*, with respect to a certain space, moved in a certain time.

Relative, or *respective* velocity, is that wherewith two distant bodies approach each other, and come to meet in a longer, or less time: whether only one of them moves, towards the other at rest, or whether they both move; which may happen two ways; either by two bodies naturally approaching each other in the same right line, or by two bodies moving the same way in the same line, only the foremost slower than the other; for by this means, this will overtake that. And, as they come to meet, in a greater or less time, the *relative* velocity will be greater or less.

Thus, if two bodies come nearer each other by two feet, in one second of time; their respective velocity is double that of two others, which only approach one foot in the same time.

VELOCITIES of bodies moving in Curves—According to Galileo's system of the fall of heavy bodies, which is now admitted by all philosophers, the velocities of a body falling vertically, are, each moment of its fall, as the roots of the heights from whence it has fallen; reckoning from the beginning thereof. Hence that author gathered, that if a body fall along an inclined plane, the velocities it has at the different times, will be in the same ratio: for since its velocity

is all owing to its fall, and it only fall as much as there is perpendicular height in the inclined plane; the velocity should be measured by that height, as much as if it were vertical.

The same principle, likewise, led him to conclude, that if a body fall through two contiguous inclined planes, making an angle between them, much like a stick when broke, the velocity would be regulated after the same manner, by the vertical height of the two planes taken together: for it is only this height that it falls; and from its fall it has all its velocity.

This conclusion was universally admitted, till the year 1693, when M. Varignon demonstrated it to be false: from his demonstration, it should seem to follow, that the velocities of a body falling along the cavity of a curve, for instance, of a cycloid; ought not to be as the roots of the heights; since a curve is only a series of an infinity of infinitely little contiguous planes, inclined towards one another. So that Galileo's proposition would seem to fail in this case too, and yet it holds good; only with some restriction.

All this mixture of truths and errors, so near akin to each other, shewed that they had not got hold of the first principle; M. Varignon, therefore, undertook to clear what related to the velocities of falling bodies; and to set the whole matter in a new light: he still supposes Galileo's first system, that the velocities, at the different time of a vertical fall, are as the roots of the correspondent heights.—The great principle he makes use of to attain his end, is that of compound motion.

If a body fall along two contiguous inclined planes, making an obtuse angle, or a kind of concavity between them; M. Varignon shews, from the composition of those motions, that the body, as it meets the second plane, loses somewhat of its velocity; and, of consequence, that it is not the same at the end of the fall, as it would be, had it fell through the first plane prolonged: so that the proportion of the roots of the heights asserted by Galileo, does not here obtain.

The reason of this loss of velocity, is, that the motion, which was parallel to the first plane, becomes oblique to the second, since they make an angle: this motion, which is oblique to the second plane, being conceived as compounded, that part perpendicular to the plane, is lost, by the opposition thereof, and part of the velocity along with it: consequently, the less of the perpendicular there is in the oblique motion, or, which is the same thing, the less the two planes are from being one, i. e. the more obtuse the angle is, the less velocity does the body lose.

Now, all the infinitely little, contiguous, inclined planes, wherof a curve consists, making infinitely obtuse angles among themselves, a body falling along the concavity of a curve, the loss of velocity it undergoes each instant, is infinitely little: but a finite portion of any curve, how little soever, consisting of an infinity of infinitely little planes, a body moving through it, loses an infinite number of infinitely little parts of its velocity: and an infinity of infinitely little parts, makes an infinity of a higher order, i. e. an infinity of infinitely little parts makes a finite magnitude, if they be of the first order, or kind; and an infinitely little quantity of the first order, if they be of the second; and so in infinitum.—Therefore, if the losses of velocity of a body falling along a curve, be of the first order, they will mount to a finite quantity in any finite part of the curve, &c.

The nature of every curve is abundantly determined, by the ratio of the ordinates, to the correspondent portions of the axis; and the essence of curves in general may be conceived as consisting in this ratio, which is variable a thousand ways.—Now this same ratio will be likewise that of two simple velocities, by whose concurrence a body will describe any curve: and, of consequence, the essence of all curves in the general, is the same thing as the concurrence, or combination of all the forces, which, taken two by two, may move the same body.—Thus we have a most simple, and general equation, of all possible curves, and of all possible velocities.

By means of this equation, as soon as the two simple velocities of a body are known, the curve, resulting from them, is immediately determined.—It is observable, that on the foot of this equation, an uniform velocity, and a velocity that always varies according to the roots of the heights, produce a parabola, independent of the angle made by the two projectile forces that give the velocities: and consequently, a cannon ball, shot either horizontally, or obliquely to the horizon, must always describe a parabola.—The best mathematicians, hitherto, had much ado to prove, that oblique projections formed parabolas, as well as horizontal ones.

To have some measure of velocity, the space is to be divided into as many equal parts, as the time is conceived to be divided into: for the quantity of space, corresponding to that division of time, is the measure of the velocity.

For an instance; suppose the moveable A, (Tab. Mechanics, fig. 40.) travel a space of 80 feet, in 40 seconds of time;

13 E dividing

dividing 60 by 40, the quotient 2 shews the *velocity* of the moveable to be such, as that it passes over an interval of two feet in one minute: the *velocity*, therefore, is rightly expressed by 2; that is, by 2. Suppose, again, another moveable B, which, in 30 seconds of time, travels 90 feet; the index of the celerity will be 3. Wherefore, since in each case the measure of the space is a foot, which is supposed every where of the same length; and the measure of time a second, which is conceived every where of the same duration: the indices of the *velocities* 2 and 3, are homogenous: and therefore, the *velocity* of A, is to the *velocity* of B, as 2 to 3. Hence, if the space be $=f$, and the time $=t$, the *velocity* may be expressed by $f:t$; the space being in a ratio of the time, and the *velocity*. See MOTION.

Circular VELOCITY. } See the article { CIRCULAR.
Measure of VELOCITY. } MEASURE.
VELOCITY of Wind, of Light, Sound, &c. See WIND,
LIGHT, SOUND, &c.
VELOM*, a kind of parchment, finer, evenner, and whiter, than the common parchment.

* The word is formed from the French *velin*, of the Latin *velidinus*, belonging to a calf.

Abortive VELUM. See the article ABORTIVE.

VELVET*, a rich kind of stuff, all silk, covered on the outside with a close, short, fine, soft flage; the other side being very strong, and close.

* The word is formed of the French *velours*, which signifies the same; and which comes from *velus*, a thing covered with hair.

The nap or flage, called also the *velveting*, of this stuff, is formed of part of the threads of the warp, which the workman puts on a long narrow channelled ruler, or needle; and which he afterwards cuts, by drawing a sharp steel tool along the channel of the needle, to the ends of the warp. The principal and best manufactories of *velvet* are in France and Italy, particularly at Venice, Milan, Florence, Genoa, and Lucca: there are others in Holland, set up by the French refugees; whereof, that at Haerlem is the most considerable: but the *velvets* of these all come short of the beauty of those of France; and, accordingly, they are sold for 10 or 15 per cent. less.—There are also some brought from China, but they are the worst of all.

There are *velvets* of various kinds, as—*plain*, that is, uniform and smooth, without either figures or stripes.

Figured VELVET, that is, adorned and worked with divers figures; though the ground be the same with the figures; that is, the whole surface *velveted*.

Ramage, or branched VELVET, representing long stalks, branches, &c. on a satin ground, which is sometimes of the same colour with the *velvet*, but more usually of a different one.—Sometimes, instead of satin, they make the ground of gold and silver; whence the denominations of *velvets with gold ground*, &c.

Shorn VELVET, is that wherein the threads, that make the *velveting*, have been ranged in the channelled ruler, but not cut there.

Striped VELVET, is that wherein there are stripes of divers colours, running along the warp; whether those stripes be partly *velvet*, and partly satin, or all *velveted*.

Cat VELVET, is that wherein the ground is a kind of taffety, or gros de Tours, and the figures *velvet*.

Velvets are likewise distinguished, with regard to their different degrees of strength and goodness, into *velvets* of four threads, three threads, two threads, and a thread and half: the first are those where there are eight threads of flage, or *velveting*, to each tooth of the reed; the second have only six, and the rest four.

In general, all *velvets*, both worked and cut, shorn and flowered, are to have their warp and flage of organin, spun and twisted, or thrown in the mill; and their woof of silk well boiled, &c. They are all of the same breadth.

VENA VEIN, in anatomy. See the article VEIN.

VENA Cava. See the article CAVA.

VENA Porta, &c.—See Tab. Anat. (Splanchn.) fig. 5. lit. i; see also the article PORTA, &c.

VENA Pulmonis. See the article PULMONARY.

VENÆ-SECTIO, the opening of a vein; called also *phlebotomy*; and popularly, *bleeding*. See PHLEBOTOMY, &c.

VENÆ Lactææ.

VENÆ Lymphaticæ, &c. } See the article { LACTEAL.
LYMPHATIC.
VENÆ Præputii, &c. } PREPUCE.

VENAL, or **VENOUS**, among anatomists, something that bears relation to a vein. See VEIN.

The extremities of the cava and pulmonary veins, where they enter the arteries of the heart, are called *venous sinu*s.

VENAL*, **VENALIS**, is also used for something bought with money, or procured by bribes.

* The word is formed from the Latin, *venalis*, to be sold.

Thus, we say, *venal* bards; courtizans, and flatterers are *venal*; even justice in Turkey is *venal*; and must be bought of the bawfaws.

In England, there are several offices in the revenue, policy, &c. *venial*: but this *venality* of offices is no where so considerable, as in France; where all offices of judicature are bought of the king, and only municipal officers are elected. Offices, in England, are *venal* only by a kind of connivance; in France, it is a thing solemn, and authorized.—The *venality* was first introduced by Louis XII. who, to clear those immense debts contracted by his predecessor Charles VIII. without burthening his people with new taxes, betought himself to sell the offices; and, in reality, he made a vast sum thereby.

Francis I. made an advantage of the same expedient to get money, and fold his posts openly: under this king, it was only accounted a kind of loan; but that loan was no more than a name to disguise a real sale.—The parliament not being able to relish the *venality* of offices, always made the buyer take an oath, that he did not buy his post, either directly or indirectly; but there was a tacit exception made, of monies lent the king for being put into them.—At length, the parliament finding its oppositions were in vain, and that the traffic of offices were publicly authorized, abolished the oath in 1597.

VENDEE, in law, the person to whom any thing is sold; in contradistinction to *venditor*, or the seller.

VENDITIONI Expositus, is a judicial writ, directed to the sheriff; commanding him to sell goods, which he has formerly, by commandment, taken into his hands; for the satisfying a judgment given in the king's court.

VENERING, VANEERING, or FINERING, a kind of marquetry, or inlaying; whereby several thin slices, or leaves of fine wood, of different kinds, are applied and fastened on a ground of some common wood.

There are two kinds of inlaying; the one, which is the more ordinary, goes no further than the making of comparisons of different woods; the other requires a deal more art, and represents flowers, birds, and the like figures.

The first kind is what we properly call *venering*; the latter we have already described under the article MARQUETRY. The wood intended for *venering*, is first sawed out into slices or leaves about a line thick: in order to saw them, the blocks or planks are placed upright, in a kind of sawing-press:—The description whereof may be seen under the article Press.

These slices are afterwards cut into narrow slips, and fashioned divers ways, according to the design proposed: when the joints being carefully adjusted, and the pieces brought down to their proper thickness, with several planes for the purpose; they are glued down on a ground, or block of dry wood, with good strong English glue.

The pieces thus joined and glued, the work, if small, is put in a press; if large, it is laid on the bench, covered with a board, and pressed down with poles, or pieces of wood, one end whereof reaches to the ceiling of the room, and the other bears on the boards.

When the glue is quite dry, they take it out of the press, and finish it; first with little planes, then with divers scrapers; some whereof resemble rasps, which take off dents, &c. left by the planes.

When sufficiently scraped, the work is polished with the skin of a sea-dog, wax, and a brush and polisher of shave grass: which is the last operation.

VENELLIS. See VICIS & *Venellis mundandis*.

VENEREAL, something belonging to *Venus*. See VENUS.

A *venereal* person, is one addicted to *venery*, or *venereal* pleasures.—*Venereal* medicines, are called *aphrodisiacs*, *procreantives*, &c.

VENEREAL Disease, Lues VENEREA, the French *disease*, *soil disease*, *French pax*, or *great pax*, is a contagious malady, contracted by some impure humour, generally received in coition; and discovering itself in ulcers and pains about the genital and other parts.

It is usually said to have made its first appearance in Europe in the year 1493; though others will have it much older, and contend for its being known to the ancients, only under other names.

Mr Becket, particularly, has attempted to shew, that it is the same with what among our forefathers was called the *le-prosy*; and which, in many of our ancient English writings, chaisters, &c. is called *burning*, or *burning*.

In order to prove his point, he has searched the records relating to the stewards anciently kept on the Bankside, Southwark, under the jurisdiction of the bishop of Winchester. Among other constitutions of these stewards, dated 1162, it was appointed, "That no stew-holder should keep any woman "that hath the perilous infirmity of BURNING." And in another vellum manuscript, now in the custody of the bishop of Winchester, dated 1430, it is again ordered, "That no

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"stew-holder keep any woman within his house that hath any sickness of **BRENNING**, but that she be putte out, upon the payne of making a fine unto the lord of a hundred shillings."

To confirm this account, Mr Becket quotes a description of the disease from a manuscript of John Arden, Esq; surgeon to king Richard II. and king Henry IV. Arden defines the disease called *brønning, incendium*, to be a certain inward heat and excoriation of the urethra: which definition, Mr Becket observes, gives us a perfect idea of what we now call a *clap*; agreeable to the latest and most exact anatomical discoveries, and free of all the errors of Platerus, Rondeletius, Bartholin, Wharton, and other later writers on this disease.

As to the leprosy being the same with this *venereal disease*, it must be owned, there are a good many symptoms in the one disease, which quadrate well enough with those in the other; but then the symptoms in each are so precarious, that a great deal of stress cannot be laid hereon.

The common tradition is, that the *venereal disease* first broke out in the French army, when it lay encamped before Naples; and that it was owing to some unwholesome food: on which account, the French call it the *Neapolitan disease*; and the Italians, the *mal Francefe*.

But others go much higher, and suppose this to be the ulcers Job complained of so grievously: and accordingly, in a *Misfat* printed at Venice in 1542, there is a mass in honour of S. Job, to be said by those recovered of this disease; as being supposed to owe their deliverance to his intercession.

But the opinion which prevails most among the more knowing of our physicians, is, that the disease is of Indian extraction; and that it was brought hither by the Spaniards from the American Islands, where it was very common, before ever the Spaniards set footing there: whence the Spaniards call it *farva des Indios*, or *las bubas*: notwithstanding what Herrera says, that the Spaniards carried it to Mexico, instead of bringing it thence.

Lifter, and some others, take it to have had its first rise from some of the serpentine kind; either from a bite thereof, or from some of their flesh taken as food: this is pretty certain, that men bitten or stung by scorpions, are greatly eased by coition; but the woman, Pliny assures us, receives a great deal of damage thereby: which they think no slender argument of the disease's arising from some person so poisoned. Lifter adds, there is no room to doubt, but that the lues arose from some such cause; for upon any venomous bite, the penis becomes vehemently extended, and the patient being seized with a satyricalis, breathes nothing but rage, and lust: nature, in effect, seeming to direct him to coition for a remedy.

But what proves a remedy to the wounded person, proves a disease to the woman: and from women thus infected, other men, who have to do with them, they say, become infected in their turns; and thus has the disease been propagated.

The first symptoms generally arising after an affair with an infected person, are a heat, swelling, and inflammation about the penis, or vulva, with a hotness of urine.

The second or third day usually brings on a gonorrhœa, or dripping, which denominates it a *clap*; and which, in a few days more, is followed by a chordee.

Though sometimes there is no gonorrhœa, or clap; but the poison rather makes its way, through the cutis, to the groin; and there raises buboes, with various malignant pustules in all parts of the body. See **BUBO**.

Sometimes, also, there happen callous ulcers, called *shankers*, in the scrotum and perinæum; and sometimes a cancerous and callous ulcer between the prepuce and glans; and in some the testicles swell.

Add to these, violent nocturnal pains, nodes, heats in the palms of the hands, and soles of the feet; and hence fissures, excoriations, condylomata, &c. about the anus; falling of the hair; ruddy, yellow, or livid spots; hoarseness, relaxation, and erosion of the uvula, ulcers of the palate, oxtana, tingling of the ears, deafness, blindness, itch, consumption, &c.—But it is rare that all these symptoms happen to the same person.

The *venereal disease*, Sydenham observes, is communicated by copulation, lactation, handling, saliva, sweat, the genital mucus, and the breath: and in whatever part it is received, it there discovers itself first.—Thus when the infection is received along with the milk from the nurse, it commonly shews itself in soreness and ulcers of the mouth.

The method of cure is various, according to the various symptoms and stages: for the first stage, viz. a gonorrhœa virulenta, or clap—

Dr Pitcairn's method is this:—After two or three vomits, he directs mercurius dulcis, for some days, twice a day; when the mouth grows sore, let alone the mercury for three or four days, and purge every other day. As the mouth grows well again, repeat the use of mercury; and thus alternately, till the symptoms cease.

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For a confirmed lues, mercurial salivation is generally held the only effectual cure: though mercurial frictions, applied in such quantity, and at such intervals as not to raise a salivation, are held by some to be not only easier and safer, but even more successful, in this disease, than salivation itself.

Dr Sydenham tells us, he used to salivate immediately, without any preliminary evacuation, or preparation of the body at all.—His method was this: he prescribes an unguent of two ounces of axung. porcin. i. e. hogs lard, and one ounce of mercury. With a third part of this, he orders the patient to anoint his arms and legs, for three nights successively, with his own hands; so as not to touch either the arm-pits, the groin or the abdomen.—After the third unction, the gums usually swell, and a pytalism comes on.—If it does not come in this time, he directs turbith mineral eight grains in conserve of red roses; which occasioning a vomiting, soon raises the pytalism.—And if, afterwards, the salivation abate, before the symptoms are quite disappeared, he orders it to be promoted with a fresh dose of mercurius dulcis.—The diet, and other regimen, is to be the same as in a catharris.

VENERIS Oestrum, the stimulus or incentive of venery; is an appellation given, by some anatomists, to the clitoris. See **CLITORIS**.

VENERIS Oestrum, is also used by others for the transport of love, or the utmost ecstasy of desire, or enjoyment in coition.

Some are of opinion, that infectious women are the most apt to communicate the poison, when they are thus excited with desire; whereas, with indifference, they may admit the same intercourse, without giving the infection.

VENERIS Ens. See the article **ENS**.

VENERY *, is used for the act of copulation, or coition, of the two sexes.

* It takes its name from *Venus*, the supposed deity of the passion of love.

VENERY, also denotes the arts or exercise of hunting wild beasts; which are also called *beasts of venery*, and *beasts of forest*.

Such are the hare, hart, hind, boar, and wolf. See **BEAST**.

VENEW. See the article **VENEW**.

VENIA *, among our antient writers, denotes a kneeling, or low prostration to the ground; used by penitents. See **GENUFLEXION**.

* Walsingham, p. 196. *Rege interim prostrato in longa venia. — Per venias centum verrant barbae pavimentum.*

VENIAL, a term in the Romish theology, applied to slight sins, and such as easily obtain pardon.

In confessing to the priest, people are not obliged to accuse themselves of all their *venial* sins.—The thing that gives the greatest embarrass to the Romish casuists, is to distinguish between *venial* and mortal sins.

The Reformed reject this distinction of *venial* and *mortal* sins; and maintain, that all sins, how grievous soever, are *venial*; and all sins, how slight soever, may be mortal: And the reason they urge is, that all sins, though of their own nature mortal, yet become *venial*, or pardonable, by virtue of our Saviour's passion, to all such that fulfil the conditions on which it is offered in the gospel.—To which the Romanists answer, That the chief of these conditions is confession.

VENIRE Facias, in law, is a judicial writ, lying where two parties plead, and come to issue; directed to the sheriff, to cause twelve men of the same neighbourhood to meet to try the same, and say the truth upon the issue taken.

If this inquest come not at the day of the writ returned; then shall go an *habeas corpus*, and after that a *diffess*, until they come.

VENIRE Facias tot Matronas. See **VENTRE Infipiendo**.

VENISON *, **VINAISON**, the flesh of beasts of game, or of animals to be caught in the way of game, i. e. by hunting, &c. as deer, hare, &c.

* The word is French, *venaison*; formed of the Latin *venari*, hunting. See **HUNTING**.

Beasts of VENISON. See the article **BEAST**.

VENOM, **VENENUM**. See the article **POISON**.

The terms *venom* and *poison* only differ from each other in this, that the latter is more frequently used where the noxious matter is taken inwardly, as in foods, drinks, &c. and the former, where it is applied outwardly, as in stings and bites of serpents, scorpions, vipers, spiders, &c.

The pike is said to have a *venomous* tooth.—All *venomous* beasts in the general, have that quality in a greater degree, when bred in mountainous and dry places, than when in wet and marshy places; and the southern more than the northern; those hungry and enraged, more than others; and all of them in summer more than winter. See **VIPER**.

VENOUS, **VENEUS**. See the article **VENA**.

VENOUS Artery, *Arteria VENOSA*. See ARTERY.

VENT *, *VENI-HOLE*, or *Spiracle*, a little aperture left in the tubes, or pipes of fountains, to facilitate the air's escape; or, on occasion, to give them air; as in frosty weather, &c. for want of which they are apt to burst.

* The word is formed from the Latin *ventus*, wind.

A *vent*, taken in this sense, is properly the end of a pipe, placed erect, and reaching above the ground; usually folded to the turns, or elbows of pipes.—The *vents* of large pipes, are to be as high as the superficies of the reservoir; unless there be a valve in them.

VENT is also used for a little hole, pierced in vessels of wine, beer, &c. that are on tap; and which admits air enough to make the liquor run, but not so much as to corrupt and spoil it.

VENT, again, is applied to the covers in wind-furnaces, whereby the air enters, which serves them for bellows; and which are stopped with registers, or flices, according to the degree of heat required; as in the furnaces of glass-houses, essayers, &c.

VENT is also used for a pipe of lead, or other matter; one end whereof opens into the cell of a necessary house, and the other reaches to the roof of the house; to give room for the corrupt fetid air to exhale.

There are also *vents*, or apertures made in the walls which sustain terraces, to furnish air, and give a passage for the waters.

This kind of *vent* the Italians, and we from them, call a *barbacane*.

Port-VENT. See the article PORT-VENT.

VENTER, *Belly*, in anatomy, a cavity in the body of an animal, containing viscera, or other organs, necessary for the performance of divers functions.

Physicians divide the human body into three *venters*, regions, or cavities; the first, the *head*, containing the brain, &c. See HEAD, and BRAIN.

The second, the *breast*, or *thorax*, as far as the diaphragm, containing the organs of respiration.

The third, which is what we more commonly call the *venter*, or *belly*, is that wherein the intestines, and the organs of generation and digestion are contained; this is called by anatomists the *abdomen*.

VENTER, or *Belly*, is also popularly used for the exterior part of the lower *venter*.—In which sense, we say, the navel is in the middle of the *venter*, &c.

VENTER is also used for the *ventricle*, or *stomach*; because that part is inclosed in the cavity thereof.—In this sense it is, that Jonas is said in scripture to have been three days in the whale's *venter* or *belly*.

VENTER is also used for the womb, or uterus of women.—And hence the writ *de ventre inspiciendo*. See VENTRE *Inspiciendo*.

Hence, also, in the civil law, we say, *partus sequitur ventrem*, the child follows the belly; meaning, that its condition is either free or servile, according to that of its mother.

They also say, to *appoint a curator for the belly*, with regard to posthumous children, yet in the mother's womb.—With regard to princes, the *venter*, or *belly*, has been sometimes crowned in form.

VENTER is also used, in speaking of a partition of the effects of a father and mother, among children born, or accruing from different marriages.

This partition is so ordered, as that a single child of one marriage, or *venter*, takes as much as several of another marriage, or *venter*: in order to which, the estate is divided into so many parts, as there have been *venters*, or marriages.

VENTER is also used for the children, whereof a woman is delivered at one pregnancy.—Thus, two twins are said to be of the same *venter*.

People of sense take for a fable, what is related of the countess of Holland, viz. that she had 365 children at one *venter*, all living and baptized: and yet the story is very gravely related by abundance of authors; and the font, or basin, is still shewn in the church where they were baptized; with a kind of monument of the fact inscribed thereon.

VENTER, or *belly* of a muscle, is the fleshy, or body part thereof; as contradistinguished from the two tendons, its *extremities*; one whereof is called the *head*, and the other the *tail* of the muscle.

VENTER *Dragonis*, *Dragon's belly*, in astronomy, denotes the middle of a planet's orbit; or that part most remote from the nodes, i. e. from the dragon's head and tail; being the part which has the greatest latitude, or is at the greatest distance from the ecliptic.

There are two points under this denomination, in each orbit: that towards the south, is also called the *southern*

limit, and that towards the north, the *northern limit*. The moon has 5 degrees of latitude, when in the dragon's belly; and is 90 degrees distant from the nodes.

VENTER *Equi*, *Horſe's belly*, among chymists, denotes horſedung, or a dunghill, wherein are inclosed certain vessels for particular operations, to be performed by means of the gentle heat thereof.

VENTIDUCTS, in building, are spiracles, or subterraneous places, where fresh, cool winds being kept, are made to communicate, by means of tubes, funnels, or vaults, with the chambers, or other apartments of a house; to cool them in sultry weather.

These are much in use in Italy, where they are called *ventidotti*.—Among the French they are denominated *prisons des vents*, and *palais d'Eole*.

VENTOSA *Spina*. See the article SPINA *Ventosa*.

VENTOSITY, in medicine. See the article FLATUS.

VENTRE *Inspiciendo*, a writ for the search of a woman that says she is with child, and thereby holds land from him that is, otherwise, next heir at law.

VENTRICLE, VENTRICULUS, *q. d.* little belly, in anatomy, a diminutive of *venter*; signifying a cavity, smaller than what we express by a *venter*; or rather, a division of a *venter*; or some smaller cavity, contained in a larger. See VENTER.

There are two cavities in the heart, adjoining to the auricles; and four in the brain; called *ventricles*; which see explained under the articles HEART, and BRAIN.

The right *ventricle* of the heart, in relaxing, admits the blood by the right auricle from the cava; and, in contracting, drives it out into the pulmonary arteries; the left, receiving the blood by the left auricle, from the lungs, drives it out into the aorta.—See *Tab. Anat. (Angiolog.) fig. 9. lit. c.*

VENTRICLE, or VENTRICULUS, by way of eminence thus called, is the same with the stomach.

For the action of the VENTRICLE in vomiting, see VOMITING.

VENTRICULI *Ardor*. See the article ARDOR.

VENTRILLOQUOUS *, VENTRILLOQUUS, *Gastriloquus* or *Engastrimythus*, a term applied to persons who speak inwardly, having a peculiar art of forming speech, by drawing the air into the lungs; so that the voice proceeding out of the thorax, to a by-stander seems to come from a distance.

* The word is compounded of *venter*, belly, and *loquer*, I speak.

Such a person we had lately in London, a smith by profession, who had the faculty in such perfection, that he could make his voice appear, now, as if it came out of the cellar; and the next minute, as if in an upper room; and no body present could perceive that he spoke at all: accordingly, he has frequently called a person first up, then down stairs; then out of doors, then this way, then that, and all this without stirring from his seat, or appearing to speak at all.

Rolandus, in his *Aglossostomographia*, mentions, that if the mediastinum, which is naturally a single membrane, be divided into two parts, the speech will seem to come out of the breast; so that the by-standers will fancy the person possessed.

VENTURINE, or ADVENTURINE, is sometimes used for the finest and slenderest gold wire, used by embroiderers, &c.

When reduced into powder, as fine as it can be clipped, or filed, this powder may be strewed on the first layer of pure varnish, made use of in japanning, after the varnish is dry, in order to lay any colour over it. See JAPANNING.

VENUE, or VENNUE, in law, a neighbouring, or near place.—*Locus quem vicini habitant*.

Thus, we say, twelve of the assizes ought to be of the same *venue* where the demand is made.

—“And also return, in every such pannel, upon the venire facias, six sufficient hundreders, at the least, if there be so many within the hundred where the venire lies.” *Stat. 25 Hen. VIII.*

VENUS, in astronomy, one of the inferior planets; denoted by the character, ♀. See PLANET.

Venus is easily distinguished by her brightness, and whiteness, which exceeds that of all the other planets, and which is so considerable, that, in a dusky place, she projects a sensible shadow.—Her place is between the earth and Mercury.

She constantly attends the sun, and never departs from him above 47 degrees: when she goes before the sun, that is, rises from him, she is called *phosphorus*, or *lucifer*, or the *morning star*; and when she follows him, that is, sets after him, *vesperus*, or *vesper*, or the *evening star*.

The semidiameter of Venus, is to that of the earth, as 10 to 19; her distance from the sun is $\frac{1}{2} \frac{2}{3}$ of the earth's distance from

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from the sun: her excentricity 5; the inclination of her orbit $3^{\circ} 23'$. Her periodical course round the sun is performed in 224 days 17 hours; and her motion round her own axis, in 23 hours.

Her greatest distance from the earth, according to Cassini, is 38000 semidiameters of the earth; and her smallest 6000. — Her parallax is 3 minutes.

Venus, when viewed through a telescope, is rarely seen to shine with a full face, but has phases just like those of the moon; being now gibbous, now horned, &c. and her illuminated part is constantly turned towards the sun, *i. e.* it looks towards the east, when *phosphorus*, and towards the west, when *hesperus*.

De la Hire, in 1700, through a telescope of 16 feet, discovered mountains in *Venus*; which he found to be larger than those in the moon.

And Cassini, and Campani, in the years 1665, and 1666, discovered spots in her face: from the appearances of which, he ascertained her motion round her axis.

Sometimes she is seen in the disk of the sun, in form of a dark, round spot.

In 1672, and 1686, Cassini, with a telescope of 54 feet, thought he saw a satellite moving round this planet, and distant from it about $\frac{3}{4}$ of *Venus's* diameter. — It had the same phases as *Venus*, but without any well defined form; and its diameter scarce exceeded $\frac{1}{2}$ of that of *Venus*.

Dr Gregory thinks it more than probable, that this was a satellite; and supposes the reason why it is not usually seen, to be the unfitness of its surface, to reflect the rays of the sun's light; as is the case of the spots in the moon: of which, if the whole disk of the moon were composed, he thinks, that planet could not be seen as far as to *Venus*.

The phenomena of *Venus*, evidently shew the falsity of the Ptolemaic system: for that system supposes, that *Venus's* orb, or heaven, incloses the earth; passing between the sun and Mercury. — And yet all our observations agree, that *Venus* is sometimes on this side the sun, and sometimes on the other; nor did ever any body see the earth between *Venus* and the sun: which yet must frequently happen, if *Venus* revolved round the earth in a heaven below the sun.

VENUS, in chymistry, is used for the metal *copper*. See **COPPER**.

Its character is ♀; which, say the adepts, expresses it to be gold, only joined with some corrosive and arsenical menstruum; which removed, copper would be gold.

Venus is universally allowed, by the chymists, &c. to be one of the most powerful medicines in nature: of this, is said to have been composed the famous Butler's stone, which cured most diseases by only licking it. — Of this is composed that noble remedy of Van Helmont, *viz.* the sulphur of vitriol, or ens vitrioli, fixed by calcination, and cohobation. — Of the ens vitrioli of *Venus*, is likewise composed Mr Boyle's arcanum, the colcothar vitrioli.

It is certain, copper is a most excellent emetic, and a noble antidote against poisons; for it is no sooner taken than it exerts its force: whereas other vomitories lie a good while in the stomach: but one single grain of rust of *Venus* immediately vomits. — Hence syrups, that have stood over night in copper vessels, create a vomiting.

It is also an excellent medicine in chronic cafes: hence a famous physician is recorded to have cured Charles V. of a dropsy by the use of copper.

Venus is dissoluble by all the salts known, both acid, alkaline, and nitrous; nay, even by water and air, considered as they contain salt.

It is from this common reception of all menstruums, that copper is called *Venus*, *q. d. meretrix publica*, a common prostitute: though others take the denomination to have been occasioned by its turning of a sea-green colour, when dissolved by acid. It must be given internally, with great caution.

Crystals of VENUS. See the article **CRYSTAL**.

Mount of VENUS, *Mons VENERIS*, among anatomists, is a little hairy protuberance, in the middle of the pubes of women; occasioned by the more than ordinary collection of fat under the skin in that place. See **PUBES**.

Among chiromancers, the *mount of Venus* is a little eminence in the palm of the hand, at the root of one of the fingers.

VERA Billa. See the article **BILLA**.

VERB, in grammar, a word serving to express what we affirm of any subject, or attribute to it — as the words, *is, understands, hears, believes, &c.*

The *verb* is thus called of the Latin *verbum*, word, by way of eminence; as being the principal word of a sentence. See **SENTENCE**.

The common definition given by grammarians, is, that a *verb* is a word which betokens *being, doing, or suffering*.

To conceive the origin and office of *verbs*, it may be observed, that the judgment we make of any thing, as when I say

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the earth is round, necessarily includes three terms. — The first, called the *subject*, is the thing we affirm of, *e. gr.* earth. — The second, called the *attribute*, is the thing affirmed, *e. gr.* round. — The third, *is*, connects those two terms together, and expresses the action of the mind, *affirming* the attribute of the subject.

This last is what we properly call the *verb*; and which some of our later grammarians, particularly the port royalists, chuse to call by a more significant word, *affirmation*. — The reason is, that its principal use is to signify *affirmation*; that is, to shew the discourse, wherein that word is used, is the discourse of a man who does not only conceive things, but judges and affirms somewhat of them.

By this circumstance, a *verb* is distinguished from nouns which also signify an affirmation, as *affirmans affirmatio*; those only signify an affirmation, as that, by a reflection of the mind, is rendered an object of thought: so that they do not shew, that the person who uses them *affirms*, but only that he conceives an *affirmation*.

Though the principal use of *verbs* be to signify affirmation; they also serve to express the other motions of the soul: as to desire, pray, command, &c. but this they only do, by changing the mood, or inflection.

Here, we only consider the *verb* in its primary signification, which is that it has in the indicative mood. — On this footing, the *verb* should have no other use, but to mark the connection which we make in the mind, between the two terms of a proposition; but the *verb esse*, to be, is the only one that has retained this simplicity: nor, in strictness, has this retained it, but in the third person, as *est*, is.

In effect, men being naturally inclined to shorten their expressions, to the affirmation they have almost always added other significations, in the same word: thus, *e. gr.* they add that of some attribute, so as that two words make a proposition; as in *Petrus vivit*, Peter lives: where *vivit* includes both the attribute and affirmation; it being the same thing to say *Peter lives*, as that *Peter is living*. — And hence the great variety of *verbs* in every language.

For, had people been contented to give the *verb* its general signification, without any additional attribute, each language would only have needed one *verb*, *viz.* the *verb* substantive *est*, is.

Again, on some occasions, they also superadd the subject of the proposition, as *sum homo*, I am a man: or *vivo*, I live: and hence the diversity of persons in *verbs*.

Again, we also add to the *verb*, a relation to the time, with regard to which we affirm; so that one single word, as *cœnasti*, signifies that I attribute to the person I speak the action of supping, not for the present time, but for the past: and hence the great diversity of tenses in most *verbs*.

The diversity of these significations, or additions in the same word, has perplexed and deceived many of our best authors, in the nature of a *verb*; and have led them to consider it, not according to what is essential to it, which is to affirm; but according to some of these its accidental relations.

Thus, Aristotle, taking up with the third of those additional significations, defines *verb* to be *vox significans cum tempore*, a word signifying something with time.

Others, as Buxtorf, adding the second relation, define it, *vox flexilis cum tempore & persona*; a word admitting of divers inflections, in respect of time and person.

Others, taking up with the first of the additional significations, which is that of the attribute, and considering that the attributes men ordinarily add to the affirmation, were actions and passions; have supposed the essence of a *verb* to consist in signifying *actions*, or *passions*.

Lastly, Scaliger imagined he had made a great discovery in his book of the *Principles of the Latin tongue*, in saying, that the distinction of things into *permanentes*, and *fluentes*, into what remain, and what pass away, is the proper source of the distinction between *nouns*, and *verbs*; the first being to signify what remains, and the second what passes.

But from what we have said, it is easy to perceive, that these definitions are all false: and that the only true definition is, *vox significans affirmationem*: This definition includes all that is essential to the *verb*; but if one would likewise include its principal accidents, one might define it, *vox significans affirmationem, cum designatore personæ, numeri, & temporis*; a word which signifies an affirmation, with a designation of person, number, and tense: which is what properly agrees to the *verb* substantive *est*.

For as to other *verbs*, considered as becoming different by the union of certain attributes, one may define them thus; *vox significans affirmationem aliquis attributi, cum designatione personæ, numeri, & temporis*, a word which expresses the affirmation of some attribute, with a designation of person, number, and time.

Verbs are variously divided: with respect to the subject, they are divided into *active, passive, neuter*, &c. with respect to

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their inflections, into *regular*, and *irregular*; *personal*, and *impersonal*; *auxiliary*, *substantive*, &c.

VERB Active, is a verb which expresses an action that falls on another subject, or object.

Such are, *I love, I work*, &c. which signify the action of *loving, working*, &c. — Of these grammarians make three kinds; the one called *transitive*, where the action passes on a subject different from the agent; — *reflexive*, where the action returns upon the agent; — and *reciprocal*, where the action returns mutually upon the two agents that produced it.

VERB Passive, is that which expresses a passion; or which receives the action of some agent; and which is conjugated in the modern tongues, with the auxiliary verb, *I am, je suis, je sono*, &c.

Some do not allow of any verbs *passive* in the modern languages: the reason is, what we call *passive*, is nothing but the participle of the verb, joined with the auxiliary verb, *to be*; whereas the verbs *passive* of the Latin, &c. have their particular terminations.

VERB Neuter, is that which signifies an action that has no particular object whereon to fall; but which, of itself takes up the whole idea of the action — as, *I sleep, thou yawnest, he snores, we walk, you run, they stand*.

The Latins call them *neuters*, by reason they are neither active nor passive; though they have the force and signification of both: as, *I languish*, signifies as much as *I am languishing*; *I obey*, as much as *I exercise obedience*, &c. only that they have no regimen to particularize this signification.

Of these verbs, there are some which form their tenses by the auxiliary verb, *to have*; as, *I have slept, you have run*. — These, grammarians call *neuter active*.

Others there are, which form their compound parts by the auxiliary, *to be*; as, *to come, to arrive*, &c. for we say, *I am come, not I have come*, &c. — These are called *neuters passive*.

VERB Substantive, is that which expresses the being, or substance which the mind forms to itself, or supposes in the object; whether it be there, or not — as *I am, thou art*.

Auxiliary, or Helping VERBS, are those which serve in conjugating active and passive verbs: such are, *I am, I have*, &c.

The abbot de Dangeau distinguishes all verbs into two general kinds; *auxiliary verbs*, and verbs which make use of auxiliaries.

This distinction some may tax as not very just; in regard, *auxiliary verbs*, sometimes make use of auxiliaries themselves; but this does not destroy the division; it only shews, that the *auxiliary verb* has two formalities, or two different qualities which it is to be considered under; in virtue whereof, it constitutes, as it were, two sorts of verbs.

The verbs which make use of auxiliaries, he divides into *active, neuter, and pronominal*. — Verbs *neuter*, he farther distinguishes into *neuters active*, and *neuters passive*. *Pronominals* he distinguishes into *identic, reciprocal, neuterized, and passived*. — But several of these are peculiar to the French language.

Verbs, in the English, and most modern tongues, do not change their endings, as in Latin, to denote the several times, modes, &c. of their being, doing, or suffering; but in lieu thereof, they make use of auxiliaries: as *have, am, he, do, will, shall, may, can*, &c.

Regular VERBS, are those which are conjugated after some one manner, rule, or analogy.

Irregular, or Anomalous VERBS, are those which have something singular in the terminations, or formations of their tenses.

The irregularities in our English verbs, lie wholly in the formation of the preter tense, and passive participle. — The first, and most general irregularity, took its rise from the quickness of our pronunciation, by changing the consonant *d* into *t*; the vowel *e*, in the regular ending *ed*, being also cut off, that the pronunciation might be more ready: thus, for *dwelled, kepted, sendd*, we say, *dwelt, kept, sent*.

VERBS impersonal, are those which have only the third person — as, *it behoves*, &c.

There are also *reduplicative verbs*; as, *resound, recall*, &c. and *frequentative verbs*, &c.

VERBAL*, something that belongs to verbs, or even to words spoke with the mouth.

* The word is formed from the Latin, *verbale*, I smite.

Verbal nouns, are those formed from verbs.

A *verbal contrail*, is that made merely by word of mouth; in opposition to that made in writing.

VERBAL Accident. See the article ACCIDENT.

VERBERATION, *smiting*, in physics, a term used to express the cause of sound, which arises from a *verberation* of the air, when struck, in divers manners, by the several parts of the sonorous body first put into a vibratory motion.

VERDEGREASE*, or VERDEGRIS, a kind of rust of copper, of great use among painters for a green colour.

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* The word is formed from the Latin, *viride eris*: It is also called *erugo*. Others call it the *flower*, and others the *vitriolic salt of copper*; though, in reality, it is rather the proper substance of the metal.

Verdegreafe is prepared from copper-plates, and the rape or huffs of grapes well saturated with wine, put up in earthen pots; and ranged stratum super stratum; that is, first rape, then copper; and so alternately.

When the pots are filled, they are set in a cellar; whence, after some time, they are taken out, to gather the *verdegreafe*, which is a green rust covering the plates all over.

Some talk of *verdegreafe* as if made with vinegar, and other corrosive salts; but it is a mistake; the best wine being nothing too good for the purpose.

Accordingly, the greatest part of the *verdegreafe* consumed in Europe, is made in Languedoc, of the wines of that country; and is exported in cakes of about 25 pounds weight each.

There is but little quite pure: to be good, it must be very dry, of a deep green, and clear of white spots.

The apothecaries use to dissolve *verdegreafe* in distilled vinegar, and then filtrate and evaporate it, and then set in the cellar; upon which it shoots into crystals. — These crystals are used among chirurgeons, &c. to cleanse old ulcers, eat off fungous flesh, &c.

VERDERER*, or VERDEROR, a judicial officer of the king's forest, whose business is to look to the vert, and see it well maintained.

* The word is formed from the Latin, *viridarius*, which Ulpian used in the like signification.

He is sworn to keep the assizes of the forest; as also to view, receive, and enroll the attachments and prepayments of all manner of trespasses, relating to vert and venison therein.

VERDITER. See the article VERDITER.

VERDICT*, is the answer of the jury given to the court, concerning the matter of fact, in any cause, civil or criminal, committed by the court to their trial and examination.

* It is called *verdict*, from *vere dictum*, q. d. *dictum veritatis*, the dictate of truth.

A *verdict* is either *general*, or *special*.

General VERDICT, is that which is brought into the court in like general terms as the general issue: as in action of disseisin, the defendant pleads, no wrong, no disseisin. — Then the issue is general, whether the fact be wrong, or not: which being committed to the jury, they, upon consideration of the evidence, come in and say, either for the plaintiff, *That it is a wrong disseisin*; or for the defendant, *That it is no wrong, no disseisin*.

Special VERDICT, is, when they say at large, that such and such a thing they found to be done by the defendant, or tenant; declaring the course of the fact, as in their opinion it is proved; and as to the law, upon the fact, proving the judgment of the court.

This *special verdict*, if it contain any ample declaration of the cause from the beginning to the end, is called a *verdict at large*.

Attainder by VERDICT. See the article ATTAINDER.

VERDITER, VERDTER, a kind of mineral substance sometimes used by the painters, &c. for a blue, but more usually mixed with yellow for a green colour.

Verditer, according to Savary, ought to be made of the lapis armenus; or, at least, of an earthy substance much like it, brought from the mountains of Hungary, &c. only prepared by powdering it, and cleansing it by lotion.

But this stone and earth are very rare; and the *verditer* used is not a native, but a factitious substance: the proper way of preparing it, we are told, is by casting wine or water upon new copper, just as it comes red hot out of the furnace, and catching the steams which rise from it upon other copper-plates. — Others say, it is prepared by dissolving copper-plates in wine, much after the manner of *verdegreafe*.

The method of making *verditer*, among us, is said to be as follows: — Into an hundred pounds weight of whiting, the refiners pour their copper water, and stir them together every day for some hours, till the water grows pale: then they pour that away, and set it by for farther use; and pour on more of the green water, and so till the *verditer* be made: which being taken out, is laid on large pieces of chalk in the sun, till it be dry and fit for the market. Harris.

The water mentioned to be poured off from the *verditer*, (which remains at the bottom of the tub) is put into a copper, and boiled till it come to the thickness of water-gruel: now, consisting principally of salt-petre reduced, most of the spirit of the vitriol being gone with the copper into the *verditer*; and a dish full of this being put into the other materials for aqua fortis, is re-distilled, and makes what we call a *double water*, which is near twice as good as that made without it.

VERDOY, in heraldry, is applied to a bordure of a coat of arms; charged with any kinds or parts of flowers, fruits, seeds, plants, &c.

* VERDURE,

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VERDURE*, the quality of greenness.

* The word is French, formed of *verd*, green.

VERGE, *VIRGA*, a rod, switch, or yard; particularly a stick or wand, which persons are admitted tenants by holding in their hand, and swearing fealty to the lord of the manor.

On this account, they are all called *tenants by the verge*.

Dented VERGE, among florists, is a jagged edge, or circumference of a flower.

VERGE is also used for the compass or extent of the king's court; within which is bounded the jurisdiction of the lord steward of the king's household.

It is thus called, from the *verge* or staff which the marshal bears.—It was antiently also denominated *pax regis*, or the king's peace.

The lord steward, by virtue of his office, without any commission, judges of all transgressions, as treasons, murders, felonies, bloodshed, &c. committed in the court, or within the *verge* thereof; which extends, every way, the space of twelve miles from the chief tunnel of the court; only London, by charter, being exempted.

Court of VERGE, is a court, or tribunal, in manner of a king's-bench; which takes cognizance of all crimes, and misdemeanors committed within the *verge*, or jurisdiction of the king's court.

It is held in the compting-house, by the lord steward, as judge thereof, assisted by other officers of the household; as, the treasurer, comptroller, cofferer, clerks of the green-cloth, &c.

VERGE of Land, *Virga Terræ*. See the article **YARD-Land**.

VERGERS, *VIRGATORES* *servientes*, are officers who carry white wands before the justices of either bench; called also, *porters of the verge*.

VERGERS of cathedral or collegiate churches, are inferior officers, who go before the bishop, dean, &c. with a verge, or rod tipped with silver.

VERGILÆ, a constellation, whose appearance denotes the approach of the spring.

According to the poets, the *Vergilæ* were the daughters of Atlas; and by the Greeks, were called *Pleiades*: but the Romans named them *Vergilæ*. See **PLEIADES**.

VERIFICATION, the act of proving, or making a thing appear true.

In the French law, *verifying* is used for the recording of the king's edicts, and decrees by the parliament.

VERIFICATIONE Relicta. See the article **RELICTA**.

VERISIMILI. See the article **RÛRE de verisimili notitia**.

VERISIMILITUDE. See the article **PROBABILITY**.

VERJUICE, a juice or liquor drawn from four grapes, or wild apples, unfit for wine, or cider; or from sweet ones, while yet acid, and unripe.

Its chief use is in sauces, ragouts, &c. though it is also an ingredient in some medicinal compositions, and is used by the wax-chandlers to purify their wax.

It has its name from a large sort of grape, called *verjus*, or *bourdelas*; which is said never to grow perfectly ripe; or rather, which in its utmost maturity is too austere and sour to be used in wine: whence it is commonly turned into *verjuice*; though in France all unripe grapes are denominated *verjus*.

There is also a tolerable *verjuice* made of crabs, gathered, and laid in a heap to sweat, the stalks, &c. separated; they are then stamped, or ground, and the crab-mash put in a hair bag; the juice squeezed in a press, then balled up close, and set in a warm place to work for ten or twelve days.

VERMES, in medicine. See the article **WORMS**.

VERMICELLI*, or **VERMICHELLY**, a kind of mixture, prepared of flower, cheese, yolks of eggs, sugar, and saffron; and reduced into little long pieces, or threads, like worms, by forcing it with a piston through a number of little holes in the end of a pipe made for the purpose.

* The word, in the original Italian, signifies *little worms*: they also call it *tagliarini*, and *millifanti*.

It was first brought to us from Italy, where it is in great vogue.—In effect, it is the great regale of the Italians.—Other nations are not easily brought into the taste of it.—It is chiefly used in soups and pottages, to warm, provoke venery, &c.

VERMICULAR, an epithet given to any thing that bears a relation, or resemblance to worms, *vermiculi*.

Anatomists particularly apply it to the motion of the intestines, and certain muscles of the body.

The *vermicular*, or peristaltic motion of the intestines, is performed by the contraction of the fibres thereof, from above downward; as the unnatural, or antiperistaltic motion is by their contraction from below upwards.

The contraction happening in the peristaltic, which others call the *vermicular motion*, as resembling the motion of worms, does not affect all the parts of the intestines at once; but one part after another.

VERMICULAR, or **VERMICULATED Work**, *Opus vermicu-*

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latum, in sculpture, a sort of ornament, consisting of frets, or knots, in Mosaic pavements, winding, and representing, in some sort, the tracks made by worms*.

* *Quam lepide lexis composita, ut reserale omnes*

Arte pavimenti, atque emblemate vermiculato.

Cic. de Orat. lib. III.

VERMICULARES, in anatomy. See **MUSCULI**, and **TABULI**.

VERMIFORMIS, in anatomy, a term applied to various parts in the human body; bearing some resemblance to worms.

—Such are the

Processus, or *Apophyses* **VERMIFORMES**, two extremities of the cerebellum, situate near the fourth ventricle of the brain.

VERMIFORMES Musculi, are the four muscles in each hand and foot, which bring the fingers and toes towards the thumbs and great toes: called also *lumbricales*.

VERMIFUGUS, the fame with *antihelminthic*. See **ANTHELMINTIC**, and **WORM-POWDER**.

VERMILION, a bright, beautiful red colour; in great esteem among the antients, under the denomination of *minium*.

There are two kinds of *vermilion*; the one *natural*, the other *facitious*.

The *natural* is found in some silver mines, in form of a ruddy sand; which they prepare, and purify by several lotions, and coctions.

Facitious or *common* **VERMILION** is made of artificial cinnabar, ground up with white wine, and afterwards with the whites of eggs: in this state it is made into cakes, and left to dry. And to fit it for use, they grind it up a second time with water and whites of eggs.—To purify and heighten its colour, some grind it up with urine, or spirits of wine, to which a little saffron is added.

Some also pretend to make *vermilion* of lead, burnt and washed; or of ceruse, rubified by fire.—But these are not properly denominated *vermilion*, but *red led*.

It is this last, however, that seems to be the artificial minium, or *vermilion* of the antients; and accordingly, apothecaries, and painters still give it the name.

The antient Greek and Latin authors, have given divers fabulous accounts of their minium; and several of the moderns have adopted their dreams: the most rational accounts are, that Theophrastus attributes the first invention of making it to Callias the Athenian; who hit upon it, in endeavouring to draw gold, by fire, out of a red sand, found in the silver mines, in the year of Rome 249.—But Vitruvius says, it was discovered in the Cilbian fields; where it was drawn from a red stone, called by the Greeks *anthrax*.

We have two kinds of *vermilion* from Holland; the one of a deep red, the other pale: but both are the same matter at bottom; the difference of colour only proceeding from the cinnabar's being more or less ground; when fine ground, the *vermilion* is pale; and this is preferred to the coarser, and redder.

It is of considerable use among the painters in oil, and in miniature; and likewise among the ladies, as a fucus, or paint, to heighten the complexion of such as are too pale.

VERMILION is sometimes also, though improperly, used for what we otherwise call *hermes*, or *scarlet grain*.

VERMINATION, **VERMINATIO**, the act of breeding worms, and other vermine; particularly bots in cattle, &c.

VERMINATION is sometimes also used, among physicians, for a sort of tormina ventris, or wringing of the guts; where in the patient is affected, as if worms were gnawing his intestines.

VERMINE, **VERMINA**, a collective name, including all kinds of little animals, or insects, which are hurtful or troublesome to men, beasts, fruits, &c. as worms, lice, fleas, bugs, caterpillars, ants, flies, &c.

VIRMIVOROUS Animals, are such as feed upon worms.

VERNACULAR, is applied to any thing that is peculiar to some one country.

Whence, diseases which reign most in any particular nation, province, or district, are sometimes called *vernacular diseases*: though more frequently *endemic diseases*.

Such are the *plica polonica*, *scorbutus*, *tarantism*, &c.

VERNAL, something belonging to the spring season. See **SPRING**.—Hence, *vernal leaves*, are those leaves of plants which come up in the spring, &c.

VERNAL Signs, are those which the sun is in, during the spring season, viz. Aries, Taurus, and Gemini.

VERNAL Equinox, is that which happens when the sun is ascending from the equator towards the north pole.

VERNISH. See the article **VARNISH**.

VERONICA, a term abbreviated from *veronica*, of *vera icon*, q. d. *true image*; and applied to portraits, or representations of the face of our Saviour on handkerchiefs.

Veronica's are imitations of that celebrated original one, preserved with great veneration at S. Peter's in Rome; and imagined, by some, to be the handkerchief laid over our Saviour's face in the sepulchre.

The

Thus, DE, (*Tab. Trigonometry, fig. 1.*) is the *versed sine* of the arch AE. See *SINE*.

VERSIFICATION, the art, or manner of making verse; also the tune and cadence of verse.

Versification, is properly applied to what the poet does more by labour, art, and rule, than by invention, and the genius or furor poeticus.

The matter of *versification*, is long and short syllables, and feet composed of them; and its form, is the arrangement of them, in correct, numerous, and harmonious verses; but this is no more than a mere translator may pretend to, and which the Catilinarian war, put in measure, might merit. It is with reason, therefore, that these simple matters are distinguished from the grand poetry, and called by the name *versification*.

In effect, there is much the same difference between grammar and rhetoric, as there is between the art of making verses, and that of inventing poems.

VERSION, a translation of some book, or writing, out of one language into another.

VERSO. See the article *FOLIO Verso*.

VERT, in heraldry, the term for a green colour.

It is called *vert* in the blazon of the coats of all under the degree of nobles; but in coats of nobles it is called *emerald*; and in those of kings, *Venus*.

In engraving, it is expressed by diagonals, or lines drawn athwart, from right to left, from the dexter chief corner, to the sinister base. See *Tab. Herald. fig. 48*.

In lieu of *vert*, the French heralds use *sinople*, or synople.

VERT, or *Green Hue*, in forest law, any thing that grows, and bears a green leaf within the forest, that may cover a deer.

This is divided into *over-vert*, and *nether-vert*.

Over-VERT is the great woods; which, in law-books, are usually called *hault-bois*.

Nether-VERT is the under-woods; otherwise called *sub-bois*.

We sometimes also meet with *Special VERT*, which denotes all trees growing in the king's woods, within the forest; and those that grow in other men's woods, if they be such trees as bear fruit to feed the deer.

VERTEBRÆ*, a chain of little bones, reaching from the top of the neck, down the back, to the os sacrum; and forming a third part of the human skeleton, called the *spina dors*.

* They have their name à *vertendo*; because it is on them the head and trunk turn: the Greek call them *σπονδυλοι*, *spondyli*, for the same reason.

The *vertebræ* are 24 in number; seven of them belong to the neck, twelve to the back, and five to the loins.

They lie not in a straight line; those of the neck bend inward, and those of the back outwards, for enlarging the cavity of the thorax; and those, again, of the loins bend inwards, and those of the os sacrum outwards, to enlarge the cavity of the basin.

The body of each *vertebra* is spongy and cavernous; having in the middle a large perforation, through which the medulla spinalis passes, and seven apophyses, or processes.

The fore-part of this body is round and convex; the hind-part somewhat concave: its upper and lower sides are plain, each covered with a cartilage which is pretty thick forwards, but thin backwards, by means whereof it is, that we bend the body forwards; the cartilages yielding to the pressure of the bodies of the *vertebræ*, which, in that motion, come closer to one another: which could not be effected, if the hard bodies of the *vertebra* were close to one another.

The processes of each *vertebra* are of three sorts: two transverse, or lateral; in each of which there is a tendon of the vertebral muscles inserted: four oblique ones; by which the *vertebræ* are articulated to one another: and one acute, on the hindermost part of the *vertebra*— See *Tab. Anat. (Osteol.) fig. 10. lit. a. a. b. b. fig. 7. lit. a. a. a. a. fig. 7. lit. n. n. o. o. r. r. f. f. &c. fig. 11. lit. b. b. c. c. c. fig. 8. lit. b. b. a. a.*

These processes, which are peculiarly called the *spines*, form, with the hinder or concave part of the body of the *vertebra*, a large hole in each *vertebra*; and all the holes answering one another, make a channel for the descent of the spinal marrow, which sends out its nerves to the several parts of the body by pairs, thro' two small holes, formed by the jointing of four notches, in the sides of each superior and inferior *vertebra*.

The *vertebræ* are articulated to one another, by ginglymus: the two descending oblique processes of each superior *vertebra* of the neck and back, have a little dimple in their extremities, wherein they receive the extremities of the two ascending oblique processes of the inferior *vertebra*; so that

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the two ascending processes of each *vertebra* of the neck, and back, are received, and the two descending do receive, except the first of the neck, and last of the back; but the ascending processes of each *vertebra* of the loins receive, and the two descending are received; contrary to those of the neck, and back.

The *vertebræ* are all tied together by a hard membrane, made of strong and large fibres: It covers the body of all the *vertebræ* forwards; reaching from the first of the neck, to the os sacrum.— There is another membrane, which lines the canal, made by the large hole of each *vertebra*; which also ties them together: besides, the bodies of each *vertebra* are tied to one another, by the intervening cartilages; and the tendons of the muscles, which are inserted in their processes, tie them together behind.

This structure of the spine is admirable; for had it been all one bone, we could have had no motion in our backs; had it been of two or three bones articulated for motion, the medulla spinalis must have been necessarily bruised at every angle, or joint; besides, the whole would not have been so pliable, for the several postures we have occasion to put ourselves in: if it had been made of several bones, without intervening cartilages, we should have had no more use of it, than if it had been but one bone.— And if each *vertebra* had its own distinct cartilages, it might have been easily dislocated.— Lastly, the oblique processes of each superior and inferior *vertebra*, to keep the middle one, that it can neither be thrust backwards nor forwards, so as to compress the medulla spinalis.

The *vertebræ* of the neck differ from the rest, in that they are smaller and harder, their transverse processes perforated for the passages of the vertebral vessels, and their acute processes forked and straight. See *Tab. Anat. (Osteol.) fig. 3. n. 1. 1. fig. 7. n. 14. 14. fig. 8. and fig. 9.*

Add, that the first and second have something peculiar to themselves.

The first, called *atlas*, is tied to the head; and moves with it upon the second, semicircularly.

The second is called *epistropheus*, *axis*, or *cardo*; also *vertebra dentata*: in the middle, between its two oblique ascending processes, it has a long and round process like a tooth, which is received into a sinus of the atlas; and upon it, the head with the first *vertebra*, turns half round, as upon a hinge, or axis. The extremity of this process, is knitted to the occiput, by a small, but strong ligament.— A luxation of this tooth is mortal, because it compresses the medulla spinalis.

The third is also by some, though improperly, denominated *axis*.

The *vertebræ* of the back differ from the rest in this, that they are larger than those of the neck, and smaller than those of the loins: their acute processes slope downwards upon one another. They have in each side of their bodies a small dimple, wherein they receive the round extremities of the ribs: the uppermost of them is sometimes called the *crest*; the second the *axillaries*; and the rest *costales*. See *Tab. Anat. (Osteol.) fig. 3. n. 13. 13. fig. 7. n. 15. 15. fig. 10.*

The *vertebræ* of the loins, are the broadest; and the last of them, the largest of all the *vertebræ*. See *Tab. Anat. (Osteol.) fig. 3. n. 14. 14. fig. 7. n. 16. 16. fig. 11.*

Though each *vertebra* has but a small motion, yet the motion of them all is considerable: the head, we have observed, moves only backwards and forwards on the first *vertebra*, and semicircularly on the second.— The motion of the other *vertebræ* of the neck is not so manifest, yet is greater than that of the *vertebræ* of the back; because their acute processes are short and straight, and the cartilages, which are between their bodies, are thicker.— The *vertebræ* of the back have the least motion of any, because their cartilages are thin, their acute processes long, and very near to one another: and they are fixed to the ribs, which neither move forwards, nor backwards.— The greatest motion of the back, is performed by the *vertebræ* of the loins; because their cartilages are thicker, and their acute processes stand at a greater distance from one another: for the thicker the cartilages are, the more we may bend the body forwards; and the greater distance there is between the acute processes, the more we may bend backwards.

Such is the structure and motion of the *vertebræ*, when in their natural position: but we frequently find them variously distorted.— If the *vertebra* of the back stick out, it constitutes what we call a *bunched back*; and in such cases, the cartilages between the *vertebræ* are very thin and hard forwards but considerably thick backwards, where the oblique processes of the superior and inferior *vertebræ*, are at a considerable distance from one another, which distance is filled up with a viscous substance.

This inequality of the thickness of the cartilages happens, either by a relaxation, or a weakness of the ligaments and muscles,

muscles, fastened to the back-side of the *vertebrae*: in which cases, their antagonists finding no opposition, remain in a continual contraction.

The os sacrum does also consist of *vertebrae* in children; which grow so close together in adults, that they make but one large and solid bone of the figure of an isosceles triangle, whose base is tied to the last *vertebra* of the loins, and the upper part of its sides to the ilia, and its point to the os coccygis.

VERTEBRALES, in anatomy, a pair of muscles, whose office is to stretch out all the *vertebrae* of the back.

VERTEX, in anatomy, the crown of the head; or that uppermost and middle part situate between the sinciput and occiput.

Hence, also, *vertex* is figuratively used for the top of other things.—Thus, the *vertex* of a cone, pyramid, conic section, &c. is the point of the upper extremity of the axis; or the top of the figure.

VERTEX of an Angle, is the angular point; or the point A, (*Tab. Geometry*, fig. 91.) wherein the legs meet.

VERTEX of a Figure, is the *vertex* of the angle opposite to the base.

Such is the point M, (*Tab. Geometry*, fig. 19.) opposite to the base KL.

VERTEX of a curve, is the point A, (*Tab. Geometry*, fig. 51.) from which the diameter is drawn; or it is the intersection of the diameter, and the curve.

VERTEX of a Glass, in optics, the same with the pole thereof.

VERTEX is also used, in astronomy, for that point of heaven perpendicularly over our heads; called the *zenith*.

Path of the VERTEX. See the article **PATH**.

VERTICAL Circle, in astronomy, is a great circle of the sphere, passing through the zenith Z, and nadir N, (*Tab. Astronomy*, fig. 6.) and any other given point on the surface of the sphere, as B.

The *vertical circles* are also called *azimuths*.—The meridian of any place is a *vertical circle*.—All the *vertical circles* intersect each other in the zenith and nadir.

The use of the *vertical circles*, is to measure the height of the stars, and their distances from the zenith, which is reckoned on these circles; and to find their eastern and western amplitude, by observing how many degrees the *vertical* wherein the star rises, or sets, is distant from the meridian.

Prime VERTICAL, is that *vertical circle*, or azimuth, which passes through the poles of the meridian; or which is perpendicular to the meridian, and passes through the equinoctial points.

VERTICAL of the Sun, is the *vertical* which passes through the centre of the sun, at any moment of time.

Its use is in dialing, to find the declination of the plane whereon the dial is to be drawn; which is done by observing how many degrees that *vertical* is distant from the meridian, after marking the point, or line of the shadow upon the plane, at any times.

VERTICAL Angles.—Two angles, as, θ and x , (*Tab. Geometry*, fig. 18.) are said to be *vertical*, if the legs of one of them, AE and EC, be only continuations of the legs of the other, DE and BE.

VERTICAL Plane, in perspective, is a plane perpendicular to the geometrical plane; passing through the eye, and cutting the perspective plane at right angles.

VERTICAL Plane, in conics, is a plane passing through the vertex of the cone, and parallel to any conic section.

VERTICAL Line, in conics, is a right line drawn on the *vertical plane*, and passing through the vertex of the cone.

VERTICAL Dial, is a sun-dial, drawn on the plane of a *vertical circle*; or perpendicular to the horizon.

These are particularly called *oriental*, east; *occidental*, west; *meridional*, south; and *septentrional*, or north *verticals*, when opposed to one or other of these cardinal points of the horizon.

When they do not look precisely to any of them, they are called *decliners*; and when their plane, or surface is not perfectly perpendicular, *recliners*.

VERTICAL Point, in astronomy, the same with *vertex*, or *zenith*.

Hence, a star is said to be *vertical*, when it happens to be in that point which is perpendicularly over any place.

VERTICAL Line, in dialing, is a line or any plane perpendicular to the horizon.

This is best found and drawn on an erect and reclining plane, by holding up a string and heavy plummet steadily, and then marking two points of the shadow of the thread on the plane, a good distance from one another; and drawing a line through those marks.

VERTICILLATE Plants, are such as have their flowers

intermixed with small leaves, growing in a kind of whorl about the joints of the stalk; as penny-royal, hore-hound.

The peculiar characteristic of this genus of plants, according to Mr Ray, is, that their leaves grow by pairs, one just against another, on the stalk: the flower is monopetalous, but usually growing down with a kind of lip, or turning something like the form of a helmet: four seeds succeed each flower; to which the perianthium of the flower serves instead of a capsula feminalis.

The same author makes two distinctions of these *verticillate plants*.—1°. The *fruticosa*, or such whose superficies is perennial: these, again, have either a plain flower, as the chamædrys vulgaris, teucrium, and the marum syriacum; or a flower with a lip, which they call a *labiated flower*; or one something in the form of an helmet, which they call *galeated*; as the *scalaria*, *stachas*, *hyssopus*, *rosmarinus*, *satureia*, *marum vulgare*, *thymum vulgare*, and the *polium montanum*.

2°. The *herbacea*, or such whose stalks are not perennial; these are the mentha, verbenæ, dictamnus creticus, origanum, majorana, ocimum, horminum, galeopsis, nepeta, betonica, prunella, flachys, clinopodium vulgare, lamium, moluca, hedera terrestris, galericulata, calamintha, melissa, marrubium commune, nigrum & aquaticum; chamæpitys, scordonia, scordium, bugula, lyderitis, and cardiaca.

VERTICILLATE Flowers. See the article **FLOWER**.

VERTICITY, is that property of the loadstone, whereby it turns or directs itself to some peculiar point.

The attraction of the magnet was known long before its *verticity*.

VERTIGO*, in medicine, an indisposition of the brain, wherein the patient sees the objects about him as if they turned round, and fancies he turns round himself; though he is all the while at rest.

* The word is Latin, formed à *vertendo*, from turning round.

Physicians distinguish two kinds, or rather, two degrees of *vertiges*.—The first, called a *simple vertigo*, is when the body and external objects appear to turn round, without any great dimness of sight.

The other, called *scotomia*, or *vertigo tenebrosa*, is when the eyes are also darkened; and, is it were, covered with a mist.

Some make a third stage, viz. *vertigo caduca*, wherein the patient actually falls down.—But this seems scarce to differ from an epilepsy. See **EPILEPSY**.

Sometimes the *vertigo* is seated in the fore-part of the head, and sometimes in the hind-part: the latter is much the more dangerous.

Bellini accounts for the *vertigo* very well, from a preternatural motion in the retina: for it is evident, an object will seem to move circularly, if the images thereof, painted on the retina, fall successively on different parts of the retina.

This they may do, either by the object's moving while the eye is at rest, or from the eye moving while the object rests; or, lastly, the object and eye being both at rest, and the rays falling on the same place, by the optic nerve's being alone in motion. For since a right and an oblique incident do not excite the same tremors in the nerves, and the same species of motion; if the optic nerve only be moved, and the object be at rest, it will appear to shift its situation, by the change of the place in which it was represented.

External causes of *vertiges*, are a continued turning round of the body, drunkenness, too long fasting, immoderate exercise, surprize, voracity, much use of pulse, onions, leeks, radishes, cabbage, mustard, &c. and, in general, whatever may press, distend, or contract the arteries.

The first step in the cure, is bleeding in the jugular, or cupping; then they proceed to an emetic; then a vesicatory on the neck, or a perpetual blister, or issues; with sternutatories, and the other medicines that obtain in the apoplexy.

VERTILLAGE, in agriculture, the tilling, or preparing of ground to receive the seed, by turning, stirring, or tilling it.

VERTUE. See the article **VIRTUE**.

VERTUOSO. See the article **VIRTUOSO**.

VERU-MONTANUM, in anatomy, a kind of little valve, in the place wherein the ejaculatory ducts enter the urethra.

Its use is, to prevent the urine, in passing the urethra, from getting in at those ducts, and so mixing with the semen.

VERY* Lord, and **VERY Tenant**, are those that are immediate lord and tenant to one another.

* —And know ye, that in taking of leases six things are necessary, viz. *very lord*, and *very tenant*; service behind; the day of the taking; feisin of the services, and within his fee; and that a man is not *very tenant*, until he have assumed to "the lord by some service. *Old. Nat. Breve*. See **TENANT**, **ATOURNMENT**, &c.

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VESICA, in anatomy, a bladder; a membranous or skinny part, in which any humour is contained.

VESICA Biliaria. See **VESICULA FELLIS**.

VESICA, among chymists, is a large copper vessel, tinned on the inside; used in distilling ardent spirits: so called, as resembling the figure of a blown bladder.

VESICÆ Fundus. } See the article { **FUNDUS**.

VESICÆ Spincter. } See the article { **SPHINCTER**.

VESICATORY, **VESICATORIUM**, an external medicine, serving to raise a blister; whence also it is itself by some, though improperly, called a blister.

Vesicatories are unguents, cataplasms, or plaisters made of sharp, irritating medicaments, which have a faculty of drawing the humours from within, outwards; inflaming and ulcerating the skin, and raising vesicæ, or bladders; whence their denomination, *vesicatory*.

We have *vesicatories* made of cantharides, or else of euphorbium, figs, sublimate of mercury, lapis infernalis, mustard, anacardium, squills, briony, vinegar, pepper, leaven, &c. which are incorporated and made up with honey, gums, resins, &c. to bring them to the confidence required. See **CANTHARIDES**, &c.

Vesicatories are a stronger sort of sinapisms, and a kind of potential cauteries.

VESICULA, **VESICLE**, a diminutive of *vesica*; signifying a little bladder. See **VESICA**, and **BLADDER**.

The lungs consist of *vesiculae*, or lobules of *vesiculae*, admitting air from the bronchia; and not only air, but also dust, &c.

There are several parts in the body which bear this appellation; as,

VESICULA fellis, *cistula fellis*, or the gall-bladder; which is an oblong membranous vessel, not unlike a pear both in form and size; and is situated in the hollow part of the liver.

It adheres to the liver, not only by its vessels, which it receives from it, but likewise by its membranes, whereof, the external is common to both.—The lower part, which hangs out of the liver, rests on the pylorus of the stomach.

Its trunks, or membranes, are usually reckoned five; an outer, or common one, from the peritoneum; an inner one, on that side which adheres to the liver from the capsula of the porta, and of the porus biliaris.—And three proper ones: the first whereof is vascular; the second, muscular; and the third, glandulous.

But Dr Drake, viewing a piece of dried gall-bladder with a microscope, found but little reason for this accurate distinction; the several orders of fibres of the several coats, appearing to be no other than an infinite perplexity of vessels diversely ramified.

The gall-bladder is usually distinguished into the *fundus*, which is the widest part; and *collum*, or neck, which is the narrowest.

The neck of the *vesicula fellis* being prolonged, terminates in a duct, called *meatus cysticus*, or *biliaris*; which, at about two inches distance from the gall-bladder, is joined to the meatus hepaticus; these, together, form the ductus communis.

The use of the gall-bladder, is to receive the bile, after its being secreted in the glands of the liver; and to discharge it by the common duct into the duodenum.

The bile found in this vessel is of a brighter yellow, a greater consistence, and is also more bitter and acrimonious than that in the porus biliaris.

VESICULÆ Seminales.—See *Tab. Anat. (Splanchn.) fig. 8. lit. o. o. fig. 15. lit. b b*; see also the article **SEMINALES**.

VESICULÆ Adiposæ. See the article **ADIPOSÆ**.

VESICULAR Glands. See the article **GLAND**.

VESPER, in astronomy, called also *hesperus*, and the *evening star*; is the planet Venus, when she is eastward of the sun, and consequently sets after him.

VESPER, in the Romish church, *evening song*; that part of the office which is rehearsed after noon—answering to our *evening prayers*; except that it differs more from the office of the morning, called *matins*.

Sicilian VESPER, is a famous aria in the French history; signifying a general massacre of all the French in Sicily, in the year 1282; to which the first toll that called to *vespers* was the signal.

Some will have it to have happened on Easter-eve: others, on the day of the Annunciation.—It was raised by one Prochites, a cordelier, at the time when Charles of Anjou, count of Provence, was king of Naples and Sicily.—The women with child by French-men were not spared.

After the like manner, we say, the *matins* of Moscow, speaking of the Muscovites assassinating their prince Demetrius, and all the Poles, his adherents, at Moscow, the 27th of May 1600, under the conduct of their duke Choutky, at six a clock in the morning.

VESPERTILIONUM *Alæ*, *bats wings*, among anatomi-

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mists, two broad membranous ligaments, with which the bottom of the womb is tied to the bones of the ilium; they are so called from their resembling the wings of a bat.—See *Tab. Anat. (Splanchn.) fig. 11. tit. g. g.*

VESPERTINE, **VESPERTINUS**, in astronomy, is when a planet is seen descending to the west after sun-set.

VESSEL, **VAS**, **VASE**, a thing proper to hold, or contain liquor. See **VAS**.

Thus, a tun, hoghead, &c. are *vessels*, fit to contain ale, wine, &c.

The chymists use a great diversity of *vessels* in their operations; as *matrales*, *pelicans*, *retorts*, *receivers*, &c.

Double VESSEL. See the article **DOUBLE**.

Among anatomists, &c. all the tubes or canals, wherein the blood, and other juices, or humours are secreted, conveyed, deposited, &c. as the veins, arteries, lymphatics, spermatics, &c. are called *vessels*.—See *Tab. Anat. P. 2. Vessels of human body*.

Some even extend the word *vessel* to the nerves; as supposing them the conduits of the animal spirits.

Vessels consist of membranes, variously formed, and disposed for the reception of the fluids; and these membranes, again, consist of lesser vessels, or *vesiculae*: and this, for what we know, without end.

In the new system of many modern philosophers and physicians, *vessel* is a name common to all the solid parts of the body.

These authors explain the whole animal economy, functions, &c. from the divers liquors diffused throughout the body, and the various tubes, or *vessels* which contain these liquors.—In effect, all we know in the human body, is either *vessel*, or liquor.

The antients, it is true, had a notion, that some parts of the body, as the heart, spleen, &c. are mere parenchyma's, i. e. a kind of pulp, or pith, void of all *vessels*; but the moderns, by the advantage of microscopes, injections, &c. find that these, and all other parts of the body, are mere congeries, or masses of *vessels* interwove.

Some philosophers even extend the modern system to all material beings; owning only two elements, viz. a matter infinitely liquid, diffused through all nature; and hard, or solid parts; which are, as it were, the *vessels* of that matter. The *vessels* have a considerable share in the vital actions; all that is required to the maintenance of life, being a due quantity of a proper humour and its continued motion along the *vessels*: this motion depends in great measure, on the action of the *vessels* themselves; and the action of the *vessels*, depends on the contraction of the fibres, whereby, when stretched and distended by the flowing humour, they shorten themselves again, and dispose themselves into right lines, still approaching towards the axis of their cavity; and thus, they propel their contents: so that the force of the *vessels* is chiefly to be determined from their figure.

The number of *vessels*, some of our latest and best anatomists observe, is greatest in embryo's; and continually decreases as age comes on.

For, in the actions whereby nutrition, &c. are effected, the greater *vessels* being much distended by their humours, the smaller vessels, whereof the membranes, or coats of the larger are composed, become compressed and frightened, and at length quite dry, and void of juices; so that growing together, the fibres become the firmer and stronger, by the loss of the vesicles.—And hence the strength, firmness, stiffness, &c. of the solid parts.

Axis of a VESSEL.

Capillary VESSELS.

Cervical VESSELS.

Phrenic VESSELS.

Pulmonary VESSELS.

Spermatic VESSELS.

Umbilical VESSELS.

AXIS.
CAPILLARY.
CERVICAL.
PHRENIC.
PULMONARY.
SPERMATIC.
UMBILICAL.

VESSEL, in navigation, is a name common to all sorts of shipping, i. e. all floating machines, or vehicles that move in water.

Vessels are frequently distinguished into two general classes, viz. *high-bottomed* or *decked vessels*; which are those that move wholly with wind and sail, and live in all seas; as *pinks*, *galleons*, *ships*, &c.

And *flat-bottomed vessels*, which go both by oars and sails: such are *boats*, *galley*, *praams*, *zoberries*, &c. *Floating vessels*, are usually distinguished into *boats*, *lighters*, *barges*, *barkis*, *fishing vessels*, *ships of trade*, and *vessels of war*; of each whereof there are divers kinds and denominations.

Vessels of war, are a *three-decked ship*, first and second rate; a *frigate*, or *two decked ship*, third, fourth, and fifth rate; a *one decked ship*, sixth rate; a *boom-vessel*, a *fire-ship*, a *ketch*, a *machine-vessel*, and a *smucker*.

A *vessel* is said to be of *three or four hundred tons*; meaning, that it will carry three or four hundred times two thousand

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land weight: or, that when immersed in water; it possesses the space of three or four hundred tun of water; which is equal to the weight of the *vessel*, and all the loading it can carry.

A *vessel* is said to draw ten or fifteen feet of water; meaning, that when loaded, it sinks to deep under water.

The figure of *vessels*, is a thing of great importance, with regard to their motion, sailing, &c. and in the determining what form is most commodious, the new doctrine of infinites becomes of apparent service to navigation and commerce.

A body moving in an immovable fluid, is obliged to sever the parts thereof; and they resist such separation.—Now, setting aside a certain tenacity, whereby they are, as it were, glued together; and which is different in different fluids; the whole force of the resistance depends on that of the shock, or impulse for a body that is struck, strikes at the same time; but a perpendicular stroke is that which a liquid resists the most, as being the greatest. and for a body to move freely therein, it must be of such figure, as to present itself as obliquely as possible.—If it were triangular, and moved with the point foremost, it is certain all its parts would strike the fluid obliquely, but they would all strike it with the same obliquity; and it were more advantageous, that each should strike more obliquely than its neighbour.

Now, such a perpetual augmentation of obliquity, can no where be had in a curve line; each point whereof is considered as an infinitely small right line, always inclined to the other little right lines contiguous to it.

To find what curve it is, whose perpetual change of obliquity, or inclination in all its parts, renders it, of all others, the fittest to divide the fluid easily; is a problem much more difficult than it appears to be; and, in effect, is only to be solved by the new geometry: the solution was first given by Sir Isaac Newton, in his investigation of the solid of the least resistance.

That author, however, did not publish his analysis; yet the marquis de l'Hopital hit upon it: and afterwards M. Fatio resolved the same problem; though by a much longer, and more perplexed way. See SOLID of the least resistance.

Book of VESSELS. See the article BOOK.

VEST, and VESTITURE. See the article INVESTITURE.

VESTALIA, feasts held in honour of the goddess Vesta, on the fifth of the ides of June; i. e. on the ninth day of that month.

On that day, banquets were made before the houses; and meats were sent to the vestals, to be offered by them to the goddesses. See VESTAL.

The asses that turned the mills for grinding corn, were, on this occasion, led about the city, crowned with flowers, and chaplets formed of pieces of bread; and the mill-stones were likewise decked with garlands and crowns.

The ladies went barefooted in procession to the temple of Vesta; and an altar was erected to Jupiter the baker, *Jovis pistori*, in the capitol.

The *vestalia* had their names from that of their goddesses Vesta, from the Greeks called *tesia*, fire, or hearth; whence Cicero derives the Latin name.—Accordingly, the poets frequently use *Vesta* for fire, or flame; as they do *Jupiter* for air, *Ceres*, for corn, &c.

VESTALS, VESTALES, in antiquity, maids in ancient Rome, consecrated to the service of the goddesses Vesta; and particularly, to watch the sacred fire in her temple.

Numa first instituted four *vestals*; and Plutarch tells us, Servius Tullius added two more: which, number, six, lasted as long as the worship of the goddesses Vesta.—It is true, S. Ambrose reckons them seven; but without any foundation. The *vestals* made a vow of perpetual virginity: their employment was, the sacrificing to Vesta, and keeping up the holy fire in her temple.—If they violated the vows of chastity, they were punished with remarkable severity; being shut up, or buried in a deep pit, or cavern, with a lighted lamp; and a little water and milk, and there left to be devoured by hunger.—If they let out the fire, they were whipped by the pontifex maximus; and the fire was re-kindled by the sun-beams, collected, as some say, in burning-glasses, and not otherwise.

To be secure of their virginity, at their admission, it was provided, that they should not be above six years old.—They were chosen by lot, out of 20 virgins, carried by the pontiff to the comitia, for that purpose.

They were only consecrated for 30 years; after which time, they were at liberty to go out and be married. If they continued in the house after that time, they were only to be assistant, in point of advice, to the other *vestals*.

The first ten years they were to employ in learning their functions; the ten following they were to exercise them; and the last ten, to teach them to others.

VES

Their order was very rich; both on account of the endowments of the emperor, and of legacies of other persons.

The *vestals* had a particular place allotted them at the amphitheatres, and games of the circus.—Their vehicle was the *carpentum*, or *pentum*.—The vail wherein they sacrificed, was called *suffibulum*.

At first, they were nominated by the kings; but after the extinction of monarchy, by the pontifex maximus, or high priest.—The oldest of them was called *maxima*, as the first pontiff was maximus.

They had divers privileges: disposed of their effects by testament, in their father's life-time; had the same gratification as a mother of three children; and whenever they met a criminal going to execution, they had a power to pardon him.

The fire which the *vestals* were to watch, was not on an altar, or a hearth; but in little earthen vessels with two handles, called *capuducula*.

This fire was held a pledge of the empire of the world. If it went out, it was judged a very unlucky prognostic; and was to be expiated with infinite ceremonies.—Among the Romans, Festus tells us, it was only to be re-kindled by the rubbing a kind of wood, proper for the purpose. But among the Greeks, Plutarch, in the life of Numa, observes, it was to be re-kindled, by exposing some inflammable matter, in the centre of a concave vessel held to the sun.—For it is to be noted, the Romans were not the only people who kept the perpetual fire of Vesta, in imitation of the celestial fires: but the Greeks were possessed with the same superstition; particularly the Delphians, Athenians, Tenedians, Argives, Rhodians, Cyziceniens, Milesians, Ephesians, &c.

VESTIARIUS, VESTIARY, in antiquity, master of the wardrobe; an officer under the Greek empire, who had the care and direction of the emperor's apparel, robes, &c.

The *provestiarius*, or *first vestiary*, was the grand master of the wardrobe.—But, among the Romans, *vestiarius* simply was only a salesman, or taylor.

VESTIBLE*, VESTIBULUM, in the ancient architecture, a large open space before the door, or entrance of a house.

* Martinus derives the word from *vestis stabulum*; by reason the fore-part of the house was dedicated to *Vesta*.—Daviler derives it from *vestis*, and *ambulo*; by reason people there begin to let their trains fall.

The Romans had places called *vestibles*, at the entrance of their houses, to shelter people obliged to stand at the door from the weather: and we have still *vestibles* of the like kind, in many old churches, houses, &c. called *porches*.

Vestibles only intended for magnificence, are usually between the court and the garden: these are sometimes *simple*; that is, have their opposite sides equally enriched with arches; and sometimes their plan is not contained under four equal lines, or a circular one, but forms several van-corps, and rear-corps, furnished with pilasters.

VESTIBLE, VESTIBULUM, in anatomy, denotes the fore-part of the labyrinth of the ear.

The *vestible* is a small cavity, of an irregular form, placed immediately above the basis of the itapes; between the femicircular canals, and the cochlea.

In it appear divers foramina; as that of the fenestra ovalis; the five foramina of the femicircular canals; that of the cochlea; and five other very small ones, through which so many nerves pass.

VESTIGIA, a Latin term, frequently used by English writers, to signify the traces, or footsteps any thing has left behind it.

The word is particularly applied to the marks remaining of something antique, gone to ruin by time.

VESTIS Angelica. See the article ANGELICA.

VESTMENT. See the article VESTURE.

VESTRY, VESTIARIA, a room adjoining to a church, where the priests vestments, and the sacred utensils are kept, and parochial assemblies are held.

VESTRY-Men, a select number of the principal persons of every parish within the city of London, and elsewhere; who yearly chuse parish-officers, and take care of its concerns.

They are thus called, because they usually meet in the *vestry* of the church.

VESTRY-Clerk, an officer who keeps the parish accounts.

VESTURE, VESTMENT, a garment, or clothing. In our law-books, it is also used metaphorically: as in *vestitura terre*, i. e. *segetes quibus terra vestitur*; the corn wherewith the earth is clothed, or covered.

VESTURE of an *Acre of Land*, is the produce on it; or the wood, corn, &c. growing on it.—It shall be enquired how much

VIA

much the *vesture* of an acre of ground, and how much the land, &c. 4 Ed. I. 14 Ed. III. &c.

VESTURE, VESTURA, also signifies a possession, or feisin. In which sense, it is borrowed from the feudists; with whom *investitura* signifies a delivery of possession by a spear or staff; and *vestura*, the possession itself.

VETERAN, VETERANUS, in the Roman militia, a soldier who was grown old in the service; or who had made a certain number of campaigns; and on that account was entitled to certain benefits, and privileges.

Twenty years service, were sufficient to entitle a man to the benefits of a *veteran*.—These privileges consisted in being absolved from the military oath; in being exempted from all the functions of a soldier; and in enjoying a certain salary, or appointment, &c.

In France, the term **VETERAN** is still retained to such officers as have held their posts 20 years; and who enjoy certain of the honours and privileges affixed thereto, even after they have laid them down.

A *veteran* counsellor has a voice and seat at audiences, though not at processions by writing.—A *veteran* secretary of the king, acquires the privileges, &c. of nobility, to himself and his children.

VETERINARIA, Mulo-medicina, or medicine applied to the diseases of cattle.—Whence,

VETERINARIUS, a farrier, or horse-leech.

VETERNUS, is used by some physicians for a lethargy, or other drowsy disease.

VETITUM *Namium*, in law, imports a forbidden distress. See **NAM** and **DISTRESS**.

Such, *e. gr.* is that when the bailiff of a lord distrains beasts, or goods, and the lord forbids his bailiff to deliver them when the sheriff comes to replevy them; and to that end, drives them to places unknown:—Or when, without any words, they are so eloioped, as that they cannot be replevied.

Divers lords of hundreds, and courts-baron, have power to hold *plea de vetito namio*.—*Mathilda de Morton clamat in manerio de Mawerden duos law-days, & infangentheft & placita de namio vetito, sine breve domini regis.* Int. Record. in Theaur. Scac.

VEXES. See the article **NE INJUSTE VEXES**.

VIET ARMIS, *q. d. by force and arms*, a law term used in an indictment; to denote the forcible and violent commission of any crime.

VILATA remouenda, a writ, lying where debate being between two parsons, or provisors for a church; one of them makes a forcible entry into it, with a number of laymen, and holds the other out.

VIA, Way. See the articles **WAY**, and **ROAD**.

VIA LACTEA, in astronomy, the *milky way*, or galaxy. See **GALAXY**.

VIA MILITARIS, in our law-books, is used for a *highway*.—*quæ publica dici poterit & ducit ad mare & ad portum, & quandoque ad mercata.* Bracon, Lib. IV. c. 16.

VIA REGIA, the *king's highway*, is defined in *Leg. Hen. I.* to be "that which is always open, and which no body may 'shut by any means, as leading to a city, port, or town." Its breadth the same laws prescribe to be such, as that two carts may pass each other, and sixteen horsemen armed may go abreast.

VIA SOLIS, the *sun's way*, in astronomy, is used, among some astronomers, for the ecliptic line; so called, because the sun never goes out of it.

VIE PRIMÆ, *first passages*, among physicians, are the oesophagus, stomach, and guts; including the whole length of the alimentary duct, or canal, from the mouth to the sphincter ani.

In this sense, we say, An obstruction in the *primæ viæ*.—Purging and emetic medicines operate chiefly on the *primæ viæ*.—And sudorifics, alteratives, cardiacs, &c. suspend their action till after they have passed the *primæ viæ*.

VIAL, or PHIAL, a small and thin glass bottle. See **PHIAL**.

VIALES, in mythology, a name given, among the Romans, to the gods who had the care and guard of the roads and highways.

The *diuiales*, according to Labeo, were of the number of those gods called *diu animales*; who were supposed to be the souls of men changed into gods; these were of two kinds, *viz. the viales, and penates*.

The *viales* were the same with those otherwise called *lares*; at least, some of the *lares* were denominated *viales*, *viz.* such of them as had the more immediate intendency of the roads.

Hence, the two names are sometimes joined, and those highway deities are called *lares viales*: witness that inscription in Gruter.

VOL. II.

VIB

FORTUNAE
REDUCI LARI
VIALI ROMAE
AETERNAE
Q. AXIUS AELIA
NUS—VE. PROC.
AUG.
IONI.

VIATICUM, among the antient Romans, was the allowance or appointment which the republic gave to such of its officers as were sent into the provinces, to exercise any office, or perform any service, or commission; as also to the officers of the army, and even the soldiers, &c.

Tacitus makes mention of it, Lib. I. *Annal. c. 37. Viaticum amicorum ipsiusque Caesaris*; meaning the appointments which the republic paid to Germanicus, and his officers.

This *viaticum*, however, did not consist altogether in money; the ring given the magistrates and officers sent into the provinces, was part of it; so were the clothes, baggage, tents, and the rest of their equipage.

In the Romish church, **VIATICUM** is still the allowance made a religious, to defray the expences of a journey, mission, &c.

VIATICUM is also used for the communion, or eucharist, which is given to the people in the pangs of death; or who are about to make the voyage of the other world.

The *viaticum* is not to be given to persons executed in course of justice.

VIATOR, in antiquity, an officer of justice among the Romans.—The term, originally, had no other signification than that of a publick messenger, or servant, sent to advertise the senators and magistrates when assemblies were to be held, where their presence was required.

Hence, because, in the first ages of that empire, the Roman magistrates lived mostly at their country-houses; these officers being obliged to be frequently upon the road, were called *viatores*, travellers; from *via*, highway.

In process of time, the name *viator* became common to all officers of the magistrates, lictors, accensi, scribes, statores, and cryers; either by reason these names and offices were confounded in one: or because *viator* was a general name, and the rest particular ones, specifying the particular functions they discharged, as A. Gellius seems to insinuate, when he says, that member of the company of *viatores*, who binds a criminal condemned to be whipped, was called *lictor*.

Be this as it will, the names *lictor* and *viator* are often used indiscriminately for each other; and we as often meet with *Send to seek, or advertise him by a lictor, as by a viator*.

None but the consuls, prætors, tribunes, and ædiles, had a right to have *viatores*.—They were not to be Roman citizens, and yet they were required to be free.

VIBEX, is sometimes used, by physicians, for a black and blue spot on the skin, occasioned by an afflux, or extravasation of blood.

VIBRATION, in mechanics, a regular, reciprocal motion of a body, *e. gr.* a pendulum; which, being suspended at freedom, swings or vibrates, first this way, then that. For the bob being raised, falls again by its gravity; and with the velocity thus acquired, rises to the same height on the other side; whence, its gravity makes it fall again: and thus its vibrations are continued.

Mechanical authors, in lieu of *vibration*, frequently use the term *oscillation*.

The vibrations of the same pendulum are all isochronal; that is, they are performed in equal time, at least in the same climate; for, towards the equator, they are found somewhat slower.

A pendulum 3 feet 3 inches, and 2 tenths of an inch, according to Huygens, or 39.25 inches, according to Sir J. Moor and lord Brouncker, vibrates seconds, or makes 3600 vibrations in an hour.

The vibrations of a longer pendulum, takes up more time than those of a shorter one, in a subduplicate ratio of the lengths.—Thus, a pendulum 3 feet long will make 10 vibrations; while another 9 inches long makes 20.—For 10 is the half of 20, and 3 feet, or 36 inches, are the square of 6 inches; which is double of 3, whose square is 9: so that 10 is to 20 in a subduplicate ratio of 36 to 9.

The same thing is meant, when we say, that the number of vibrations of pendulums in a given time, is in a reciprocal ratio of their lengths.

M. Mouton, a priest of Lyons, wrote an express treatise, to shew, that by means of the number of vibrations of a given pendulum, in a certain time, one might establish an universal measure throughout the whole world; and fix the several measures in use among us, in such manner, as that they might be recovered again, at any time they should chance to be lost, as is the case of most of the antient measures, which we now only know by conjecture.

The *VIBRATIONS* of a stretched cord, or string, arise from its elasticity; which power being of the same kind with that of gravity, the vibrations of a cord follow the same laws as those of pendulums: consequently the vibrations of the same cord equally stretched, though they be unequal in length, are equidurnal, or are performed in equal times; and the squares of the times of the vibrations are among themselves, inversely, as the powers whereby they are equally bent, and inflected.

The vibrations of a spring, too, are proportionable to the powers whereby it is bent: these follow the same laws as those of the cord, or pendulum, and, consequently, are equidurnal; which is the foundation of spring-watches.

VIBRATION is also used in physics, &c. and for divers other regular alternate motions.—Sensation is supposed to be performed, by means of the vibratory motion of the nerves, begun by external objects, and propagated to the brain.

The several forts and rays of light, Sir Isaac Newton conceives to make vibrations of several bignesses; which, according to those magnitudes, excite sensations of several colours; much after the same manner as vibrations of air, according to their several magnitudes, excite sensations of several sounds. Heat, according to the same author, is only an accident of light, occasioned by the rays putting a fine, subtle ethereal medium, which pervades all bodies, into a vibrative motion, which gives us that sensation.

From the vibrations, or pulses of the same medium, he accounts for the alternate fits of easy reflection, and easy transmission of the rays.

In the *Philosophical Transactions* it is observed, that the butterfly, into which the silk-worm is transformed, makes 130 vibrations, or motions of its wings, in one position.

VICAR *, VICARIUS, a person appointed as deputy of another; to perform his functions, in his absence, and under his authority.

* The word is formed from *vicarius*, *qui alterius vices gerit*.

The pope pretends to be vicar of Jesus Christ on earth.—He has under him a *grand-vicar*, who is a cardinal, and whose jurisdiction extends over all priests both secular, and regular; and even, in many cases, over laymen.

Among the ancient Romans, *vicarius*, *vicar*, was a legatus, or lieutenant, sent into the provinces where there was no governor: so that the *vicarii* were properly the emperor's vicars, not those of governors. *Cod. de Offic. Vicar.*

Italy, in the time of the eastern empire, was governed by two *vicarii*: the one vicar of Italy, who resided at Milan; the other vicar of the city, who resided at Rome.

Cujas observed, that the word *vicar* was sometimes, though rarely, attributed to the lieutenant-generals of proconsuls, or governors of Roman provinces.

VICAR, in the canon law, denotes a priest of a parish, the predial tithes whereof are impropriated, or appropriated; that is, belong either to a chapter, religious house, &c. or to a layman, who receives them, and only allows the vicar the small tithes, or a convenient salary, antiently called *portia congrua*.

He is thus called *quasi vice fungens rectoris*, as serving for, or in lieu of a rector, who would be intitled to the great tithes.

These vicars were antiently called *perpetui vicarii*; because not appointed by the impropriator, and licenced by the bishop to read service; but presented by the patron, and canonical institution given them by the hands of the ordinary; and so having constant succession, or corporations, and never dying.

The canonists mention four species of vicars: some *perpetual*; others appointed for a certain time, and on some special occasion, called *mercenarii*; others called *speciales*, appointed not for the whole cure, but for some certain place, article, or act: others *generales*, neither perpetual, nor appointed for any certain act, but for all things in the general.

VICAR General, was a title given by king Henry VIII. to Thomas Cromwell, earl of Essex; with full power to oversee the clergy, and regulate all matters relating to church affairs.

VICE, VITIUM, in ethics, is ordinarily defined an elective habit, deviating, either in excess, or defect, from the just medium wherein virtue is placed.

It is called a *habit*, to distinguish it from *sin*, which is only an act: hence, a sin is looked on, as something transient; and a *vice*, as something permanent.

Authors distinguish three states of *vice*: the first *incontinentia*, of incontinence; wherein a person fees, and approves the good, but is hurried to evil by the violence of his passions.

—The second, *intemperantia*, of intemperance; wherein, even the judgment is depraved and perverted.—The third, *feritatis*, of obduracy; wherein the person is totally immersed in *vice*, without any sense or feeling thereof.

The state of incontinency, is considered as infirmity, where-

in the person feels the sharpest stings of conscience: that of intemperance, as malice, wherein the remorse is not so lively.—In that of obduracy there is none.

VICE, in smithery, and other arts employed in metals, &c. is a machine or instrument, serving to hold fast any thing they are at work upon; whether it be to be filed, bent, or riveted, &c.

To file square, it is absolutely necessary the *vice* be placed perpendicular, with its chaps parallel to the work-bench.

The parts of the *vice* are, the *face*, or *plane*, which is its uppermost part; the *chaps*, which are cut with a bastard cut, and well tempered; the *scREW pin*, cut with a square strong worm; the *nut*, or *scREW-box*, which has a square worm, and is brazed into the round box; the *spring*, which throws the chaps open; and the *foot*, on which the whole is mounted.

Hand-VICE, is a small kind of *vice*, serving to hold the lesser works in, that require often turning about.

Of this there are two kinds, the *broad chapt hand-vice*, which is that commonly used; and the *square nosed hand-vice*, seldom used but for filing small round work.

VICE is also a machine used by the glaziers, to turn, or draw lead into flat rods, with grooves on each side, proper to receive the edges of the glass.

This machine consists of two iron chaps, or cheeks, joined with two cross iron pieces.—In the space between the chaps, are two steel wheels, and their spindles, or axes passed through the middle; each of which has its nut, or pinion with teeth, that catch into each other: and to the lowest is fitted a handle, whereby the machine is turned.

There are some of these *vices* double, and that will draw two leads at once: these have three wheels.—Some glaziers, will turn lead of different sizes in the same *vice*; by changing their cheeks for each size.

With another pair of spindles, whose nuts almost meet, they turn lead for *tiers*; which, when it comes out of the *vice*, is almost cut asunder, in two thicknesses, easy to be parted. Before the invention of this *vice*, which is but a late thing, they used a plane; accordingly, in all the antient windows, we find the lead planed, and grooved that way.

VICE is also used in the composition of divers words, to denote the relation of something which comes instead, or in the place of another.

In this sense, the word is Latin, *vice*, stead, place, turn, &c.

VICE ADMIRAL, is one of the three principal officers of the royal navy; who commands the second squadron, and has his flag set up in the fore-top of his ship.

VICE-CHAMBERLAIN, called also, in antient statutes, *under-chamberlain*; is an officer in the court, next under the lord chamberlain; and who, in his absence, has command, and controul, of all officers belonging to that part of the household, called the *chamber* above stairs.

VICE-CHANCELLOR of a university, is an eminent member, chose annually, to manage affairs in the absence of the chancellor.

VICE-DOGE, is a counsellor of Venice, who represents the doge when sick, or absent; that the seignory may never be without a chief.

The *vice-doge* never takes the ducal chair, nor bears the horn, nor is addressed under the title of *serenissimo*: yet, the foreign ambassadors, speaking to the college, use the common apostrophe of *serenissimo principe*: and he performs all the offices of doge; and gives answers to ambassadors, without moving his cap.

VICE-DOMINUS, a viscount, sheriff, or vidame.

VICE-DOMINUS Abbatia, or Ecclesie, in the civil and canon law, an advocate, or protector of an abbey, or church. See ADVOCATE.

VICE-DOMINUS Episcopi, in the canon law, is the commissary, or vicar-general of a bishop. See COMMISSARY, &c.

VICE-GERENT, *Vicgerens*, a vicar, deputy, or lieutenant.

VICE-COMES, in law, &c. } See { VICOUNT.

Accedas ad VICE-COMITEM. } See { ACCEDAS.

Respectu habendo compati VICE-COMITIS. See RESPECTU.

VICE-LEGATE, an officer whom the pope sends to Avignon, and some other cities, to perform the office of a spiritual and temporal governor, at a time when there is no legate, or cardinal to command there.

All the Gaule Narbonnoise, as Dauphine, Provence, &c. has recourse to the *vice-legate* of Avignon, for all ecclesiastical dispatches; in like manner as the other provinces address themselves to Rome. See LEGATE.

VICE-ROY, a governor of a kingdom, who commands therein, in the name, and stead of a king; with full and sovereign authority.

Thus Sicily, Catalonia, Mexico, &c. are governed by *vice-roys*.

VICE Versa, a Latin phrase, frequently retained in English writings; signifying as much as, on the contrary.

Thus, as the sun mounts higher and higher above the horizon, insensible perspiration increases; and, *vice versa*, as he descends lower, it diminishes.

VIC

VICENNALIS, in antiquity, something of 20 years, or that returns after 20 years.

Among the Romans, *vicennalia* was particularly used for the funeral feasts, held on the 20th day after a person's decease.

VICENNALIA, or **VICENNALES Ludi**, were also games, feasts, and rejoicings, held every 20th year of the reign of a prince.

On medals, we frequently meet with *vicennalia vota*; the vows put up on that occasion, for the safety of the emperor, and the enlargement of the empire.

These are expressed by VOT. X & XX, in the medals of Tacitus, Gallienus, and Probus; VOT. X. M. XX, in those of Valerius Maximianus, and Galerius Maximianus; VOT. X. MUL. XX, in those of Constantine, Valentinian, and Valens; VOT. X. MULT. XX, in those of Diocletian, Constantine, Julian, Valentinian, Theodosius, Arcadius, Honorius; VOTIS X. MULT. XX, in those of Julian, Valentinian, Gratian; VOT. X. SIC. XX, in those of Valerius Constantius; VOT. XII. FEL. XX, in the younger Licinius; VOT. XV. FEL. XX, in Constantine.

VICINAGE, and **VICINITUM**, a neighbourhood. See **VENUE**.

Common per Cause de VICINAGE. See **COMMON**.

VICIS & *Venelis Mundandis*, a writ lying against a mayor, bailiff, &c. for not taking care that the streets be well cleaned.

VICISSITUDE, **VICISSITUDO**, the succeeding of one thing after another. — As, the *vicissitude* of seasons, fortune, &c.

VICONTIEL. } See the article { **VISCOUNTIEL**.
VICONTIELS. } **VISCOUNTIELS**.

VICOINT, **VICE-COMES**, in our law-books, signifies the same with *sheriff*; between which two words, there seems to be no other difference, but that the one came from our conquerors, the Normans; and the other from our ancestors, the Saxons.

VICOINT, or **VISCOINT**, is also used for a degree of nobility, next below a count or earl, and above a baron.

Camden observes, that this is an ancient name of office, but a new one of dignity, never heard of among us till Henry VIII's days, who, in his 18th year, created, in parliament, John lord Beaumont, *vicoimt Beaumont*: but it is much more ancient in other countries.

Du Cange, indeed, will have the dignity to have had its first rise in England; but it is much more probable, it was first brought over hither by the Normans.

The privileges of a *vicoimt*, are, that he may have a cover of assay held under his cup when he drinks, and may have a travers in his own house. — And a *vicoimts* may have her gown bore up by a man, out of the presence of her superiors; and in their presence by a woman.

VICOUNTIELS, **VICONTIELS**, **VICCOMITALIA**, in our law-books, denotes things belonging to the sheriff; particularly certain farms, for which the sheriff pays a rent to the king, and makes what profit he can of them.

Writs VICOUNTIEL, are such as are triable in the county or sheriff's court. — Of which kind are divers writs of nuisance, &c.

VICOUNTIEL, or **VICONTIEL Jurisdiction**, is that jurisdiction belonging to the officers of a county; as sheriffs, coroners, escheators, &c.

VICTIM, **VICTIMA**, a bloody sacrifice offered to some deity, of a living thing; either a human person, or a beast, which is slain to appease his wrath, or to obtain some favour. See **SACRIFICE**.

The Greeks offered Iphigenia, at Aulis, for a *victim* to obtain a favourable wind. — The gods of the heathens had each their proper *victims*: thus, the goat was Bacchus's *victim*; and the horse Neptune's.

VICTIMARIUS, a minister, or servant of the priest, whose office was to bind the *victims*, and prepare the water, knife, cake, and other things, necessary for the sacrifice. See **SACRIFICE**.

To the *victimarii* it also belonged, to knock down, and kill the victims: in order to which, they stood close by the altar, naked to the waist, but crowned with laurel; and holding a hatchet or a knife up, asked the priest leave to strike; saying, *Agone? shall I strike?* Whence they were called *agones*, and *cultellarii*, or *cultuarij*.

When the *victim* was killed, they opened it, and after viewing the entrails, took them away, washed the carcase, and sprinkled the flower on it, &c.

The same *victimarii* also lighted the fire, wherein books were condemned to be burnt. See **Liv. 40. lib. 40. c. 29.** and **A. Gellius, lib. 1. c. 1. extr. 12.**

VICTORIAN Period, in chronology. See **PERIOD**.

VICTORY, **VICTORIA**, the overthrow, or defeat of an enemy, in war, combat, duel, or the like. See **WAR**, **COMBAT**, **DUEL**, **CHAMPION**, &c.

VIG

Among the Romans, crowns, triumphs, &c. were decreed to their generals, for the *victories* they gained.

VICTUALLING-Office, an office kept on Tower-hill, for the furnishing his majesty's navy with *victuals*.

It is managed by seven commissioners, who have their inferior officers; as secretaries, clerks, &c. besides agents in divers parts of Great Britain, Ireland, &c.

VICTUS Ratio, among physicians, a particular manner of living, for the preservation of health, and prevention of diseases.

VIDAME *, *Vice-Dominus*, was antiently used for the bishop's deputy in temporals; as *comes*, or *vice-comes*, was the king's.

* The word, according to Nicod, comes from *vicarius*; according to Pasquier, from *vice-dominus*; *dam* signifying *dominus*, or lord. See **DOM**.

The original institution of *vidames*, was for defence of the temporalties of bishopricks, while the bishops themselves were taken up in prayer, and other spiritual functions. — They also led the bishop's forces, when they were obliged to go to war, either to defend their temporalties, or for the arrier-ban.

They also managed, and pleaded their cause in courts of justice; distributed justice among their tenants, and prevented any body's pillaging, or damaging the houses of deceased bishops, &c. — In effect, they represented the bishop, considered as a temporal lord.

In some antient charters, the *vidames* are called *advocates*, or *advocates*.

VIDAME is still a title of feignory, or lordship: attributed to several gentlemen in France: as, the *vidame* of Chartres, of Amiens, &c.

The antient *vidames*, Pasquier says, were the bishops temporal judges; and they had the same privileges as the vicounts.

By degrees, the *vidames* converted their office into a fee; and the bishops their *vidames*, or judges, into vassals, as kings did their counts, dukes, &c. — Accordingly, the *vidame* of Chartres, &c. still hold lands of the bishops of those places.

VIDIMUS, in law, the same with *innoteimus*; being letters patent of a charter of feoffment, or some other instrument, not of record.

VIDUITATIS Professio, the making a solemn profession of living a chaste widow; a custom heretofore observed in England, and attended with divers ceremonies.

VIEW. See the article **CESTUI qui Vie**.

VIEW *, **VISUS**, in law, the act of *viewers*, or *viewers*.

* This is called, by Bracton, *Res quasi sacra quia solam personam regis respicit, & introducta pro pace, & communi utilitate*.

When a real action is brought, and the tenant knows not well what the land is that the demandant asks; he may pray the *view*: which is, that the jury may see the land which is claimed.

This course of proceeding we received from the Normans, as appears by the *Grand customary*. — It is used in various cases; as in assize of rent-service, rent-charge, rent-sec; in a writ of nuisance; in a writ *quo jure*; in the writ de *rationabilibus divisib.* &c.

VIEW of Franc-pledge, **VISUS Franci Plegii**, is the office which the sheriff in his county-court, or the bailiff in his hundred, performs; in looking to the king's peace, and seeing that every man be in some pledge.

VIEW, in matters of optics, perspective, &c. See **VISION**.

Point of VIEW. See the article **POINT**.

VIEW, among hunters, the track, or print of the feet of a fallow deer on the ground.

To **VIEW** a place, in the military art, is to ride about it, before the laying of a siege, in order to observe the strength or weakness of its situation, and fortification.

VIEWERS, or **VEIORS**, in law, are persons sent by a court, to *view* a place, or person in question; as the situation of a place where a fact was committed, or a person, in case of sickness, &c. See **VEIOR**.

VIGIL, or **EVE**, in church chronology, the day before any feast, &c.

Though the civil day begins at midnight, yet the ecclesiastical, or scriptural day, begins at six o'clock in the evening, and holds till six in the evening the ensuing day.

Hence, the collect for every Sunday and holy-day, by order of the church, is to be read, at the preceding evening-service, that is, at six o'clock the day before; from which time the religious day was supposed to begin.

And this first part of the holy-day, from six o'clock the day before, was, by the primitive Christians, spent in hymns, and other devotions; and being often continued till late in the night, was called *vigil*.

These *vigils* came by degrees to be so enlarged, that, at last, all the day preceeding the holy-day was called by the name.

VIL

The origin of *vigils* is deduced by Forbes from a custom in the ancient church, for the people, both men and women, to meet together in the evening before Easter-day, and watch and pray, as expecting the coming of our Lord, who was to rise early in the morning. This practice, Tertullian observes, *ad Uxorem*, afterwards got to other feasts and saints-days.—But abuses creeping in, they were forbid by a council, in 1322, and in lieu thereof fastings were instituted on the day before, though still called by the ancient name of *vigils*.

Coma VIGIL. See the article COMA.

VIGILIA, that state of an animal which is opposite to sleep, and is popularly called *waking*, or *watching*. See SLEEP, and WATCHING.

VIGIN TIVIRATE, a dignity among the ancient Romans, established by Cæsar.

This dignity comprehended four others; for of the *vigintiviri*, or twenty men which composed the company, there were three who sat and judged all criminal affairs; three others had the inspection of the coins, and coinage; four took care of the streets of Rome; and the rest were judges of civil affairs.

VILL, VILLA. See the article VILLAGE.

VILLA Regis, or *Regia*, a title antiently given to those *villages* where the kings of England had a royal seat, and held the manor in their own demesne: having there commonly a free chapel exempt from the bishop's jurisdiction.

VILLÆ Præpositus. See the article PRÆPOSITUS.

VILLAGE*, *VILLA*, or *VILL*, an assemblage of houses, inhabited chiefly by peasants and farmers, having usually a church, but no market.

* The word is French, formed of *vill*, or *villis*, low, mean, contemptible: or rather, from the Latin, *villa*, a country house, or farm.

The want of a market distinguishes a *village* from a *town*, as the church does from a *green*, *street*, &c.—Among our Saxon ancestors, *vill*, or *village*, was used in the sense of the Roman *villa*; viz. for a country farm, or seat, furnished with convenient out-houses, &c. for depositing the fruits thereof. Afterwards it came to be taken for a manor: and then for part of a parish, or the parish itself.

Hence, in several antient law-books, *vill* and *parish* are the same thing: accordingly, Fortescue, *de Laudibus Leg. Ang.* writes, "That the boundaries of *villages* are not by houses, streets, or walls; but by a large circuit of ground, within which may be divers hamlets, waters, woods, &c."

Fleta makes this difference between a *manor*, a *village*, and a *manor*; that a manor may consist of one, or more houses; though there is only to be one dwelling-place, without any other very near it: for if other houses be contiguous, it is then a *village*.—A manor may consist of one or more *villages*.

For the better government of *villages*, the lord of the soil has usually a power to hold a court-baron every three weeks.

VILLAIN, VILLANUS, in our antient customs, the same with *bond-man*: called also, in Domesday-book, *servus*, *slave*.

A *villain* was one who held lands in *villanage*, or on condition of rendering base services to his lord.

There were antiently in England two sorts of *villains*, viz. *villains in gress*, who were bound immediately to the persons of their lords, and to their heirs — and *villains regardant* to a manor, by the civilians called *gleba adscripti*; who were bound to their lord, as members belonging to such a manor, of which he was owner.

This latter was a *pure villain*, of whom the lord took redemption to marry his daughter, and to make him free; and he might put him out of his lands and tenements at his will; and might beat and chastise him, but not maim him.

They were called *villains* from *villa*; because they dwelt in *villages*: the same were also called *pageses*, and *rustici*; and of such servile condition were they, that they were usually fold with the farm to which they respectively belonged. There are not properly any such *villains* now, though the law concerning them stands unrepealed.—The lands before held in *villanage*, are now held in free and common socage.

See TENURE, SOCAGE, &c.

VILLAIN Estate, or *condition*, is contradistinguished to *free estate*. See BASE Estate, and VILLENAGE.

VILLAINAGE. See the article VILLENAGE.

VILLAINOUS Judgment, is that which casts the reproach and stain of *villany* and shame on him against whom it is given.—As that against a conspirator, &c.

Lambard calls it *villainous punishment*; and says, it may well be called *villainous*, in regard the judgment, in such case, shall be like the antient judgment in attain, viz. that the criminals shall not be of any credit afterwards; nor shall it be lawful for them, in person, to approach the king's court: that their lands and goods shall be seized into the king's hands, their trees rooted up, their bodies imprisoned, &c.

VIN

VILLARUM Nomina. See the article NOMINA.

VILLENAGE, or *VILAINAGE*, *VILLANIA*, the quality or condition of a *villain*. See VILLAIN.

Villanage is more particularly used for a servile kind of tenure of lands, or tenements; whereby the tenant was bound to do all such service as the lord commanded, or were fit for a *villain* to perform: which Bracton expresses, by *Sciri non poterit vesperare, quale servitium fieri debet mane*.

Villanage, is divided into that by blood, and that by tenure.—Tenure, in *villanage*, could make no freeman a villain, unless it were continued time out of mind; nor could free land make a *villain* free.

Villanage is also divided by Bracton into *pure villanage*, where the services to be performed were indeterminate and arbitrary, as above expressed — and *socage villanage*; which was to carry the lord's dung into his fields, to plough his ground on certain days, to sow and reap his corn, &c. and even to empty his jakes: as the inhabitants of Bickton were bound to do to the lord of Clun-castle in Shropshire; which was afterwards turned into a rent, now called *Bickton silver*; and the *villainous* service excused.

VILLI, *coarse hair*, in anatomy, is sometimes used in the same sense as *fibre*, or *fibrilla*. See FIBRE.

VILLI, in botany, denotes a sort of tomentum, or down, like the grain or shag of plush; with which, as a kind of excrescence, some trees and plants do abound.

VILLOUS, *VILLOSA*, is particularly applied to one of the coats or membranes of the stomach, called *crusta villosa*.—See Tab. Anat. (Splanchn.) fig. 2. lit. h.

It takes its name from innumerable *villi*, or fine fibrillæ, wherewith its inner surface is covered. See CRUSTA Villosa.

VINALIA, in antiquity, a name common to two feasts among the antient Romans; the one in honour of Jupiter, and the other of Venus.

The first was held on the nineteenth of August, and the second on the first of May.—The *vinalia* of the nineteenth of August, were called *vinalia rustica*, and were instituted on occasion of the war of the Latins against Mezentius; in the course of which war, that people vowed a libation to Jupiter of all the wine of the succeeding vintage.

On the same day likewise fell the dedication of a temple of Venus; whence some authors have fallen into a mistake, that these *vinalia* were sacred to Venus.—But Varro, LLL. V. and Festus, in *Verbo Rustica*, distinguish between the two ceremonies; and expressly assert the *vinalia* to be a feast of Jupiter.

VINCULUM, in algebra, a character in form of a line, or stroke drawn over a factor, divisor, or dividend, when compounded of several letters, or quantities; to connect them, and shew that they are to be multiplied, or divided, &c. together, by the other term.

Thus, $d \times a + b - c$, shews that d is to be multiplied into $a + b - c$.

VINDEMIATING*, the gathering of grapes, or other ripe fruits; as apples, pears, cherries, &c.

* The word is formed of the Latin, *vindemia*, vintage. See VINTAGE.

VINDEMIATRIX, or *VINDEMIATOR*, a fixed star of the third magnitude, in the northern wing of the constellation Virgo; whose longitude, latitude, &c. see among the rest of those of VIRGO.

VINDICATION, *Claiming*, in the civil law, an action arising from the property a person has in any thing: or a permission to take or seize a thing, as one's own, out of the hands of a person, whom the law has doomed not to be the true proprietor.

VINE, VITIS, a noble plant, or shrub, of the reptile kind; famous for its fruit, or grapes, and for the liquor they afford. See WINE.

The kinds of *vines* are almost infinite; they are denominated either from the soil, and place where they grow; as the *Bourguignon*, *Bourdelais*, *Italian*, *Mantuan vine*, &c. or from the form, colour, taste, &c. of their grapes; as the *acorn*, *apricot*, *damask*, *birds-bill*, *muscadine*, &c. vine.

Our gardeners find, that *vines* are capable of being cultivated in England, so as to produce large quantities of grapes; and those ripened to such a degree, as may afford a good substantial vinous juice.—Witness the vineyards in Somersetshire; particularly that famous one at Bath.

In effect, it does not seem so much owing to the inclemency of our English air, that our grapes are generally inferior to those of France, as to the want of a just culture.

Those fitted for the English climate, Mr Mortimer finds to be the small black grape, the white muscadine, parsley grape, muscadilla, and white and red Frontignac.—Mr Bradley recommends the July grape, the early sweet water grape, lately brought from the Canaries; the arbois, or French sweet water grape: all which, if well managed, and the weather favourable, are ripe by the middle of August.—He also recommends the claret and Burgundy grapes.

The

VIN

VIN

The best soil for *vines*, according to Mortimer, is the hottest gravel, sand, or dry rocky ground; provided it be well watered and shaded.—Mr Bradley recommends chalky hills, as proper for *vines*.

To mend a soil that wants those qualities, it is good to throw in the rubbish of old buildings, well mixed with twice as much earth, and sifted about the roots of the *vines*.

Vines are propagated either by layers, or cuttings; that is, either by laying down the young branches as soon as the fruit is gathered, or by making plantations of slips, or cuttings, at that time.

Mr Mortimer says, it is best done any time in the winter before January; though Bradley says, he has done it, with success, in March and April.

For the Pruning of VINES. } See the article { PRUNING.
For the Planting of VINES. } VINEYARD.

VINEA, in fortification. See MANTELET.

VINEGAR*, *Acetum*, an agreeable, acid, penetrating liquor, prepared from wine, cider, beer, and other liquors; and of considerable use, both as a medicine, and a sauce.

* The word is French, *vinaigre*; formed from *vin*, wine; and *aigre*, sour. See WINE.

Wine, and other vinous liquors, are said to gain a grateful sharpness, *i. e.* to become *vinegar*, by having their salts exalted by infolation, or other means; and their sulphurs weakened and depressed.

Others ascribe the conversion of vinous liquors into *vinegar*, to the grinding or sharpening of the longitudinal particles thereof; by which means, they become more sharp and pungent.

The method of making *vinegar* has long been kept a secret among the people of that profession; who, it is said, oblige themselves to each other by oath not to reveal it: but, notwithstanding this, the *Philosophical Transactions*, and some other late writings, furnish us with approved accounts thereof.

Method of making Cider VINEGAR.—The cider (the meanest of which will serve the purpose) is first to be drawn off fine into another vessel, and a quantity of the must, or pouz, of apples to be added: the whole is then to be set in the sun, if there be a convenience for the purpose; and, at a week or nine days end, it may be drawn off.

Method of making Beer VINEGAR.—Take a middling sort of beer, indifferently well hopped; into which, when it has worked well, and is grown fine, put some rape, or the hulks of grapes, usually brought home for that purpose: malm them together in a tub; then, letting the rape settle, draw off the liquid part, put it into a cask, and let it in the sun as hot as may be; the bung hole being only covered with a tile, or slate-stone: and in about thirty or forty days, it will become a good *vinegar*, and may pass in use as well as that made of wine, if it be refined, and kept from turning musty.

Or *vinegar* may be made thus:—To every gallon of spring water, add three pounds of Malaga raisins; which put into an earthen jar, and place them where they may have the hottest sun from May till Michaelmas: then pressing all well, tun the liquor up in a very strong iron-hoped vessel, to prevent its bursting: it will appear very thick and muddy, when newly pressed; but it will refine in the vessel, and be as clear as wine.—Thus let it remain untouched for three months, before it be drawn off, and it will prove excellent *vinegar*.

To make Wine VINEGAR.—Any sort of vinous liquor, being mixed with its own faeces, flowers, or ferment, and its tartar first reduced to powder; or else with the acid and austere stalks of the vegetable from whence the wine was obtained, which hold a large proportion of tartar; and the whole being kept frequently stirring in a vessel which has formerly held *vinegar*, or set in a warm place full of the steams of the same, will begin to ferment a-new, and conceive heat, and will grow four by degrees, and soon after turn into *vinegar*.

The remote subjects of acetous fermentation, are the same with those of vinous; but the immediate subjects of it, are all kinds of vegetable juices, after they have once undergone that fermentation which reduces them to wine: for it is absolutely impossible to make *vinegar* of must, the crude juice of grapes, or other ripe fruits, without the previous assistance of vinous fermentation.

The proper ferments for this operation, whereby *vinegar* is prepared, are—1°. The faeces of all acid wines.—2°. The lees of *vinegar*.—3°. Pulverized tartar; especially that of renish wine, or the cream or crystals thereof.—4°. *Vinegar* itself.—5°. A wooden vessel well drenched with *vinegar*, or one that has long been employed to contain it.—6°. Wine that has often been mixed with its own faeces.—7°. The twigs of vines, and the stalks of grapes, currants, cherries, or other vegetables of an acid austere taste.—8°. Bakers leaven, after it is turned acid.—9°. All manner of ferments, compounded of those already mentioned.

Vinegar is no production of nature, but a mere creature of art: for verjuice, the juices of citrons, lemons, and the like native acids, are improperly said to be natural *vinegars*; because, when distilled, they afford nothing but vappid water: whereas it is the property of *vinegar* to yield an acid spirit by distillation.

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Method of making VINEGAR in France.—The French use a method of making *vinegar* different from that above described.

—They take two very large oaken vessels, the larger the better, open at the top; in each whereof they place a wooden grate, within a foot of the bottom: upon these grates, they first lay twigs, or cuttings of vines, and afterwards the stalks of the branches, without the grapes themselves, or their stones; till the whole pile reaches within a foot of the brim of the vessels: then they fill one of these vessels with wine to the very top, and half fill the other; and with liquor drawn out of the full vessel, they fill up that which was only half full before; daily repeating the same operation, and pouring the liquor back from one vessel to the other; so that each of them is full, and half full by turns.

When this process has been continued for two or three days, a degree of heat will arise in the vessel which is then but half full, and will increase for several days successively without any appearance of the like in the vessel which happens to be full during those days; the liquor whereof will still remain cool: and as soon as the heat ceases in the vessel that is half full, the *vinegar* is prepared: which, in the summer, happens on the fourteenth or fifteenth day from the beginning; but in the winter, the fermentation proceeds much slower: so that they are often obliged to forward it by artificial warmth, or the use of stoves.

When the weather is exceeding hot, the liquor ought to be poured off from the full vessel into the other twice a-day: otherwise, the liquor would be over-heated, and the fermentation would prove too strong; whence the spirituous parts would fly away, and leave a vappid wine, instead of *vinegar*, behind.

The full vessel is always to be left open at the top, but the mouth of the other must be closed with a cover of wood; in order the better to keep down and fix the spirit in the body of the liquor; for otherwise, it might easily fly off in the heat of fermentation.—The vessel that is only half full seems to grow hot, rather than the other, because it contains a much greater quantity of the vine-twigs and stalks, than that, in proportion to the liquor; above which the pile rising to a considerable height, conceives heat the more, and so conveys it to the wine below.

VINEGAR of Antimony, is an acid spirit, best made by distillation from the ore of antimony.

Its use is commended in continued and malignant fevers.

The apothecaries have, likewise, a kind of theriacal *vinegar*, acetum theriacale, made of Venice treacle digested in wine *vinegar*.

VINEYARD, VINETUM, a plantation of vines. See VINE.

The best situation of a *vineyard*, is on the declivity of an hill lying to the south. See EXPOSURE.

The vine is to be propagated by slips, layers, or suckers, planted in a nursery, and thence transplanted, about February, into the *vineyard*.

As to the soil, it is agreed, nothing can be too dry for them: and as to the sorts of vines, none but the forward ones ought to be planted in England.—These are found to ripen very well in open borders, without walls.

They are to be planted in lines running north and south, five or six foot apart; and only two vines in each hole.—

The September following, the shoots of that summer are to be pruned shorter, according to their strength; and the summer following, the strongest will begin to throw a little fruit.

—They are then to be supported with stakes, &c. so as they may run about a foot above ground: the higher they run, the less danger they are in of being spoiled with wet; but the lower they are, the sweeter will be the grapes, and the stronger wine.

If, notwithstanding due pruning, they do not seem inclinable to bear large bunches, the ground is to be helped with a mixture of rubbish of some old building, with sea-coal ashes, or drift sand.—Thus managed, a *vineyard*, in five or six years, will produce good store of grapes.

The celebrated *vineyard* at Bath, containing about six acres of ground, planted with white muscadine, and black cluster grapes, Mr Bradley assures us, by such management, some years ago, yielded sixty hogheads of wine at a vintage: though in the year 1721, it only yielded three hogheads.

The same author mentions a little *vineyard* of a private person at Rotherhith; which, though only consisting of 100 vines, and some of them only of the second year's growth, yielded, at a vintage, 95 gallons of wine; which, he adds, had the true Burgundy flavour, as being made from that sort of grape: and exceeded any made from any *vineyard* on this side Paris.

VINOUS, VINOSUS, something that relates to wine; or that has the taste, and smell thereof. See WINE.

All vegetables, by a due treatment, afford a *vinous* liquor; as corn, pulse, nuts, apples, grapes, &c.

A second fermentation, dily managed, turns any *vinous* liquor into an acetous one.

The proper character, and effect of fermentation, is to produce

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duce either a *vinous*, or an acetous quality in the body fermented.

Some of our countrymen, bound on a voyage to the East Indies, having filled several casks with Thames-water, to carry along with them; observed an intestine motion in it, when they came to the equator; and found it afterwards turned into a kind of *vinous* liquor, capable of affording an inflammable spirit by distillation.

This, without dispute, proceeded from the flowers, leaves, roots, fruits, and other vegetable matters, continually falling, or washed down in that river.—And such waters are always found in a state of putrefaction, ere they put on a *vinous* nature.

VINTAGE, the crop of wine, or what is got from the vines each season.

The word is also used for the time or season of gathering, or pressing the grapes.

In France, a decree or ordinance of the proper judge, and a solemn publication thereof, are required, before the *vintage* can be begun.

VINUM, a liquor, or drink, popularly called *wine*. See *WINE*.

VINUM, in medicine, *Vinum Medicatum*, is particularly applied to several medicated wines, i. e. medicinal preparations, whereof wine is the basis; such as the

Vinum Aloysi, or wormwood wine; made of the great or little *alysanthium*, by taking the apices, or tops, with the flowers, putting them in a faculus, or bag, and suspending it in the middle of a vessel of wine; which fermenting, extracts the taste, smell, and virtues of the wormwood.

Vinum Aromaticum, made by infusing aromatics, or spices, in new wine, or must.

Vinum Cydonites, quince-wine; made of slices of that fruit, steeped in must, or new wine.

Vinum Emeticum, emetic wine; is wine wherein the glass, or regulus of antimony, or crocus metallorum, have been steeped.

This only takes a certain degree of efficacy from the matters; nor is it found any stronger at three months end, than at the end of eight days.—It purges both upwards, and downwards.

Vinum Hippocraticum, or *Hippocras*; so called of *manica Hippocratis*, or Hippocrates's sleeve, through which it is strained; is a sort of spiced wine, in which sugar and spices have been steeped for some time.

Vinum Marinum, sea-wine; is made by casting sea-water on the grapes in the vat.

Vinum Picatum, pitched wine; is made of pitch infused in must.

Vinum Rosatum, rose-wine; is made by steeping roses for three months in wine.

VINUM, and *acetum*, *scilliticum*. See *SCILLA*.

Vinum Strabitis, or pine-apple wine:—*Vinum hyssopites*, hyssop-wine. See *PINE*, and *HYSSOP*.

VIOL, *VIOLA*, a musical instrument, of the same form with the *violin*; and struck, like that, with a bow.

There are *viols* of divers kinds.—The first, and principal, among us, is the *bass-viol*, called, by the Italians, *viola di gamba*, or the *leg-viol*; because held between the legs. It is the largest of all; and is mounted with six strings. Its neck is divided in half notes, by seven frets fixed thereon. Its sound is very deep, soft, and agreeable.—The tablature, or music for the *bass-viol*, is laid down on six lines, or rules.

What the Italians call *alto viola*, is the counter-tenor of this; and their *tenore viola*, the tenor. They sometimes call it, simply, the *viol*: some authors will have it the *lyra*, others the *cithara*, others the *chelys*, and others the *testudo* of the ancients.

2°. The *love-viol*, *viola d'amore*, which is a kind of triple *viol*, or violin; having six brass or steel strings, like those of the harpsicord.—This yields a kind of silver sound, which has something in it very agreeable.

3°. A *large viol*, with 44 strings, called, by the Italians, *viola di bardone*; but little known among us.

4°. *Viola bastarda*, or *bastard viol*, of the Italians; not used among us: Brossard takes it to be a kind of *bass-viol*, mounted with 6 or 7 strings, and tuned as the common one.

5°. What the Italians call *viola di braccio*, *arm-viol*; or, simply, *braccio*, *arm*; is an instrument answering to our counter-tenor, treble, and fifth violin.

6°. Their *viola prima*, or *first viol*, is really our counter-tenor violin; at least, they commonly use the cliff *c sol ut* on the first line, to denote the piece intended for this instrument.

7°. *Viola secunda*, is much the same with our tenor violin; having the cliff of *c sol ut* on the second line.

8°. *Viola terza*, is nearly our fifth violin; the cliff *c sol ut* on the third line.

9°. *Viola quarta*, or *fourth viol*, is not known in England, or France: though we frequently find it mentioned in the Italian compositions; the cliff on the fourth line.

Lastly, their *violetta*, or little *viol*; is, in reality, our triple *viol*: though strangers frequently confound the term, with what we have said of the *viola prima*, *secunda*, *terza*, &c.

VIP

VOZ, is also a term used among mariners, when a hawser, or strand-rope is bound fast with nippers to the cable, and brought to the jee-capstan, for the better weighing of the anchor, where the main capstan proves insufficient.

VIOLATION, the act of *violating*, i. e. forcing a woman, or committing a rape upon her.

Amnon, David's son, *violated* his sister, who was avenged by Absalom: Tereus *violated* his sister-in-law Philomela.—To *violate* the queen, the king's eldest daughter, or the princess of Wales, is high treason.

VIOLATION, is also used, in a moral sense, for a breach, or infringement of a law, ordinance, or the like.

Thus, we say, a *violation* of the law of nature, of a treaty of peace, of one's oath, &c.—The law of nations was *violated* in the insult offered to Mr S—— the king's ambassador at Madrid.

VIOLATION, is also used for a profanation.—In which sense, we say, to *violate* a church, &c.

VIOLENT, in the schools, a thing done by force.—In which sense it stands opposed to *spontaneous*. See *SPONTANEOUS*.

A thing is said to be *violent*, when effected by some external principle; the body that undergoes it contributing nothing thereto, but struggling against it.

The body, in such case, is said to *struggle*, by reason whatever is *violent*, discomposes and distracts a thing from its natural constitution, and tends to destroy it.

The schoolmen all allow, that man, as being endued with reason, is capable of suffering such *violence*; but brute and inanimate bodies are not: *in brutum*, &c. *violentem non cadit*.

VIOLENT Motion. See the article *MOTION*.

VIOLIN, *VIOLINO*, *Fiddle*, a musical instrument, mounted with four strings, or guts; and struck, or played with a bow.

The *violin* consists, like most other instruments, of three parts; the *neck*, the *table*, and the *soundboard*.

At the side are two apertures, and sometimes a third towards the top, shaped like a heart.

Its bridge, which is below the apertures, bears up the strings, which are fastened to the two extremes of the instrument; at one of them, by a screw, which stretches, or loosens them at pleasure.

The style and sound of the *violin*, is the gayest and most sprightly of all other instruments; and hence it is, of all other, the fittest for dancing. Yet there are ways of touching it, which render it grave, soft, languishing, and fit for church, or chamber music.

It generally makes the treble, or highest parts in concerts.—Its harmony is from fifth to fifth. Its play is composed of bass, counter-tenor, tenor, and treble; to which may be added, a fifth part: each part has four fifths, which rise to a greater seventeenth.

In compositions of music, *violin* is expressed by V: two V V denote two *violins*.

The word *violin*, alone, stands for *treble violin*: when the Italians prefix *alto*, *tenore*, or *basso*, it then expresses the counter-tenor, tenor, or bass-violin.

In compositions, where there are two, three, or more different *violins*, they make use of *primo*, *secunda*, *terza*, or of the characters 1° 2° 3°, or 1° 2° 3°, &c. to denote the difference.

The *violin* has only four strings, each of a different thickness, the smallest whereof makes the *c si mi* of the highest octave of the organ; the second, a fifth below the first, makes the *a mi la*; the third, a fifth below the second, is *d la re*; lastly, the fourth, a fifth below the third, is *g re sol*. Most nations, ordinarily, use the cliff *g re sol* on the second line, to denote the music for the *violin*; only in France, they use the same cliff as the first line at bottom: the first of these methods is best, where the song goes very low; the second, where it goes very high.

The *VIOLONCELLO* of the Italians, is properly our fifth *violin*, which is a little bass *violin*. half the size of the common bass *violin*, and its strings just half as thick, and half as long; which renders the sound just an octave higher than the same.

The *VIOLONE* is a double bass, almost twice as big as the common bass *violin*, and the strings bigger and longer, in proportion; and consequently, its sound an octave lower than that of our bass *violin*: which has a noble effect in great concerto's. See *VIOL*.

VIPER, *VIPERA*, in natural history, a kind of serpent, famed not only for the exceeding venomousness of its bite, which is one of the most dangerous poisons in the animal kingdom, but also for the great usefulness of its skin in medicine: whence vipers come to make a considerable article in the materia medica.

This remarkable reptile, has the biggest and flattest head of all the serpent-kind. Its usual length is about half an ell; and its thickness an inch: its snout is not unlike that of a hog. It has sixteen small immovable teeth in each jaw; besides, two other large, sharp, hooked, hollow, transverse canines.

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canine teeth, situate at each side of the upper jaw, which are those that do the mischief: these are flexible in their articulation; and are ordinarily laid flat along the jaw, the animal never raising them but when it would bite.

The roots or bases of these teeth, or fangs, are incompassed with a vesicle, or bladder, containing the quantity of a large drop of a yellow insipid salivous juice.

It has only one row of teeth; whereas many other serpents have two: its body is not at all fetid; whereas the inner parts of the bodies of other serpents are intolerably so.—It creeps but slowly, and never leaps like other serpents; though it is nimble enough to bite, when provoked.

Its body is of two colours, ash-coloured, or yellowish, and the ground speckled with longish brown spots.—The scales under its belly, are of the colour of well polished steel.

The male and female have the organs of generation very perfect; the female *viper* brings forth her young living; whereas all other serpents lay eggs, and hatch them: on which account, the *viper* is ranked among the viviparous animals.

Her young ones come forth wrapped up in thin skins, which break on the third day, and set the animal at liberty.—She brings forth to the number of 20 young; but, they say, only one each day. The antients, particularly Pliny, Galen, &c. believed that the young killed their mother in the delivery; but this is not the only mistake they were guilty of on the subject of the *viper*.—They held also, that it eat cantharides, scorpions, &c. which rendered its poison so very dangerous. Dr Mead observes, that the antients esteemed the *viper* sacred; and that the kings of the East Indies caused cottages to be built for their entertainment, and their killers to be punished with death.—On medals, the *viper* is frequently represented as a symbol of divine power; and as such, given by way of attribute to the antient physicians.

As to the manner wherein the *viper* conveys its poison, authors are a little disagreed.—Francisco Redi, and Moise Charas, have each of them wrote very curious pieces on the subject, but their result is very different.

Redi maintains, that all the venom of the *viper*, is contained in the two vesiculae, or bags, which cover the base of the two canine teeth; whence, upon biting, a yellowish liquor is squeezed out into the wound: where, mixing with the blood, and other juices, it produces those dreadful symptoms.

This hypothesis he maintains, by a good number of experiments; as of animals, viz. cocks, &c. being bit with *vipers*, after these vesiculae and their juice had been taken out; without any signs of poison, or any ill consequence at all.

Charas, on the other hand, maintains, that this yellow liquor is not poisonous; that he has given it to pigeons, as food, without their being at all disordered thereby; that the *viper's* bite he has always found mortal to animals, even after the bag has been taken clear out, as well as before: and lastly, that the poison must lie in the irritated spirits of the *viper*, which it exhales in the ardor of its biting; and which are so cold, that they curdle the blood, and stop the circulation. The controversy between these two ingenious authors, is very extraordinary: their systems are opposite; yet both are maintained by a great number of well attested experiments.

—The public, however, generally give into the sentiment of Sig. Redi; as answering best to the mechanism of the parts. Dr Mead supposes it the true one, in his essay on the poison of the *viper*; and adds to Redi's account, that the poison in the *viper's* bag is separated from the blood, by a conglomerate gland, lying in the lateral anterior part of the os scinipitis, behind the orbit of the eye; from which gland there is a duct, that conveys the poison to the bags at the teeth.—The teeth, he adds, are tubulated for the conveyance and emission of the poison into the wound; but their hollowness does not reach to the apex, or tip of the tooth, but ends in a long slit below the point, out of which slit the poison is emitted.

Thee flits, or perforations of the teeth, Galen tells us, the mountebanks of his days used to stop with some kind of paste; after which, they would publicly expose themselves to be bitten, without danger.

Effects of the bite of the VIPER.—The symptoms following the bite of a *viper*, are an acute pain in the place wounded; swelling, first red, afterwards livid, spreading by degrees; great faintness; a quick, low, and sometimes interrupted pulse; sickness at the stomach; bilious convulsive vomiting; cold sweats; sometimes pains about the navel; and death itself, if the strength of the patient, or slowness of the bite, do not prevent it.

If he do overcome it, the swelling continues inflamed for some time; and the symptoms abating, from the wound runs a sanious liquor, little pustules are raised about it, and the colour of the skin is as if the patient were icterical.

By the microscope, the virus was found to consist of minute salts in continual motion; after which a number of spicula, or darts appeared, resembling, but much finer, a spider's

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web.—This, when mixed with fyr. violar, inclined it to red, no ways to green; so that the juice is not alkalous: But Mr Boyle, and Dr Pitcairn, prove the blood to be only an alkaly.

Such a small quantity of the virus, seems to have so great an effect, partly by wounding the fibres, and partly by altering the cohesion of the globules of blood, which, by the elastic matter thereof proves a nimble vehicle, to carry the viperine spicula almost every where suddenly.—These will stimulate and fret the sensible membranes; whereupon, a more than usual afflux of the animal juices may be carried to the parts.

The cure seems very unsettled: Mr Boyle found a hot iron held near the place successful; but it proved otherwise with M. Charas.—Again, the snake-root from the East Indies, immediately applied to the place, is much commended: but Signor Redi, and M. Charas, found it of no use; yet Baglivi, and Dr Havers, give instances of its good success.

Dr Mead adds, that the snake-stone directly applied to a pigeon, when bitten, saved its life four hours; whereas, most of the other pigeons bitten died in half an hour.

This stone is not natural, but factitious; its virtue lies in its porosity, which is supposed to imbibe the virus.

The *viper*-catchers, Dr Mead adds, have a specific, in which they can so far confide, as not to be afraid of being bitten.—That specific is, the axungia of the *viper* presently rubbed into the wound; which consisting of clammy, viscid, penetrating, and active parts, sheaths the salts of the virus.

The same author, applying it to the nostrils of a dog bitten, found the creature well the next day: when this is not timely applied, and the virus has insinuated into the blood, the *sal. viper.* is excellent, given and repeated till sweats be produced.—This succeeded well with M. Charas; and Dr Mead relates, that it recovered one, after the virus had induced an universal icterus.

Vipers make a considerable article in medicine.—Most authors agree, that there is no part, humour, or excrement, not even the gall itself, of a *viper*, but may be swallowed without harm.—Accordingly, the antients, and, as several authors assure us, the Indians, as well as many other people, at this day, both of the east and west, eat them as we do eels.

Caro viperina, *viper's* flesh, either roasted or boiled, the physicians unanimously prescribe as an excellent restorative; and particularly in the elephantiasis, incurable consumptions, leprosy, &c. and Dr Mead thinks, they might be less sparing in the quantity than they are; instead of a little *viper's* flesh, he recommends the broth, or jelly of *vipers*; or, as the antients did, to boil and eat them as fish, or at least, to drink vinum viperinum, i. e. wine wherein they have been long infused.

Viper's flesh is an ingredient in several of our best antidotes; as the theriaca andromach, &c.

The apothecaries also sell the pulvis viperinus, which is only dried *vipers* pulverized, heart, liver, and all, and passed through a sieve.—This, to heighten the price, we suppose, the call animal bezoard. See BEZOARD.

The *salts of vipers*, whether volatile, or fixed, also their fat, or axungia, and their oil, chymically drawn, are drugs in good repute.

VIPER-WINE. See the article WINE.

VIRAGO*, a woman of extraordinary stature and courage; and who, with the female sex, has the mein and air of a man, and performs the actions and exercises of men.

* The word is pure Latin, formed from *vir*, man; and is seldom used, but in the way of diversion.

Such were Semiramis, and Penthesilea, among the antients, and Jeanne la Pucelle, commonly called the maid of Orleans, among the moderns.

In the vulgate version of the Bible, Eve is called *virago*, because made of the rib of the man.—The Latin translator, by this, aimed to preserve the etymology as it is in the Hebrew, and of *vir*, formed *virago*; as Adam, in the Hebrew text, called Eve *Ischa*, of isch, man.

VIRGA. See the article YARD.

VIRGA*, is particularly used in law for a verge, or rod, such as sheriffs and bailiffs carry, a badge of their office. See VERGE.

* —Ranf. ap Houel, *praepositus de Lontiffin amerciatu pro eo quod habuit in manu sua coram iusticiariis hic virgam nigram et inbonselam, ubi habere debuisset virgam album et honestam certe longitudinis, prout deest.* In test. liti. de Cardiff. 7 Hen. VI.

VIRGÆ, in physiology, a meteor, called also *columnellæ*, and *funes tentorii*; being an assemblage of several streams of light, representing a bundle of rods, or ropes.

It is supposed owing to the streaming of the sun-beams through certain rimulae, or chinks; at least, through the more lax and open parts of a watery cloud; happening chiefly in the morning and evening.

There is also another kind, consisting not of streams of mere white light, but, as it were, painted of various colours; like those of the rainbow.

VIRGATA Terra; or **VIRGA terra**, a yard-land. See YARD-LAND.

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VIRGATORES *Servientes*, in Fleta, are vergers, or tip-staves, who attend the judges. See **VERGER**, and **SERJEANT at Arms**.

VIRGIN, **VIRGO**, a female who has had no carnal commerce with man; or, more properly, who has still the *flor virginis*, or maiden-hood.

In the Roman Breviary, there is a particular office for *virgins* departed, answering to those for saints, martyrs, and confessors. Critics and antiquaries are much divided about a feast held in that church in honour of S. Ursula, and her companions; who are said in the Ritual, Legend, &c. to have been eleven thousand *virgins*.

Some imagine there has been a mistake in reading the ancient rituals, wherein XI M. V. which was only an abbreviation of *eleven virgin martyrs*, was read according to the numeral letters, *eleven thousand virgins*.—F. Sirmond conjectures, that in the ancient lists of martyrs, there were found S. S. Ursula, and Undecimilla V. M. and that in lieu of Undecimilla, which is the name of a *virgin martyr*, the copists had made *undecimilla*, which is eleven thousand.

By the Mosaic law, the priests are enjoined to take none to wife but those that are *virgins*: the widows, the divorced, and the harlot, are to be refrained from.

VIRGIN is also applied, by way of eminence, to Mary the mother of our Saviour; as conceiving, and bringing him forth without any breach of her chastity.

The fathers, many of whom, with the modern churches, hold that the *virgin* not only conceived, but brought forth, or was delivered, without breach of her virginity; otherwise, says S. Augustin, it would be false which is said in the creed, that he was born of a *virgin*.—'Tis even alledged, that she still remained a *virgin* to the end of her life: whence the Greeks always call her *αειπάρθενη*, *ever virgin Mary*; and after them the Latins, *semper virgo*. Though, as this is not recorded in holy writ, many have denied it, and held, that she had afterwards to do with Joseph, and bore other children; and this as early as the time of Origen. Tertullian himself is produced as one that denied the perpetual virginity: and the like may be said of Apollinaris and Eunomius, with their followers. These impugnors of the perpetual virginity encreased afterwards to a great number, and are called by Epiphanius, *Antidicomarianitæ*; and were condemned under that name by the sixth general council. The same were also called by the Latins *Helvediani*, from Helvedius, a disciple of Auxentius, whose name was made use of as having been refuted by S. Jerom. He was followed by Jovinian, a monk of Milan, as Jerom testifies; though S. Augustin speaks otherwise, viz. that he held, that the *virgin* lost her virginity in bringing forth: And Bonosus, a bishop in Macedonia, was condemned for the same position.

Their error was founded on the same subtle interpretations of scripture: as, because S. Matthew says, that Joseph knew not Mary (*ὅτι*) 'till she had brought forth her first-born: from hence they infer, that he knew her afterwards: so because he was called her first-born, they argue, that she must have had a second.—But the Jewish law determines what is meant by first-born, and affixes it to the apertion of the womb: *primogenitum omne quod aperit vulvam*, Luke ii. 22, 23.—But they add, that mention is made of the mother and brethren of Jesus; John ii. 12, and Matth. xii. 46. But this the ancient fathers, especially of the Greek church, explain, after Origen, of some children of Joseph by a former wife, of which some make six; the eldest of which was James, the brother of our Lord: But in reality there seems no necessity of supposing, from these texts, that Joseph had any other offspring; because the language of the Jews included in the name of brethren, not only the strict relation of fraternity, but also the larger of consanguinity.

But the Helvedians further argue, that the scriptures not only call them the brothers of Christ, but declare them to be the sons of Mary: for that the Jews, Matth. xiii. 35, say, "Is not his mother called Mary, and his brethren James, and Joses, and Simon, and Judas?"—To this bishop Pearson answers, That Mary the mother of James and Joses was a different person from Mary the *virgin*; which he shews, by comparing the accounts of John xix. 25, Matth. xxvii. 56, and Mark xv. 40, where this Mary the mother of James, and the sister of Mary the *virgin*, is represented as the wife of Cleophas. Nestorius and his adherents maintained, that the *virgin* could not, with any propriety, be called the *mother of God*; as being really no more than the *best of God*: for that the eternal Word could not be conceived, and born of the womb of a *virgin*.

This heresy was condemned at the council of Ephesus; yet it has been lately revived in Holland, chiefly by a refugee monk, one Renoult.

Charity of the holy VIRGIN. } See { **CHARITY**.
Presentation of the VIRGIN. } { **PRESENTATION**.

VIRGIN is also applied, figuratively, to several things that retain their absolute purity, and have never been made use of.—Thus,

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VIRGIN-WAX, is that which has never been wrought, but remains as it came out of the hive. See **WAX**.

VIRGIN-OIL, is what oozes spontaneously from the olive, &c. without pressing.

VIRGIN GOLD, is that metal such as it is found pure in the mine, without any mixture or alloy; in which state it is sometimes so soft, that it will take the impression of a seal.

VIRGIN COPPER, is a native copper found in the mine, and which has never been melted down.

VIRGIN QUICKSILVER, is that found perfectly formed, and fluid, in the veins of mines; or, at least, such as is got from the mineral earth, by mere lotion, without fire.

VIRGIN PARCHMENT, is that made of the skin of an abortive lamb, or calf.

VIRGIN SULPHUR. } See the article { **SULPHUR**.
VIRGIN'S MILK. } { **LAC VIRGINALE**.

VIRGIN'S THREAD, a sort of meteor that flies in the air, like small untwisted silk; and which falling upon the ground, or upon plants, changes itself into a substance like a spider's web. In these northern climates, it is most frequent in summer; the days being then temperately warm, the earth not exceeding dry, nor yet overcharged with moisture.

This has formerly passed for a sort of dew, of an earthy, slimy nature: but naturalists are now agreed, that the *virgins threads* are no other than so many spiders webs.

VIRGINALE CLAUSTRUM, in anatomy, the same as *hymen*.
VIRGINEUS MORBUS, the *virgin's disease*; the green-sickness, or chlorosis.

VIRGINIS SPICA. See the article **SPICA**.

VIRGINITY, **VIRGINITAS**, the test or criterion of a *virgin*; or that which entitles her to the denomination.

In the first ages of the Christian church, *virginity* grew into great honour and esteem; inasmuch, that the women were admitted to make solemn vows thereof in public.—Yet was it held infamous among the Jews, for a woman to die a maid. The vestals, among the antients, and the nuns or religious, among the moderns, found guilty of a breach of the vow of *virginity*, are allotted a severe punishment; the first to be buried alive, the latter to be immured.

The physicians, both ancient and modern, are exceedingly divided upon the subject of *virginity*: some holding that there are no certain marks, or testimonies thereof, and others that there are. Solomon says expressly, there are four things too wonderful for him to know: "The way of an eagle in the air; of a serpent on the rock; of a ship in the midst of the sea; and the way of a man in a maid;" which our translators have rendered, less justly, *the way of a man with a maid*.

Yet Moses established a test, which was to be conclusive among the Jews.—The nuptial sheets, it seems, were to be viewed by the relations on both sides; and the maid's parents were to preserve them as a token of her *virginity*; to be produced, in case her husband should ever reproach her on that score. In case the token of *virginity* was not found thereon, she was to be stoned to death at her father's door.

This test of *virginity* has occasioned abundance of speculation about the parts concerned; but the nice inquiries cannot settle any thing certain about them.—Dr Drake says expressly, that, whatever might be expected among the Jews, there is not the same reason to expect those tokens of *virginity* in these countries: for besides, that the Hebrews married extremely young, as is the custom in all the eastern countries, there are several circumstances which may here frustrate such expectations, even in virgins not vitiated either by any male contact, or any wantonness of their own.

In effect, in these northern climates, the inclemency of the air exposes the sex to such checks of perspiration, as gives a great turn to the course of the humours, and drives to much humidity through the parts, as may extraordinarily supple and relax those membranes from which the resistance is expected; and from which, in hotter countries, it might more reasonably be depended on.

What most commonly passes among us for a test of *virginity*, is the hymen: and yet the most curious among the anatomists are greatly divided not only about the figure, substance, place, and perforations of this famous membrane, but even about the existence thereof; some positively affirming, and others as flatly denying it.

As nice a point as that of *virginity* is among anatomists, the midwives and matrons treat it with less diffidence.—In the statues of the sworn matrons, or midwives, of Paris, containing likewise divers formula's of reports, and depositions made in court, upon their being called to visit girls that made their complaint of being deflowered, they lay down fourteen marks whereon to form a judgment.

Laur. Joubart, a famous physician of Montpellier, has transcribed three of these reports: one made to the provost of Paris, another in Languedoc; and a third in Bearn.—These reports are very consistent with each other; and contain fourteen marks of *virginity*, expressed in their proper terms; such as were received among the women of that profession, and authorized in court.

M. Joubert does not explain those terms; nor do we find any explanation of them any where, but in another report of the 23d of October 1672, inserted in the *Piſture of Love* of Venette, a phyſician of Rochel; a copy of which, we ſhall here give in Engliſh.

We, Mary Miran, Chriſtophette Reine, and Jeanne Porte Pouillet, ſworn matrons of the city of Paris, certify to all thoſe whom it may concern, that on the 22d of October, in this preſent year, at the appointment of Monſieur the provot of Paris, we went into the ſtreet de Pompiere, to a houſe next the ſign of the ſilver key, to view and viſit Olive Tiſſerand, of the age of 30 years; on a complaint made by her in court againſt James Mudont, citizen of Roche ſur Mer, for forcing and violating her the ſaid Olive: and having viewed and examined the whole with the eye, and finger, we find;

Les tetons deſcovez, that is, the breasts looſe and flaccid, *mammae marcidæ & flaccidæ*: *Les barres froiſſes*, i. e. the os pubis bruised, *os pubis colluſum*: *Le lippion recoquillé*, i. e. the hair curled up, *pubes in orbem ſinuata*: *L'entrepied ridé*, i. e. the perineum or ſcam wrinkled, *perinaeum corrugatum*: *Le poutant debiffé*, i. e. the vulva, or pudendum, tumbled and diſordered, *vulva diſſoluta & marceſcens*: *Les balanaux pendans*, i. e. the labia hanging down, *labia pendencia*: *Le lippendis pile*, i. e. the edge of the labia bared of hair, *labiorum ora pilis deſectæ*: *Les baboles abbatues*, i. e. the nymphæ beat down, *nymphæ depreſſæ*: *Les halerons demis*, i. e. the carunculae undone, or opened, *carunculae diſſolutæ*: *L'entrecheat retourné*, i. e. the membranes which connect the caruncules inverted, *membrana connectens inverſa*: *Le barbidau ecorché*, i. e. the clitoris excoriated, *clitoris excoriata*: *Le guilboquet fendu*, i. e. the neck of the womb torn, *collum uteri dilaceratum*: *Le guillenard elargi*, i. e. the vagina ſtretched, or widened, *vagina dilatata*: *La dame du milieu retirée*, i. e. the hymen broke and gone, *hymen deductum*: *L'arriere ſeſſe ouverte*, i. e. the inner orifice of the womb opened, *os internum matricis apertum*. — *Le tout veu & viſité ſeuillet par ſeuillet nous avons trouvé qu'il y avoit trace de*—The whole viewed and examined part by part, we find plainly the track or foot-ſtep of — *Omnibus ſigillatim perſpectis & perſcrutatis*, &c.—Accordingly we, the ſaid matrons, do certify it to be true, to you, Monſieur le provot, on the oath we have taken.—Done at Paris the 23d of October, 1672.

In Peru, and ſeveral other provinces of South-America, we are aſſured by Pedro de Cieca, in the hiſtory of the Yncas, &c. that the men never marry, but on condition that the next relation, or friend of the maid's, ſhall undertake to enjoy her before him, and take away her virginity. — And our countryman Lawſon relates the like of ſome of the Indian nations of Carolina. — So little is the *ſlas virginis*, prized to much among us, valued by them.

VIRGO, in aſtronomy, one of the ſigns, or conſtellations of the zodiac, into which the ſun enters in the beginning of Auguſt. The ſtars in the conſtellation *Virgo*, in Ptolemy's catalogue, are 32; in Tycho's, 39; in the Britanniæ, 89. — The longitudes, latitudes, magnitudes, &c. whereof, are as follows:

Names and Situations of the Stars.	Right Aſc.	Longit.	Latitude.	Magnit.
That preced. <i>Virgo's</i> head	17 30 05	5 19 13	N 6	6
North. in the top of the head	19 00 29	6 6 21	N 5	5
South.	19 49 35	4 35 39	N 5	5
Subſeq. and leſs in the top of the head	19 37 15	6 21 33	N 6	6
In the bend of the ſouth. wing	22 46 14	0 40 47	N 3	3
5	21 09 47	7 14 53	N 6	6
South. in the face	24 12 31	3 20 31	N 5	5
North.	23 13 29	6 8 52	N 5	5
	23 23 06	8 31 29	N 5	5
	27 08 22	2 42 52	N 6	6
10	25 39 56	6 19 31	N 6	6
	24 38 13	10 44 24	N 6	7
	21 06 44	1 8 8	N 6	6
	3 39 31	6 16 20	S 7	7
	30 52	1 22 1	N 4	3
Preced. in the ſouth. wing	29 2 17	5 4 22	N 5	5
That in the neck	28 44 8	7 7 4	N 6	6
	29 7 52	12 43 22	N 6	6
	7 9 52	5 19 47	S 6	6
In the ſouth. arm	6 29 0	1 42 25	S 6	6
20				
Fiſt of three under ſouth. arm	7 50 38	3 27 23	S 5	5
	1 3 53	13 41 37	N 6	6
	8 15 49	2 44 25	S 6	6
Second of the ſouth. wing	5 52 11	2 48 53	N 3	3
Preced. of three in the north. wing	1 10 33	13 32 49	N 5	5
25				
	2 36 19	10 24 41	N 6	6
South. of the north. wing	3 6 26	11 34 19	N 5	6
	2 28 51	13 22 45	N 6	7
	1 42 23	15 38 52	N 6	6
	1 10 31	17 47 57	N 6	6

Names and Situations of the Stars.	Right Aſc.	Longit.	Latitude.	Magnit.
30				
	6 20 45	7 55 15	N 7	7
	11 31 30	3 3 16	S 6	6
Middle under the ſouth. arm	11 52 25	3 25 22	S 5	5
	3 3 20	6 43 39	N 6	6
In the north. ſide againſt the girdle	7 9 55	8 38 27	N 3	3
35				
Third of the ſouth. wing	10 52 55	2 21 50	N 6	6
	10 55 41	2 51 50	N 7	7
Upper of north. wing. <i>vindemiatrix</i>	5 37 40	16 12 34	N 3	3
	11 47 47	2 55 7	N 7	7
Third under the ſouth. arm	15 25 09	3 16 3	S 5	5
40				
	14 44 20	1 26 51	S 6	6
	15 41 25	2 42 31	S 6	6
Fourth and laſt of the ſouth. wing	13 54 23	1 45 29	N 4	4
Fiſt of three under ſpica	18 25 56	7 53 20	N 4	5
	19 46 20	10 12 6	S 6	6
45				
	20 30 30	11 6 24	S 6	6
That following <i>vindemiatrix</i>	9 41 24	16 13 6	N 7	7
That following north. wing	11 27 17	12 39 30	N 5	5
Middle under ſpica	20 43 10	9 59 53	N 4	5
	21 29 8	8 19 33	S 5	6
50				
	13 52 05	9 58 50	N 7	7
	12 39 6	12 48 11	N 6	6
In ſouth. hand	19 31 23	2 1 59	S 1	1
Underneath ſpica	20 26 48	3 18 24	S 6	6
Laſt, and north. of three under ſpica	21 49 15	6 17 54	S 5	6
55				
	10 38 12	21 24 25	N 6	6
	12 4 17	18 42 49	N 6	6
North. of preced. in ſquare of thigh	18 39 18	2 47 25	N 5	5
	23 52 19	8 26 42	S 5	5
Second	19 16 27	3 8 55	N 6	6
60				
	22 48 30	5 14 34	S 6	6
South. of preced. in ſquare of thigh	20 55 51	0 24 7	S 6	6
	19 44 11	2 55 30	N 7	7
Another follow. north. wing	16 3 45	12 33 1	N 6	6
Under the girdle, as in the hip	17 49 50	8 39 9	N 3	3
65				
Third in ſquare of thigh	19 46 12	4 15 21	N 6	6
	21 10 4	2 9 18	N 6	6
North. of thoſe foll. in ſquare of thigh	22 33 31	1 43 45	N 6	6
That over the girdle	18 15 4	13 16 45	N 6	6
	25 44 18	4 59 33	S 7	7
70				
	25 50 19	4 30 31	S 6	6
In ſouth. knee	24 43 6	1 21 40	S 5	5
	26 59 34	6 18 29	S 6	6
	23 16 7	4 4 4	N 6	6
	27 39 20	6 21 37	S 5	6
75				
In north. thigh	22 52 22	9 37 22	N 6	6
	22 21 36	12 9 45	N 6	6
That over the north. thigh	23 24 56	13 4 50	N 5	5
	28 10 39	3 41 47	N 6	6
	28 25 25	3 19 59	N 6	6
80				
South. of 3 in the border of garment	22 0 10	40 2 55	N 4	4
Middle in the border	22 29 27	7 15 37	N 4	4
In extrem. of ſouth. foot	22 38 13	0 31 4	N 4	4
North. of three in the garment	22 29 3	3 1 1	N 5	5
	29 33 5	11 30 3	N 5	5
85				
A bright one follow. theſe	22 1 8	14 11 47	N 5	4
In extrem. of the north. foot	5 47 23	9 43 8	N 4	4
	4 22 44	15 50 52	N 6	6
	4 10 50	17 7 21	N 4	4

VIRGULA Divina, or *baculus divinatorius*, a forked branch in form of a Y, cut off a hazle-tree; by means whereof people have pretended to diſcover mines, ſprings, &c. under ground.

The method of uſing it is this: the perſon who bears it walking very ſlowly over the places where he ſuſpects mines or ſprings may be, the effluvia exhaling from the metals, or vapour from the water, impregnating the wood, makes it dip, or incline; which is the ſign of a diſcovery.

We find no mention made of this *virgula* in any author before the eleventh century: but from that time it has been in frequent uſe. Divers fine names have been invented for it, ſome calling it *caduceus*, others *Aaron's rod*, &c.

Some diſpute the matter of fact, and deny it to be poſſible; others, convinced with the great number of experiments alledged in its behalf, look out for the natural cauſes thereof. — The corpufcles, ſay theſe authors, riſing from the ſprings, or minerals, entering the rod, determine it to bow down, in order to render it parallel to the vertical lines which the effluvia deſcribe in their riſe.

In effect, the mineral, or watery particles, are ſuppoſed to be emitted by means of the ſubterraneous heat, or of the fermentations in the entrails of the earth: now the *virgula* being of a light, porous wood, gives an eaſy paſſage to thoſe particles, which, withal, are very fine and lubre; the ef-

fluvia then driven forwards by those that follow them, and oppressed at the same time by the atmosphere incumbent on them, are forced to enter the little interfaces between the fibres of the wood, and by that effort they oblige it to incline or dip down perpendicularly, to become parallel with the little columns which those vapours form in their rise.

VIRGULA, in grammar, a term which Latin, French, and some other authors use for a point in writing, usually called by us comma.

Virgula's, F. Simon observes, are an invention of the modern grammarians, to give the greater clearness to discourse.—The use thereof was unknown to the antient Greeks and Romans, who wrote all without taking off the pen, so that their books lie all together without any distinction of points and *virgula's*.

VIRGULTUM, in our antient law-books, is used for an holt, or plantation of twigs, or ozers.

Sometimes, also, for a coppice of young wood.—*Et præterea concedo virgultum meum & totam communiam domini mei.* Mon. Angl.

In another place of the same work *virgultum*, or rather *virgulta*, may be taken for *virgata*, viz.—*Dedit prædictæ ecclesie unam virgultam terræ in manerio de Grumpton.* See **YARD-Land**.

VIRIDARIO *Eligendo*, a writ that lies for the choice of a verdor in the forest. See **VERDEROR**.

VIRIDE *aris*, the same as *arugo*, or *verdegrees*. See **VERDEGREEN**.

VIRILE, something that belongs, or is peculiar to man, or the male sex.

Thus *virile* member, *membrum virile*, is frequently used for the penis. See **PENIS**.

VIRILE *Age*, *Ætas virilis*, is the strength and vigour of a man's age, viz. from thirty to forty-five years, which is an age wherein we are equally removed from the extremes of youth and of old age.

The civil lawyers only make one age of youth and *virility*; and yet their different temperatures seem to require a distinction; for which reason, some compare youth to summer, and *virility* to autumn.

At Rome, the youth quitted the prætexta at fourteen or fifteen years of age, and took the *virile* gown, *toga virilis*, to shew, it seems, that they then entered on a serious age.

M. Dacier will have it, that children did not take the prætexta till thirteen years of age, nor quit it for the *toga virilis*, till seventeen.

VIRILIA, a man's genitals, or privy members; including the penis, and testes.

The cutting off the *virilia*, according to Brafton, was felony by common law; and that, whether the party were consenting or not.*

*—*Henricus Hall & A. uxor ejus capti & detenti in prisona de Boilechester, eo quod reſtati fuerunt quod ipſi abſciderunt virilia Johannis Monachi, quem idem Henricus deprehendit cum prædicta d. uxore ejus.* Rot. Clauf. 13 Hen. III.

VIRTSUNGIANUS * *Ductus*, or *Ductus* **VIRTSUNGII**, in anatomy, a canal, more usually called *ductus pancreaticus*. See **PANCREATIC**.

* It took its name *virtsungianus*, from the inventor, *Virtsungius*, a professor at Padua.

VIRTUAL, *Potential*, something that has a power, or virtue of acting, or doing.

The term is chiefly understood, of something that acts by a secret invisible cause; in opposition to *actual*, and *sensible*.

VIRTUAL *Focus*, in optics, is a point from which rays, before converging, begin to diverge, or divaricate.

Hence it is also called, *point of diſperſion*, or *divergency*; in opposition to the *focus*, which is called the *point of concurrence*.

Suppoſe, e. gr. the concavity of a glaſs to be *abc* (*Tab. Optics*, fig. 11.) and its axis *d e*; let *f g* be a ray of light falling on the glaſs parallel to the axis *d e*, and let *d* be the centre of the arch *abc*.

This ray *f g*, after it has paſſed the glaſs, at its emerſion at *g*, will not proceed directly to *b*, but will be refracted from the perpendicular *d g*, and become the ray *g k*.

Draw then directly *g k*, ſo that it may croſs the axis in *e*.

—The point *e* ſo found, Mr Molyneux calls the *virtual focus*, or *point of divergency*. Dioptr. Nov.

VIRTUALITY, **VIRTUALITAS**, in the ſchools, denotes ſome mode or analogy in an object, which, in reality, is the ſame with ſome other mode, but out of regard to contradictory predicates, is conſidered as if diſtinct therefrom.

Thus the divine nature, and the perſon of the Word, are two *virtualities*; for though, in reality, they be the ſame, yet are they conſidered as things different.—For the perſon of the Word is ſaid to have been begotten, and his nature is ſaid not to be begotten: now begotten, and not begotten, are contradictory predicates.

And hence ariſe what we call *virtual diſtinctions*, whereby

one *virtuality* is diſtinguiſhed from another, not one thing from another.

Thus it is, the divine nature is diſtinguiſhed from the divine perſon, and the divine underſtanding from the divine will.

VIRTUALLY, **VIRTUALITER**, in the ſchools, is applied to a mode of exiſtence.—A thing is ſaid to be *virtually* any where, when it is deemed to be there by ſome *virtue*, influence, or other effect produced by it.—Thus the ſun is *virtually* on earth, i. e. by his light, heat, &c.

A thing is alſo ſaid to be *virtually* preſent, when the virtues, or properties belonging to it, and iſſuing from it, remain.—In which ſenſe, the forms of the elements are held to be *virtually* in mixed bodies.

A thing is alſo ſaid to be a cauſe *virtually*, or a *virtual cauſe*, and that two ways: the firſt, when there is no real diſtinction between it, and the effect attributed to it; and yet it is conceived by us, as if it were really the cauſe thereof.—Thus, immutability in God, is the cauſe of eternity.

Secondly, when an effect is not of the ſame kind with the cauſe, and yet the cauſe has the power or *virtue* of producing the effect: thus the ſun is not formally, but *virtually* hot; and fire is not contained formally, but *virtually* in heat.

VIRTUE, **VIRTUS**, a term uſed in various ſignifications.

In the general, it denotes *power*, or *perfection* of any thing, whether natural, or ſupernatural, animate, or inanimate, eſſential, or acceſſory.—Hence the *virtues*, that is, powers of God, angels, men, plants, elements, &c.

VIRTUE, in its more proper and reſtrained ſenſe, ſignifies a habit, which improves and perfects the haver, or poſſeſſor, and his actions.

In this ſenſe, *virtue* is a principle of acting, or doing well and readily; and that, either inſuſed from above, ſuch as are *theological virtues*; or acquired by our own application, as the *intellectual*, and *moral virtues*.

For as there are two things in man, from which all his actions proceed, viz. the underſtanding, and the will; ſo the *virtue*, by which he is perfected, or whereby he is diſpoſed to do all things rightly, and to live happily, muſt be twofold: the one, of the underſtanding; the other, of the will! That which improves the underſtanding is called *intellectual*, or *dianoetic*; and that, the will, *moral*, or *ethic*.—For, ſince there are two things required in order to live aright, viz. to know what ſhould be done; and, when known, readily to perform it: and ſince man is apt to err various ways in each reſpect, unleſs regulated by diſcipline, &c. he alone can deport himſelf rightly in his whole courſe of life, whoſe underſtanding and will have attained their utmoſt perfection.

Intellectual **VIRTUE**, then, according to Ariſtotle, is a habit of the reaſonable ſoul, whereby it conceives, or ſpeaks the truth, either in affirming, or denying.

The *virtues* which come under this claſs, are divided into *ſpeculative*; which are thoſe conſervant about neceſſary things, that can only be known, or contemplated; and *practical*, which are conſervant about contingent things, that may likewiſe be praſticed.

Ariſtotle has another diviſion of *intellectual virtue*, fetched from the ſubject; as ſome of them are ſeated in the *νοητικόν*, or *contemplative part*, viz. thoſe conſervant about neceſſary things, as *ſcience*, *wiſdom*, *intelligence*. See **SCIENCE**, **UNDERSTANDING**, &c.

And others in the *λογικόν*, or *practical part*; ſuch as thoſe conſervant about contingent things, as *prudence*, *art*, &c. See **ART**, &c.

Moral **VIRTUE**, is defined by Ariſtotle, to be an elective habit, placed in a mediocrity, determined by reaſon, and as a prudent man would determine.

The Stoicks maintain every moral habit to be indifferent, as to good or evil, and capable of becoming, ſucceſſively, either *virtue* or *vice*: *virtue*, if it have a relation of conformity with right reaſon; and *vice*, if it have not.

According to them, therefore, *virtue* is a habit ſubjectively, but not intuitively, good: as it is only a relation of conformity, &c. which is ſeparable from the entity of the habit. The Thomiſts, on the contrary, aſſert *virtue* to be a habit eſſentially good; nor capable of miſiſting any thing to any act poſitively bad.—And they philoſophize thus: every habit eſſentially good, inclines to acts like thoſe whereby it was acquired: thus, by doing juſtly, we become juſt; and, by abſtaining from forbidden pleaſures, we become temperate. But *moral virtue* is produced, or acquired, by acts aſſentially good; good, we mean, both in reſpect of our duty, and of the motive and end: therefore *moral virtue* inclines only to good acts.

Others diſallow the peripatetic notion of *virtue*, as placed in a habit: for a habit, or habituality, ſay they, includes two things; a cuſtom, and facility: the firſt as a cauſe, and the ſecond as an effect: ſo that a habit is nothing but a facility acquired by cuſtom.—They therefore who make *virtue* a habit of doing well, muſt, of neceſſity, aſcribe it to a frequent

VIS

quent exercise of good actions.—But this cannot be; for the *virtue* must be before the good actions; and the habit, after them.—Indeed, whence should the actions proceed, but from *virtue*? *Virtue* therefore is before the good actions, and certainly before a habit, resulting from a frequency of good actions. Hence, they define *virtue* to be a firm purpose, or resolution of doing whatever right reason demands to be done.—For though a custom of doing well be required, to make a person esteemed good among men; yet it does not follow, that that custom or habit is the formal cause of that denomination, or the goodness itself.

Moralists usually distinguish four *principal*, or, as they are vulgarly called, *cardinal virtues*, viz. *prudence*, *justice*, *fortitude*, and *temperance*: the reason of which division is founded in this, that for a man to live *virtuously* and honestly, it is necessary he know what is fit to be done; which is the business of *prudence*. That he have a constant and firm will to do what he judges best; which will perfect the man, either as it refrains too violent perturbations, the office of *temperance*—

Or, as it spurs and urges on those that are too slow and languid, which is the business of *fortitude*.

Or, lastly, comparatively, and with regard to human society; which is the object of *justice*.

To these four all the other *virtues* are referred, either as parts, or as concomitants.

VIRTUES, in the celestial hierarchy, the third rank, or choir of angels; being that in order between *dominations* and *powers*. To these is attributed the power of working miracles, and of strengthening and reinforcing the inferior angels in the exercise of their functions.

VIRTUOSO, an Italian term, lately introduced into English; signifying a man of curiosity and learning; or one who loves and promotes the arts and sciences.

In Italy, *virtuosi* are properly such as apply themselves to the polite arts of painting, sculpture, turning, mathematics, music, &c.—A person who makes profession thereof, is called *virtuoso*, *questo è un virtuoso*.

Among us, the term seems appropriated to those who apply themselves to some curious and quaint, rather than immediately useful art or study: as antiquaries, collectors of rarities of any kind, microscopical observers, &c.

VIRULENT, a term applied to any thing that yields a *virus*; that is, a contagious, or malignant pus.

The *gonorrhœa virulenta*, is what we popularly call a *clap*.

VIS, a Latin word, signifying *force*, or *power*; adopted by physical writers, to express divers kinds of natural powers, or faculties.

Vis Inertiæ, or *power of Inactivity*, is defined by Sir Isaac Newton, to be a power implanted in all matter, whereby it resists any change endeavoured to be made in its state, *i. e.* whereby it becomes difficult to alter its state, either of rest, or motion.

This power, then, coincides with the *vis resistendi*, power of resisting, whereby every body endeavours, as much as it can, to persevere in its own state, whether of rest, or uniform rectilinear motion: which power is still proportional to the body, and only differs from the *vis inertiæ* of the mass, in the manner of conceiving it.

Bodies only exert this power, in changes brought on their state by some *vis impressa*, force impressed on them.—And the exercise of this power, is, in different respects, both resistance, and impetus: resistance, as the body opposes a force, impressed on it to change its state; and impetus, as the same body endeavours to change the state of the resisting obstacle. *Phil. Nat. Princ. Math. Lib. I.*

The *vis inertiæ*, the same great author elsewhere observes, is a passive principle, by which bodies persist in their motion or rest; receive motion, in proportion to the force impressing it, and resist as much as they are resisted.

For the effect of the *Vis Inertiæ*, in *resisting* and *retarding* the motion of Bodies, &c. See **RESISTANCE**.

Vis Impressa, is defined by Sir Isaac Newton, to be the action exercised on any body, to change its state, either of resisting, or moving uniformly in a right line.

This force consists altogether in the action; and has no place in the body after the action is ceased.—For the body perseveres in every new state, by the *vis inertiæ* alone.

The *vis impressa* may arise from divers causes, as from the percussion, pression, and centripetal force.

Vis Centripeta.	} See {	CENTRIPETAL Force.
Vis Centrifuga.		CENTRIFUGAL Force.
Vis Motrix.		MOTION.
Vis Stimulus.		STIMULATING.

VISCERA*, in anatomy, a term of equal import with *entrails*; including the heart, liver, lungs, spleen, intestines and other inward parts of the body. See *Tab. Anat. (Splanchn.) P. 3.*

* The term is pure Latin, being formed of *vivere*, to feed; by reason, eatables, called in Latin *egeda*, undergo divers preparations in the *viscera*.

VIS

The word is also frequently used singularly, *visus*, to express some particular part of the entrails; by reason the word *entrails* has no singular.

VISCIDITY, or **VISCOSITY**, the quality of something that is *viscid*, or *viscous*, *i. e.* glutinous and sticky; like bird-lime, which the Latins call by the name *viscus*.

Viscid bodies, are those which consist of parts so implicated within each other, that they resist, a long time, a complete separation, and rather give way to the violence done them, by stretching or extending each way.

The too great *viscidty* of foods, has very ill effects: thus, meals, or farinæ not fermented, gellers, &c. of animals, tough cheese, or curd too much pressed, produce a weight or oppression in the stomach; wind, yawnings, crudities, obstructions of the minutest vessels in the intestines, &c. Hence, an inactivity of the intestines themselves, a swelling of the abdomen; and, hence, a *viscidty* of the blood, from the reunion of the *viscid* particles; obstructions of the glands; paleness, coldness, tremors, &c.

VISCOUNT. See the article **VICOUNT**.

VISCUS and **VISCOSITY**. See **VISCERA**, and **VISCIDITY**.

VISCUS, or **VISCUM**, in natural history, &c. See **MISLETOE**.

VISIBLE, **VISIBILE**, something that is an object of sight, or vision; or something whereby the eye is affected, so as to produce a sensation. See **VISION**.

The school philosophers make two kinds of *visibles*, or *visible* objects: the one *proper*, or *adequate*; which are such as are no other way perceivable, but by sight alone: the other *common*, which are subject to divers senses, as the sight, hearing, feeling, &c.

Again, the first, or *proper object of vision*, is of two kinds, viz. *light*, and *colour*, for these two are only sensible by sight.—The first, and primary, *vis*, *light*, they make the formal, and *colour*, the material object.

The Cartesians think they philosophize better, when they say, that light, alone, is the proper object of vision; whether it flow from a luminous body through a transparent medium, and retain its first name, *light*, or whether it be reflected from opaque bodies, under a certain new modification, or habitude, and exhibit their images; or, lastly, whether in being reflected, it is likewise refracted, after this, or that manner, and affects the eye with the appearance of *colour*.

But, agreeably to Sir Isaac Newton's sentiments, colour alone is the proper object of sight: colour being that property of light, whereby the light itself is *visible*; and whereby the images of opaque objects are painted on the retina.

Aristotle, *De Anima*, Lib. II. enumerates five kinds of common *visibles*, which are usually received for such in the schools, viz. *motion*, *rest*, *number*, *figure*, and *magnitude*.—Others maintain nine, as in the verities;

Sunt objecta novem visus communia: quantum, Indæ figura, locus, sequitur distantia, situs, Continuumque & ceterum, motusque, quiesque.

Authors reason very variously as to these common objects of vision: there are two principal opinions among the schoolmen.—The adherents to the first, hold, that the common *visibles* produce proper representations of themselves, by some peculiar species or image, whereby they are formally perceived, independently of the proper *visibles*.

But the second opinion prevails most, which imports, that the common *visibles* have not any such formal peculiar species to become *visible* by; but that the proper objects are sufficient to shew themselves in this or that place, or situation, and in this or that distance, figure, magnitude, &c. by the circumstances of their conveyance to the sensory.

In effect, since these common *visibles* cannot be represented alone, (for who ever saw place, distance, figure, situation, &c. of itself) but are always conveyed along with the images of light and colour to the organ; what necessity is there to conceive any such proper images, whereby the common *visibles* should be formally perceived by the soul? It is much more probable, that from the peculiar manner wherein the sensitive faculty perceives a proper object, it is apprized of its being in this or that situation, or place; in this or that figure, magnitude, &c.—How this is effected, may be conceived from what follows.

I. The situation and place of *visible* objects, are perceived without any intentional species thereof, merely by the impulse being made from a certain place, and situation, either above, or below, on the right, or left, before, or behind; whereby the rays of the proper *visibles* are thrown upon the retina, and their impression is conveyed to the sensory.

For since an object is seen by those rays which carry its image to the retina, and in that place to which the visive power is directed by the rays it receives: as it perceives the impulse on the rays to come from any place, &c. it is abundantly admonished of the object's being in that place, and situation. See **PERCEPTION**. From this principle, several remarkable phenomena of vision are accountable for; as,

1°. That if the distance between two *visible* objects be an angle that is insensible, the distant bodies will appear as if contiguous: whence, a continuous body being the result of several contiguous ones; if the distances between several *visible* subtend insensible angles, they will appear one continuous body: which gives a pretty illustration of the notion of a continuum.

2°. If the eye be placed above a horizontal plane, objects, the more remote they are, the higher will they appear, till the last be seen in a level with the eye.—Whence it is, that the sea, to persons standing ashore, seems to rise higher and higher the further they look.

3°. If any number of objects be placed below the eye, the most remote will appear the highest; if they be above the eye, the most remote will appear the lowest.

4°. The upper parts of high objects appear to stoop, or incline forwards; as the fronts of churches, towers, &c.—And statues at the tops of buildings, to appear upright, must recline, or bend backwards. See further under the articles REFRACTION, and HORIZON.

II The mind perceives the distance of *visible* objects, from the different configurations of the eye, and the manner wherein the rays strike the eye, and in which the image is impressed thereon. For the eye disposes itself differently, according to the different distances it is to see, viz. for remote objects the pupil is dilated, and the crystalline brought nearer the retina, and the whole eye is made more globous: on the contrary, for near objects, the pupil is contracted, the crystalline thrust forwards, and the eye lengthened.

The distance, again, is adjudged of by the angle the object makes, from the distinct or confused representation of the objects, and the briskness or feebleness, or the rarity or spikitude of the rays. To this it is owing, 1°. That objects which appear obscure or confused, are judged to be more remote: a principle which the painters use, to make some of their figures appear farther distant than others on the same plane.

To this it is likewise owing, that rooms whose walls are whitened, appear the smaller: that fields covered with snow, or white flowers, show less than when clothed with grass: that mountains covered with snow, in the night-time, appear the nearer: and that opaque bodies appear the more remote in the twilight.

III The magnitude or quantity of *visible* objects, is known chiefly by the angle comprehended between two rays drawn from the two extremes of the object, to the centre of the eye. An object appears so big as is the angle it subtends: or bodies seen under a greater angle appear greater; and those under a less, less, &c.—Hence, the same thing appears now bigger, and now less, as it is less or more distant from the eye.—This we call the *apparent magnitude*.

Now, to judge of the real magnitude of an object, we consider the distance: for since a near and a remote object may appear under equal angles, the distance must necessarily be estimated; that if it be great, and the optic angle small, the remote object may be judged great, and vice versa.

The magnitude of *visible* objects, is brought under certain laws, demonstrated by the mathematicians; as,

1°. That the apparent magnitudes of a remote object, are as the distances reciprocally.

2°. That the co-tangent of half the apparent magnitudes of the same objects, are as the distances: hence, the apparent magnitude and distance being given, we have a method of determining the true magnitude: the canon is this, As the whole sine is to the tangent of half the apparent magnitude, so is the given distance to half the real magnitude.—The same canon, inverted, will, from the distance and magnitude given, determine the apparent one.

3°. Objects, seen under the same angle, have their magnitudes proportional to their distance.

4°. The subtense AB (*Tab. Optics*, fig. 51.) of any arch of a circle, appears of equal magnitude in all the points DCEG, though one point be vastly nearer than another; and the diameter DG, appears of the same magnitude in all the points of the periphery of the circle.—Hence we take a pretty hint for the most commodious form of theatres.

5°. If the eye be fixed in A, (*fig. 52.*) and the right line BC be moved in such manner, as that the extremes thereof always fall on the periphery; it will always appear of the same magnitude.—Hence, the eye being placed in any angle of a regular polygon, the sides will appear equal.

6°. If the magnitude of an object directly opposite to the eye, be equal to its distance from the eye, the whole object will be taken in by the eye, but nothing more.—Whence, the nearer you approach an object, the less part you see of it.

IV The figure of *visible* objects is estimated chiefly from our opinion of the situation of the several parts thereof.

This opinion of the situation, &c. enables the mind to apprehend an external object under this or that figure, more justly than any similitude of the images in the retina with the object can; the images being frequently elliptical, oblong, &c. when the objects they exhibit to the mind are circles, squares, &c. The laws of vision, with regard to the figures of *visible* objects, are,

1°. That if the centre of the pupil be exactly against, or in the direction of a right line, the line will appear as one point.

2°. If the eye be placed in the direction of a surface, so that only one line of the perimeter can radiate on it, it will appear as a line.

3°. If a body be opposed directly towards the eye, so as only one plane of the surface can radiate on it, it will appear as a surface.

4°. A remote arch, viewed by an eye in the same plane, will appear as a right line.

5°. A sphere, viewed at a distance, appears a circle.

6°. Angular figures, at a distance, appear round.

7°. If the eye look obliquely on the centre of a regular figure, or a circle, the true figure will not be seen; but the circle will appear oval, &c.

V. The number of *visible* objects is perceived, not only by one or more images formed in the fund of the eye; but also by such a position of those parts of the brain, whence the optic nerves spring, as the mind has been used to, in attending to a certain place, and that either single, or manifold.

Accordingly, when either of the eyes, with the contiguous part of the brain, are forced out of their just parallelism with the other, *v. gr.* by pressing it with the finger, &c. all things appear double: but when they are in the requisite parallelism, though there be two images in the fund of the two eyes, yet the object will appear single.—Again, one thing may appear double, or even manifold, not only with both eyes, but even with only one of them open: by reason, the common concourse of the cones of rays, reflected from the object to the eye, either falls short of the retina, or goes much beyond it.

VI. Motion and rest are seen, when the images of objects represented in the eye, and propagated to the brain, are either moved, or at rest: and the mind perceives these images either moving or at rest, by comparing the moved image to another, with respect to which it changes place; or, by the situation of the eye to the object being continually changed. So that motion is only perceived, by perceiving the images to be in different places and situations: nor are these changes perceived, unless effected in time. So that to perceive motion, a sensible time is required.—But rest is perceived by the visual faculty, from the perception of the image in the same place of the retina, and the same situation, for some sensible time.

Hence the reason, why bodies moving exceeding fast appear at rest: thus, a live coal, swung briskly round, appears a continued circle of fire; the motion not being commensurate with *visible* time, but much swifter than the same: so that in the time the soul requires to judge of any change of situation of the image on the retina, or that it is moved from this place to that, the thing itself performs its whole circuit, and is in its former place again.

Laws of vision with regard to the motion of *visible* objects, are—

1°. That if two objects, unequally distant from the eye, move from it with equal velocity; the more remote one will appear the slower: or, if their celerities be proportionable to their distances, they will appear to move equally swift.

2°. If two objects, unequally distant from the eye, move with unequal velocities in the same direction, their apparent velocities are in a ratio compounded of the direct ratios of their true velocities, and the reciprocal one of their distances from the eye.

3°. A *visible* object, moving with any velocity, appears to be at rest, if the space described in the interval of one second be imperceptible at the distance of the eye.—Hence it is, that a near object, moving very slowly, as the index of a clock, or a remote one very swiftly, as a planet, seem at rest.

4°. An object, moving with any degree of velocity, will appear to rest, if the space it runs over in a second of time be to its distance from the eye, as 1 to 1400: nay, in fact, if it be as 1 to 1300.

5°. The eye proceeding straight, from one place to another, a lateral object, either on the right or left, will seem to move the contrary way.

6°. If the eye and the object move both the same way, only the eye much swifter than the object, that last will appear to go backwards.

7°. If two or more objects move with the same velocity, and a third remain at rest, the moveables will appear fixed, and the quiescent in motion the contrary way.—Thus, clouds moving very swiftly, their parts seem to preserve their situation, and the moon to move the contrary way.

If the eye be moved with a great velocity, lateral objects, at rest appear to move the contrary way.—Thus, to a person, sitting in a coach, and riding briskly through a wood, the trees seem to retire the contrary way; and to people in a ship, &c. the shores seem to recede.

VISIBLE Horizon.	} See the article	HORIZON.
VISIBLE Place.		PLACE.
VISIBLE Species.		SPECIES.

VISIER, or VIZIER, an officer or dignitary in the Ottoman

man empire; whereof there are two kinds: the first called, by the Turks *visier aum*, that is, *grand visier*; first created in 1370, by Amurath I. in order to ease himself of the chief and weightier affairs of the government.

The *grand* or *prime visier*, is the prime minister of state of the whole empire. — He commands the army in chief, and presides at the divan, or great council. — Rensgado Christians, have been sometimes raised to the *visierate*: such were Khairadain, surnamed Barbarossa, Ulug Ali, Cuproli, &c.

Next to the *grand visier*, there are six other subordinate *visiers*, called *visiers of the bench*, who officiate as his counsellors, or assessors in the divan.

VISION, *Visto*, the act of seeing, or of perceiving external objects by the organ of sight.

Vision is well defined to be a sensation, whereby, from a certain motion of the optic nerve, made in the bottom of the eye by the rays of light emitted or reflected from objects, and hence conveyed to the common sensory in the brain, the mind perceives the luminous object, its quantity, quality, figure, &c. The phenomena of *vision*, the causes thereof, and the manner wherein it is effected, make one of the greatest and most important articles in the whole system of natural knowledge. — Indeed, a great part of the physical, mathematical, and anatomical discoveries and improvements of the moderns, terminate here; and only tend to set the business of *vision* in a clearer light.

Hitherto refer what Sir Isaac Newton and others have discovered of the nature of light, and colours; the laws of inflection, reflection, and refraction of the rays; the structure of the eye, particularly the retina, and optic nerves, &c. It is not necessary we should here give a minute detail of the process of *vision* from its first principles: the greatest part is already delivered under the respective articles. — The eye, the organ of *vision*, we have described under the article *EYE*; and its several parts, tunics, humours, &c. under their proper heads, CORNEA, CRYSTALLINE, &c.

The immediate and principal organ of *vision*, viz. the retina, according to some, and the choroides, according to others, are also distinctly considered; as also, the structure of the optic nerve, which conveys the impression to the brain; and the texture and disposition of the brain itself, which receives them, and represents them to the soul. See RETINA, CHOROIDES, OPTIC NERVE, BRAIN, SENSORY, &c.

Again, the nature of light, which is the medium, or vehicle whereby objects are carried to the eye, is laid down at large under the articles LIGHT, and COLOURS; and the chief properties thereof concerned in *vision*, under REFLECTION, REFRACTION, &c. and also many of its circumstances under RAY, MEDIUM, &c. — What remains for this article, therefore, is only to give a general idea of the whole process; in which all the several parts are concerned.

Different Opinions, or Systems of VISION. — The Platonists and Stoics held *vision* to be effected by the emission of rays out of the eyes; conceiving that there was a sort of light thus darted out, which, with the light of the external air, taking, as it were, hold of the objects, rendered them visible; and thus returning back again to the eye, altered and new modified by the contact of the object, made an impression on the pupil, which gave the sensation of the object.

The reasons whereby they maintain their opinion, are fetched, 1^o. From the brightness and lustre of the eye: 2^o. From our seeing a remote cloud, without seeing one which we are encompassed withal; (the rays being supposed too brisk and penetrating to be stopped by the near cloud, but growing languid at a greater distance, are returned to the eye): 3^o. From our not seeing an object laid on the pupil: 4^o. From the eye's being weary with seeing, i. e. by emitting great quantities of rays: and lastly, From animals which see in the night; as cats, lions, moles, owls, and some men.

The Epicureans held *vision* to be performed by the emanation of corporeal species, or images from objects; or, a sort of atomical effluvia, continually flying off from the intimate parts of objects to the eye.

Their chief reasons are, 1^o. That the object must necessarily be united to the visive faculty; and since it is not united by itself, it must be so by some species that represents it, and that is continually flowing from bodies: 2^o. That it frequently happens, that old men see remote objects better than near ones; the distance making the species thinner, and more commensurate to the debility of their organ.

The Peripatetics hold, with Epicurus, that *vision* is performed by the reception of species; but they differ from him in the circumstances: for they will have the species (which they call *intentionales*) to be incorporeal.

It is true, Aristotle's doctrine of *vision*, delivered in his chapter *de Aspectu*, amounts to no more than this; That objects must move some intermediate body, that by this they may move the organ of sight. — To which he adds, in another place, that when we perceive bodies, it is their species, not their matter, that we receive; as a seal makes an impression on wax, without the wax's retaining any thing of the seal.

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But this vague and obscure account, the Peripatetics have thought fit to improve. — Accordingly, what their master called *species*, the disciples understanding of real proper species, assert, That every visible object expresses a perfect image of itself, in the air contiguous to it; and this image another, somewhat less, in the next air; and the third another, &c. till the last image arrives at the crystalline, which they hold for the chief organ of sight, or that which immediately moves the soul. — These images they called *intentional species*. See SPECIES.

The modern philosophers, as the Cartesians and Newtonians, give a better account of *vision*. — They all agree, that it is performed by rays of light reflected from the several points of objects, received in at the pupil, refracted and collected in their passage through the coats and humours, to the retina; and thus striking, or making an impression on so many points thereof: which impression is conveyed, by the correspondent capillaments of the optic nerve, to the brain, &c.

As for the Peripatetic series, or chain of images, it is a mere chimera, and Aristotle's meaning is better understood without, than with them. — In effect, setting these aside, the Aristotelian, Cartesian, and Newtonian doctrine of *vision* are very consistent: for Sir Isaac Newton imagines, that *vision* is performed chiefly by the vibrations of a fine medium, which penetrates all bodies, excited in the bottom of the eye by the rays of light; and propagated through the capillaments of the optic nerves, to the sensorium. — And Des Cartes maintains, That the sun pressing the materia subtilis, wherewith the world is filled every way, the vibrations or pulses of that matter reflected from objects, are communicated to the eye, and thence to the sensory: so that the action or vibration of a medium, is equally supposed in all.

Modern Theory of VISION. — In order to *vision*, we are certain, it is required that the rays of light be thrown from the visible objects to the eye. — What befalls them in the eye, will be conceived from what follows.

Suppose, a. gr. Z the eye, and ABC the object, (Tab. Optics, fig. 53.) Now, though every point of an object be a radiant point, that is, though there be rays reflected from every point of the object to every point of the circumambient space, each carrying with it its respective colour, (which we falsely imagine to be those of the object;) yet, as only those rays which pass through the pupil of the eye affect the sense, we shall here consider none else but these.

And, again, though there be a great number of rays passing from one radiant point, as B, through the pupil, yet we shall only consider the action of a few of them; as BD, BE, BF.

Now then, the ray BD, falling perpendicularly on the surface EDF, will pass out of the air into the aqueous humour, without any refraction, and proceed right to H; where, falling perpendicularly on the surface of a crystalline humour, it will go on, without any refraction, to M; where, again, falling perpendicularly on the surface of the vitreous humour, it will proceed straight to the point O, in the fund or bottom of the eye. Again, the ray BE, passing obliquely out of the air upon the surface of the watery humour EDF, will be refracted, and approach towards the perpendicular EP: and thus, proceeding to the point G, in the surface of the crystalline, it will be there refracted still nearer to the perpendicular. So also EG, falling obliquely out of air into a harder body, will be refracted towards the perpendicular GR; and falling on the point L of the surface of the vitreous humour, it will still be brought nearer to M.

Lastly, GL, falling obliquely out of a denser, upon the surface of a rarer body LMN, will be refracted, and recede from the perpendicular LT; in receding from which, it is evident it approaches towards the ray BDO, and may be so refracted, as to meet the other in O. — In like manner, the ray BF, being refracted in B, will turn to I, and thence to N, and thence to the others in O. — But the rays between BE and BF, being somewhat less refracted, will not meet precisely in the same point O.

Thus will the radiant point B affect the fund of the eye, in the same manner as if the pupil had had no breadth, or as if the radiant itself had only emitted one single ray, such as were equal in power to all those between BE, and BF.

In like manner, the rays proceeding from the point A, will be so refracted in passing through the humours of the eye, as to meet near the point X; and the rays from any intermediate point between A and B, will nearly meet in some other point in the fund of the eye, between X and O.

Upon the whole, it may be asserted universally, that every point of an object, affects only one point in the fund of the eye; and, on the contrary, that every point in the fund of the eye, only receives rays from one point of the object. — Though this is not to be understood in the utmost rigour.

Now if the object recede from the eye, in such manner, as that the radiant point B, does not decline from the line BD; the rays which would proceed from B, not enough diverge, would be so refracted in passing the three surfaces, as that they would meet before they reached the point O. on the contrary,

If the object should be brought nearer the eye, the rays passing from the point B to the pupil, being too much divaricated, would be refracted so, as not to meet till beyond the point O. Nay, the object may be so near, that the rays proceeding from any point may be so divaricated, as that they shall never meet at all.—In all which cases, there would be no point of the object, but would move a pretty large portion of the fund of the eye; and thus the action of each point would be confounded with that of the contiguous one.

And this would commonly be the case, but that nature has provided against it; either by contriving the eye, so as its bulb may be lengthened, or shortened, as objects may be more or less distant; or, as others will have it, so as that the crystalline may be made more convex, or more flat; or, according to others, so as that the distance between the crystalline and the retina may be lengthened or shortened.

The first expedient is the most probable; on the footing of which, when we direct our eyes to an object so remote, as that it cannot be distinctly viewed by the eye in its accustomed figure, the eye is drawn back into a flatter figure, by the contraction of four muscles; by which means, the retina becoming nearer the crystalline humour, receives the rays sooner: and on the other hand, when we view an object too near, the eye being compressed by the two oblique muscles, is rendered more globular; by which means, the retina being set further off from the crystalline, does not receive the rays of any point before they meet.

It may be here added, that this access, and recess of the crystalline, is so necessary to *vision*, that, whereas, in some birds the coats of the eye are of such a bony consistence, that muscles would not have been able to contract and distend them; nature has taken other means, by binding the crystalline down to the retina, with a kind of blackish threads, not found in the eyes of other animals.—Nor must it be omitted, that of the three refractions above mentioned, the first is wanting in fishes; and that to remedy this, their crystalline is not lenticular, as in other animals, but globular.—Lastly, since the eyes of old people are generally worn flatter than those of young ones; so that the rays from any point, fall on the retina ere they become collected into one; they must exhibit the object somewhat confusely: nor can such eyes see any but remote objects distinctly.—In others, whose eyes are too globular, the case is just the reverse.

From what has been shewn, that every point of an object moves only one point of the bottom of the eye; and, on the contrary, that every point in the fund of the eye, only receives rays from one point of the object; it is easy to conceive, that the whole object moves a certain part of the retina; that in this part there is a distinct, and vivid collection of all the rays received in at the pupil; and that as each ray carries its proper colour along with it, there are as many points painted in the fund of the eye, as there were points visible in the object.—Thus is there a species, or picture, on the retina, exactly like the object; all the difference between them, is, that a body is here represented by a surface; a surface frequently by a line, and a line by a point: that the image is inverted, the right hand answering to the left of the object, &c. and that it is exceedingly small, and still the more so as the object is more remote.

What we have shewn under other articles of the nature of light, and colours, readily accounts for this painting of the object on the retina.—The matter of fact is proved by an easy experiment, long since tried by Des Cartes; thus, The windows of a chamber being shut, and light only admitted at one little aperture; to that aperture apply the eye of some animal newly killed, having first dexterously pulled off the membranes that cover the bottom of the vitreous humour, viz. the hind part of the sclerotica, choroides, and even part of the retina; then will the images of all the objects, without doors, be seen distinctly painted on any white body, as on an egg-shell, that the eye is laid upon.—And the same thing is better shewn by an artificial eye, or a camera obscura.

The images of objects, then, are represented on the retina; which is only an expansion of the fine capillaments of the optic nerve, and from which the optic nerve is continued into the brain.—Now, any motion or vibration, expressed on one extreme of the nerve, will be propagated to the other: Hence the impulse of the several rays, sent from the several points of the object, will be propagated as they are on the retina, (i. e. in their proper colours, &c. or in particular vibrations, or manners of pressure, corresponding thereto) to the place where those capillaments are interwoven into the substance of the brain.—And thus is *vision* brought to the common case of sensation.

For such, we know, is the law of the union between the soul and body; that certain perceptions of the first, do necessarily follow certain motions of the last: but the different parts of the object do separately move different parts of the fund of the eye; and those motions are propagated to the sensory: it follows, therefore, that there must arise so many distinct sensations at the same time. See SENSATION.

Hence, 1^o. we easily conceive, that the perception, or image in the mind, must be the clearer, and more vivid; the more rays the eye receives from the object: and consequently, the largeness of the pupil will have some share in the clearness of *vision*.

2^o. Considering only one radiant point of an object, we may say, that that point would move the sense more weakly, or be seen more obscurely, as it is more remote; by reason the rays coming from any point, like all qualities propagated in orbem, are always diverging; and therefore the more remote, the fewer of them will be received in at the pupil.—But, as it is not a single point of an object, but all of them together, that affects the organ of sense; and as the image of the object still possesses a less part of the retina, as it is more remote; therefore, though the rays that flow from any point of an object two miles off, into the pupil, be rarer, or fewer by half, than those flowing from the same point at a mile's distance; yet the same capillament of the optic nerve, which, in the latter case, would only be moved by that one point, in the former will be affected with the joint action of the neighbouring points; and therefore the image will be as clear as in the other case.

—Add, that the pupil dilating itself more, as the object is more remote, takes in more rays than it would otherwise do. 3^o. The distinctness of *vision*, is somewhat concerned in the size of the image, exhibited in the fund of the eye.—For there should be, at least, as many extremes of capillaments, or fibres of the optic nerve, in the space that image possesses, as there are particles in the object, that sends rays into the pupil: otherwise, every particle will not move its separate capillament: and if the rays from two points fall on the same capillament, it will be the same as if only one point had fell there; since the same capillament cannot be differently moved at the same time.—And hence it is, that the images of very remote objects being very small, they appear confused, several points of the image affecting each capillament: and hence, also, if the object be of different colours, several particles affecting the same capillament at the same time, only the brightest and most lucid will be perceived: thus, a field, furnished with a good number of white flowers, among a much greater quantity of green grass, &c. at a distance appears all white.

Our seeing of objects *single*, though with two eyes, in each of which is a several image, or picture; and our seeing of them *erect*, whereas the picture is really inverted, are two great phenomena in *vision*: which we see considered under the articles SIGHT, and SEEING.—For the manner of seeing, and judging of the distance and magnitude of objects, see VISIBLE, MAGNITUDE, &c.

VISION, in optics.—The laws of *vision*, brought under mathematical demonstrations, make the subject of *optics*, taken in the greatest latitude of that word: for among the writers of mathematics, optics is generally taken in a more restrained signification, for the doctrine of *direct vision*; catoptrics, for the doctrine of *reflected vision*; and dioptrics, for that of *refracted vision*.

Direct, or *Simple VISION*, is that performed by means of direct rays; that is, of rays passing directly, or in right lines, from the radiant point to the eye.—Such is that explained in the preceding article, VISION.

Reflected VISION, is that performed by rays reflected from specula, or mirrors.—The laws hereof, see under REFLECTION, and MIRROR.

Refracted VISION, is that performed by means of rays refracted, or turned out of their way, by passing through mediums of different density; chiefly through glasses and lens's.—The laws of this, see under the article REFRACTION.

Arch of VISION. See the article ARCH.

VISION, among divines, is used for an appearance, which God occasionally sent his prophets and saints; either by way of dream, or in reality.

Such were the *visions* of Ezekiel, Amos, &c. the *vision* of S. Paul, lifted up to the third heaven, &c. of Joseph, by which he was assured of the purity of the virgin, &c.

Many among the Romish saints still pretend to *visions*: thus the *Revelations* of S. Bridget are so many *visions*.

Hence the word has come into disrepute, and become a common name for all chimeras, or spectres, which either our folly or fear possesses us with: and hence, a person that frames to himself wild romantic notions, is called a *visionary*. Quevedo's *visions*, are descriptions of what passed in the imagination of that author.

Beatific VISION, denotes the act whereby the angels and blessed spirits see God in paradise.

VISIR, VISIER, or VIZIER. See the article VISIER.

VISITATION, VISITATIO, an act of jurisdiction, whereby a superior, or proper officer, visits some corporation, college, church, or other public or private house, to see that the laws and regulations thereof be duly observed.

Among us, the bishop of each diocese is obliged to hold a *visitation* every third year, and the archdeacon the other two years;

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to see that the discipline be well observed, the people well instructed; and to take care, that neither the church, nor the pastors thereof, receive any detriment.

Anciently the regar'd of his office was expressed to be the *visitation of manners*. See **REGARDER**.

The lawyers hold it a branch of the king's prerogative, to visit the universities, to enquire into the statutes, and the observations of them; to expel delinquents, &c. But some of the colleges disallow this privilege; and plead themselves, by royal charters, exempt from all civil and royal visitations.

Among the Romanists, the general of each religious order, is obliged to visit the several monasteries of his order.

In abbeys, that are chiefs of their orders, there are particular officers, called *visitors*; who are dispatched into all the houses and congregations depending on them, to see that the regular discipline is observed.

In Spain, there is a *visitor*, and *inquisitor general*. — The visitation of the cloister belongs to the ordinary. — At Paris, the parliament visits the several prisons and prisoners four times a year.

VISITATION, in a moral and religious sense, is also applied to the afflictions that befall mankind; as coming from the hand of God, to try or prove them. — In which sense, the plague, among us, is frequently called the *visitation*.

VISIVE, **VISIVUS**, in the school philosophy, a term applied to the power of seeing. See **VISION**.

Authors are exceedingly divided, about the place where the *visive faculty* resides: some will have it, in the retina; others, in the choroides; others, in the optic nerves; others, as Sir Isaac Newton, in the place where the optic nerves meet, before they come to the brain; and others, in the brain itself.

VISNE, **VISNETUM**, in law, a neighbouring place, or a place near at hand. See **VENUE**.

VISUAL, something belonging to the sight, or seeing. See **SIGHT**, and **SEEING**.

VISUAL Rays, are lines of light, imagined to come from the object to the eye.

All the observations of astronomers and geometers, are performed by means of the *visual rays*, received in at the sights, or pinnules of alidades.

VISUAL Point, in perspective, is a point in the horizontal line, wherein all the ocular rays unite. See **POINT**.

Thus, a person standing in a straight long gallery, and looking forwards, the sides, floor, and ceiling seem to meet, and touch one another in a point, or common centre.

VISUAL Angle. } See the article **ANGLE**.

VISUAL Line. } See the article **LINE**.

VISUM. See the article **HABERE facias Visum**.

VITA, **Life**. } See the article **LIFE**.

Cui in VITA. } See the article **CUI**.

Aqua VITÆ. See the article **AQUA**.

VITAL, **VITALIS**, in anatomy, something that ministers principally to the constituting, or maintaining of life in the bodies of animals.

Thus, the heart, lungs, and brain, are called *vital parts*.

VITAL Functions, or *actions*, are those operations of the *vital parts*, whereby life is effected; so as that it cannot subsist without them.

Such are the muscular action of the heart; the secretory action in the cerebellum; the respiratory action of the lungs; and the circulation of the blood and spirits through the arteries, veins, and nerves.

VITAL Spirits, are the finest, and most volatile parts of the blood.

VITELLIANI, in antiquity, a kind of tablet, or pocket-book, wherein people anciently used to write down their ingenious, humorous, and even wanton fancies and imperfections: the same with what in English we may call a *trifle-book*. See **Martial**, Lib. XIV. Epig. viii.

Some will have them to take their name from *vitellus*, a yolk of an egg; by reason, the leaves were rubbed therewith. — Others derive the name from one *Vitellius* their inventor.

VITI Choreæ. See the article **CHOREA Santi Viti**.

VITRIFICATION, or **VITRIFICATION**, the act of converting a body into glass, by means of fire.

Of all bodies, sand, bricks, and pebbles, with alkaline salts, vitrify the most easily. Accordingly, it is of these that glass is principally made.

Gold held, by M. Homberg, near the focus of the duke of Orleans's large burning concave mirror, at first smoked, then changed, all of it that did not go off in fumes, into glass, of a deep violet colour. — This glass of gold weighs less than gold. *Memoirs of the Royal Academy*, 1702.

All metals, and even almost all natural bodies, sufficiently heated, vitrify: and this vitrification is the last effect of the fire; after which the most intense heat of the largest burning-glass, will make no further alteration,

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Vitrification, some authors will have to be chiefly effected, by the salts uniting and incorporating with the metalline particles.

But, according to M. Homberg, all *vitrification* arises from the earthy part; which, being exposed to a violent fire, and intimately penetrated by some other dissolvent, commences glass. — Thus, supposing the principles of gold to be mercury, a metallic sulphur, and an earth; the *vitrification* of gold is easily conceived: the mercury, being volatile, exhales in smoke, and leaves behind it the earth, and sulphur, which are fixed; and then the sulphur dissolves the earth, and vitrifies it.

VITRIOL*, **VITRIOLUM**, a mineral substance, composed of an acid salt, intermixed with something metalline.

* Some take the word *vitriolum* to be used *quasi vitri oleum*, because of its shining colour; but Menage rather derives it à *vitres colore*: the Latins call it *atramentum sutorium*; and the Greeks, *chalcanthus*.

Vitriol is usually considered as a salt, but is more properly ranked among the class of semi-metals; as having always a metallic matter mixt or combined with its salt.

Vitriol is defined by Boerhaave, a saline, metallic, transparent glebe; dissoluble in water, and fusible and calcinable by fire.

It acquires different names, according to the different places where it is dug: and the *vitriols* of those also, differ from each other in denomination and colour, some being *white*, others *blue*, and others *green*.

Roman and Cyprus *vitriol*, for instance, is blue; and that of Sweden and Germany greenish: besides which, there is also there a white kind.

White Vitriol partakes of iron, *blue* partakes of copper, and *green* again of iron.

M. Geoffroy, the elder, observes, that they all consist of an acid salt, like that found in allum and sulphur; excepting that in allum, the acid is mixed with an absorbent earth, or calx: in sulphur, it is united with certain fatty, bituminous parts; and in *vitriols*, with metallic parts.

According to Boerhaave, *vitriols* consist of a metallic part, with a sulphur adhering. a menstruous acid, and water. — In *blue vitriol*, the metal wherewith the acid, &c. is joined, is copper. — In *white vitriol*, called also *white copperas*, it is mixed with lapis calaminaris, and some ferruginous earth, intermixed with lead or tin. — In *green vitriol*, the acid is joined with iron.

* In five ounces of *green vitriol*, M. Geoffroy, the younger, has found two of water, two of iron, and one of acid. *Vid. Hist. Acad. R. Scienc. an. 1728. p. 45.*

The antients give the name *chalcitis*, or *chalcanthum*, to such *native vitriol*, as had acquired, according to their opinions, its full perfection in the entrails of the earth, and which is a kind of mineral stone, of a reddish colour. — Of this they observed three other different states, or transformations: *chalcitis*, in its first state, they called *missi*; this afterwards turned into *melanteria*, and that afterwards into *fori*.

Some moderns take this *chalcitis* to be the same with that *chalcanthum* brought from Sweden and Germany; the best whereof is of a brownish red colour, and a *vitriolic* taste, and dissolves easily in water; and when broke, is of the colour of shining copper.

The other *vitriols* above-named, are usually facitious, being only a kind of crystals, drawn, by means of water, from a sort of marcasite ordinarily found in mines, and called by naturalists, *pyrites*, or *quits*.

Roman vitriol is made by exposing these pyrites to the air, till such time as they calcine, and change into a greenish, acid, *vitriolic* calx, or dust; in which state they are thrown into the water, and are afterwards, by boiling and evaporation, reduced into that kind of crystals sent us from Italy.

All the other *vitriols* are made after the same manner; that is, much after the same manner as allum is made in England, or salt-petre in France.

For *green vitriol*, they add a great number of pieces of iron to the liquor in the boiling; these raise a great ebullition. And as soon as the iron is dissolved, they evaporate the dissolution to a certain degree, and so let it crystallize. — The crystals being formed, there remains a thick, reddish, unctuous styptic, and astringent liquor; which M. Geoffroy calls *eau mere de vitriol*; as containing all the principles of the mineral, though disunited.

The powder of this *vitriol* is exceedingly styptic, and excellent for the cure of wounds, and the stopping of blood. — Its effects this way, have been raised, by the knavery of some, and credulity of others, to a kind of miracle; it being this that makes the basis of the famous sympathetic powder.

The medicinal virtues of *vitriol* are very great; but all owing to the iron, or other metallic parts mixed with it, and therefore following the kind of metal. — Thus, these of *green vitriol*

vitriol depend on the stypticity or astringency of iron, or Mars.

The eau-mere drawn from *green vitriol*, M. Geoffroy observes, does not differ any way, essentially, from a great number of preparations which the chymists have given us of *vitriol*, iron, and the lapishematites; such are the fixed and anodyne sulphurs of *vitriol*, or Mars; arcana, and magisteries of *vitriol*; tinctures, &c. of *vitriol*, Mars, &c.—The common basis of all which is iron exceedingly subtilized and attenuated.

A solution of *vitriol*, mixed with a tincture of galls, becomes instantly exceeding black: and it is this that makes the common writing-ink. See *INK*.

M. Lemery, the younger, has a pretty hypothesis to account for this blackness: he imagines, that as the *vitriol* whereof ink is made, is iron dissolved by an acid, and intimately mixed therewith; and as galls are an alkali, or absorbent, this alkali meeting the acids which hold the iron dissolved, unites with them, and makes them let the iron loose; which thereupon revivifies, and resumes its natural blackness: so that, in strictness, it is iron that we write withal.

This system is confirmed hence: that of the five sorts of *vitriol*, that of Cyprus or Hungary is the only one whose base is copper; that of the rest is iron: and accordingly they all serve to make ink withal, excepting the first.

Some naturalists hold *vitriol* to be the root, or matrix of copper; because in the copper-mines, they never dig deeper than the glebe out of which the *vitriol* is drawn.

Vitriol affords several chymical preparations; as—*spirit of vitriol*, procured by first calcining, then distilling it.—*Oil of vitriol*, which comes out after the spirit, by heightening the fire wherewith that had been raised.—What remains after both, is *colcothar of vitriol*.—*Tartar of vitriol* is had by mixing *oil of vitriol* with oil of tartar per deliquium; a salt precipitating to the bottom, which being set to exhale and crystallize, is the *tartar of vitriol*.

From the *colcothar of vitriol*, is prepared the *ens veneris*. See *ENS VENERIS*.

Metallic VITRIOLS.—All metals, it is to be observed, may be converted into *vitriols*, by dissolving them with acid spirits, and letting them stand to crystallize.

Facitious vitriols, being only metals dissolved and crystallized in saline menstruums, are frequently called, by way of distinction, *metallic vitriols*, and *metallic salts*.

VITRIOL of Iron, Vitriolum Martis, is a preparation made by dissolving iron, or steel, in oil or spirit of *vitriol*; then evaporating or drawing off the moisture, and bringing the matter to crystallize, by setting it in a cool place.—This is also called *sal martis*, or *salt of steel*.

VITRIOL of Luna, or the Moon, is the body of silver chymically opened, and reduced into the form of salt by the sharp points of spirit of nitre.

VITRIOL of Venus, is a solution of copper in spirit of nitre, evaporated and crystallized, to gain the salt; called also *vitriol of copper*.

Ros VITRIOLI. See the article *ROS*.

VITRIOLATED, among chymists, turned into *vitriol*, or having *vitriol* infused in it.

Tartar VITRIOLATED. See *TARTARUM VITRIOLATUM*.

VITRIOLIC, something that has the quality of *vitriol*, or that partakes of the nature of *vitriol*.

In this sense, we say, *vitriolic spring*, *vitriolic stone*, *vitriolic spirits*, &c.—If iron be thrown into a cupreous *vitriolic* water, and the red ruff arising on the surface of the iron be melted down, it will be found real copper; which is by some ignorantly alledged as an instance of the transmutation of one metal into another, whereas it is only a precipitation of the copper before contained in the water. See *supplement*, article *ZIMENT*.

VITRIOUS, or VITREOUS, in anatomy, the third, or glassy humour of the eye, thus called from its resemblance to melted glass. See *HUMOUR*, and *EYE*.

It lies under the crystalline; by the impression of which, its fore-part is rendered concave.

For the office of the *vitrious humours*, see *VISION*.

Some authors also call the coats or membranes that contain this humour, *vitrious tunics*.

VITA, among anatomists, *fillet* or *head-band*; is used for that part of the amnios, which sticks to the infant's head when it is just born.

VITUS's Dance, in medicine. See *CHOREA SANCTI VITI*.

VIVA Pecunia, was antiently used for live cattle.

VIVA VOCE, q. d. by word of mouth. See *ORAL*.

VIVARY, VIVARIUM, in our law-books, is sometimes used for a park, warren, or fish-pond, wherein living creatures are kept.

VIVIFICATION, in medicine, the art of *vivifying*, that is, of contributing to the action that gives life, or maintains life.

The chymists also use the word, in speaking of the new force, vigour, and lustre, which, by their art, they give to natural

bodies, particularly to mercury; which, after having been fixed, or amalgamated, they restore to its first state. See *REVIVIFICATION*.

VIVIPAROUS, VIVIPARUS, in natural history, an epithet applied to such animals as bring forth their young alive, and perfect: in contradistinction to such as lay eggs; which are called *oviparous animals*.

Vipers are distinguished from snakes, in that the latter lay eggs in dunghills, to be hatched by the warmth thereof; but the former are *viviparous*, that is, they keep their eggs within their bellies, and bring forth live vipers.

In the *Philosophical Transactions*, we have an account of a *viviparous fly*, of the oestrum or gad-kind.—Dr Lister tells us, he opened several females of this class, and found, in each, two bags of live white worms.—The like is hinted by Aldrovandus.—Lister even suspects, that all of this tribe are, in some measure, *viviparous*.

VIVO, in architecture, the shaft, or fust of a column.—See *Tab. Architectæ*. fig. 24. lit. r.

The term is also used, in a more particular sense, for the naked of a column, or other part.

VIVUM Linum. } See the article { *LINUM*.

VIVUM Sulphur. } *SULPHUR*.

VIZARD, or VIZOR. See the article *MASQUE*.

VIZIER. See the article *VISIER*.

ULCER, ULCUS, in medicine, a solution, or discontinuity of texture, or loss of substance in the fleshy parts of the body, proceeding from an internal cause.

Galen defines *ulcer* an inveterate erosion of the soft parts of the body; by which, instead of blood, they are brought to yield a kind of pus, or fancies; which prevents the consolidation.

Etmuller defines an *ulcer*, a solution of continuity from some corrosive sharpness or acidity, that takes away from the parts, and turns the proper nourishment of the body into a fœtious matter.—A like solution of continuity happening in a bony part, is called a *caries*.

Galen commonly uses the word *ulcer* and *wound* indifferently; but the Arabs, and the moderns after them, distinguish between the two.

Spontaneous *ulcers*, are generally supposed to proceed from acrimony, or a corrosive disposition of the humours of the body; whether brought on by poisons, by the venereal taint, or by other causes.

Ulcers are divided into *simple*, and *complicated*.—They are again divided, with regard to their circumstances, into *putrid*, or *fordid*, wherein the flesh all around is corrupted, and fetid, —*verminous*, where the matter being thick, does not flow away, but generates worms, &c.—*virulent*, which instead of pus, or fancies, yield a malignant virus, &c.

They are again distinguished, with regard to their form, into *sinuous*, *fistulous*, *varicose*, *carious*, &c.

When an *ulcer* happens in a good constitution, and proves easy of cure, it is said to be *simple*.

When attended with other concurring symptoms, as a cacochymic habit, which greatly retards or obstructs the cure, it is called a *compound ulcer*.

A *simple ulcer* is attended with no other sign, than that of erosion; but *compound ulcers*, happening in a scorbutic, dropical, or scrophulous constitution, may be attended with pain, a fever, convulsions, a large and emaciating discharge of matter, inflammation and swelling of the part, callosity of the lips, a caries of the bones, &c.

A *Putrid or fordid ULCER*, is that whose sides are lined with a tough, viscid humour, and which is also attended with heat, pain, inflammation, and a large flux of humours to the part: with time the fordes increase and change colour, the *ulcer* corrupts, its matter grows fetid, and sometimes the part gangrenes.—Putrid fevers often give rise to this kind of *ulcer*.

Phagedænic ULCER, is an *ulcer* of a corrosive nature, eating away the adjacent parts all around; the lips thereof remaining tumefied.—When this kind of *ulcer* eats deep, and spreads wide, without being attended with a tumour, but putrifies, and grows foul and fetid, it is called *noma*; and both, on account of the difficulty wherewith they heal, are also termed *dysphulæta*.

Varicous ULCERS, are such as being seated in the veins, and becoming painful and inflammatory, swell up the part they possess.—These, when recent, being occasioned by the use of corrosives, or proceeding from a ruptured varix, are often attended with an hemorrhage.—The veins adjacent to the *ulcers* are, in this case, præternaturally diffended, and may, sometimes, be felt interwoven together, like net-work, about the part.

Sinuous ULCERS, are such as run afloat, or sideways, from their orifice; and may be known either by searching with the probe, wax candle, &c. or by the quantity of matter they discharge, in proportion to their apparent magnitude.—These sometimes lie deep, and have several turnings: they are distinguished from fistula's only by their want of callosity, except in the very orifice.

Fistulous

Fistulous ULCERS, are such as are sinuous, or winding, and are attended with great callosity; and discharge a thin, ferrous, and fetid matter. See **FISTULA**.

Oil ULCERS are rarely cured without the use of internal, which are to be such as absorb and destroy the acidity; sudorifics especially, decoctions of the woods, antimonial, viperines, and volatiles are good; but above all things, vomitories often repeated: in the most obstinate ulcers, mercurial salivation is often required; old ulcers are frequently incurable, without making an issue in the opposite part.

The cure of simple, shallow ulcers, is commonly effected by applying a pledget armed with liniment, arcei, or balsic flav. to the part, a plaister of diachyl. simpl. or de minio, being laid over it, and repeating the dressing once aday, or seldom. But if only the cuticula be lost, or eaten away, nothing more than a little unguent. deficcativ. rub. or diapomphol. &c. spread thin upon linen, need be applied.

If spongy flesh should grow up, in either case, it may be kept down with a little Roman vitriol, &c. as in case of healing up the simple ulcers, made by the breaking of common tumors. Evacuations are indispensibly necessary in the cure of ulcers of the compound kind, where the constitution will admit thereof.—If the ulcer be fistulous, sinuous, cancerous, &c. and the matter fetid, thin, or sanious, it is found proper always to join calomel with the purgatives, or to give it in small doses, between the repetitions thereof, so as not to salivate. Besides the use of evacuating medicines, it will here also be proper to order a course of diet-drink, made with the sudorific woods, especially where the ulcer is suspected to be venereal.—In the mean time, proper dressings are to be used.

When the ulcer obstinately resists this treatment, a salivation is generally proposed, and seldom fails to promote the cure, though all other remedies should have been tried in vain.—If the patient be too weak to undergo the fatigue of a thorough salivation, it may be moderated, and kept up the longer, in proportion to his strength.

External medicines for ulcers, are digestives, cleansers, sarcotics, and epulotics.—M. Belloste gives a medicine of singular efficacy in the cure of ulcers; and this is no more than a decoction of walnut-tree leaves in water, with a little sugar; in which a linen cloth being dipped, is to be laid on the ulcer, and this to be repeated every second or third day.—This simple and vulgar medicine, he finds, suppurates, deterges, incarnates, and relieves putrefaction, &c. more than any other medicine known.

An ulcer in the lungs, makes what we call a *phthisis*. See **PHTHISIS**.

The venereal disease is a grand source of ulcers; particularly in the prepuce and glans, in men; in the vagina, &c. in women; and in the mouth and palate in both.

Venereal ulcers are of various kinds; those that grow callous and cancerous, are called *phankers*. See **SHANKER**.

ULCERATED CANCERS. See the article **CANCER**.

ULCERATION, EXULCERATIO, a little aperture, or hole in the skin, caused by an ulcer.

Cautic medicines occasion ulcerations in the skin.—Arsenic always ulcerates the part it sticks to.—A salivation ulcerates the tongue and palate.

ULIGINOUS, ULIGINOSUS, implies as much as moist, moorish, fenny.

ULLAGE of a cask, is so much as a vessel wants of being full.

ULNA, in anatomy, a long, hard bone in the arm, with a cavity in the middle; called also *foecile majus*, and *cubitus*.—See *Tab. Anat. (Osteol.) fig. 3. n. 8. fig. 7. n. 10.*

The ulna lies on the inside of the fore-arm, reaching from the elbow to the wrist; is big at its upper end, and grows smaller to its lower end.

At its upper it has two processes, which are received into the fore and hind sinu's of the extremity of the humerus.—The foremost process is small and short; the hindmost, called *olecranon*, is bigger and longer; it flays the fore-arm, when it comes to a right line with the arm. See **OLECRANON**.

Between these processes it has a femicircular sinus, which receives the inner protuberance of the lower end of the humerus, upon which we bend and extend our fore-arm; and along the middle of that there runs a small ridge, by which this bone is articulated to the humerus by ginglymus.—Had the articulation here been an arthrodia, the joint must have been much weaker; but the hand could have received no more motion from it, than it has now from the shoulder.

The inside of this upper end has a small sinus, which receives the circumference of the round head of the radius.—Its lower extremity, which is round and small, is received into a sinus, in the lower end of the radius; and upon this extremity, it has a short and small process, from which the ligaments which tie it to the bone of the wrist arise: this process serves to keep the bones of the wrist in their place.

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ULNA, an ell in measure. See **ELL**, and **MEASURE**.

ULNA Ferrea, denotes the standard iron ell, kept in the Exchequer.

ULNAGE. See the article **ALNAGE**.

ULNARIS Extensor, in anatomy, a muscle called also *extensor carpi*.—See *Tab. Anat. (Mysl.) fig. 1. n. 38.*

ULNARIS Flexor. See the article **FLEXOR Carpi**.

ULTERIOR, in geography, is applied to some part of a country, or province, which, with regard to the rest of that country, is situate on the farther side of a river, mountain, or other boundary, which divides the country into two parts. Thus Africa, with regard to Europe, is divided by mount Atlas, into ceterior, and ulterior; i. e. into two portions, the one on this side mount Atlas, and the other on that.

ULTIMA Bassa, *last kisses*, is a phrase used among some painters, for the last finishing touches with the pencil.

ULTRAMARINE*, **ULTRAMARINUM**, a beautiful blue colour, used by the painters, prepared from lapis lazuli.

* Some derive its name, *ultramarine*, q. d. beyond sea, from its being first brought into Europe out of India, and Persia: Others say, it is because its colour is deeper than that of the sea.

This blue is one of the richest, and most valuable colours, used in painting.—The preparation consists, in first calcining the stone in an iron pot or crucible, then grinding it very fine on a porphyry; then mixing it up with a paste made of wax, pitch, maffick, turpentine, and oil; and at last washing the paste well in clear water, to separate the colouring part from the rest, which precipitates to the bottom, in form of a subtle, beautiful, blue powder.—The water is then poured off, and the powder at bottom is dried in the sun; and is the true *ultramarine*.

Those who prepare this colour, make usually four kinds, which they procure by so many different lotions: the first is always the best; and the rest worse and worse to the last.—There is *ultramarine* of the first kind, sold for 11 l. sterling per ounce; and of the last, for about 12 or 15 s.

The common opinion concerning its origin is, that the method of making it was first discovered in England; and that a member of the East India company, having a quarrel with his associates, to be revenged of them, made the secret public.

Ultramarine must be chosen of a high colour, and well ground, which is known by putting it between the teeth, where, if it feel gritty, it is a sign the triture is not sufficient.

To know whether it be pure and unmixed, put a little of it in a crucible, and heating it red hot, if the powder has not changed its colour after this trial, it is certainly pure: on the contrary, if you perceive any change, or any black specks in it, it is falsified.

Beside this, there is another kind, called *common*, or *Dutch ultramarine*; which is only the crude lapis armenus and salt well ground, and pulverized; the colour whetted, when used by the painters, is something like that of the true *ultramarine*, though much less valued.

ULTRAMONTANE, something beyond the mountains.

The term is principally used in relation to Italy and France, which are separated by the mountains of the Alps.

In France, the opinions of the *ultramontane* canonists, i. e. of those of Italy, are not received.

The painters, particularly those of Italy, call all those that are not of that country, *ultramontanes*; or, simply, *tramontanes*.—Poussin is the only *tramontane* painter that the Italians seem to envy.

ULTRAMUNDANE, **ULTRAMUNDANUS**, beyond the world; is that part of the universe, supposed to be without, or beyond the limits of our world, or system.

UMBELICUS. See the article **UMBILICUS**.

UMBELICAL. See the article **UMBILICAL**.

UMBELLA, or **UMBRELLA**. See the article **PARASOL**.

UMBELLÆ, **UMBELLS**, among botanists, the round tufts, or heads of certain plants, set thick together, and all of the same height.—*Sparjed*, or thin *umbellæ*, are those whose parts stand at a distance from one another, and yet are all of an equal height.

UMBELLIFEROUS Plants, are such as have their flowery tops branched, and spread out like an umbrella; on each little subdivision of which, there is growing a small flower: such are fennel, dill, &c.

This flower is always pentapetalous; and is succeeded by two naked seeds adjoining to each other, which are the true characteristics that distinguish these plants from others.

The *umbelliferous* are a very large class of plants, and are distinguished by Mr Ray, into,

1^o. Such as have a compounded leaf, of a triangular and pinnate form.—The seeds of these are either broad, flat, and plain, and edged with membranes, as the spondylium, pitt-naca latifolia, panax heracleum tordylium, oroselinum, thyselinum, apium cicute folios, daucus, carvohola, anethum, pucedanum, thapsia, ferula, &c. Or the seeds are more tumid, and less compressed and flat, than the former;

U M B

as the cachrys, laferpitium, cicutaria vulgaris, scandix, ceratophyllum, myrrhis sativa angelica, levisticum, filer montanum, bulbocastanum, silarum, oenanthe, fenum, pimpinella, apium, cicuta, visnaga, faxifraga, crithmum, feeniculum, pastinaca vulgaris, anifum, caucalci, coriandrum, pastinaca marina, &c. z'. Such as have a simple, or undivided leaf, or at least one only a little jagged; as the perfoliata, buplerum, afrantia nigra, fanicula, and the fefeli athiopicum.

UMBER, or UMBRE, UMBRIA, among painters, &c. a dry dusky coloured earth, which, diluted with water, serves to make a dark brown colour, usually called with us a hair-colour.

It is called *umber* from *umbra*, shadow; as serving chiefly for the shadowing of objects: or rather from *Umbria*, a country of Italy, whence it is used to be brought. See *Supplement*, article UMBRA.

UMBILICAL, UMBILICALIS, in anatomy, something that relates to the *umbilicus*, or navel.

UMBILICAL Region, is that part of the abdomen lying round about the *umbilicus*, or navel.

UMBILICAL Vessels, are a set or assemblage of vessels belonging to a fetus; constituting what we call the *funiculus umbilicalis*, or navel-string.

These vessels are two arteries, a vein, and the urachus. The UMBILICAL arteries arise from the iliacs, near their division into external and internal; and pass thence on each side of the bladder, through the navel, to the placenta.—See *Tab. Anat. (Angiol.) fig. 1. n. 56. 56. fig. 3. lit. c. e. fig. 16. lit. g. g.*

The UMBILICAL vein, from innumerable capillaries united into one trunk, descends to the placenta, to the liver of the fetus; where it is partly distributed into the porta, and partly into the cava.—See *Tab. Anat. (Angiol.) fig. 4. lit. c. (Splanch.) fig. 3. lit. i. fig. 16. lit. f.*

The urachus is most plainly found in brutes; though there is no doubt but it has place likewise in the human species.

The use of these vessels, is to maintain a continuity and communication, between the mother and the fetus.—Some authors will have it, that the fetus receives its food and increase this way; and that it grows, like a vegetable, from the mother as the root, of which the *umbilical vessels* are the stem; and the child the head or fruit of this plant-animal.

Funiculus UMBILICALIS, popularly called the *navel-string*, is a kind of string, formed of the *umbilical vessels*; which, being tied up in a common coat, or membrane, traverse the secundines, and are inserted, at one end, into the placenta of the mother, and at the other, into the abdomen of the fetus.—See *Tab. Anat. (Splanch.) fig. 16.*

The navel-string is membranous, wreathed, and unequal; arising out of the middle of the abdomen, and reaching to the placenta uterina: it is usually half an ell in length, and as thick as one's finger.—It was necessary it should be so long and lax, that when the fetus in the womb grows strong, it might not break it by its sprawling and tumbling about; and that after it is born, the secundine, or after-birth, might be drawn out the better by it.

The way that it passes from the navel to the placenta, is very unconfined; for sometimes it goes upon the right hand, to the neck, which being incompassed, it defends to the placenta; and sometimes it goes on the left hand up to the neck, &c. Sometimes it comes not to the neck at all, but goes first a little up towards the breast, and then turns round the back, and from thence passes to the placenta.

This part, at the birth, is either broke, or cut away, to the navel; so that its vessels, viz. two arteries, a vein, and urachus, become perfectly useless, as vessels; and, drying up, become impervious, and serve only as ligaments to suspend the liver.

UMBILICAL Points, in mathematics, the same with *foci*. See *Focus*.

UMBILICUS*, *Navel*, in anatomy, the centre or middle part of the lower venter, or belly; being the place through which the *umbilical vessels* pass, out of the fetus, to the placenta of the mother.—See *Tab. Anat. (Splanch.) fig. 16. lit. e.*

* The word is pure Latin, formed of *umbo*, the little bunch in the middle of a buckler; by reason of its resemblance to the navel.

UMBILICUS, in mathematics, the same with *focus*.

UMBONE, or *Horn*, among florists, signifies any pointed style, or pistil, in the middle of a flower.

There is also an *umbone* called *double-pointed*, or *by-parted*, as in the peony; and sometimes the *umbone* has four sharp points, in which case it is termed, an *umbone* divided into so many heads, or cut into three or four parts.

UMBRA, *Shadow*. See the article *LIGHT*, *SHADOW*, *PENUMBRA*, &c.

UMBRE. See the article *UMBER*.

U N C

UMBRELLA. See the article UMBRELLA.

UMPIRE*, a third person, chosen to decide a controversy left to an arbitration, in case the arbitrators cannot agree. See *ARBITRATOR*.

* Minthw supposes the word formed of the French *un pre*, a father.—Some call him a *jur-arbitrator*.

UNCASING, among hunters, the cutting up, or fleaving of a fox.

UNCIA, a term generally used for the twelfth part of a thing.—In which sense it occurs in Latin writers, both for a weight, called by us an *ounce*; and a measure called an *inch*.

UNCIA Terra, or Agri, is a phrase frequently met with in the ancient charters of the British kings; but what the quantity of ground was, is a little obscure.—All that we know for certain, is, that it signified a large quantity, as much as 12 modii; which modulus some conjecture to have been an hundred feet square.

UNCIAE, in algebra, are the numbers prefixed to the letter, of the members of any power, produced from a binomial, residual, or multinomial root.

Thus, in the fourth power of $a+b$, that is, $a^4 + 4a^3b + 6a^2b^2 + 4ab^3 + b^4$, the *unciae* are, 4, 6, 4. Sir Isaac Newton gives a rule, for finding the *unciae* of any power, arising from a binomial root. Thus:—Let the index of the power be called m ; then will the *unciae* arise from such a

continual multiplication as this, viz. $1 \times \frac{m-0}{1} \times \frac{m-1}{2} \times \frac{m-2}{3}$

$\times \frac{m-3}{4} \times \frac{m-4}{5}$, &c. Thus, if the *unciae* of the biquadrate,

or fourth power, were required; the rule is, $1 \times \frac{4-0}{1} (=4)$

$\times \frac{4-1}{2} (=6) \times \frac{4-2}{3} (=4) \times \frac{4-3}{4} (=1)$; which shews, that the *unciae* are 1, 4, 6, 4, 1.

Or thus: The terms of any powers are compounded of certain literal factors, with numbers called *unciae*, prefixed; and the factors are found, by making two geometrical progressions; the first of them beginning from the required power of the first part of the root, and ending in unity; and the second beginning with unity, and ending in the required power of the second part: thus, for a sixth power of $a+b$;

a^6 first series.
 $1 \ b^6$ second series.

and multiplying the terms of the same order in either series, into one another: as $a^6 \times a^0 = a^6$, $b^6 \times a^0 = a^6$, $b^5 \times a^1 = a^1 b^5$, &c. out of which the sixth power of $a+b$ is compounded.

The *unciae*, then, are found by writing the exponents of the powers of the second series, i. e. of b , under the exponents of the powers of the first series, i. e. of a ; and taking the first figure of the upper series for the numerator, and the first of the lower for the denominator of a fraction, which is equal to the *unciae* of the second term; and so for the rest. Thus, for the sixth power we have,

$\begin{matrix} 6 & 5 & 4 & 3 & 2 & 1 \\ 1 & 2 & 3 & 4 & 5 & 6 \end{matrix}$

Accordingly, $\frac{6}{1} = 6$ is the *uncia* of the second term of the

sixth power $\frac{6 \cdot 5}{1 \cdot 2} = \frac{30}{2} = 15$, the *uncia* of the third term;

$\frac{6 \cdot 5 \cdot 4}{1 \cdot 2 \cdot 3} = \frac{120}{6} = 20$, the *uncia* of the fourth term;

$\frac{6 \cdot 5 \cdot 4 \cdot 3}{1 \cdot 2 \cdot 3 \cdot 4} = \frac{360}{24} = 15$, the *uncia* of the fifth term;

$\frac{6 \cdot 5 \cdot 4 \cdot 3 \cdot 2}{1 \cdot 2 \cdot 3 \cdot 4 \cdot 5} = \frac{720}{120} = 6$, the *uncia* of the sixth term;

$\frac{6 \cdot 5 \cdot 4 \cdot 3 \cdot 2 \cdot 1}{1 \cdot 2 \cdot 3 \cdot 4 \cdot 5 \cdot 6} = 1$, the *uncia* of the last power.

UNCIAL, UNCIALIS, an epithet, which antiquaries give to certain large-sized letters, or characters, antiently used in inscriptions, and epitaphs.

The word is formed from the Latin *uncia*, the twelfth part of any thing; and which, in geometrical measure, signified the twelfth part of a foot, viz. an inch; which was supposed to be the thickness of the stem of one of these letters.

UNCORE, or UNQUES *Pris*, still ready; in law, a plea, for the defendant, being sued for a debt due on a bond at a day past, to save the forfeiture of his bond, &c. by affirming that he tendered the debt at the time and place, and that there was none to receive it; and that he is yet also ready to pay the same.

UNCTION, UNCTIO, the act of anointing, or rubbing with oil, or other fatty matter.

Mercurial *unction*, properly applied, brings on a salivation.—The furgeons cure divers wounds, ulcers, &c. by repeated *unctions*, with oils, unguents, cerats, &c.

UNCTION, in matters of religion, is used for the character conferred on sacred things, by anointing them with oil. Antiently, in the eastern countries, which abounded so much in oil, and odoriferous spices, it was the custom to separate persons and things designed for extraordinary offices, or uses, by anointing

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ing them with ointments composed of such ingredients; symbolizing thereby, both an effusion of the necessary gifts to qualify them for their office, and a diffusion of the good and grateful effects expected from them.

There were three sorts of persons to whom this unction, or consecration, especially belonged, kings, priests and prophets; who, therefore, are of all them (says Barrow) stiled in scripture the *Lord's Anointed*.

The unction of kings is supposed to be a ceremony, introduced very late among Christian princes: Onuphrius says, none of the emperors were ever anointed before Justinian, or Justin. — The emperors of Germany took up the practice from those of the eastern empire. — King Pepin of France was the first king who received the unction.

In the Romish church, besides an unction at baptism, on the forehead, and at confirmation, on the head, they have an *extreme unction*, given to people in the pangs of death, on the parts where the five senses reside, being the parts by which the person is supposed to have sinned.

UNCUTH*, **UNKNOWN**, is used in the ancient Saxon laws, for him that comes to an inn, guest-wife, and lies there but one night — In which case, his host was not bound to answer for any offence he committed, whereof he was guilty himself.

* — *Prima nocte potest dici uncuth, secunda vero, guest, tertia nocte hogenhine. Bradon, Lib. III. See THIRD NIGHTS OWN HOME.*

UNDECAGON, is a regular polygon of eleven sides. See **POLYGON**.

UNDECEMVIR, a magistrate among the antient Athenians, who had ten other colleagues, or associates, joined with him in the same commission.

The functions of the *undecimviri* at Athens, were much the same as those of the *prevots de marechaussée* in France. They took care of the apprehending of criminals: secured them in the hands of justice; and when they were condemned, took them again into custody, that the sentence might be executed on them.

They were chose by the tribes; each tribe naming its own: And as the number of tribes, after Callisthenes, was but ten, which made ten members, a scribe or notary was added, which made the number eleven. — Whence their name *ὑνδεκά, or undecimviri*, as Cornelius Nepos calls them in the life of *Phocion*. — In Julius Pollux, they are denominated *ἐκακχοῖ, and ἐκακχιλακῆς*.

UNDEE, **UNDEE**, or **UNDY**, in heraldry. See **WAVY**.

UNDER the sea, in the sea language. — A ship is said to be so, when she lies still, or waits for some other ships, with her helm lashed, or tied up a-lee.

UNDER-CURRENTS. — *Currents* distinct from the *upper*, or *apparent currents* of the seas. Some naturalists conclude, there are in divers places *under-currents*, which set or drive a contrary way from the *upper-current*.

Dr Smith, in the *Philosophical Transactions*, brings the hypothesis of *under-currents*, to solve that remarkable phenomenon, the sea's setting strongly through the Straights into the Mediterranean, with a constant current 20 leagues broad.

— What should become of the vast quantity of water poured in this way; as also, of that running from the Euxine, through the Bosphorus, into the Hellespont, and thence into the Archipelago, is a speculation that has long employed the philosophers! This author's conjecture is, that there is an *under-current*, whereby as great a quantity of water is carried out as comes in. — To confirm which, he observes, that between the north and south foreland, it is either high or low water upon the shore, three hours before it is so off at sea: a certain sign, that though the tide of flood runs aloft, yet the tide of ebb runs under-foot, or close by the ground. He adds an account from an able sailor in the Baltic sound; that going with their pinnace into the middle stream, they were carried violently away by the current: but that sinking a bucket with a large cannon-bullet, to a certain depth of water, it gave a check to the boat's motion: and sinking it still lower, the boat was driven a-head to the windward, against the upper current, which was not above four or five fathom deep.

Dr Halley solves the current's setting in at the Straights, without overflowing the banks, from the great evaporation; without supposing any *under-current*.

UNDER-CHAMBERLAINS of the exchequer, two officers there, who cleave the tallies, and read the same; so that the clerk of the pells, and the comptrollers thereof, may see that the entries are true.

They also make searches for all records in the treasury, and have the custody of Domesday book.

UNDERMINING. See the article **SAPPING**.

UNDER-SHERIFF, *Sub-vice-comes*. See **SHERIFF**.

UNDERSHRUB. See the article **SUFFRUTEX**.

UNDER-SITTER, an inmate. See **INMATE**.

UNDERSTANDING, *Intellectus*, is defined, by the Peripatetics, to be a faculty of the reasonable soul, conver-

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sant about intelligible things, considered as intelligible. They also make it twofold, viz. *active*, and *passive*.

Active UNDERSTANDING, *Intellectus agens*, they hold, that faculty of the soul by which the species and images of intelligible things are framed, on occasion of the presence of phantasms, or appearances thereof. — For, maintaining the intellect to be immaterial, they hold it impossible it should be disposed to think by any disproportionate phantasms of mere body, and therefore that it is obliged to frame other proportionate species of itself; and hence its denomination *active*.

Passive UNDERSTANDING, *Intellectus patiens*, is that which, receiving the species framed by the *active understanding*, breaks forth into actual knowledge.

The moderns set aside the Peripatetic notion of an *active understanding*. — The Cartesians define the *understanding* to be that faculty, whereby the mind conversing with, and, as it were, intent on itself, evidently knows what is true in any thing not exceeding its capacity.

The corpuscular philosophers define the *understanding* to be a faculty, expressive of things which strike on the external senses, either by their images, or their effects, and so enter the mind. — Their great doctrine is, *Nihil esse in intellectu quod non prius fuerit in sensu*; and to this doctrine our famous Mr Locke, and most of the latest English philosophers, subscribe.

The Cartesians cry out aloud against it, and between these and the Corpuscularians there is this farther difference, that the latter make the judgment to belong to the *understanding*; but the former to the will.

Hence, according to the most approved opinion of the Corpuscularians, the *understanding* has two offices, viz. *perception*, and *judgment*; according to the Cartesians it has only one, viz. *perception*.

UNDERSTANDING is also used for the act, exercise, or exertion of this faculty; or the action whereby the mind knows things, or represents them in idea to itself.

UNDERTAKERS, were antiently such persons as were employed by the king's purveyors, and acted as their deputies.

At present, the name is chiefly used for *upholders*, or persons who furnish out funerals. — And also for such as *undertake* any great work, as the draining of fens, &c. Stat. 43 Eliz.

UNDER-TREASURER of England, *Vice-Thesaurarius Angliæ*, an officer mentioned in the Stat. 39 Eliz. c. 7. and whom several other statutes confound with treasurer of the Exchequer.

He chieftly up the king's treasure at the end of every term, and noted the content of money in each chest, and saw it carried to the king's treasury in the Tower, for the ease of the lord treasurer, &c.

In the vacancy of the lord treasurer's office, he also did every thing in the receipt, that the lord treasurer himself does. See **TREASURER**.

UNDER-WOOD, *sub-boscus*, is coppice, or any wood that is not accounted timber.

UNDULATION, in physics, a kind of tremulous motion, or vibration, observable in a liquid; whereby it alternately rises and falls, like the waves of the sea*.

* And hence it is that the term takes its rise from the Latin, *unda*, wave.

This *undulatory* motion, if the liquid be smooth, and at rest, is propagated in concentric circles, as most people have observed upon throwing a stone, or other matter upon the surface of a stagnant water, or even upon touching the surface of the water lightly with the finger, or the like.

The reason of these circular *undulations* is, that, by touching the surface with the finger, there is produced a depression of the water in the place of contact. — By this depression the subjacent parts are moved successively out of their place, and the other adjacent parts thrust upwards, which lying successively on the descending liquid, follow it; and thus the parts of the liquid are alternately raised and depressed, and that circularly.

When a stone is thrown into the liquid, the reciprocal vibrations are more conspicuous: here the water in the place of immersion rising higher, by means of the impulse or rebound, till it comes to fall again, gives an impulse to the adjoining liquid, by which means that is likewise raised about the place of the stone, as about a centre, and forms the first *undulous* circle; this falling again, gives another impulse to the fluid next to it further from the centre, which rises likewise in a circle; and thus, successively, greater and greater circles are produced.

UNDULATORY Motion, is likewise applied to a motion in the air, whereby its parts are agitated after the like manner as waves in the sea; as is supposed to be the case when the string of a musical instrument is struck.

This *undulatory* motion of the air, is supposed the matter or cause of sound. See **SOUND**.

Instead

Instead of the *undulatory*, some authors chuse to call this a *salutary motion*.

UNDULATION is also used, in chirurgery, for a motion ensuing in the matter contained in an abscess, upon squeezing it.—A tumour is said to be in a condition for opening, when one perceives the *undulation*.

UNEQUAL Courses. } See the article { **MASONRY.**
UNEQUAL Hours. } **Hour.**

UNEVEN Number. See the article **NUMBER.**

UNGELD*, in our antient customs, a person out of the protection of the law; so that if he were murdered, no *geld*, or fine, was to be paid in the way of compensation by him that killed him.

* The word is compounded of the negative *un*, and *gildan*, to pay. See **GELS**, and **ESTIMATIO Capitis**.

Si Frithman, i. e. *homo pacis, fugiet & repugnet, & se nolit indicare; si occidatur jaceat ungeld*, i. e. no pecuniary compensation shall be made for his death. *Skinner*.—*Ungilda alere*, mentioned in Brompton, has much the same signification, *viz.* where any man was killed, attempting any felony, he was to lie in the field unburied, and no pecuniary compensation was to be made for his death.

UNGUENT, **UNGUENTUM**, *Ointment*, in chirurgery, a topical remedy, or composition, chiefly used in the dressing of wounds and ulcers.

Unguent, liniments, and cerats, are external forms, applied on divers parts of the body, both to cure, and to ease and relieve them.—They only differ from each other in their confidence; with regard to which, *unguent* holds the medium; being stiffer than liniments, but softer than cerats.

Oils are ordinarily the bases of all three; to which are added wax, axungia, and several parts of plants, animals, and minerals; both on account of the virtues they furnish, and to give a confidence to the oils, and to keep them longer on the part, that they may have more time to act.

The principal *unguent*s, or ointments, are, *unguentum album*, or white *unguent* of cerus; *populeum*, made of the buds of the poplar tree, &c. *Unguentum basilicum*, a suppurative; *unguentum Egyptiacum*, a mild caustic; *unguentum aureum*, incarnative, and cicatrizing.—*Pomatums* are also ranked in the number of *unguent*s. See **POMATUM**.

UNGUIS, a Latin term, signifying a *nail* of the hand or foot. See **NAIL**.

UNGUIS, in medicine, a disease of the eye; being a whitish speck on the adnata, formed of a nervous excrescence growing on that coat; beginning at the great canthus, somewhat of the shape and size of a nail of the hand, and spreading intensify till it reach the pupil, and at last quite cover it.

The *unguis* is much of the same nature with the *pterygium* and *pannus*.

The ordinary cause of the *unguis* is an excessive acrimony in the tears, which corrode the tunica conjunctiva; as is often the case in an ophthalmia, or after the small-pox.

UNGUIS, in anatomy, is applied to two bones of the nose, being as thin as scales, and resembling the nail; whence their name.

The *ungues* are the smallest bones in the upper jaw, and are situate close to the great canthus of the eyes.

Some authors call them *ossa lachrymalia*, but improperly; there being no glandula lachrymalis in the canthus. Others call them *orbitaria ossa*.

They are contiguous to four other bones, *viz.* the coronal, that of the nose, the maxillary, and that part of the ethmoides which forms the orbit.

UNGUIS, or **UNGUICULUS**, among botanists and florists, denotes a little speck, of a different colour from the rest of the petala, or leaves of flowers.

It has the figure of a nail of the hand: its place is at the origin, or root of those petals; as we see in the rose, poppy-flowers, and divers others.

In preparing of medicines, the *ungues*, or *unguiculi*, are pulled off the flowers that enter the same.

UNGUIS Odoratus. See **BIATTA Bizantia**.

UNGULA, in geometry, is the section of a cylinder, cut off by a plane passing obliquely through the plane of the base, and part of the cylindric surface.

UNGULA, in natural history, the claw, or hoof of a quadruped. See **HOOF**.

UNGULA Alcis, the elk's claw. See the article **ELK**.

UNGULA, or *Hamas*, among surgeons, a sort of hooked instrument, wherewithal to extract a dead fetus out of the womb.

UNICORN, in natural history, an animal famous among the Greek authors, under the name of *monoceros*; and among the Latins, under that of *unicornus*.

Both these names it takes from its distinguishing characteristic, the having one horn only; which is represented as five palms long, and growing in the middle of the forehead. This animal claims a place here, not only as it makes a curious article in natural history, but also as it, nominally at least, furnishes something to medicine, commerce, and heraldry.

The popular account is, that it is about the size of a horse, its hair short, and of a dark-brown colour; very timorous, and therefore keeping mostly in the woods; and that its true place is the province of Agoas, in the kingdom of Lamotes, in Ethiopia.

The first author who wrote of the *unicorn*, was one Cresius, whom Aristotle mentions as a very suspicious author: Arian only speaks of it in very doubtful terms.—The other writers on the subject are Philostratus, and Solinus; Aeneas Sylvius, who is pope Pius II. Marcus Paulus, Aleofius, Gesner, Garcias ab Oita, And. Marinus, &c. Of these, some say it resembles a horse, others an ass, others a goat, by its beard; others an elephant, others a rhinoceros, others a greyhound, &c.

Munster and Thevet will have it an amphibious animal, and its horn to be moveable at pleasure.—Others make all its strength to consist in its horn; and add, that when pursued by the hunters, it precipitates itself from the tops of the highest rocks, and pitches upon its horn; which sustains the whole effort of its fall, so that it receives no damage thereby.—In effect, the several authors do all give several accounts of the figure and colour, both of the animal, and of its horn, and all its parts.—And hence the more knowing among the moderns, do unanimously hold it a merely fabulous animal.

The legend adds, that it is wonderful fond of chaste persons; and therefore, in order to take it, a virgin is placed in its way; whom when the *unicorn* spies, he lies down by her and lays his head on her lap, and so falls asleep; upon which the virgin making a signal, the hunters come in, and take the beast; which could never be caught any other way, because it would either cast itself headlong from a rock, or die. What ordinarily passes among us for *unicorn's horn*, and is shewn for such in the collections of curiosities, and used for such by several physicians, we are assured by Percy, in his account of Greenland, &c. is the tooth of a large fish of the whale kind, called by the islanders *narwal*; frequent enough in the icy sea. This tooth, or horn, turned, channelled, and terminating in a point, as it is, springs out of the middle of the fore-part of the upper jaw, where it has a root a foot long, as thick as the horn itself: it is the only tooth the animal has in the upper jaw, and serves it as a weapon of defence, wherewith it dares to attack the largest whale.*—It can strike it with such violence, as even to pierce the side of a strong-built ship.

* The horn of a narwal caught in 1736 in a creek of the Elbe, in the duchy of Bremen, arose, as Dr Hampe assures us, from the fore-part of the head, just above the mouth, and was six foot long, white like ivory, and curiously twisted.—Yet Wormius, and the generality of authors, take it for a tooth. Many hold its chief use is to break the ice. Dr Steigart rather imagines it to serve for seeking its food; and mentions a whale caught in Greenland, in the belly of which a narwal had stuck his tooth up to the mouth, and had sucked the blood and humours. *Vid. Phil. Transf. Numb. 447. p. 147, & p. 149. seq.*

There is a fine horn of this kind preserved in the repository of S. Denis at Paris, given by And. Thevet, and pretended to have been a present to him from the king of Monomotapa, who carried him to hunt the *unicorn*; which is frequent in that country: this horn some have suspected to be an elephant's tooth, carved in that manner.—At Strasbourg there is another, between seven and eight feet long.—In the repository at Venice, there is a good number; all different from each other.

The antients held the *unicorn's horn* to be a counter-poison; and, that the animal used to dip it in the water, to purify and sweeten it ere it would drink: it is added, that for the same reason other beasts wait to see this creature drink before them.—Thence, as also from the rarity of the thing, people have taken occasion to attribute divers medicinal virtues thereto.

But Amb. Paré has proved it a mere piece of charlatanery, and all the virtues attributed to it to be false; and yet the price it has bore is almost incredible: Andrea Racci, a physician of Florence, affirms the pound of 16 ounces to have been at one time sold, in the apothecaries shops, for 1536 crowns, when the same weight of gold was only worth one hundred forty eight crowns.

The *unicorn* is one of the supporters of the arms of England.—This beast is represented, by heralds, passant, and sometimes rampant.—When in this last action, as in the English arms, it is properly said to be *saillant*.—Argent, an *unicorn* saillant sable, armed and unguled, or, borne by the name of *Harding*.

UNIFORM, **UNIFORMIS**, denotes a thing to be similar, or consistent either with another thing, or with itself, in respect of figure, structure, proportion, and the like.—In which sense it stands opposed to *difform*.

UNIFORM, or *Equable Motion*. See the article **MOTION**.

UNIFORM Flowers of plants, are such as are of the same figure all around, having their fore and back parts, as also their right and left parts, exactly alike.

When they are otherwise, they are termed *difform flowers*.

UNIFORM Temperament. See the article **TEMPERAMENT**.

UNIFORMITY, *Regularity*, a similitude or resemblance between the parts of a whole.—Such is that we meet withal in figures of many sides, and angles respectively equal, and answerable to each other.

A late ingenious author makes beauty to consist in *uniformity*, joined or combined with variety.

Where the *uniformity* is equal in two objects, the beauty, he contends, is as the variety; and where the variety is equal, the beauty is as the *uniformity*.

UNIFORMITY, is particularly used for one and the same form of public prayers, and administration of sacraments, and other rites, &c. of the church of England, prescribed by the famous Stat. 1 Eliz. and 14 Car. II. called the *Act of uniformity*.

UNION, a junction, coalition, or assemblage of two or more different things in one.—Philosophers are exceedingly to seek about the manner of the *union* of soul and body, or by what medium it is that two such heterogeneous beings are kept so closely together?—It is one of the great laws of this *union*, that such and such an impression on the brain be followed by such and such a sensation, or perception in the soul.

UNION, in a philosophical sense, is used, by Dr Grew, for one of the three ways of mixture; being the joining together of atoms, or insensible particles, so as to touch in a plane: as is supposed to be the case in the crystallizations of salts, and the like bodies.

UNION, among painters, expresses a symmetry and agreement between the several parts of a painting; when, *e. gr.* there is a deal of relation and connection between them, both as to the figuring, and the colouring: so that they apparently conspire to form one thing.

UNION, in architecture, may denote a harmony between the colours in the materials of a building.

UNION, in an ecclesiastical sense, denotes a combining or consolidating of two churches into one.

This is not to be done without the consent both of the bishop, the patron, and the incumbent.

The canons distinguish three kinds of *union*: that of *accession*, that of *confusion*, and that of *equality*.

UNION of Accession, is the most usual: by this the united benefice becomes a member, and accessory of the principal.

UNION by Confusion, is that where the two titles are suppressed, and a new one created, including both.

UNION of Equality, is that where the two titles subsist; but are equal, and independent.

By stat. 37 Henry VIII. it is enacted, "That an *union*, or consolidation of two churches may be admitted, provided the annual value of one of them, in the king's books, do not exceed 6*l.* and the distance between them, be not above one mile."—And by another, stat. 17 Car. II. it is enacted, "That the *union* of two churches, or chapels, in any city or town, by the bishop, patron, and chief magistrate of the town, shall be valid, unless the value of the churches so united exceed 100*l.*"

Hypothetical UNION. See the article **HYPOSTATICAL**.

UNION, or the *UNION*, by way of eminence, is more particularly used, among us, to express the act whereby the two separate kingdoms of England and Scotland were incorporated into one, under the title of the *kingdom of Great Britain*.

This *happy union*, in vain attempted by king James I. was at length effected in the year 1707, by the general consent of the queen, and the estates of each realm.

The act, or treaty of *union*, consists of twenty-five articles; which eleven English commissioners, and eleven Scotch ones, examined, approved, and signed on the third of August 1706.

—The parliament of Scotland approved it on the fourth of February, 1707; and the parliament of England, on the tenth of March, in the same year.—On the 17th following, the queen went to parliament, where she approved the same treaty, with the act of ratification.

Since that time, there is only one privy council, and one parliament for the two kingdoms: the Scotch parliament is suppressed, or, rather super-added to the English; both of them only constituting one, under the title of the *parliament of Great Britain*.

The number of members which, by the articles of the *union*, the Scots are to send into the house of commons, to represent the commons of that country, are 45; and the number of peers, whereby their peerage is to be represented, is 16.

The great officers of the crown of Scotland, before the *union*, where the lord high chancellor, lord high treasurer, or treasurer, lord privy-seal, and lord register.—Their lesser officers of state were, the lord register, lord advocate, lord treasurer deputy, and lord justice-clerk.

The four first officers are dissolved by the *union*, and instead thereof new officers are erected, serving for both countries, under the title of *lord high chancellor of Great Britain*, &c. —The four latter officers still subsist.

UNIONS, UNIONES, in physiology, the same with *margaritæ*, or *pearls*. See **PEARL**.

UNISON, in music, is the effect of two sounds, which are equal, in degree of tune, or in point of gravity, and acuteness. *Unison* may be defined a consonance of two sounds, produced by two strings, or other bodies of the same matter, length, thickness, and tension, equally struck, and at the same time; so that they yield the same tone, or note.

Or, it is the *union* of two sounds, so like each other, that the ear perceiving no difference, receives them as one and the same sound. See **SOUND**.

What constitutes *unisonance*, is the equality of the number of vibrations of the two sonorous bodies in equal times: where there is an inequality in that respect; and, of consequence, an inequality in degree of tune, the unequal sounds constitute an *interval*.

Unison is the first and greatest of concords; and the foundation, or, as some call it, the *mother* of all the rest: yet others deny it to be any concord at all, maintaining it to be only that in sounds, which unity is in numbers.

These restrain the word *concord* to intervals, and make it include a difference of tune; but this is precarious: for as the word *concord* signifies an agreement of sounds, it is certainly applicable to *unisons* in the first degree.

But though *unisonance*, or an equality of tune, makes the most perfect agreement of sound; it is not true that the nearer any two sounds come to an equality of tune, they are the more agreeable.—The mind is delighted with variety; and the reason of the agreeableness, or disagreeableness of two sounds, must be ascribed to some other cause than the equality, or inequality of the number of their vibrations.

It is a famed phenomenon in music, that an intense sound being raised, either with the voice, or a sonorous body, another sonorous body near it, whose tune is either *unison*, or octave to that sound, will found its proper note *unison*, or octave, to the given note.—The experiment is easily tried by the strings of two instruments; or by a voice, and a harpichord; or a bell, or even a drinking-glass.

This our philosophers account for thus: one string being struck, and the air put in motion thereby; every other string within the reach of that motion, will receive some impression therefrom: but each string can only move with a determinate velocity of recourses, or vibrations; and all *unisons* proceed from equal, or equidistant vibrations; and other concords from other proportions.—The *unison* string, then, keeping equal pace with the founded string, as having the same measure of vibrations, must have its motion continued, and still improved, till its motion become sensible, and it give a distinct sound. Other concurring strings have their motions propagated in different degrees, according to the frequency of the coincidence of their vibrations, with those of the founded string: the octave, therefore, most sensibly; then the fifth: after which, the crossing of the motions prevents any effect.

This they illustrate by the pendulum; which being set a moving, the motion may be continued and augmented, by making frequent, light, coincident impulses; as blowing on it when the vibration is just finished: but if it be touched by any cross or opposite motion, and this, too, frequently; the motion will be interrupted, and cease altogether.—So, of two *unison* strings, if the one be forcibly struck, it communicates motion, by the air, to the other: and both being equidistant in their vibrations, that is, finishing them precisely together, the motion of that other will be improved and heightened, by the frequent impulses received from the vibrations of the first, because given precisely when that other has finished its vibration, and is ready to return: but if the vibrations of the chords be unequal in duration, there will be a crossing of motions, less or more, according to the proportion of the inequality; by which the motion of the untouched string will be so checked, as never to be sensible. And this we find is the case in all consonances, except *unison*, octave, and the fifth. See **CHORD**.

UNIT, UNITE, or UNITY, in arithmetic, the number one; or one single individual part of discrete quantity. See **NUMBER**.

If a number consist of four or five places, that which is outermost towards the right hand, is called the place of *units*.

Number, in general, is by Euclid defined to be ποσὸν ποσότης, a multitude, or aggregate of *units*; but in this sense, *unity* is not a number.

UNITARIANS, a name assumed by the new Antitrinitarians; as making profession to preserve the glory and attribute of divinity to the one, only great and supreme God, and Father of our Lord Jesus Christ.

UNITED Affection. See the article AFFECTION.

UNITY, UNITAS, the abstract, or quality, which constitutes, or denominates a thing *unum*, or one.

The school philosophers generally define *unity*, by a thing's being undivided in itself, and divided from every thing else.

—Others, more accurately, define it, a mode of being, whereby it agrees to any particular being, once: these make two kinds of *unity*, viz. *unity of simplicity*, which is both undivided and indivisible; such as that of God, angels, and human souls: the other, *union of composition*, which, though undivided, is divisible in the being, as consisting of divers parts: such is that of man, &c.

Hence, *unity* is also divided into that *per se*, which agrees to any being whose parts are collected into one substratum; and *unity per accidens*, whose parts are not united into one substratum; as that of a flock of sheep, &c.

Some also make a *singular*, or *numerical unity*, and an *universal unity*; a *real*, and an *imaginary unity*, &c.

It is disputed among mathematicians, whether or no *unity* be a number? —The generality of authors hold the negative, and make *unity* to be only inceptive of number, or the principle thereof; as a point is of magnitude, and an *union* of concord.

Stevinus is very angry with the maintainers of this opinion: and yet, if number be defined a multitude of units joined together, as many authors define it, it is evident that *unity* is not itself a number.

UNITY, among divines. —The Romanists, and the reformed dispute, whether or no the church be one single body, all the members whereof are joined together, either really, or in inclination; so that whatever does not appertain to that body, is no part of the church: which is what they call *the unity of the church*; and which the Romanists maintain to be restrained to one single society, or one communion, under one visible head; and out of which the Protestants are excluded! These last, on the contrary, hold, that the *unity* of the church may still subsist, without the members being united under any one visible head; it being sufficient, that all Christians be united by the bonds of mutual love, and charity; and that they be agreed in the fundamental points of religion.

All the difficulty is, to fix what those fundamentals are; some inclining to make the door of the church wider than others.

UNITY, in poetry. —In the drama there are three *unities* to be observed; the *unity of action*, that of *time*, and that of *place*.

In the epic poem, the great and almost only *unity*, is that of the action. —Some regard, indeed, ought to be had to that of time: but that of place there is no room for. —The *unity of character* is not reckoned among the *unities*.

The *unity* of the dramatic action, consists in the *unity* of the intrigue in comedy, and that of the danger in tragedy; and this not only in the plan of the fable, but also in the fable extended and filled with episodes.

The episodes are to be wove in, without corrupting the *unity*, or forming a double action; and the several members are to be so connected together, as to be consistent with that continuity of action so necessary to the body; and which Horace prescribes, when he says, —*Sit quodvis simplex duntaxat et unum*.

The *unity* of the epic action, M. Dacier observes, does not consist in the *unity* of the hero, or in the *unity* of his character, and manners; though those be circumstances necessary thereto. —The *unity of action* requires, that there be but one principal action, of which all the rest are to be incidents, or dependencies.

F. Boissu assigns three things requisite thereto: the first, that no episode be used, but what is fetched from the plan, and ground of the action, and which is a natural member of that body: the second, that these episodes and members be well connected with each other: The third is, not to finish any episode, so as it may appear a whole action; but to let each be always seen in its quality of member of the body, and an unfinished part.

The same excellent critic examines the *Æneid*, *Iliad*, and *Odyssey*, with respect to these rules, and finds them strictly observed. —Indeed, it was from the conduct of those divine poems, that he took the hint of the rules themselves. Instances wherein these rules are all neglected, he gives us in Statius's *Thebaid*.

To the *unity of time*, it is required, in the drama, that the action be included in the space of a day. —Aristotle says expressly, it must not exceed the time the sun employs in making one revolution, which is a natural day, under pain of irregularity: some critics will even have it included in the space of twelve hours, or an artificial day.

Indeed, the ancient tragic poets sometimes dispensed with this rule; and the modern English ones many of them disallow it: and very few of them practise it.

In the epic poem, the *unity of time* is still less established:

In effect, there is no fixing the time of its duration; in regard, the warmer and more violent the action is, the less must be its continuance: Whence it is, that the *Iliad*, representing the anger of Achilles, only contains forty seven days at most; whereas the action of the *Odyssey* holds eight years and an half, and that of the *Æneid* almost seven years.

But the length of the poem Aristotle gives us a rule for; which is, that it be such as it may be read over in one day: pretending, that if it exceeds that compass, the imagination will be bewildered in it, and that one cannot see the end, without having lost the idea of the beginning.

As to the *unity of place and scene*, neither Horace nor Aristotle gives us any rules relating thereto —It were to be wished, indeed, that what is presented to the audience on the same stage, which is never shifted, might be supposed to have passed in the same house, and the same apartment. —But as such a constraint would cramp the poet too much; and as such an uniformity would suit very ill with abundance of subjects; it has been agreed, that what passes any where in the same town or city, shall be allowed for *unity of place*. —At least, if two different places be unavoidable; yet the place is never to be changed in the same act.

UNITY of possession, in law, signifies a joint possession of two rights, by several titles.

Thus, if I take a lease of land upon a certain rent, and afterwards buy the fee simple; this is an *unity of possession*, whereby the lease is extinguished: by reason I, who before had only the occupation for my rent, am now become lord of the fame, and am to pay rent to none but myself.

Unity of possession, amounts to the same with what civilians called *consolidation*.

UNIVERSAL *, something that is common to many things: or it is one thing belonging to many, or all things.

* The word, according to some, is compounded of *unum* *versus* *alia*.

There are *universal instruments*, for measuring all kinds of distances, as heights, lengths, &c. called also *pantometers*, and *holometers*.

An *universal dial*, is that whereby the hour may be found by the sun all over the earth; or under any elevation of the pole.

Several learned authors have had it in view, to establish an *universal character*; by which the different nations might understand each other's writings, without learning their language.

The Romanists are divided among themselves, about the title of *universal bishop*, which some of the popes have arrogated to themselves; though others of them have declined it. —Baronius holds the appellation to belong to the pope jure divino; and yet S. Gregory, opposing the same quality given by a council in 586, to John, patriarch of Constantinople, asserted expressly, that it did not belong to any bishop; and that the bishops of Rome could not, nor ought not to take it. —Accordingly, S. Leo refused to accept it, when offered him by the council of Chalcedon; for fear, least giving something particular to one bishop, they should take from all the rest; since there could not be an *universal bishop*, but the authority of the rest must be diminished.

UNIVERSAL, UNIVERSALE, in logic, is either *complex*, or *incomplex*. —A *complex universal*, is either an universal proposition, as, "Every whole is greater than its part," or whatever raises a manifold conception in the mind; as the definition of a reasonable animal.

An *incomplex universal*, is what produces one only conception in the mind, and is a simple thing, respecting many; as human nature, which relates to every individual wherein it is found.

According to the various order and respect this *universal* has to many, there are seven modes thereof assigned, viz.

Universals in causing, such are the common efficient causes of divers effects; as God, the sun, &c. See CAUSE, &c. —*Universals in distributing*, such are common, or universal signs; as all, none, &c. —*Universals in knowing*, which know all things; as the understanding, &c. —*Universals in representing*, such are images, or ideas of universal things; as the idea of a house, of a man, &c. —*Universals in signifying*, such are common words, signifying many things; as animal, stone, &c. —*Universals in being*, or *existing*, are natures existing in several; as humanity in Peter, Paul, &c. —And, *Universals in predicating*, which exist in many things, and are separately predicated of them all; as, *ens*, and *unum*: these are also called *logical universals*.

All these kinds of *universals*, the two last only excepted, are not *universals* in themselves, but only with respect to their objects, caused, represented, &c. So that what we chiefly consider as *universals*, are the *universalia in essendo*, and *prædicando*.

Now in an *universal*, they distinguish two things, the *matter*, called the *material universal*, *universale materiale*, which is the one nature multipliable in many; as humanity in Peter,

ter, Paul, &c. and the *form*, called the *formal universal*, which is the unity of that nature.

Wherefore, to constitute an *universal*, it is requisite the nature be one, yet multipliable: but what such a nature is, has proved matter of great controversy, both among the ancient and modern philosophers.

The Platonists will have *universals* to be nothing but divine ideas.—Now by *idea* they mean the pattern or form which the artificer has in view, when he makes any thing: but as this is two-fold, *internal*, which is a sort of image of the thing to be done, which the artificer frames in himself; and *external*, which is something out of himself, which the artificer imitates: the philosophers have been infinitely perplexed, to find which of the two Plato meant.—The Peripatetics insist he meant the *external*; but the Platonists, and most of the Christian divines, hold for the *internal*.

The Stoics and Nominalists hold this in common with the Platonists, that *universals* are not in the things themselves, but out of them: The Stoics, particularly, for *universals*, put a kind of formal conceptions, or acts of knowing; by reason they represent many things at the same time. *e. gr.* knowledge, representing all men, is, according to the Stoics, an *universal*.

The Nominalists make words *universals*; by reason the same word represents many things, as the word *man* represents all men: but both Stoics and Nominalists make *universals* to be something extrinsic to things themselves; by reason whatever exists, or is produced, is singular: so that there is no *universal* really in things.

The Peripatetics, however, contend, that there are *universal* and *common* natures in things themselves; or that things and natures like each other, form a material *universal*.—But as to the manner wherein they are *universal*, or whence they derive their *universality*, that is, their unity and aptitude of being in many, whether from nature, or from our understanding, is great matter of dispute among them.—If they derive that unity, wherein their *universal* form is placed, from nature; then there is an *universal à parte rei*; which is the opinion of the Scotists.

If they do not derive it from nature, but only from our minds or understandings, then the doctrine of the Thomists is allowed; who contend, that a formal *universal* has no other existence, but by an act of the intellect. See THOMISTS.

UNIVERSAL Cause.	} See	CAUSE.
UNIVERSAL Characters.		CHARACTER.
UNIVERSAL Consumption.		CONSUMPTION.
UNIVERSAL Executor.		EXECUTOR.
UNIVERSAL Geography.		GEOGRAPHY.
UNIVERSAL Gravity.		GRAVITY.
UNIVERSAL Idops.		MAP.
UNIVERSAL Palsy.		PALSY.
UNIVERSAL Rheumatism.		RHEUMATISM.
UNIVERSAL Ring-dial.		RING-Dial.
UNIVERSAL System.		SYSTEM.
UNIVERSAL Theorem.		THEOREM.

UNIVERSALISTS, in polemical divinity, an appellation, given to such as hold an *universal* grace; in like manner as the denomination *particularists*, is given to those who hold a *particular* and *efficacious* grace.

The Arminians are particularly denominated *universalists*. See ARMINIAN.

UNIVERSALITY, the quality that denominates a thing *universal*.

The Catholics assert the *universality* of their church, both as to time, and persons; and maintain this to be a note or mark of the true church; which distinguishes it from all other societies that pretend to the name.

UNIVERSALITY, in the schools.—Logicians make two kinds of *universality*; the one *metaphysical*, the other *moral*.

Metaphysical UNIVERSALITY, is that which excepts nothing: as this proposition, "Every man is mortal."

Moral UNIVERSALITY, is that which admits of some exception: as, "All old men praise the times past."—In such like propositions, it is enough that the thing be ordinarily so; it not being strictly required, that every old man should be of that disposition.

UNIVERSE, a collective name, signifying the whole world, or the assemblage of heaven and earth, with all things therein: called by the Greeks, *το πᾶν*, and by the Latins, *mundus*.

The antients, and after them the Cartesians, imagine the *universe* to be infinite.—The reason they give, is, that it implies a contradiction to suppose it finite, or bounded; since it is impossible not to conceive space beyond any limits that can be assigned it: which space, according to the Cartesians, is body; and consequently part of the *universe*. But that the *universe* is finite, appears from the two following considerations.—1st. That whatever consists of parts, cannot be infinite; since the parts that compose it, must be

finite, either in number or magnitude; which if they be, what they compose must be so too; or, 2^{dly}, they must be infinite in number or magnitude; but an infinite number is a contradiction, and to suppose the parts infinitely big, is to suppose several infinities, one bigger than another; which, though it may pass among mathematicians, who only argue about infinities, *in passe*, or in imagination, will not be allowed in philosophy.

UNIVERSITY, UNIVERSITAS, a collective term, applied to an assemblage of several colleges established in a city, or town, wherein are professors in the several sciences, appointed to teach them to students; and where degrees, or certificates of study in the divers faculties, are taken up. In each *university*, four faculties are usually taught; theology, medicine, law, and the arts and sciences.

They are called *universities*, or *universal schools*, by reason the four faculties are supposed to make the grand world, or whole compass of study.

In the eye of the law, an *university* is held a mere lay body, or community, though, in reality, it be a mixed body, composed partly of laymen, and partly of ecclesiastics.

Universities had their first rise in the twelfth and thirteenth centuries.—Those of Paris and Bologna pretend to be the first that were set on foot; but then they were on a very different footing from the *universities* among us.

The *university* of Paris is said to have commenced under Charlemagne, and to owe its rise to four Englishmen, disciples of venerable Bede; who, going to that city, made a proposal to set up, and sell learning; and accordingly, held their first lectures in places assigned them by that Prince: such is the account given by Gaguin, Gilles, de Beauvais, &c.—Though the authors who wrote in those days, as Eginhard, Aimon, Rheginon, Siebert, &c. make not the least mention of this memorable fact.

Add, that Pasquier, Du Tillet, &c. declare openly against the opinion; and assert, that the first foundations were not laid till Louis the young, and Philip Auguste, in the twelfth century.—The earliest mention we find made of the *university* of Paris, is in Regordus, who lived in that age; and who was cotemporary with Peter Lombard, the master of the sentences, the great glory of that *university*; in memory of whom, an anniversary is to this day observed by that body, in the church of S. Marcel, where he lies buried. But it is certain it was not established all at once; it appears to have been at first no other than a public school in the cathedral church; from which it grew, by little and little, under the favour and protection of the kings, into a regular body.

In effect, our own *universities*, Oxford and Cambridge, seem intitled to the greatest antiquity of any in the world; and *University*, Balliol, and Merton colleges in Oxford, and Peter's in Cambridge, all made colleges in the thirteenth century, may be said to be the first regular endowments of this kind in Europe.

For though *University* college in Cambridge had been a place for students ever since the year 872, yet this, like many of the other ancient colleges beyond sea, and Leyden to this day, was no proper college; but the students, without any distinction of habit, lived in citizens houses; having only meeting-places to hear lectures, and to dispute.

In after-times, there were houses built for the students to live in society; only each to be at his own charge, as in the inns of court.—These, at first, were called *inns*; but now *halls*.

At last, plentiful revenues were settled on several of these halls, to maintain the students in diet, apparel, &c. and these were then called *colleges*.

The *universities* of Oxford and Cambridge are governed, next under the king, by a *chancellor*, who is to take care of the government of the whole *university*, to maintain the liberties thereof, &c.

Under him is the *high steward*, whose office is to assist the chancellor, and other officers, when required, in the execution of their offices, and to hear and determine capital causes, according to the laws of the land, and the privileges of the *university*.

The next officer is the *vice-chancellor*, who officiates for the chancellor in his absence.—There are also two *proctors*, who assist in the government of the *university*; particularly in the business of school-exercise, taking up degrees, punishing violators of the statutes, &c. See PROCTOR.—Add to these a *public orator*, *keeper of records*, *register*, *beadles*, and *verger*.

For the degrees taken up in each faculty, with the exercises, &c. requisite thereto, see DEGREE.

UNIVOCAL, in the schools, is applied to two or more names, or terms, that have but one signification.—In opposition to *equivocal*, which is, where one term has two or more significations.

Or, *univocal terms*, are such whose name, as well as nature,

is the fame; in opposition to *equivocal*, whose names are the same, but their natures very different.

For a thing to be predicated *univocally* of any others, it is to be attributed to all of them alike, and in the same proper sense. See **PREDICATE**, and **PREDICABLE**.

UNIVOCAL Generation—The doctrine of the antients, with respect to propagation, was, That all perfect animals were produced by *univocal generation*; that is, by the sole union, or copulation of a male and female of the same species, or denomination: and, that insects were produced by *equivocal generation*, without any seed, and merely of the corruption of the earth exalted, and, as it were, impregnated by the sun's rays: but this is wholly erroneous. Some philosophers make a kind of intermediate generation between *equivocal* and *univocal*, which they call *analogous generation*.

UNIVOCAL Action. } See the article } **ACTION**.

UNIVOCAL Cause. } **CAUSE**.

UNIVOCALS, called by the Greeks *synonyma*, are defined by Aristotle to be those things whose name is common, and also the reason corresponding to the name; that is, the definition of the idea affixed to it, the same.

Thus, under the name and definition of *animal*, man and brute are equally included; and circle and square, in the reason or definition of a *figure*.

Here, the word, as *figure*, they use to call *univocum univocans*, or *univocating univocal*; and the things included under the *univocal* name, as *circle*, and *square*, *univoca univocata*, *univocated univocals*.

UNIVOCATION, in logics, and metaphysics.—The school-men have long disputed about the *univocation* of being, i. e. whether the general idea of *being* agree in the same manner, and in the same sense, to the substance and the accident; to God, and the creature?

UNKNOWN. See the article **UNCERTAIN**.

UNLAWFUL, *illegal*, something prohibited by, or contrary to the terms of a law, either divine or human.

UNLAWFUL Assembly, the meeting of three or more persons together, by force to commit some unlawful act; as, to assault any person, to enter his house, or land, &c. and thus abiding together, whether they attempt the execution, or not.

By the stat. 16 Car. II. If five persons, or more, shall be assembled together, above those of the family, at any conventicle or meeting, under colour of any exercise of religion, it is *unlawful*, and punishable by fines, and otherwise, as in that statute is provided.

UNLIKE Quantities, and **Signs**, in algebra. See **LIKE Signs**, and **Quantities**: see also **SIGN**, and **QUANTITY**.

UNLIMITED, or *indeterminate Problem*, is such a one as is capable of infinite solutions.—As, to divide a triangle given into two equal parts; to make a circle pass through two points assigned, &c.

UNLUTING, in chymistry, the taking away of the lute, loam, or clay, wherewith a vessel was before closed, joined to another, or covered. See **LUTE**.

UNMOOR, a term used at sea, when a vessel that before rid, or was held by two anchors, is begun to be disengaged and prepared to weigh.

UNQUES Priſt, *always ready*. See **UNCORE Priſt**.

UNREEVING a Rope. See the article **REEVING**.

UNRIGGING of a Ship, is the taking away the rigging, or cordage.

UNSEELING, in falconry, a taking away the thread that runs through the hawk's eye-lids, and hinders her sight. See **HAWK**.

Drawing the strings of the hood, to be in readiness to pull off, is called *unſtriking the hood*.

UNWRITTEN Tradition. See the article **TRADITION**.

VOCABULARY*, **VOCABULARIUM**, in grammar, denotes a collection of the words of a language, with their significations: otherwise called a *dictionary*, *lexicon*, or *nomenclature*.

* The word is French, formed of the obsolete term *vocabale*; of the Latin, *vocabulum*, word.

The *vocabulary* is, properly, a lesser kind of dictionary, which does not enter to minutely into the origins, and different acceptations of words.—Though the Italian *vocabulary* of the acad. ay. de la Crusca seems to be an exception from this distinction, as being a copious and exact work, in three volumes folio, said to have been forty years in compiling.—And the like holds of the *vocabulario* Portuguez of F. Bluteau, in ten volumes folio: in the titles of both these books the word is used in a larger sense.

VOCAL, something that relates to the voice or speech. See **VOICE**, &c.

Thus, *vocal prayer* is that spoke out, or delivered in words, in contradistinction to *mental prayer*.

—our ancient customs, **VOCALIS** is frequently used for *so*

called:—*Post hæc Morganus de tribu Walensium, &c. alter nomine Madocus vocalis principis eorum.* Matt. Paris.

VOCAL is sometimes also used substantively, in speaking of matters of election, to signify a person who has a right to vote.—Thus the Romanists say, a man must have been a religious a certain number of years, to be *vocal*.

VOCAL Music, is music set to words, especially verses; and to be performed with the voice.—In contradistinction to *instrumental music*, composed only for instruments, without singing.

Poetry then makes a necessary part of *vocal music*; and this appears to have been the chief, if not the only practice of the antients, from the definitions which they give us of music.

Their *vocal music* seems to have had some advantage over ours, in that the Greek and Latin languages were better contrived to please the ear than the modern ones.—In effect, Vossius taxes all the latter languages as unfit for music, and says, “We shall never have any good *vocal music*, till “our poets learn to make verses on the model of the antients;” i. e. till the antient metrical feet and quantities are restored.

But it is to be observed, that the rhythmus of their *vocal music*, was only that of their poetry; and had no other forms and mutations, than what the metrical art afforded.

Their changes were no other than from one kind of metrum or verse to another; as from iambic, to choric. See **MEASURE**, and **RHYTHMUS**.

Their *vocal music*, then, consisted of verses set to musical tunes, and sung by one or more voices, in chorus, or alternately; sometimes with, and sometimes without the accompaniments of instruments.

For instrumental music, in the manner we have defined it, it is not very clear that they ever had any. See **SYNAUTLIA**, &c.

VOCATION, *Calling*; among divines, the grace or favour which God does any one in calling him out of the way of death, and putting him into the way of salvation.

In this sense, we say, the *vocation of the Jews*, the *vocation of the Gentiles*, &c.—There are two kinds of *vocation*; the one *external*, the other *internal*.—The first consists in a simple and naked proposing of objects to the will.—The second, is that which renders the first effectual, by disposing our faculties to receive those objects.

VOCATION, is also used for a destination to any state, or profession.—It is a rule, that none are to enter the ecclesiastic or monastic state, without a particular *vocation*, or call.

The Romanists hold the *vocation* of the reformed divines null and invalid.—Among ourselves, some hold an uninterrupted succession necessary to the validity of the *vocation* of a priest.

VOCATIVE, in grammar, the fifth case, or state of nouns.

When we name the person we are speaking to, or address ourselves to the thing we are speaking of, as if it were a person; the noun or name acquires a new relation, which the Latins and Greeks express by a new termination, called the *vocative*.

Thus, of *Dominus*, Lord, in the nominative, the Latins have made *Domine*, O Lord, in the *vocative*; of *Antonius*, *Antoni*, &c.—But as this was a thing not absolutely necessary, and as the nominative case might very well serve on such occasions, this new case, or termination, was not universal: in the plural, for instance, it was the same with the nominative; and even in the singular, it was only practised in the second declension among the Latins; and in Greek, where it is the most common, it is frequently neglected, and the nominative used instead of it: as in that passage in the Greek psalms, quoted by St Paul, to prove the divinity of Jesus Christ, *Spesce os, & oces*, thy throne, O God!

In English, and most of the modern tongues, this case is ordinarily expressed in nouns that have an article in the nominative, by suppressing that article: as, *the Lord is my hope*—*Lord, thou art my hope!* though, on many occasions, we use an interjection.

VOCIFERATIO*, in our old law-books, the same with *buc* and *cry*.

* —*Qui furem plagiatum dimiserit, qui ei obnoxiaverit & gratis sine vociferatione dimiserit, &c.* Leg. Hen. I.

VOICE, *Vox*, a sound produced in the throat and mouth of an animal, by an apparatus of instruments for that purpose.

Voices are either *articulate*, or *inarticulate*.

Articulate Voices, are those whereof several conspire together to form some assemblage, or little system of sounds.

—Such are the *voices* expressing the letters of an alphabet, numbers of which joined together, form words.

Inarticulate VOICES, are such as are not organized, or assimilated into words: such is the barking of dogs, the braying of asses, the hissing of serpents, the singing of birds, &c.

The formation of the *human voice*, with all the varieties thereof observed in speech, music, &c. makes a very curious article of inquiry; and the apparatus and organization of the parts ministering thereto, is something exceedingly surprising. Those parts are, the trachea, or wind-pipe, through which the air passes and repasses into the lungs; the larynx, which is a short cylindrical canal, at the head of the trachea; and the glottis, which is a little oval cleft, or chink, left between two semicircular membranes, stretched horizontally within the larynx; which membranes, though capable of joining close together, do generally leave an interval, either greater or less, between them, called the *glottis*.—See particular descriptions of each of these parts, under the articles TRACHEA, LARYNX, and GLOTTIS.

The long canal of the trachea, terminated at top with the glottis, appears so like a flute, that the ancients made no doubt but the trachea contributed the same to the *voice*, as the body of the flute does to the sound of that instrument.—Galen himself fell, in some measure, into the mistake: he perceived, indeed, that the principal organ of *voice* was the glottis; but he still allowed the trachea a considerable share in the production of sound.

Galen's opinion was followed by all the ancients after him; and even by all the moderns, before M. Dodart.—But that author, observing that we do not either speak or sing, when we inspire, or take in the air, but only when we expire, or expel it; and that, the air coming out of the lungs, passes always out of the minuter vessels of that part into larger; and at last into the trachea itself, which is the largest of all: that thus its passage becoming still more free and easy, and this more than ever in the trachea, it can never undergo such a violence, and acquire such a velocity in that canal, as is required to the production of sound.—But that, as the aperture of the glottis is very small, in comparison with the width of the trachea, the air can never get out of the trachea by the glottis, without a vast compression and augmentation of its velocity; and that by this means, in passing, it communicates a brisk agitation to the minute parts of the two lips of the glottis, and gives them a kind of spring, and occasions them to make vibrations; which, communicated to the passing air, are what really occasion the sound.

This sound, thus formed, proceeds into the cavity of the mouth and nostrils; where it is reflected, and rebounds: and on this resonance, M. Dodart shews, it is that the agreeableness of the *voice* intirely depends.—The different consistencies, forms, &c. of the divers parts of the mouth, contribute to the resonance, each in their way; and from this mixture of so many different resonances in their due proportion, there results a harmony in the *human voice*, inimitable by any musician.—Hence it is, that when any of these parts is disordered, e. g. when the nose is stopped, the *voice* becomes displeasing.

This resonance in the cavity of the mouth, does not seem to consist in a simple reflexion, such as that of a vault, &c. but in a resonance proportionate to the tones of the sound sent into the mouth from the glottis; and accordingly, we find this cavity to lengthen and shorten itself, according to the depth or acuteness of the tone.

Now, for the trachea to effect this resonance, as it was the common opinion it did, it would be required, that the air, after its being modified, and turned into sound by the glottis, instead of continuing its course from within outwards; should return from without inwards, and thus strike on the sides of the trachea: which can never happen, except in those who have a violent cough, and in ventriloquious persons.—Indeed, in most river fowl, which have a very strong *voice*, the trachea does resound; but the reason is, that in them the glottis is placed at the bottom of the trachea, and not at the top, as in men.

That canal, then, which at first passed for the principal organ of *voice*, is now found not to be so much as the secondary one, i. e. not that which occasions the resonance.—It does not serve the glottis, as the body of a flute does its plug; but instead of that, the mouth serves the glottis, as the body of some other wind-instrument not yet known in music.—In effect, the office of the trachea is no other, than that of the port-vent in an organ, viz. to furnish wind.

For the cause of the different tones of VOICE.—As the organs that form the *voice* make a kind of wind-instrument, one might expect to find some provision therein, answerable to that which produces the differences of tones in some other wind-instruments.—The tone, therefore, must be attributed either to the mouth and nostrils, which occasion the resonance, or to the glottis, which produces the sound: and as all the different tones are produced in man by the same instrument, it follows, that the part which produces them must be capable of changes answerable thereto.

Now, for a grave tone, we know there is more air required than for an acute one.—The trachea, therefore, to let this greater quantity pass, must dilate and shorten itself; by which shortening, the external canal, that is, the canal of the mouth and nose, reckoned from the glottis to the lips, or nostrils, is lengthened.—For, the shortening of the internal canal, i. e. of the trachea, brings the larynx and glottis lower down; and of consequence makes its distance from the mouth, &c. greater: and there is a change in the length of each canal, for every change of tone, and semitone.—Accordingly, it is easy to observe, that the knot of the larynx alternately rises and falls in all quaverings, or shakings of the *voice*, how small soever the difference of tone may be.

Hence, as the depth of the tone of a hautboy is answerable to the length of the instrument; the longest fibres of the wood, whose vibrations make the resonance, making always the slowest vibrations, and consequently the deepest tone: it may appear probable, that the concavity of the mouth, by its lengthening for grave tones, and shortening for acute ones, might serve very well for the production of the divers tones: but M. Dodart observes, that in that stop of the organ called the *human voice*, the longest pipe is six inches, and yet with all that length, it does not make any difference of tone; but the tone of the pipe is precisely that of the plug; whereas the concavity of the mouth of a man of the gravest *voice*, not being above six inches deep; it is evident that cannot modify, vary, and give the tone.

It is the glottis, then, that forms the tone, as well as the sound; and the manner of forming the various tones, is by varying its aperture.—A piece of mechanism too admirable, not to be here particularly inquired into.

The human glottis, then, represented in *Tab. Nat. History*, fig. 11. is only capable of one proper motion, viz. that of an approach of its lips, ADB, and ADB.—Accordingly, the dotted lines AEB, AFB, AGB, exhibit three different degrees of approach.—These different apertures of the glottis, anatomists usually attribute to the action of the muscles of the larynx; but M. Dodart shews, from their position, direction, &c. that they have other uses; and that the opening and shutting of the glottis is effected by other means, viz. by two tendinous cords, or fringes, inclosed in the two lips of that aperture.

In effect, each of the two semicircular membranes, whose interstice forms the glottis, is doubled back upon itself; and within each duplicature there is a cord, or string, which is fastened at one end, to the fore-part of the larynx, and to the hind-part at the other.—It is true, they appear more like ligaments than muscles; as consisting of white and membranous fibres; not of red and fleshy ones: but the vast number of minute changes in this aperture, necessary to form the vast variety of tones, make an extraordinary kind of muscle, by whose contraction they should be effected, absolutely necessary.—Common fleshy fibres, wherein the blood is received in large quantity, had been infinitely too coarse for such delicate motions.

These strings, which in their state of relaxation make each a little arch of an ellipsis; as they contract more and more, become longer, but less and less curve; and at last, with the greatest contraction they are capable of, they degenerate into two right lines, applied close to each other; so close, and so firm, that an atom of air cannot escape out of the lungs, how full soever they may be, and how great an effort soever all the muscles of the lower venter may make against the diaphragm, and by the diaphragm, against these two little muscles.

The different apertures of the lips of the glottis, then, produce all the different tones in the several parts of music, viz. *bass*, *tenor*, *counter-tenor*, *treble-bass*, and *treble*; and the manner is thus:

The *voice*, we have shewn, can only be formed by the glottis; but the tones of the *voice*, are modifications of the *voice*, and these can only be produced by the modifications of the glottis.—Now the glottis is only capable of one modification; which is, the mutual approach or recedes of its lips: it is this, therefore, produces the different tones.—Now that modification includes two circumstances: the first, and principal, is, that the lips are stretched more and more, from the lowest tone, to the highest; the second is, that the more they are stretched, the nearer they approach.

From the first it follows, that their vibrations will be so much the quicker, as they come nearer their highest tone; and that the *voice* will be just, when the two lips are equally stretched, and false, when they are unequally; which agrees perfectly well with the nature of string instruments.

From the second it follows, that the higher the tones are, the nearer will they approach to each other; which agrees perfectly well with wind instruments, governed by reeds, or plugs.

The degrees of tension of the lips, are the first and principal cause of tones; but their differences are infensible.—The degrees

degrees of approach, are only consequences of that tension; but their differences are more easily assigned.

To give a precise idea of the thing, therefore, we had best keep to that, and say, that this modification consists in a tension, from whence results a very numerous subdivision of a very small interval; which yet, small as it is, is capable, physically speaking, or being subdivided infinitely.

The doctrine is confirmed, from the different apertures found in a singing person of different ages, of both sexes.—The aperture is less, and the exterior canal always shallower in the sex and ages fittest to sing treble.—Add, that the reed of a hautboy, separated from the body of the instrument, being a little pressed between the lips, will yield a tone, somewhat higher than its natural one; and if pressed still more, will yield another still higher: and thus an able musician may run successively through all the tones, and semi-tones of an octave. It is different apertures, then, that produce, or at least that accompany different tones, both in natural wind instruments, and artificial ones; and the diminution of the aperture, raises the tones both of the glottis, and the reed.

The reason why lessening the aperture heightens the tone, is, that the wind passes through it with the greater velocity; and from the same cause it is, that if any reed, or plug of an instrument be too weakly blown, its tone will be lower than ordinary.

Indeed, the contractions and dilatations of the glottis, must be infinitely delicate: by an exact calculation of the ingenious author abovementioned, it appears, that to perform all the tones and semitones of a common voice, which is computed to reach twelve tones, to perform all the particles and subdivisions of those tones into commas, and other minuter, though still sensible parts; to perform all the shakes, or the differences in a tone, when sounded more or less strong, without changing the tone: the little diameter of the glottis, which does not exceed $\frac{1}{16}$ of an inch, but which varies within that extent at every change, must be actually divided into 9632 parts; which parts are yet very unequal, and therefore many of them much less than the $\frac{1}{9632}$ part of an inch.—A delicacy scarce to be matched by any thing but a good ear, which has so just a sense of sound, as, naked, to perceive differences in all these tones; even those whose origin is much less than the $\frac{1}{963200}$ part of an inch.

VOICE, in grammar, is a circumstance in verbs, whereby they come to be considered, as either *active*, or *passive*, i. e. either as expressing an action impressed on another subject, as *I beat*; or receiving it from another, as *I am beaten*.

VOICE, in matters of elections, denotes a *vote*, or *suffrage*.

In this sense, a man is said to have a *deliberative voice*, when he has a right to give his advice and opinion in a matter of debate, and his suffrage is taken.—An *active voice*, when he gives his vote for the election of any one; and a *passive voice*, when the suffrages may fall on himself to be elected.—An *executive voice*, when he may act to procure another to be elected.—A *consultative voice*, when he can only offer reasons and remonstrances, whereon the chief, or head, determines at his own discretion: such the cardinals have, with regard to the pope; and the masters in chancery, with regard to the lord chancellor, &c.

Part of the VOICE, in music. See the article **PART**.

VOID Space, in physics. See the article **VACUUM**, &c.

VOID, in common law. See **ANNULING**.

VOID Bastion. See the article **BASTION**.

VOIDANCE, **VACANCY**, in the canon law, a want of an incumbent upon a benefice. See **VACANCY**, &c.

This is twofold, either in law, *de jure*; as when one holds several benefices that are incompatible: or *de facto*, in deed; as when the incumbent is dead, or is actually deprived.

VOIDED, **UIDED**, in heraldry, is understood of an ordinary, whose inner or middle part is cut out; leaving nothing but its edges to shew its form; so that the field appears through it. Hence, it is needless to express the colour, or metal of the *voided* part; because it must, of course, be that of the field.

The *Crofs VOIDED*, differs from the *crofs finbriated*, in that this latter does not shew the field through it, as the other does.—And the same obtains in other ordinaries.

VOIDER, in heraldry, one of the ordinaries, whose figure is much like that of the *flaque*, or *flanch*; only that it doth not bend so much.—See *Tab. Herald. fig. 89*. see also the article **FLANCH**.

This armoury, they say, is properly the reward of a gentleman that has well served her prince.—It is always borne by pairs.

VOIDING, *Evacuating*, in medicine. See **EVACUATION**. In the *Philosophical Transactions*, we have an account of one Matt. Milford, who voided a worm by urine, supposed to have come from the kidneys.

Dr Lister mentions true caterpillars voided by a boy of nine years old.—Mr Jessop saw hexapods vomited up by a girl.—Catherina Geilaria, who died in 1662, in the hospital of

Altenburg, for 20 years voided, they say, by vomit and stool, toads, and lizards. *Ephem. German. T. I. Obf. 103*.

In the same *Ephem.* is also a story of a kitten, bred in the stomach, and vomited up; and others of whelps, frogs, lacertæ aquaticæ, and other animals, bred and voided the like way.—Bartholine gives us an instance of a worm, bred in the brain, and voided by the nose of O. W. See **VERMES**.

VOIR DIRE, in law.—When, upon a trial at law, it is prayed that a witness may be sworn upon a *voir dire*; the meaning is, that he shall, upon his oath, speak or declare the truth, whether he shall get or lose by the matter in controversy.—If he be unconcerned, his testimony is allowed; otherwise, not.

VOL, among heralds, signifies the two wings of a fowl joined together, borne in armoury; as being the whole that makes the flight.—Accordingly, a *semi-vol*, is a single wing.

VOLA, the palm, or inside of the hand, comprehended between the fingers and the wrist.

VOLANS, See the articles **DRACO**, and **PISCIS**.

VOLANT, in heraldry, is when a bird, in a coat of arms, is drawn flying, or having its wings spread out.

Pass-VOLANT. } See the article { **PASS-VOLANT**.

Pont-VOLANT. } See the article { **PONT**.

VOLATILE, in physics, is commonly used to denote a mixt body, whose integral parts are easily dissipated by fire; or heat; but it is more properly used for bodies, whose elements, or first component parts, are easily separated from each other, and dispersed in air.

For, as any mixt body is said to be *fixt*, in a double sense; so may it be said to be *volatile* two ways: whence the same body, e. gr. mercury, is both *volatile*, and *fixt* at the same time.

Since, as its integral parts, or those which still retain the nature of mercury, are easily separable by fire, and readily fly away; it is said to be *volatile*: and yet, as it is very difficult to destroy its contexture, and resolve it by fire, or any other menstruum, into its first elements, it is said to be *fixt*.—The same may be said of sulphur, antimony, &c.

Minerals, for the generality, are less *volatile* than vegetables, and vegetables are less so than animals.

The chymists distinguish greatly between *volatile* salts and *fixt* salts.—The capitals of aludels, stop and collect the *volatile* parts of substances in sublimation; and make what we call *flowers*.

“The particles of fluids, which do not cohere very strongly together, and are of such smallness, as renders them most susceptible of those agitations, which keep liquors in a flux, are easily rarified into vapour; and, in the language of the chymists, are *volatile*.—Those which are grosser, and by that means less susceptible of alterations; or which cohere by a stronger heat, or, perhaps, not without fermentation: these are what the chymists call *fixt bodies*.”

Newton. Optic. p. 371.

VOLATILE, in chymistry.—When the fire decomposes any mixt body, the parts most disposed to receive a great motion, are soonest loosened, and rise up in the order, which the differences of that disposition give them; the rest remaining immovable at the bottom of the vessel.

Those that rise first are called *volatile parts*; such are *phlegm*, *oil*, *spirits*, and *salts*, both urinous, and alkalious.

The parts remaining, viz. *earth*, and *lividial salts*, are called *fixt*.—For the making of *fixt* salts volatile; see **VOLATILISATION**.

VOLATILE Alkaly. } See the article { **ALKALY**.

VOLATILE Salt of Amber. } See the article { **AMBER**.

Sal VOLATILE Oleum. See the article **SAL**.

VOLATILISATION, or **VOLATILIZATION**, the act of rendering *fixt* bodies *volatile*; or of resolving them by fire into a fine, subtle vapour, or spirit, which easily dissipates, and flies away.

All bodies, even the most *fixt*, as gold, may be *volatilized*; either of themselves, or with the admixture of some *volatile* substance, or spirit; by distillation, or sublimation.

In the *Memoirs of the Royal Academy*, we have a discourse on the *volatilisation of the fixt salts of plants*, by M. Homberg.—That admirable chymist, it seems, by an odd accident, found *fixt* salts spontaneously volatilized in soap: Now soap, we know, is a composition of oil, and the alkalious lixivial salts of the plant kali.—Upon this, M. Homberg conjectured, that the oil, from which the volatile salts seem to derive their volatility, being intimately mixt with the *fixt* salts of the kali in the soap, had rendered them *volatile*: so that they ceased to be alkalious, by reason their pores were now filled with the oil which they had absorbed.—Oil, in effect, has always somewhat of an acid in it; which acid, being joined to the alkali, the whole is rendered a kind of intermediate salt; which yet, as the acid and alkali are only joined by means of the oil, is still oily or sulphurous.

In consequence of this view, he made divers chymical operations,

tions, whereby he found, that to dispose the fixt salts of plants to *volatilise*, the process is to be begun, by making them into a fapo, and letting that fapo shoot out little saline points, or crystals on its surface; which crystals are no other than fixt salts already *volatilized*.—Then, the remainder of the matter is to be set over the fire, after being well imbibed and penetrated by some new liquor, proper to assist in a new sublimation of more fixt salts to be *volatilized*: and this to be repeated till no more salts will rise.

The choice of the liquor, wherewith the fapo is to be saturated, is not indifferent.—Water is, of all others, the least fit for the effect: oil does well; distilled oil better than that drawn by expression: and spirit of wine best of all.

By such means, M. Homberg *volatilized* almost half a quantity of salt of tartar, which is a fixt vegetable salt.

VOLATILITY. See *VOLATILE*, *SUBLIMATION*, &c.

VOYCANO, or **VULCANO**, in natural history, a name given to mountains that belch, or vomit fire, flame, ashes, cinders, stones, &c.

Such are mount Etna, mount Vesuvius near Naples, and many others.

Near Guatemala, in South America, are two mountains, the one called *volcano of fire*; the other of *water*.—Out of the first, huge pieces of rocks are frequently hurled, with as much vehemence as balls out of a cannon; and a written letter may be read by the light of its flames, at the distance of three miles.—Out of the other, vast quantities of water are continually thrown up.

Volcano's and ignivomous mountains, though some of the most terrible phenomena in nature, have their uses; being a kind of spiracles, or tunnels, whereby to vent the fire and vapour, that would otherwise make a more dreadful havoc, by convulsions and earthquakes.

Nay, if the hypothesis of a central fire and waters be admitted, these outlets must be absolutely necessary to the peace and quiet of the terraqueous globe.—Accordingly, Dr Woodward observes, there is scarce any country much annoyed with earthquakes, but has one of these fiery vents; which is constantly observed to be all in flames, whenever an earthquake happens; by which means, it soon disgorges that fire, which, while it was underneath, was the cause of the disaster.—He adds, that were it not for these diverticula, whereby the central fire has an exit, it would rage in the bowels of the earth much more furiously, and make much greater havoc than it does; and that there are not wanting instances of countries, that have been wholly freed from earthquakes, by the eruption of a new *volcano* there.

VOLERY, a great bird-cage, so large; that the birds have room to fly up and down in it.

VOLITION, the act of willing. See *WILL*.

VOLITIVE Thinking. See the article *THINKING*.

VOLLEY, a military salute, made by discharging a great number of fire-arms at the same time.

In the *Philosophical Transactions*, Mr Robert Clarke gives us an account of a very remarkable effect of firing some *volleys* of small arms: "Upon proclaiming the peace, in 1697, two troops of horse were drawn in a line, the centre whereof was against a butcher's door, who kept a very large, courageous mastiff dog, the biggest in the town.

"Upon firing of the first *volley*, the dog, who before lay asleep by the fire, started up, ran into an upper room, and hid himself under the bed.—The servant being about to beat him down, (as he had never used to go up stairs) a second *volley* came; which made the dog rise, run several times about the chamber, with violent tremblings, and strange agonies.—But immediately a third *volley* came; upon which the dog ran once or twice about, fell down, and died immediately; throwing out blood at his mouth and nose."

VULO, in antiquity, a name which the Romans gave the slaves, who, in the second Punic war, offered themselves to serve in the army; upon a want of a sufficient number of citizens.

The name *volo*, *volones*, they are said to have had from their offering themselves voluntarily.—Festus says, it was after the battle of Cannæ that this happened: Macrobius, *Sat. Lib. I. cap. II.* places it before that battle.

Capitolinus tells us, that Marcus Aurelius formed troops, or legions of slaves, which he called *voluntarii*; and that the like forces, in the second Punic war, had been called *volones*.—But before M. Aurelius, Augustus had given the name *voluntarii* to forces which he had raised out of *liberti*, or freed-men; as we are assured by Macrobius, *Sat. Lib. I. cap. II.*

VOLTE, in the mane, signifies a round or circular motion, consisting of a gait of two treads, made by an horse going sideways round a centre; the two treads making parallel tracks, one by the fore feet, larger; and the other by the hind feet, smaller: the shoulders bearing outwards, and the croup approaching towards the centre.

Demi-VOLTE, is a half-round of one tread, or two, made by the horse at one of the angles or corners of the *volte*, or at the end of the line of the passade; so as when he is near the end of this line, or near one of the corners of the *volte*, he changes hands, to return by a semicircle.

Reversed, or *inverted VOLTE*, is a track of two treads, which the horse makes with his head to the centre, and his croup out; going sideways upon a walk, trot, or gallop, and tracing out a larger circumference with his shoulders, and a smaller with his croup.

VOLUME*, **VOLUMEN**, a book, or writing, of a just bulk to be bound by itself.

* The word had its rise à *volvendo*, rolling, or winding; the ancient way of making up books, being in rolls of bark, or parchment.

This manner lasted till Cicero's time, and long after that paper was invented, and books wrote thereon.—The several sheets were glued, or pasted end to end, wrote only on one side; and at the bottom a stick was fastened, called *umbilicus*; and at the other end a piece of parchment, whereon was the title of the book in letters of gold.

And yet, we are assured, king Attalus, or rather Eumenes, had, long before, done up some of his books in the square form; as having found the secret of parchment, which would bear writing on both sides.

The library of Ptolemy king of Egypt, contained, according to Aulus Gellius, three hundred thousand *volumes*; and, according to Sabellicus, seven hundred thousand.

Raymond Lully wrote above four thousand *volumes*; whereof we have divers catalogues extant.—It is held, that Trifmegistus wrote six thousand five hundred twenty five *volumes*; others say, thirty six thousand five hundred twenty nine: But it is much more rational to suppose, with La Croix, that it was the custom of the Egyptians to put all the books they composed, under the name of *trifmegistus*.

At present, **VOLUME** is chiefly used in the same sense with *tome*, for a part or division of a work, bound separately.—In this sense, we say, "the councils are printed at the Louvre in 37 *volumes*." See *TOME*.

VOLUME of a *Body*, is also used, among foreign philosophers, for its *bulk*, or the space inclosed within its superficies.

VOLUMUS, in law, the first word of a clause in one species of the king's writs of protection, and letters patent.

VOLUNT, **VOLUNTAS**, in law, is when a tenant holds lands, &c. at the will of the lessor, or lord of the manor.

VOLUNTARY, in the school.—The generality of philosophers use *voluntary* in the same sense with *spontaneous*; and apply it to any thing arising from an internal principle, attended with a due knowledge thereof.—In which sense, they say, "A dog moves *voluntarily* when he runs to the pot."

Aristotle, and his followers, refrain the term *voluntary* to those actions that proceed from an inward principle, which knows all the circumstances of the action.

There are two things, therefore, required to the *voluntariness* of an action: the first, that it proceed from an inward principle; thus, walking for pleasure-fake is a *voluntary* action; as arising from the will commanding, and the moving faculty obeying, which are both internal.—On the contrary, the motion of a man dragged to prison is not *voluntary*.

The second, that the action be performed with a perfect intelligence of the end, and circumstances thereof: in which sense, the actions of brutes, children, sleeping people, &c. are not properly *voluntary*.

Anatomists distinguish between the *voluntary*, and natural, or *involuntary motions* in the body.—Of the latter kind are those of the heart, lungs, pulse, &c.

VOLUNTARY Agent.	} See the article	AGENT.
VOLUNTARY Escape.		ESCAPE.
VOLUNTARY Homicide.		HOMICIDE.
VOLUNTARY Novation.		NOVATION.

VOLUTE*, **VOLUTA**, in architecture, a kind of spiral scroll, used in the Ionic, and Composite capitals; whereof it makes the principal characteristic, and ornament.—See *Tab. Archit. fig. 41. fig. 26. lit. D. fig. 32. litt. ii.*

* Some call it the *ram's-horn*, from its figure, which bears a near resemblance thereto.

Most architects suppose, that the ancients intended the *volute* to represent the bark or rind of a tree, laid under the abacus, and twisted thus at each extreme, where it is at liberty: others will have it a sort of pillow, or bolster, laid between the abacus and echinus, to prevent the latter being broke by the weight of the former, and the entablature over it; and accordingly they call it *pukivinus*.—Others, after Vitruvius, will have it to represent the curls, or tresses of a woman's hair.

The number of *volumes* in the Ionic order is four; in the Composite, eight.

There are also eight angular *volumes* in the Corinthian capital, accompanied with eight other smaller ones, called *belices*.

There

There are several diversities practised in the *volute*.—In some, the list or edge, throughout all the circumvolutions, is in the same line, or plane: such are the antique Ionic *volutæ*, and those of Vignola.—In others, the spires of circumvolutions fall back; in others, they project, or stand out.—Again, in some the circumvolutions are oval; in others, the canal of one circumvolution is detached from the list of another, by a vacuity or aperture.—In others, the rim is parallel to the abacus, and springs out from behind the flower thereof.—In others, it seems to spring out of the vase, from behind the ovum, and rises to the abacus, as in most of the fine Composite capitals.

The *volute* is a part of great importance to the beauty of the column.—Hence, architects have invented divers ways of delineating it.—The principal are that of Vitruvius, which was long lost, and at last restored by Goldman; and that of Palladio.—Daviler prefers the former as the easier.—The manner thereof is as follows.

Divide the altitude AB (Tab. *Architecture*, fig. 12) into eight equal parts, and assuming the fifth QP, for a diameter, from the centre G, with half the diameter GP, describe a circle of the eye of the *volute*.—Bisect the radii GP and GQ in 1 and 4, and subdivide the half parts G1 and G4, each into three equal parts: then, upon the right line 14, construct a square 1, 2, 3, 4; one of whose sides 2, 3, continue on to D; another, 3, 4, to E; and the third, 1, 2, to C. From G draw right lines G2, and G3; which divide into three equal parts.—Then, through 6 and 10, draw 61 and 10N, parallel to 2D. And through 11 and 7 draw 11O and 7K, parallel to 3E, and through 5 and 9, draw 5H, and 9M, parallel to 1C.—Lastly, from 12, 11, 10, 9, 8, &c. strike the quadrants PO, ON, NM, ML, LK, &c. which will form the *volute*.

Consoles, modillions, and other sorts of ornaments, have likewise their *volutæ*, or scrolls.

Canal of the *VOLUTE* } See the article { CANAL.
Eye of the *VOLUTE*. } { EYE.

VOLVULUS, in medicine, a name which some authors give to the iliac passion, by others called *chordaspilus*, and by others, *miserere mei*.

VOMER, in anatomy, a Latin name, signifying, literally, a *ploughshare*; used by authors to denote the eleventh, or, according to the numeration of others, the thirteenth bone of the upper jaw: by reason of the resemblance it bears to that utensil.

The *vomer*, or *vomer aratri*, is a thin bone, placed in the middle of the nose, over the palate, and serving to part the two nostrils from each other.

It is small, but hard, and is joined to the sphenoides and ethmoides, and these have each of them little eminences that are received into the cavities of the *vomer*; by which means it is fastened in its place.

VOMICA, in medicine, a collection of pus in any part of the body.

When this mass, or collection, is in the lungs, it is called *vomica pulmonum*.—When in the kidneys, *vomica renum*, &c.

The *vomica* of the lungs differs from an empyema, which is a collection of pus in the cavity of the thorax. See EMPYEMA.

Nux VOMICA, *Ponic Nut*, is a little flat, round, woody fruit, or seed; hard as horn, of a pale mouse-colour without, but of various colours within: sometimes yellow, sometimes white, and sometimes brown.

It is a poison for dogs, and divers quadrupeds, which it kills presently, through excessive vomiting.

VOMITING, **VOMITUS**, a violent casting up, or evacuating by the mouth, what is contained in the stomach. See EVACUATION.

This action has been generally allowed to be owing, principally, to the contraction of the fibres of the stomach, when irritated by the acrimonious quality, or oppressed with the quantity of its contents.

But M. Chirac, and after him M. du Verney, and others, set aside the fibres of the stomach; and advance, that *vomiting* is produced wholly by the extraordinary motions of the diaphragm, and muscles of the lower venter.—So that the stomach is here supposed destitute of all action, and casts back its contents only by its being compressed and flatted, from some foreign and accidental causes.

However, Boerhaave, and most of our latest writers, allow the stomach, the diaphragm, and the muscles of the abdomen, all to have their share in the action of *vomiting*: accordingly, that diligent author makes *vomiting* to consist in a convulsive and retrograde motion of the muscular fibres of the gullet, stomach, and intestines; as well as those of the abdomen, and the septum transversum; which, when in a less degree, produce a nausea; and in a greater, a *vomiting*.

By the contraction of so many parts, the stomach comes to be squeezed, as in a press; whence it is obliged to give up what is contained in its cavity, and the neighbouring parts; just as water is forced out from a bladder, or sponge, when squeezed between the hands.

The evacuation, too, must be upwards, rather than downwards; by reason the passage is more open and easy that way, and that the intestines are pressed by the diaphragm, and the muscles of the lower venter.

The primary cause of *vomiting*, uses to be the too great quantity, or too much acrimony of the contents, arising from poisons, contusions, compressions, inflammations, and wounds in the brain; inflammations of the diaphragm, stomach, intestines, spleen; liver, kidneys, pancreas, and mesentery; unusual agitations in coaches, at sea, &c. foulness of the stomach, and *vomitives*, or emetic medicines.

VOMITIVES, or **VOMITIVE Medicines**. See Emetics.

VOPISCUS, a Latin term, used in respect of twins in the womb, for that which comes to the perfect birth; the other being before excluded abortive.

VORTEX, *Whirlwind*, in meteorology, a sudden, rapid, violent motion of the air, in gyres, or circles.

VORTEX, **VORAGO**, is also used for an *eddy*, or *whirlpool*; or a body of water, in certain seas and rivers, which runs rapidly around, forming a sort of cavity in the middle.

The ordinary course of these *vortices*, is a gulph, or outlet, whereby the water of the sea, &c. is absorbed, or precipitates itself into some other receptacle; sometimes to some other communicant sea; and sometimes, perhaps, into the vast abyss of central water.

An artificial **VORTEX**, expressive of the phenomena of the natural ones, may be made with a cylindric vessel, placed, immovable, on a horizontal plane, and filled to a certain height with water.—In this water a stick being plunged, and turned round as briskly as may be, the water is necessarily put into a pretty rapid circular motion, and rises to the very edge of the vessel; and when there arrived, ceases to be further agitated.

The water thus raised, forms a cavity in the middle, whose figure is that of a truncated cone; its base is the same with the upper cavity of the vessel; and its vertex in the axis of the cylinder.

What raises the water at the side of the vessel, which occasions the cavity in the middle, is its centrifugal force.—For the motion of the water being circular, it respects a centre taken in the axis of the vessel; or, which is the same, in the axis of the *vortex* formed by the water; the same velocity then, being impressed on all the water, the circumference of a smaller circle of water, or a circle less remote from the axis, has a greater centrifugal force than another that is greater, or more remote from the axis.—The smaller circle, therefore, drives the greater towards the side of the vessel; and from this pressure, or impulsion, which all the circles receive from the smaller ones that precede them, and convey to the greater which follow them, arises that elevation of the water along the edge of the vessel to the very top, where we suppose the motion to cease.

With a *vortex* thus formed, M. Saulmon, of the royal academy of sciences, made divers experiments, by putting several solid bodies therein, to acquire the same circular motion; with intent to discover which of them, in making their revolutions round the axis of the *vortex*, approach toward, or recede from it, and with what velocity.—The result was, that the heavier the body, still the greater was its recess from the axis.

M. Saulmon's view in this attempt, was, to shew how the laws of mechanics produce the celestial motions; and that it is probably to those motions that the gravity or weight of bodies is owing.—But, unhappily, the experiments shew just the contrary of what they should do, to confirm the Cartesian doctrine of gravity.

VORTEX, in the Cartesian philosophy, is a system or collection of particles of matter moving the same way, and round the same axis.

Such *vortices* are the grand machines whereby these philosophers solve most of the motions, and other phenomena of the heavenly bodies.—Accordingly, the doctrine of these *vortices* makes a great part of the Cartesian philosophy.

The matter of the world, they hold to have been divided at the beginning into innumerable little equal particles, each endowed with an equal degree of motion, both about its own centre and separately, so as to constitute a fluid.

Several systems, or collections of this matter, they further hold to have been endowed with a common motion about certain points, as common centres, placed at equal distances; and that the matters moving round these, composed so many *vortices*.

Then,

Then, the primitive particles of the matter they suppose, by these intestine motions, to become, as it were, ground into spherical figures, and so to compose globules of divers magnitudes; which they call the matter of the second element: and the particles rubbed, or ground off them, to bring them to that form, they call the matter of the first element.

And since there would be more of this first element than would suffice to fill all the vacuities between the globules of the second, they suppose the remaining part to be driven towards the centre of the vortex, by the circular motion of the globules; and that being there amassed into a sphere, it would produce a body like the sun.

This sun being thus formed, and moving about its own axis with the common matter of the vortex, would necessarily throw out some parts of its matter, through the vacuities of the globules of the second element constituting the vortex; and this especially at such places as are farthest from its poles; receiving, at the same time in, by these poles, as much as it loses in its equatorial parts. And, by this means, it would be able to carry round with it those globules that are nearest, with the greater velocity; and the remoter, with less.—And, by this means, those globules which are nearest the centre of the sun, must be smallest; because, were they greater, or equal, they would, by reason of their velocity, have a greater centrifugal force, and recede from the centre. If it should happen that any of these sun-like bodies, in the centres of the several vortices, should be so incrustated, and weakened, as to be carried about in the vortex of the true sun: if it were of less solidity, or had less motion than the globules towards the extremity of the solar vortex, it would descend towards the sun, till it met with globules of the same solidity, and susceptible of the same degree of motion with itself; and thus, being fixed there, it would be for ever after carried about by the motion of the vortex, without either approaching any nearer to, or receding from the sun; and so would become a planet.

Supposing then all this, we are next to imagine, that our system was at first divided into several vortices, in the centre of each of which was a lucid spherical body; and that some of these being gradually incrustated, were swallowed up by others which were larger, and more powerful, till at last they were all destroyed, and swallowed up by the biggest solar vortex; except some few which were thrown off in right lines from one vortex to another, and so become comets.

But this doctrine of vortices, is, at best, merely hypothetical. —It does not pretend to shew by what laws and means the celestial motions are really effected, so much as by what means they possibly might, in case it should have so pleased the Creator. —But we have another principle which accounts for the same phenomena as well, nay, better than that of vortices: and which we plainly find has an actual existence in the nature of things: and this is gravity, or the weight of bodies.

The vortices, then, should be cast out of philosophy, were it only that two different adequate causes of the same phenomena are inconsistent.

But we have other objections against them.—For, 1^o. If the bodies of the planets and comets be carried round the sun in vortices, the bodies of the parts of the vortex immediately investing them, must move with the same velocity, and in the same direction; and besides, they must have the same density, or the same vis inertiae. —But it is evident, that the planets and comets move in the very same parts of the heavens with different velocity, and in different directions. —It follows, therefore, that those parts of the vortex must revolve at the same time, in different directions, and with different velocities; since one velocity, and direction, will be required for the passage of the planets, and another for that of the comets. 2^o. If it were granted, that several vortices are contained in the same space, and do penetrate each other, and revolve with divers motions; since those motions must be conformable to those of the bodies, which are perfectly regular, and performed in conic sections; it may be asked, How they should have been preserved intire so many ages, and not disturbed, and confounded by the adverse actions and shocks of such much matter as they must meet withal?

3^o. The number of comets is very great, and their motions are perfectly regular, observing the same laws with the planets, and moving in conical orbits, that are exceedingly excentric. Accordingly, they move every way, and to all parts of the heavens, freely pervading the planetary regions, and going frequently contrary to the order of the signs, which would be impossible, unless these vortices were away.

4^o. If the planets move round the sun in vortices, those parts of the vortices next the planets, we have already observed, would be equally dense with the planets themselves: consequently the vortical matter, contiguous to the perimeter of the earth's orbit, would be as dense as the earth itself; and that between the orbits of the Earth and Saturn, must be as dense, or denser. —For a vortex cannot maintain it-

self, unless the more dense parts be in the centre, and the less dense towards the circumference: and since the periodical times of the planets are in a sesquialterate ratio of their distances from the sun, the parts of the vortex must be in the same ratio. —Whence it follows, that the centrifugal forces of the parts will be reciprocally as the squares of the distances. —Such, therefore, as are at a greater distance from the centre, will endeavour to recede therefrom with the less force. Accordingly, if they be less dense, they must give way to the greater force, whereby the parts nearer the centre endeavour to rise. —Thus, the more dense will rise, and the less dense descend; and thus there will be a change of places, till the whole fluid matter of the vortex be so adjusted, as it may rest in æquilibrio.

Thus will the greatest part of the vortex without the earth's orbit, have a degree of density and inactivity, not less than that of the earth itself. —Whence the comets must meet with a very great resistance, which is contrary to all appearances. *Cotel. pref. ad Newton. Princip.*

The doctrine of vortices, Sir Isaac Newton observes, labours under many difficulties: for a planet to describe areas proportional to the times, the periodical times of the vortex, should be in a duplicate ratio of their distances from the sun; and for the periodical time of the plane, to be a sesquialterate proportion of their distances from the sun, the periodical times of the parts of the vortex should be in the same proportion of their distances: and, lastly, for the lesser vortices about Jupiter, Saturn, and the other planets, to be preserved, and swim securely in the sun's vortex, the periodical times of the parts of the sun's vortex should be equal. —None of which proportions are found to obtain in the revolutions of the sun, and planets around their axis. *Phil. nat. princ. math. apud sebol. gen. in calce.*

Besides, the planets, according to this hypothesis, being carried about the sun in ellipses, and having the sun in the umbilicus of each figure, by lines drawn from themselves to the sun, do always describe areas proportionable to the times of their revolutions; which that author shews the parts of no vortex can do. *Scol. prop. ult. lib. 2. princip.*

Again, Dr Keil proves, in his *Examination of Burnet's Theory*, that if the earth were carried in a vortex, it would move faster in the proportion of three to two, when it is in Virgo, than when it is in Pices; which all experience proves to be false.

VOTE, or VOICE. See SUFFRAGE, and VOICE.

In the house of peers, they give their votes, or suffrages, beginning at the puiſſe, or lowest baron, and so to the rest, senatim, every one answering, apart, *content*, or *not content*: and if the affirmatives and negatives are equal, *senſer præſumitur pro negante*; the speaker having no casting vote, unless he be a peer.

In the house of commons, they vote by yea's and no's, promiscuously. See PARLIAMENT.

VOTIVE Medals, are those whereon the vows of the people, for the emperors, or empresses, are expressed.

The public vows, made every five, ten, or twenty years, are more often found round the edges of medals, than on the faces thereof, at least under the western empire; for in the eastern the case is different: witness the medal of M. Aurelius the younger, where the reverse represents the vows made at the time of his marriage, VOTA PUBLICA. And on Greek medals, ΔΗΜΟΤΕΥΧΑΙ, which they sometimes express by the two initial letters, ΔΕ, according to F. Hardouin's conjecture, which may be admitted in certain medals, where the ΔΗΜ.Ε.Ε. that is, ΔΗΜΑΡΧΙΚΗΣ ΕΞΟΥΣΙΑΣ, does not well agree. Witness also the medal of Antonine, VOTA SUSCEPTA DECENNALIA.

The origin of *votus*, and *votive medals*, is given by M. Du Cange, thus:—Augustus feigning himself willing to quit the empire, and having twice, at the prayers of the senate, condescended to hold it for ten years longer, it grew into a custom, to make fresh public prayers, sacrifices, and games, for his continuing it, at the ten years end; and these they called *decennalia*, or *vota decennalia*.

Under the eastern emperors, these vows were repeated every five years: hence it is, that, after Dioclesian's time, we find on medals VOTIS V, XV, &c. which practice continued till the time of Theodosius, when Christianity being well established, a ceremony that had some remains of heathenism in it, was set aside. So that the VOTIS MULTIS, on a medal of Majorianus, must be a very different thing; and no other, doubtless, than a kind of acclamation, like that PLURA NATALIA FAELICITER.

Votive Mass. See the article MASS.

VOTUM, Vow See the article VOW.

VOTUM, in our ancient law-books, is used for *nuptia*, or marriage: so, *diēs votorum*, is the wedding-day, *Fleta*, lib. 4. cap. 2. par. 16. *Si donatarius ad alia vota convolvaverit*, &c. See MARRIAGE.

VOW

VOUCH.—A person is said to *vouch* for another, when he undertakes to maintain, or warrant him in any thing, or passes his word in his behalf.
In law, to *vouch*, is to call such person, or *vouches*, into court, to make good his warrant.

VOUCHEE, a person who is to warranty, or *vouch* for another, who in respect herof, is called *voucher*. See **VOUCHER**, and **WARRANTY**.

VOUCHER*, in law, the tenant in a writ of right, who calls another person into court, bound to warranty him, and either to defend his right against the demandant, or to yield him other lands, &c. to the value.

* This seems in some measure to agree to the contract in the civil law, whereby the vendee binds the vendor, sometimes in the simple value of the things bought, sometimes in the double; to warrant the secure enjoying of the thing bought.—Yet there is this difference between the civil and common law, in this point, that the civil law binds every man to warrant the security of that which he selleth; which the common law doth not, unless it be specially covenanted.

The process whereby the vouchee is called, is a *summones ad warrantandum*; and if the sheriff return upon that writ, that the party hath nothing whereby he may be summoned, then goes out another writ, called, *sequatur sub suo periculo*.

A recovery with a *single voucher*, is when there is but one voucher; and with a *double voucher*, is when the vouchee voucheth over; and so a *treble voucher*.

There is also a *foreign voucher*, when the tenant impleaded in a particular jurisdiction, voucheth one to warranty in some other county, out of the jurisdiction of that court; and prays he may be summoned, &c.—This were more pertinently called a *voucher of a foreigner*.

VOUCHER, also signifies a ledger-book, or book of accounts, wherein are entered the warrants for the accomptant's discharge.

VOUSSOIR, *Vault-stone*, or *Key-stone*, in architecture, a stone proper to form the sweep of an arch, being cut somewhat in the manner of a truncated cone, whose sides, were they prolonged, would terminate in a centre, to which all the stones of the vault are directed.

VOW, **VOTUM**, a solemn promise, or offering of a man's self, or other thing to God.

A person is constituted a religious, by taking three *vows*, that of poverty, that of chastity, and that of obedience.

Authors are divided as to the antiquity of these *vows*.—It is agreed, the ancient anchorites, and hermits of the Thebaid, made none; they did not consecrate themselves to God by any indissoluble obligation, but were at liberty to quit their retirement, and return into the world, whenever the fervor that drove them out of it, came to abate.

Vows were not introduced till long after; and that to fix the too frequent inconstancy of such as, after retiring from the world, repented themselves too soon, or too slightly; and by that means scandalized the church, and disturbed the quiet of families by their return.

Erasmus will have it, that solemn *vows* were not introduced till the thirteenth century, under the pontificate of Boniface VIII.—Others hold them to be as antient as the council of Calcedon: but the truth is, before Boniface VIII. there were none but simple *vows*, and such as might be dispensed withal.—Their *vows*, till that time, were not deemed eternal chains; they were not indissoluble. It is true, they were obligatory promises, as to conscience, and the inconstancy of such as violated them, was held an odious desertion: but, as to law, the persons were not held to be civilly dead, so as, upon their return, to render them incapable of all acts of civil society.

The most common *vow* was that of poverty, but this only regarded the convent; on account of which, every person divested himself of all property: but the making of *vows* did not at all exclude them from the rights of blood, or render them incapable of inheriting.

No religious, it is true, acquired the property of the effects that fell to him; they all belonged to the monastery, in favour of which he had divested himself of every thing; and the monastery only left him the usufruct and direction of them.—The popes have frequently confirmed this privilege to divers orders, and permitted the monks to inherit, as much as if they were seculars, and had made no *vow*.

At present, the civil death of a religious is dated from the day he makes the *vow*; and from that time he is utterly incapable of inheriting.—A religious may reclaim, or protest against his *vow* within five years; but, after that, it is no longer admitted.—The failures in the profession, are esteemed to be purged, by his silence and perseverance for five years.—Indeed, to be relieved from his *vow*, it is not enough the

URA

party reclaim within the five years; but he must likewise prove that he was forced to take the habit.

Vows, **VOVA**, among the Romans, signify sacrifices, offerings, presents, and prayers, made for the emperors and caesars, particularly for their prosperity, and the lastingness of their empire.

These were, at first, made every five years, then every fifteen, and thence every twenty, called *quinquennialia*, *decennialia*, and *vicennialia*.

In divers antique medals and inscriptions, we read, *Vot. XX. Vol. XX. Vol. mult.* signifying *votis decennialibus, vicennialibus, multis*, &c.

VOWEL, **VOCALIS**, in grammar, a letter which affords a complete sound of itself; or a letter so simple, as only to need a bare opening of the mouth to make it heard, and to form a distinct voice.

Such are *a, e, i, o, u*; which are called *vocales, vowels*, in contradistinction to certain other letters, which depending on a particular application of some part of the mouth, as the teeth, lips, or palate, can make no perfect sound without an opening of the mouth, that is, without the addition of a *vowel*; and are therefore called *consonants*.

Though we ordinarily only reckon five *vowels*, yet, besides that each of these may be either long or short, which occasions a considerable variety in the sound: to consider only their differences resulting from the different apertures of the mouth, one might add four or five more *vowels* to the number.—For the *e* open, and the *e* close, are different enough to make two *vowels*, as in *sea*, and *deph*; so also the *o* open, and *o* close, in *best*, and *organ*.—Add, that the *u* pronounced *ou*, as the Latins did, and as the Italians and Spaniards still do, has a very different sound from the *u*, as pronounced by the Greeks, and as at this day, by the English and French.—Again, *ea*, in *people*, make but one simple sound, though we write it with two *vowels*.

Lastly, the *e* mute is, originally, no more than a surd joined to a consonant, when that is to be pronounced without a *vowel*, as when it is immediately followed by other consonants, as in the word *scammum*.—This is what the Hebrews call *sheva*, especially when it begins the syllable: and this *sheva* is found in all languages, though overlooked in many of them, particularly in the English, Latin, &c. by reason it has no proper character to denote it; though, in some of the vulgar tongues, particularly French and High-Dutch, it is expressed by the *vowel* *e* adding its sound to the rest.

Thus, without regarding the differences of the same sound or *vowel*, as to length or shortness, one may distinguish ten several *vowels*, expressed by the following characters, *a, e, i, o, u, æ, œ, eu, ou, u, e* mute.

VOX, in law — **VOCEM non habere**, is a phrase used by Bracton and Fleta, for an infamous person; one who is not admitted to be a witness.

UP-LAND, denotes high ground, or, as some call it, *terra firma*: by which it stands opposed to such as is moorish, marshy, or low.—Or, it is pasture-land, which lies so high, as not to be overflowed with rivers, or land-floods.

UPPER Hemisphere.	} See the article	HEMISPHERE.
UPPER Ocean.		OCEAN.
UPPER polar Dial.		DIAL.
UPPER Region.		REGION.

UPRIGHT, in architecture, a representation or draught of the front of a building; called also, an *elevation*, or *orthography*.

UPRIGHT, in heraldry, is used in respect of shell-fishes, as crevices, &c. when standing erect in a coat.—Inasmuch as they want fins, they cannot, according to Guillim, be properly said to be *hauriant*; that being a term appropriated to scaly fishes.

URACHUS, **ΟΥΡΑΧΟΣ**, in anatomy, a membranous canal in a foetus, proceeding from the bottom of the urinary bladder, through the navel, to the placenta, along with the umbilical vessels, whereof it is esteemed one.—See *Tab. Anat. (Splanchn.) fig. 1. lit. f. f. fig. 3. lit. e. d. fig. 8. lit. n. fig. 16. lit. n.*

The termination of the *urachus* in the placenta, forms a little oval vesica, or bladder, which serves to receive the urine secreted in the kidneys of the foetus, and that could not make its way through the urethra, by reason of the resistance of the sphincter of the bladder, which is not to be overcome, but by inspiration.

The humour found in the vesica of the *urachus*, is still in the greater quantity, the higher coloured, and the more like urine, as the foetus is nearer the time of the birth.

The *urachus* is most plainly found in brutes; but there is no dispute but that it exists in a human foetus.

M. Drelincourt, a celebrated professor of anatomy at Leiden, and some others after him, deny the *urachus* to be hollow:

on which supposition it would not be easy to assign its use, unless to keep the bladder suspended to the navel. But the former opinion seems the best warranted. See URINE.

URAN. See the article **URAN**.

URANIBOURGH, a term often heard among astronomers, being the name of a celebrated observatory, in a castle in the little island Veena, or Huena, in the Sound; built by that noble Dane, Tycho Brahe, and furnished with instruments for observing the course and motions of the heavenly bodies.

This famed observatory, finished about the year 1580, did not subsist above seventeen years; when Tycho, who little thought to have erected an edifice of so short a duration, and who had even published the figure and position of the heavens, which he had chose for the moment to lay the first stone in, was obliged to abandon his country.

Soon after this, those to whom the property of the island Huena was given, made it their business to demolish *Uranibourg*: part of the ruins were dispersed into divers places, the rest served to build Tycho a handsome seat upon his ancient estate, which, to this day, bears the name of *Uranibourg*.—For as to the ancient *Uranibourg*, there is now no footsteps of it remaining.—It was here Tycho composed his catalogue of the stars.

M. Picart, making a voyage to *Uranibourg*, found Tycho's meridian line drawn thereon, to deviate from the meridian of the world; which confirms the conjecture of some, that the position of the meridian line may vary.

URBICARY *Provinces*. See the article **SUBURBICARY**.

URDE*, or URDE*, in heraldry.—A *crus urdi*, seems to be the same with what we otherwise call *clebsie*. See **CLECHEE**.

URED, the blasting or blighting of trees, or herbs. See **BLIGHT**.

URED, is sometimes used by physicians, for an itching, or burning in the skin.

URENTIA, are sometimes used for medicines of a hot or burning quality. See **CAUSTIC**.

URETERS*, OYPHTHEE, in anatomy, two long and slender canals, which come from the pelvis or basin of the kidneys, one on each side, and terminate in the bladder; serving to convey the urine, secreted in the glands of the kidneys, into the bladder.—See *Tab. Anat. (Splanch.) fig. 1. lit. g. g. fig. 4. lit. f. fig. 8. lit. m. m. fig. 9. lit. II.*

* The word is formed from the Greek *ureis, miere*, to make water.

The *ureters* lie between the doubling of the peritonæum; and descending in the form of an S, they pierce the bladder near its neck, where they run, first, some space betwixt its coats, and then open into its cavity.

They are composed of three coats.—The first is from the peritonæum; the second is made of small oblique muscular fibres; and the third, which is very sensible, has several small glands, which separate a slimy liquor, to defend it against the acrimony of the urine.

The neighbouring parts furnish them with blood-vessels; and they have nerves from the intercostal, and the vertebrae of the loins.—Their cavity is sometimes contracted in three or four places, especially towards the bladder.

Such as are subject to the gravel, and given to excessive drinking, have them sometimes so much dilated, that one may put the end of ones little finger into them. Their obstruction causes a suppression of the urine.

URETHRA, OYPHOPA, in anatomy, a tube or canal arising from the neck of the bladder, and continued to the pudendum; serving to discharge, or carry off the urine out of the bladder. See *Tab. Anat. (Splanch.) fig. 8. lit. u. u. fig. 15. lit. d. f. m. m.*

Some will have it to be only a production of the neck of the bladder itself.—Its length is very different in the two sexes.—In man it terminates in the extremity of the glans, and is ordinarily about a foot long.—In women, where it is usually called *meatus urinarius*, it is but two fingers breadth along, and terminates in the vulva; but it is much wider, and more easily dilated here, than in the other sex.

Mr Cowper gives us an instance of a woman, wherein the hymen was so firm and impervious, that her husband finding no passage through it, had opened himself another through the orifice of the *urethra*.

The *urethra* is composed of two membranes, and a little spongy substance, like that of the corpora cavernosa; except at the end which joins the neck of the bladder; where the distance between the membranes is small, and filled up with a thin and red glandulous substance, whose excretory ducts, piercing the inner membrane, pour into the pipe a mucilaginous liquor, which lines and lubricates its cavity, and prevents the salts of the urine from galling it; and having a farther office in the male sex, viz. the emission of the seed.

VRIGO, a burning with a caustic, or cautery.

URIM and Thummin, אוריי חמין q d light and perfect-

tion, the name of a kind of ornament belonging to the habit of the Jewish high-priest; in virtue whereof he gave oracular answers to the people.

The high-priests of the Jews, we are told, consulted God in the most important affairs of their commonwealth, and received answers by the *urim and thummin*.—What these were, is disputed among the critics: some take them to be the 12 precious stones in the breast-plate of the high-priest, which shone like a flame of fire.

Others will have them, the theraphim, or little human figures carried by the high-priest, hid in the fold of his robe or gown, and by which he answered the questions of the Jews.

Diodorus Siculus relates, that there was also a ceremony in use among the Egyptians, whose principal minister of justice wore a collar of precious stones about his neck, which was called *anubia*, or truth.

URINAL, in medicine, a vessel fit to receive and hold urine; and used accordingly, for the convenience of sick persons. See URINE, and UROCRITERIUM.

It is usually of glass, and crooked; and sometimes it is filled with milk, to assuage the pain of the gravel.

URINAL, in chymistry, is an oblong glass vessel, used for making solutions, and so called from its resemblance to the glasses in which urine is set to settle, for the inspection of the physician.

URINARIA *Fistula*, is the same as *urethra*; so called from its office, to convey the urine. See URETHRA.

Vesica URINARIA. See the article **BLADDER**.

Meatus URINARIUS. See the article **MEATUS**.

URINARY Bladder. } See the article { **BLADDER**.

URINARY Passage. } See the article { **URETHRA**.

URINE*, URINA, a liquid excrement, or humour, separated from the blood in the kidneys, conveyed thence into the bladder, and discharged by the *urethra*.

* The word is formed from the Greek, *uron*, which signifies the same.

The *urine* is secreted from the arterial blood, in the glands of the kidneys, from which arise numerous little pellucid pipes, and veins; which, receiving the secreted *urine*, at length join into twelve papillae; out of which the *urine* oozes into a cavity called the *pelvis*, from whence it runs into the *ureters* of either side, and through them into the bladder; and from that, at length, through the *urethra*, out of the body.

The secretion of the *urine*, then, is not performed by any attraction, as some will have it; or by any fermentation, as others; or any precipitation, as others: but by the force of the heart, and arteries, whereby the blood is driven through innumerable turnings and windings of the vessels; attenuated by resistance, opposite motions, violent concussions, and various mixtures, till the more liquid and serous part thereof is forced through canals smaller than the blood-vessels, and so collected and discharged.

It is more than probable, that the blood of the emulgent artery, conveyed through all the little branches that spread through the exterior membranes of the vesiculae whereof the kidneys are composed, being by this means exceedingly divided, and, as it were, attenuated, enters the vesiculae themselves, and gives them their red colour; that it is there filtrated, and the serous or *urinous* part secreted; that this filtration is promoted by the alternate contraction and dilatation of the fleshy fibres that inclose the little vesicles; and that after filtration, the parts that remain blood are resumed by the capillary branches of the veins; the rest entering the excretory ducts of the vesiculae, which are the first receptacle of the *urine*. *Hist. Acad. des Sciences*, an. 1705.

M. Morin, in the *Memoirs of the Academy of Sciences*, marks out a new rout, or course of the *urine*.—The ordinary one, which is the passage of any liquor we drink through the stomach into the intestines, thence into the lacteals, thence into the receptacle of the chyle, thence into the sub-clavian vein, thence into the cava, thence into the right ventricle of the heart, thence into the lungs, and thence into the left ventricle of the heart; thence into the aorta, thence into the emulgent artery, thence into the kidneys, thence into the *ureters*, and at last into the bladder, seems to him too long and circuitous; considering how readily mineral waters pass, and what a speedy effect *asparagus* is found to have on our *urine*.—Besides, that on this principle, the liquors we drink mixing with so many other liquors in their way, should be greatly altered thereby; whereas we frequently find a tincture of cassia, rendered by *urine* almost as black as when first taken: and the like is observed of divers other liquors.

M. Morin, therefore, maintains, that a good part of the liquor we drink, oozes through the membranes of the stomach, and falls into the abdomen; where it enters the bladder through the pores thereof, without getting into the intestines.

testines, which are lined with too thick and viscid a humour to allow it ingress.

This system is confirmed hence, that both the stomach and bladder, even of a dead animal, are found easily permeable to water.

Accordingly, Dr Morgan assures us, that if the contents of the abdomen be taken out of an animal body, after it is just opened, and the stomach be filled with warm water, while the parts are yet reeking, the liquor will pass into the bladder; which will visibly receive it, and be filled in proportion as the stomach empties.

The same author adds, that if a ligature be made upon the ureters, while the animal is yet living, and the blood continues to circulate; though this must cut off all communication from the kidneys to the bladder; yet any liquor, with which the stomach is filled, will pass into the bladder.

From the whole, he says, though some of our best anatomists, hold that a circulation of the whole mass of blood is effected in five minutes, and others in two, which might account for the quick passage of the *urine*, it is hard to conceive, but that part of it must go immediately from the stomach into the bladder.

The general design of nature in this new *urinary* drain, is supposed to be to prevent any sudden plethora, or immoderate distention of the vessels upon drinking.

As a necessary consequence of this system, the author establishes two kinds of *urine*; the one filtrated immediately out of the stomach into the bladder, the other passing the long course of circulation.

In the *Philosophical Transactions*, we have an instance given us, by Mr Young, of a boy six years old, that pissed off almost all his *urine* by his navel.

In the same *Transactions*, Dr Richardson gives an account of a boy at North Bierly in Yorkshire, who lived to seventeen years of age without ever making water; yet was in perfect health.—He had constantly a diarrhoea on him, but without much uneasiness. The obstruction, that author observes, must be in his kidneys; for he had never any inclination to make water.

Urine is of various kinds and properties.—After drinking plentifully of any aqueous fluid, the *urine* is crude, insipid, void of smell, and easily retained.—That yielded by chyle well concocted, is sharper, more saline, less copious, somewhat fetid, and more stimulating.—That from chyle already converted into serum, is redder, sharper, saltier, and more fetid and stimulating.—And that secreted after long abstinence, from humours well concocted, and worn off the solid parts, is the least copious, sharpest, saltiest, reddest, most fetid, almost putrified, and of all others the hardest to retain. The *urine*, therefore, contains the watery part of the blood, its sharpest, subtlest, and most volatile salt, and that nearest to the alkaline kind; its sharpest, smallest, and most, volatile oil, and that nearest to putrefaction; and its smallest most volatile earth.

The phosphorus, in use among us, is made from human *urine*.—Saltpetre is likewise prepared from the *urine*, and other excrements of animals.

The Indians scarce use any other medicine but cows *urine*.—The Spaniards make great use of *urine* to clean their teeth withal: and so did the Celtiberians of old.

Urine is also used in dying, to ferment and warm the woad.—Old *urine* tinges silver with a fine gold colour.

The disorders in the *urine* are various. See STRANGURY, RETENTION, DIABETES, STONE, NUBECULA, &c.

URINE, in medicine.—The *urine* affords one of the principal criterions, or signs, whereby physicians judge of the state of the patient, and the course of the disease.

In casting, or examining *urine*, the things to be considered are its quantity, colour, smell, taste, fluidity, and the matters swimming therein.

An abundance of *urine*, indicates a looseness of the renal pipes, a diminution of perspiration, sweat, saliva, an imperfect mixture of the blood, whereby the watry parts separate easily from the rest; a nervous indispotion, a copious drinking of some aqueous liquid, or some diuretic taken.—Such *urine* prefigures a thickness of what is left behind; and its acrimony denotes thirst, anxiety, obstructions, and their effects, a dry and hot constitution.

A contrary state of the *urine*, indicates the contraries; and prefigures future repletions, heaviness, drowsiness, convulsive tremors, &c.

A thin, limpid, insipid, colourless, tasteless *urine*, denotes a great constriction of the renal vessels, and, at the same time, a brisk agitation of the humours; a strong cohesion of the oil, salt, and earth in the blood itself, and an imperfect mixture of the aqueous parts therewith; some grievous indispotion of the mind, a hysterical or hypochondriac fit; a debility of the viscera; crudity, pituita, obstructions of the vessels; and, in acute diseases, a want of a coction and crisis.

—Such *urine* portends much the same as a too copious *urine*; and, in acute inflammatory diseases, a bad condition of the viscera, deliria, phrenies, convulsions and death.

Ruddy urine, without any sediment, in acute diseases, indicates a violent motion and attrition among the parts that constitute the humours, and between the vessels and the humours; a close intimate mixture of the oil, salt, earth, and water in the humours: and hence a great crudity of the disease, and its long duration, and great danger.—Such *urine* prefigures gangrenous obstructions of the finest vessels, chiefly those of the brain and cerebellum, and thence death: a difficult coction; a slow, doubtful crisis: and all these the worse, as the *urine* is redder, and freer of sediment.—If there be a heavy, copious sediment, it shews a strong antecedent attrition, loose vessels, sharp, saline, coagulated blood, unfit for nutrition, intermitting fevers, and scurvy.

The prefigures are, the durableness of the disease, wearing of the vessels, weakness, colliquative sweats, saliva, atrophy, and droop.—If the sediment in such *urine* be branny, scaly, filmy, &c. it prefigures the like, only worse.

A yellow *urine*, with a sediment as before, denotes a jaundice, and the symptoms thereof in the cutis, stools, &c.

A green *urine*, with a thick sediment, denotes an atrabiliary temperature, and that the matter thereof is resolved, and now excreted: consequently anxieties about the præcordia, perturbations of stool, and iliac and colic pains.

Black *urine*, denotes the same with green, only in a greater and worse degree.

Blood, pus, caruncles, filaments, hairs, anguillæ, grumæ, sandy parts of stone, and a mucus at the bottom of the *urine*, denote some disorder in the kidneys, ureters, bladder, and urethra.

Fatty *urine*, generally breeds small sands, adhering to some viscid matter, and thus produces a sort of oily membrane, or pellicle, which denotes an abundance of earth, and a heavy salt in the blood, and prefigures the scurvy, stone, &c.

A fetid *urine*, denotes the salts and oils to be attenuated, dissolved, and almost putrified; whence very great danger, both in chronic and acute diseases.

Urine which, when shook, retains its froth long, denotes a tenacity of the mixture, and thence a difficulty of crisis; and pulmonary diseases, or catarrhs in the head.

But the *urine* is chiefly consulted in acute fevers, where it is a very true sign: For, 1^o. *Urine* with a white, light, equable, turbidated, inodorous sediment, through the whole course of the disease to the crisis, is a very good prefigure.

—2^o. Copious, white, stranguous *urine*, with much white sediment, emitted at the time of the crisis, cures and takes away abscesses. 3^o. A thin, ruddy *urine*, that does not subside; a white, thin, watery *urine*; a thin, equable, yellow *urine*; and a turbid *urine*, that does not subside, denotes, in very acute diseases, a great crudity, a difficult crisis, and a curable dangerous disease.

URINE, in agriculture, is of excellent use as a manure.

The knowing in agriculture and gardening, prefer *urine* for land, trees, &c. before dung; as penetrating better to the roots; and removing divers infirmities of plants.

The decay of the ancient Kentish pippins, is a thing much complained of; and Mr Mortimer observes, they will be quite lost, unless some persons set themselves to the ancient way of culture; which, as all ancient graziers and gardeners know, was by washing the mossy, worm-eaten, cankered, and unsound trees, two or three times in the month of March, with the *urine* of oxen, &c. gathered in earthen vessels, placed under the planks of the stalls wherein they were fattened.

In Holland, and in divers other parts, they preserve the *urine* of their beasts, &c. with as much care as their dung.—Mr Hartlib, Sir Hugh Plat, Mr Mortimer, &c. make a common complaint, that so great an improver of land, and so remarkable a strengthener of manure, should be so much disregarded among us.

URINOUS Salts, are the same with what we otherwise call alkali salts, or alkalies.

There are two kinds of urinous salts, the one fixt, the other volatile.—The fixt prevail in plants, and the volatile in animals.

They are called urinous, in respect of their taste, and smell, which bear some resemblance to those of *urine*.

URN, **URNA**, a kind of vase, of a roundish form, but biggest in the middle, like the common pitchers; now seldom used, but in the way of ornament over chimney-pieces, in buffets, &c. or, by way of acroters, at the tops of buildings, funeral monuments, &c.

The great use of urns, among the antients, was to preserve the ashes of the dead, after they were burnt: for which reason they were called cineraria, and urnæ cinerariæ; and were placed sometimes under the tomb-stone, whereon the epitaph

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epitaph was cut; and sometimes preserved in vaults in their own houses.

Urns were also used at their sacrifices, to put liquid things in. They were also of use in the *sortes prœnestinae*, or casting of lots.

At Rome, also, the custom was to absolve or condemn the accused, by the suffrages, or calculi, which the judges cast into the *judicatory urn*.

Virgil represents Minos, the judge of hell, shaking the *urn*, to decide the lots of mankind. — *Quæstor Minos urnam movet.*

The *urn* is still the attribute of rivers, which are painted leaning on *urns*, representing their sources by the waters flowing therefrom. — We find them represented in the same manner on antique medals, and reliefs.

URN, URNA, was also a Roman measure, for liquid things; containing about three gallons and a half of English wine measure.

The *urn* was half the amphora, and four times the congius.

UROCRITERIUM*, or UROCRISIA, a casting of water; or giving judgment on diseases by the sight of the urine. See URINE.

* The word is compounded of *uros*, urine, and *κρισις*, criterion, mark, sign. — Hence also, *urumacy*, *urisy*, &c.

URSA, in astronomy, the Bear, a name common to two constellations of the northern hemisphere, near the pole; distinguished by *major*, and *minor*.

URSA *major*, or the great Bear, according to Ptolemy's catalogue, consists of 35 stars; according to Tycho's, of 56; but, in the Britannic catalogue, we have 215. — The longitudes, latitudes, magnitudes, &c. whereof, are as follow.

Names and Situations of the Stars.	S. Equ.	Longitude.	Latitude North.	Magnit.
	°	°	°	
Inform. between Perseus and the { [head of the great Bear]	II	10 41 11 31 34 4 6		
		11 57 29 30 56 54 5 6		
		11 52 15 30 33 50 5 5		
		13 54 32 34 1 38 6		
A star of Ursa minor in Tycho		16 38 38 43 23 17 4 5		
5				
		14 49 45 32 23 17 6		
		14 58 14 30 50 59 5		
Of Ursa minor		16 59 57 37 23 19 4 5		
Of Ursa minor		17 12 5 35 53 15 5 6		
		16 20 4 28 33 30 5		
10				
		17 10 6 30 35 42 6		
		19 12 3 34 52 27 6		
Inform. between the pole and Auriga		19 47 39 34 15 39 6		
Preced. the great Bear		21 13 5 33 52 0 5 6		
		22 23 5 10 44 23 6		
15				
		22 47 5 18 30 25 6 7		
		23 20 0 38 1 1 6		
		22 54 4 13 8 33 6		
		23 27 4 12 39 56 6		
		23 33 4 33 27 49 6 7		
20				
		24 29 3 35 29 38 6		
		24 56 5 36 24 34 5		
		25 29 2 31 51 2 6		
	II	27 31 5 12 15 18 5 6		
	II	27 17 5 35 28 5 5 6		
25				
		27 26 3 35 42 35 6 7		
		28 10 1 45 52 52 4 5		
		28 9 2 30 33 18 6 7		
		28 26 3 18 4 36 5 6		
37th of Cassiopeia in Tycho		28 40 5 35 34 56 4 5		
Perhaps, 32d of Cassiopeia in Tycho				
30				
		29 3 4 38 20 59 6		
		29 11 0 35 57 43 5 6		
		29 44 35 35 3 3 7		
		29 51 0 35 13 1 6 7		
		29 59 3 35 2 36 6		
35				
	S	0 30 30 34 50 35 7		
		1 27 12 38 13 11 5 6		
		1 33 53 38 12 16 6		
		1 51 12 33 34 54 6		
		2 57 3 30 15 26 5 6		
40				
35th of Cassiopeia		2 31 17 44 23 21 4 5		
36th		2 39 13 45 43 33 4 5		
33d		3 28 17 34 0 47 6		
34th		4 2 18 36 21 17 5 6		
		4 50 22 35 24 22 4 5		
45				
		6 55 11 22 9 27 4 5		
		6 0 2 36 54 46 5 6		
		6 23 32 37 57 49 6		
		7 34 37 36 58 2 5		
		8 7 50 36 17 15 5 7		

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Names and Situations of the Stars.	S. Equ.	Longitude.	Latitude North.	Magnit.
	°	°	°	
50	S	8 30 23 37 20 15 6		
		9 58 58 26 58 23 5 6		
		9 31 29 32 47 55 5 6		
		11 18 5 26 53 54 6		
Inform. foll. Auriga, betw. the head of		11 19 26 37 25 55 6		
55 [Ursa maj. and Gemini]				
		12 3 53 35 1 55 5 6		
		12 1 5 36 41 20 4 5		
		11 24 1 40 48 39 5 6		
		14 46 52 34 56 45 6		
		16 42 59 25 58 1 6		
60				
		16 42 47 26 9 39 5 6		
		14 27 49 38 40 0 5 6		
		16 2 49 33 56 31 6		
		12 54 8 36 58 28 5 6		
		16 37 18 39 21 2 6		
65				
		17 11 39 38 38 21 5 6		
		16 18 8 41 30 16 6 7		
		18 13 48 36 58 10 5 6		
		17 33 11 39 50 13 6 7		
Inform. betw. Gemini and the fore foot		23 6 54 23 2 58 4 5		
70 [of the Bear]				
In the tip of the nose		18 39 28 40 12 47 4 3		
Preced. of two against the eyes		17 19 32 44 33 1 4 5		
		18 0 47 44 35 29 6		
Subseq. of the same		18 29 23 43 59 38 4		
		27 25 19 17 6 52 6		
75				
Against the jaw		21 56 0 42 17 49 5 6		
		20 41 31 44 53 29 5 6		
		28 37 48 25 2 44 4		
Preced. of two in the forehead		19 39 16 47 54 43 3		
North. in the preced. anterior foot		28 30 18 29 34 26		
80				
North of inform. under the anterior foot	S	0 58 20 23 41 53 4 5		
	S	20 53 39 47 28 3 6		
South of the preced. foot		29 37 3 28 57 11 3		
Posterior in the forehead		20 58 41 47 48 5 5		
Preced. in the triangle of the neck		23 15 30 44 33 3 4		
85				
Second of the informes	S	3 12 10 20 51 27 5		
That under the preced. knee	S	28 47 53 33 25 55 4 5		
South. in the triangle of the neck		24 57 27 42 47 58 5 6		
		27 39 28 38 35 45 5 6		
	S	2 57 59 25 49 20 5 6		
90				
That over the preced. knee	S	28 58 12 36 4 34 5		
Nor. of the brighter among 5 inform.	S	6 13 22 49 4 22 4		
South. of the same		7 31 11 55 58 3 4		
		0 34 53 36 36 21 6 7		
	S	20 4 2 33 16 39 7		
95				
In extrem. of the ear		22 0 38 31 13 24 5		
Poster. in the triangle of the neck		26 29 5 45 7 19 4 5		
	S	0 26 16 38 26 25 6		
		4 51 16 28 58 26 6		
In the second anterior knee		3 0 30 34 56 30 3 4		
100				
A less over this	S	6 16 35 20 16 4 5		
Lat of 5 inform. under the anter. feet	S	20 54 4 33 39 16 6		
	S	9 27 57 20 42 32 4 5		
		10 1 37 20 17 29 6		
		8 48 39 24 40 0 6		
105				
	S	28 8 57 46 25 7 5		
	S	9 44 58 24 24 4 6 7		
	S	28 38 28 46 9 35 5		
	S	2 21 40 30 39 18 6		
North. of two in the breast		1 56 55 42 39 11 4 3		
110				
South. of the same		5 0 20 38 14 10 4		
		7 52 11 34 37 7 6		
		4 41 45 41 11 33 6		
		12 18 1 26 43 16 5 6		
		16 42 35 18 32 33 5 6		
115				
Preced. of inform. under the poster. feet		16 40 51 22 4 14 4 5		
		1 23 23 49 27 46 5		
North. in the preced. posterior foot		15 13 22 29 52 27 4 3		
		1 53 10 50 11 42 5		
South. and poster. in the same foot		16 54 2 28 57 46 4 3		
120				
2d of the informes under the post. feet		2 34 45 50 35 12 6		
3d and north. of the same		21 5 21 22 13 23 5 4		
		20 13 16 25 3 44 4 5		
		10 16 3 12 30 35 5		
		10 13 49 13 45 37 5		
125				
		19 33 52 28 51 47 5 6		
		4 5 57 51 23 43 5 6		
Prec. in the base of an oxigonous Δ of		24 31 37 21 35 53 4 3		
inform. under the Bear's feet		11 31 53 14 28 41 6		
		18 21 52 24 49 14 5		
130				
		12 5 54 34 23 35 6		
		11 49 4 14 49 12 6		

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Names and Situations of the Stars.	Longitude ° ' "	Latitude ° ' "	Magni- tude
Subseq. in the base of the oxygen	Ω 26 35 38 21 3 23 4 11 5 14 46 48 33 6 13 11 35 44 29 4 6		
135			
In the apex of the oxygenous triangle	15 1 41 42 57 58 5 6 26 31 49 24 56 4 4		
In the preced. of the posterior leg	22 10 5 13 3 5 5 4 26 59 12 24 54 27 6 27 23 30 24 29 35 6		
140			
South. in square of preced. or in the side	24 46 14 31 3 16 6 15 4 12 45 6 16 2 25 39 15 30 4 51 6 5		
North. of preced. in the back	10 49 58 49 40 5 2 26 53 23 29 31 30 6		
145			
In the preced. poster. knee	24 29 32 35 31 46 4 3		
South. in the subseq. poster. knee	Π 3 0 3 24 46 5 4 2 20 15 26 9 3 4		
North. in the same knee	Ω 29 52 42 30 46 34 5 27 38 30 35 46 45 6		
150			
	Π 1 16 32 32 41 24 5 Ω 29 21 41 36 12 0 6 15 44 57 31 14 49 6 Π 0 30 32 37 17 9 6 Ω 28 33 40 40 4 3 6		
155			
	20 1 48 49 27 1 6 Π 6 30 15 29 15 46 6 Ω 10 43 46 56 11 51 6 7 Π 7 54 52 27 6 16 6 Ω 29 21 15 41 32 23 4 5		
South. in the thigh	23 14 2 48 6 52 6		
Bright star in the thigh; the south. of [the following in square	26 6 35 47 7 26 2 23 43 54 49 34 37 6 7 Π 1 51 41 41 10 22 6 7 5 44 25 38 58 35 5		
165			
	Ω 25 55 54 51 6 44 7 Π 0 5 37 43 46 41 7 Ω 26 40 40 51 39 36 3 2 Π 10 52 24 38 34 36 6 4 51 53 45 37 34 5 6		
In the root of the tail; nor. of square of [the following	Ω 26 34 28 54 41 36 6 7 Π 10 28 30 40 35 50 6 3 29 14 48 6 48 5 4 Ω 28 27 25 52 13 50 7 Π 13 13 35 57 46 0 5		
In the south. hip	Ω 29 59 48 51 38 32 5 7 Π 27 30 45 53 53 12 6 Π 4 40 31 48 40 22 6 Ω 26 26 40 33 13 4 5 14 45 13 40 37 42 7		
170			
North in the hip	Ω 23 53 31 57 57 46 6 Π 17 12 43 39 51 39 6 Ω 18 30 28 61 3 41 6 Π 19 27 18 38 51 12 6 4 31 25 54 20 16 2		
175			
That prec. the inform. under the tail	20 14 22 40 7 53 2 3 Ω 21 43 1 60 52 21 6 Π 23 45 10 33 57 20 4 5 5 16 3 55 14 19 5 6 24 1 51 38 54 37 5		
180			
First of the tail	23 7 8 11 39 50 7 23 4 4 11 51 18 7 23 13 2 11 40 11 6 21 42 2 43 40 31 7 22 54 2 43 27 21 5 6		
Bright star under the tail, informs	22 48 7 14 14 2 7 23 28 15 14 12 2 6 15 54 8 51 47 4 5 24 23 21 14 6 33 6 11 18 59 36 23 14 2		
That resting, as it were, on the former	11 29 36 56 33 25 5 5 22 51 50 23 20 5 20 0 53 12 52 3 5 12 48 17 41 5 7 16 53 28 56 26 27 6		
That preceded. the last of the tail	14 55 40 57 51 10 6 1 38 2 45 17 23 7 1 47 34 45 23 40 6 6 58 19 6 2 6 Π 16 25 2 58 14 26 6		
190			
Inform. prec. Bnotes between the tail of [the Bear, and Coma Berenices	22 34 22 54 24 0 2 5 20 16 42 31 4 7 5 25 47 12 25 12 7 5 43 46 12 18 3 6 Π 18 51 20 58 25 13 6		
195			
First of the two preced. the last of the [tail			
Middle of three bright ones in the tail			
200			
That resting, as it were, on the former			
That preceded. the last of the tail			
Preced. in triangle over last of the tail			
205			
North. in the same triangle			
210			
Last of the tail			
Informs towards Roote & belt			
Last of the triangle over the tail			
215			

USE

Urs a minor, the little Bear, called also *Charles's wain*; and by the Greeks, *synsura*; by its neighbourhood to the north pole, gives the denomination *arctica*, bear, thereto. Ptolemy and Tycho make it to consist of eight stars; but Mr Flamsteed of fourteen: the longitudes, latitudes, magnitudes, &c. whereof, as laid down in the Britannic catalogue, follow.

Names and Situations of the Stars.	Longitude ° ' "	Latitude ° ' "	Magni- tude
A small one contiguous to the polar	II 23 26 40 66 8 41 7		
That over the polar	17 6 32 65 16 0 6		
The last of the tail; the pole star	24 14 41 66 4 11 2		
Preced. of two before the shoulder	Σ 28 26 51 70 18 17 5		
Subseq. and more south.	4 0 9 71 25 4 5		
5			
Bright one in shoulder, prec. of square	18 54 40 72 58 10 2		
In the breast, mouth, south. of the square	17 11 56 75 13 15 3		
Preced. of two in the loins	25 45 45 74 41 52 6		
Subseq. of the same, north. of the square	23 2 10 75 5 45 4 5		
Preced. of two in the side	26 27 42 77 24 10 5 6		
10			
Brighter in the side, subseq. of square	25 56 25 77 49 28 4 5		
In the root of the tail	4 45 5 73 53 36 4		
Last but one of the tail	26 50 39 69 54 37 4		
Another following this, nearer the pole	II 26 45 0 69 31 27 7		
14			

URSULINES, an order of nuns, who observe the rule of S. Augustin; and are chiefly noted for taking on them the education, and instruction of young maids.

They take their name from their institutress S. Ursula; and are clothed in white, or black.—The *Ursulines* have spread exceedingly in France, &c. within these few years.—Few maids but are put out to school to them.

USAGE, in law. See { PRESCRIPTION, and CUSTOM.
USAGE, in language. See { LANGUAGE.

USANCE, *Uso*, in commerce, is a determinate time fixed for the payment of bills of exchange, reckoned either from the day of the bills being accepted, or from the day of their date; and thus called, because regulated by the usage and custom of the places whereon they are drawn. See *BILL of Exchange*.

Bills of exchange, are drawn at one or more *usances*, either from fight, or from date.—The Italians say, *uso doppio*, for double *usance*, or two *usances*.

This term is longer or shorter, according to the different countries.—In France *usance* is fixed at thirty days.—At London, *usance* is a calendar month; and double *usance*, two months.—In Spain, *usance* is two months, or sixty Days.—At Venice, Genoa, and Leghorn, three months.

At Hamburgh, *usance* of bills drawn from England, France, and Venice, is two months after date.—From Antwerp, and Nuremberg, fifteen days after fight.

At Venice, *usance* of bills drawn at Ferrara, Bologna, Florence, Lucca, and Leghorn, is five days after fight.—From Naples, Aushbourg, Genoa, and Vienna, fifteen days after fight.—From Mantua, Modena, and Milan, twenty days after date.—From Amsterdamb, Antwerp, and Hamburgh, two months after date; and from London, three months after date.

At Milan, *usance* of bills drawn from Genoa, is eight days after fight.—From Rome, ten days after fight.—And from Venice, twenty days after date.

At Florence, *usance* of bills drawn from Bologna, is three days after fight.—From Rome, ten days after fight.—From Venice and Naples, twenty days after date.

At Rome, *usance* of bills of Exchange drawn in Italy, was, originally, ten days after fight; but by an abuse, this term has been extended to fifteen.

At Leghorn, *usance* of bills drawn from Genoa, is eight days after fight: from Rome, it is ten days; from Naples, three weeks; from Venice, twenty days after date; from London, three weeks; and from Amsterdamb, forty days.

At Amsterdamb, *usance* of bills drawn from England and France, is a month after date: from Venice, and Madrid, Cadiz, and Sevil, two months.

At Genoa, *usance* of bills from Milan, Florence, Leghorn, and Lucca, is eight days after fight: from Venice, Rome, and Bologna, fifteen days: from Naples, twenty two days: from Sicily, a month after fight, or two months after date: from Sardinia, a month after fight: from Antwerp, Amsterdamb, and other places in the Low Countries, three months after date.

USE, *Usus*, in law, denotes the benefit or profit of lands, and tenements.

Ufe imports a trust and confidence reposed in a man for the holding of lands; that he to whose use or benefit the trust is intended, shall reap the benefits thereof.

A deed consists of two principal parts: the *premises*, which include all that comes before the habendum, or limitation of the estate; and the *consequent*, which is the habendum itself; wherean

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wherein are two limitations: the one of the *estate*, or property the party shall receive by the deed.—The other of the *use*, expressing to, or for what *use* and benefit he shall have the same.

Uses, some say, were invented upon the flat of Westminster, *quia emptores terrarum*: before which time, no such *uses* were known.—And because, in course of time, many deceits got footing, by settling the possession in one man, and the *use* in another; it was enacted, anno 27 Hen. VIII. That the *use* and possession of lands should stand united, or that the possession should be given to him who had the *use*.

USE and Custom, in ancient law-books, denotes the ordinary method of acting or proceeding in any case, which, by length of time, has obtained the force of a law.

Cestui qui USE. See the article **CESTUI**.

Contingent USE. See the article **CONTINGENT**.

USER *de Action*, in law, is the pursuing, or bringing an action, in the proper county, &c. See **ACTION**.

USES and Customs of the Sea, are certain maxims, rules, or *usages*, which make the base or ground-work of the maritime jurisprudence; by which the policy of navigation, and commerce of the sea, are regulated.

These *uses* and customs consist in three kinds of regulations.

—The first, called *laws*, or *judgments of Oleron*, were made by order of queen Eleanor, dutchess of Guienne, at her return from the holy war; and that chiefly from memoirs which she had gathered in the Levant, where commerce was at that time in a very flourishing condition.

She called them *rolls of Oleron*, by reason she then resided in an island of that name, in the bay of Aquitaine.—These were much augmented about the year 1266, by her son Richard, king of England, on his return from the Holy Land.

The second regulations were made by the merchants of Witsby, a city in the island of Gothland, in the Baltic, antiently much famed for commerce, most of the nations of Europe having their particular quarters, magazines, and shops therein.

These were compiled in the Teutonic language, and are still the rule in the northern countries. Their date does not appear; but it is probable, they were made since the year 1288, when the city of Witsby was destroyed the first time, and afterwards restored by Magnus, king of Sweden.

The third set of regulations were made at Lubec, about the year 1597, by the deputies of the Hanse towns. See **HANSE**.

USHER, *Huissier*, signifies an officer, or servant, who has the care and direction of the door of a court, hall, chamber, or the like.

In the king's household there are two *gentlemen-usbers* of the privy-chamber, appointed to attend the door, to give entrance, &c. to persons that have admittance thither.—Four *gentlemen-usbers*, waiters; and an assistant *gentleman usber*.—Eight *gentlemen-usbers*, quarter-waiters in ordinary.

In the French court there are two *usbers* of the anti-chamber, or hall where the king dines in public.—They wait sword by side, all the year, and open the door to such as are to come in.—There are above sixteen *usbers* of the chamber, two of the cabinet, and one of the order of the Holy Ghost.

The *usbers* of the inquisition in Spain and Portugal, are persons of the first quality, who think themselves highly honoured, by only looking to the doors of that sacred tribunal.

USHER, is also used for an officer in the Exchequer; of which sort, three or four attend the chief-officers and barons, at the court at Westminster, as alio, juries, sheriffs, and other accountants; at the pleasure of the court. See **EXCHEQUER**.

USHER of the black-rod. See the article **BLACK-ROD**.

In a chapter held at Whitehall, 13 Car. II. it was ordained, that this office should be fixed to one of the *gentlemen-usbers*, daily waiters at court; the eldest of which, always holds the place, and is called *gentleman-usber*, and *black-rod*.

In relation to the order of the garter, he is appointed to carry the rod at the feast of S. George, and other solemnities, which he also makes use of as an authority to attach delinquents, who have offended against the statutes of the order, which he frequently doth by touching them therewith.—He wears a gold badge, embellished with the ensigns of the order.—He has an House in Windsor-castle, and other privileges.

USNEA, in natural history, *muscus arboris*; a sort of plant of the parasite or moss kind, growing like a great beard on the oak, cedar, and divers other trees. See **Supplement**, article **USNEA**.

USNEA Humana, is a small greenish moss, growing on human skulls, that navelain a long time exposed to the air.

It is supposed to be very astringent, and held proper to stop hæmorrhage.—It is also an ingredient in the weapon-salve of Paracelsus, and Crolius.—It has not a whit the more virtue for the place of its growth, nor is there indeed any peculiar moss of this name, but whatever species chances to grow on the skull, is taken for use.

USQUEBAUGH, a strong, rich, compound liquor, chiefly

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taken by way of dram; its basis being brandy, or a more ordinary spirit.

The manner of making it is somewhat various, and the ingredients numerous.—We shall give a receipt much commended formerly, as a specimen.

To two gallons of brandy, or spirits, put a pound of Spanish liquorice, half a pound of raisins of the sun, four ounces of currants; three of dates sliced; tops of thyme, baum, savory, and mint, and tops or flowers of rosemary, of each two ounces; cinnamon and mace bruised, nutmegs, anis seeds, and coriander seeds, bruised likewise, of each four ounces; citron, or lemon and orange peel, scraped, of each an ounce. All these are to be left to infuse 48 hours in a warm place, often shaking them together; then set them in a cool place, for a week; after which, the clear liquor is to be decanted off, and to it is to be put an equal quantity of neat white portwine, and a gallon of canary.—The whole is finally to be sweetened with a proper quantity of double refined sugar.

USTION*, **USTIO**, in pharmacy, the preparing of certain substances, by burning them.

* The word is formed from the Latin *urere*, to burn.

The antients made use of burnt horns, nails, feathers, and other parts of animals, for divers remedies: and the moderns still use *as ustum*, which is burnt copper, or copper that has undergone the *ustion*, with sulphur.

The *ustion* of minerals, is a more imperfect kind of calcination.—It is a degree beyond torrefaction.

USTUM *As*. See the article *As ustum*.

USUCAPTION, **USUCAPTION**, in the civil law, is an acquisition of the property of a thing, by a possession and enjoyment thereof for a certain term of years prescribed by law.

Some make a difference between *prescription* and *usucaption*, maintaining, that the latter is only used with regard to moveables, and the former with regard to immoveables.—But there is no essential difference between them; and accordingly, *prescription* and *usucaption* are generally held synonymous.

USUFRUIT, **USUS-FRUCTUS**, in the civil law, the use or enjoyment of any lands or tenements; or the right of receiving the fruits and profits of an inheritance, or other thing, without a power of alienating, or changing the property thereof.

When the *usufructuary* dies, the *usufruit* returns to the proprietor.—The dower or the jointure of a widow, is only an *usufructuary* due, that is, she only enjoys the *usufruit* thereof, and cannot dispose of the principal.

All mutual presents between man and wife, only import the *usufruit* of the goods of the first that dies, to the profit of the survivor.—The incumbents of benefices are only *usufructuary*.—An *usufructuary* has full right over the coppice; but he cannot fell timber-trees.

USURER, a person charged with a habit or act of *usury*.

The laws of our antient Saxon and Norman kings, are very severe upon *usurers*, or letters-out of money upon interest.—*Usurarios quoque defendit rex Edwardus* (confessor,) *ne remaneret aliquis in toto regno suo; Et si quis inde convictus esset, quod fœnus exigerat, omni substantia propria careret. Et postea pro exlege habebatur: quoniam usura radix omnium malorum.* Leg. Edv. Confess. cap. 37.

They were indeed, allowed to dispose of their goods before conviction, and whilst they were living; but after their death, they were confiscate, if it could be proved they lent money to *use* within a year before their death. *Matt. Paris*.

If a clergyman were an *usurer*, his goods were not to be confiscated; but to be distributed to pious uses.—In those days *usury* was thus defined:

Est usura suus quisquis tradit mihi nummos

Spe lacri, fœnus duplex usura vocatur.

USURIOUS Contract, is any bargain or contract, whereby a man is obliged to pay more interest for money than the statute allows.

USURPATION, in law, an injurious using, or enjoyment of a thing for continuance of time, that belongs of right to another.

USURY, **USURA**, in the general, denotes a gain or profit, which a person makes of his money, by lending the same; or it is an increase of the principal, exacted for the loan thereof; or the price a borrower gives for the *use* of a sum credited to him by the lender: called also *interest*, and in some antient statutes, *dry exchange*.

The word *usury* is usually taken in an evil sense, viz. for an unlawful profit which a person makes of his money; in which sense it is, that *usury* is forbidden by the civil and ecclesiastical law, and even by the law of nature: in this sense it also is, that it is held *usury* to lend money on pawns, to exact interest for money, without surrendering the principal, and to stipulate interest for money which is not employed in trade, nor brings any profit to the person who receives it:

but as the Latin word *usura*, at least the plural thereof, *usuræ*, may be understood of a lawful interest, we do not see why *usury* may not be used in English, in the same harmless sense.

By the ancient Roman law, people were allowed to lend out their money at one per cent. per month; which was 12 per cent. per annum. — If they received more, they incurred the note of infamy, and were condemned as usurers.

This rate of *usury* was allowed of, as low as the time of Julian, who moderated it a little by the 26th law in the code, *de usuris*. And not long after, the canon law forbid all sort of *usury* whatever. — In compliance with this prohibition, the customary laws do not allow any interest to be exacted, for money lent on a simple promise or obligation; but only by contract, and upon alienating the principal, which the debtor is to reimburse at pleasure: which is a kind of buying an annuity, or annual revenue.

So that in propriety, *unlawful usury* consists, in extorting an excessive rate for one's money, beyond what is prescribed by law.

Du Moulin, indeed, makes *usury*, taken in the ill sense, to be a profit exacted for a loan made to a person in want; intimating, that it is unlawful to extort gain, from the assistance given to the unhappy, or to convert an office of humanity into a mercenary one. — The reason is, that money is a barren and fruitless thing, in the hands of a person whom necessity obliges to borrow; and that being lent him to be spent, he can make no advantage of it: whereas the principal pretext for requiring lawful interest is, that the person who lends, may share in the profits thereof, with the person to whom it is lent.

Notwithstanding, most of the ancient canonists insist on a rigorous observation of that precept in Deuteronomy; *Non feneratoris fratri tuo*, "Thou shalt not lend money to thy brother on *usury*:" and plead, that nothing is to be required further than the principal.

However, in life, we call nothing *usury*, but what exceeds the bounds prescribed by the laws: so that when a person does not alienate his principal, or takes interest beyond what is limited by statute, these alone are *usury*.

By the stat. 12 Car. I. no man is allowed to take above six pounds, for the forbearance of one hundred pounds for a year, under certain penalties therein enjoined. — And by a later stat. 12 Anne, no man may take above five pounds for the like occasion; and so in proportion for any other sum.

U T, a Latin term, signifying, literally, *as*; much used in the stating of ratios and proportions.

Sir Isaac Newton assigns its use thus: if indeterminate quantities of divers kinds be compared together, and one of them be said to be *ut*, *as*, any other directly, or inversely; the meaning is, that the first is increased or diminished, in the same ratio as the latter. — And if one of them be said to be, *ut*, *as*, two or more others directly, or inversely; the meaning is, that the first is increased or diminished, in a ratio, compounded of the ratios in which the others are increased or diminished.

Thus, if A be said to be *as* B directly, and *as* C directly, and *as* D inversely; the meaning is, it is increased or diminished, in the same ratio with $B \times C \times \frac{1}{D}$, that is, A and $\frac{BC}{D}$, are to each other in a given ratio. Phil. Nat. Princ. Math.

U T, in music, the first of the musical notes. See NOTE.

U t, *re*, *mi*, *fa*; the clef of G, *re*, *sol*, *ut*; of C, *sol*, *ut*, &c.

This note, with the rest, were taken out of the hymn of St John Baptist. *Ut queant laxis*, &c. See MUSIC.

UTANGTHET*, an ancient royalty or privilege, granted to the lord of a manor by the king, giving him a power to punish a thief dwelling, and committing theft out of his liberty; it he be taken within the lord's fee.

* *Utangthet dicitur extraneus latro veniens aliunde de terra aliena, & qui captus fuit in terra ipsius qui tales habet libertates.* Bradon.

UTENSIL, UTENSILE, a little domestic moveable, particularly such as belong to the kitchen. — Such as pots, pans, plates, &c.

UTENSILS, is more particularly used in war, for the moveables which the host is obliged to furnish the soldiers quartered with him; which are, a bed with bed-cloths, a pot and a spoon. — They are likewise to have a place at their host's fire, and candle. — *Utensils* are sometimes furnished in money, and sometimes in kind.

UTERINE, UTERINUS, something belonging to the uterus, or womb of women.

Uterine brothers or sisters, as those born of the same mother, but of different fathers.

Furor UTERINUS, in medicine, denotes a kind of madness, attended with lascivious speeches and gestures, and an invincible inclination to venery.

The *furor uterinus*, is a complication of hysterical symptoms arising from a turgescency, or inflation of the *uterine* vessels. Men are subject to the like disease, as well as women; so that it might with more propriety be called, the *furor venereus*, or *venereal fury*. — It had its name *furor uterinus*, from an opinion, that it proceeded from vapours, rising from the womb to the brain.

It has been frequently found, that maids supposed to be possessed, were only seized with the *uterine fury*.

The *furor uterinus*, is usually supposed to consist in an irregular motion of the spirits, occasioned by a hot, lustful temperament, the conversation of debauched persons, or the reading of wanton books, hot foods, the abundance and acrimony of the ferous matter which moistens the pudendum, suppression of the menses, large doses of cantharides, &c.

Before the paroxysm, the patient often appears silent and sorrowful, with a flushing in the face, and a respiration and pulse frequently intermitting, and suddenly varying. — During the paroxysm they burst sometimes into laughter, and then into a fit of tears, &c.

Bleeding, setid fuffiments, and other hysterical medicines, are proper during the fit.

UTERINUM JEJUR. See the article JEJUR.

UTERUS, in anatomy, the *matrix*, or *womb*; that organ of generation in women, wherein the business of conception is performed, and wherein the embryo or fetus is lodged, fed, and grows, during the time of gestation, or till its delivery.

Its description see under the article MATRIX. — Its office, &c. under GENERATION, CONCEPTION, GESTATION, and PARTUS.

FUNDUS UTERI. } See the article } FUNDUS.

PRÆCIDENTIA UTERI. } See the article } PRÆCIDENTIA.

VAGINA, or CERVIX UTERI. See VAGINA, and CERVIX.

UTILE, a Latin term, signifying profitable, or useful; sometimes used by English authors in the same sense.

The *utile* and the *dulce*, profit and delight, are both to be aimed at in poetry; but it is disputed which of them is to be aimed at in the first place. — Corneille says expressly, *Dans la tragédie l'utile n'entre que sous la forme du délectable*.

In the language of the philosophers, there is nothing *utile*, but what is just and honest: *nihil bonum nisi honestum: nihil malum, nisi turpe*. Cic. de Fin. lib. 2.

UTILE DOMINIUM. See the article DOMINIUM.

UTLAGARIÆ Perdonatio. See PERDONATIO.

UTLAGATIO, in law terms, an outlawry. See OUTLAWRY.

UTLAGATO Capiendo, quando utlagatur in uno comitatu & postea fugit in alium, a writ for the apprehending a man who is outlawed in one country, and flies into another. See OUTLAWRY.

UTLAGATUM Capias. See the article CAPIAS.

UTLAGH, UTHLAGHUS. See the article OUTLAW.

UTLAND, Outland. See the article INLAND.

UTLARY, or UTLAWRY, UTLAGARIA. See OUTLAWRY.

UTRUM. See the article ASSISE, &c.

UTTER Barrister. See the article BARRISTER.

UVEA. See the article TUNICA.

UVEA*, in anatomy, *aciniformis tunica*, the third tunic, or membrane of the eye.

* It is called — *uvea*, on account of its resembling the figure and colour of a grape, called, by the Latins, *uva*. For which reason also some have given it the name of — *aciniformis*, from *acinus*.

The hind part of this coat, or that next the orbit of the eye on each side, is called the *choroides*; and is derived from the *pia mater*.

The anterior, or fore part is, like the former, transparent, but thinner; and is, by authors, reckoned as a different tunic, and called *uvea*.

Of the duplicature of this part, is formed that striped, variegated circle, called the *iris* of the eye.

And in its middle is a perforation, through which appears a little black speck, which is the sight, or pupil of the eye; and about which the iris forms a ring.

From the inside of this membrane, spring certain fibres, which spread themselves round the crystalline humour; serving to contract or dilate the sight at pleasure.

VULCANO, among naturalists. See VOLCANO.

VULGAR Ar.

VULGAR Algebra.

VULGAR Arithmetic.

VULGAR Fractions.

VULGAR Purgation.

VULGAR Stone.

VULGATE, a very ancient Latin translation of the Bible; and the only one the church of Rome acknowledges authentic.

AIR.
ALGEBRA.
ARITHMETIC.
FRACTIONS.
PURGATION.
STONE.

The ancient *vulgate* of the Old Testament, was translated almost word for word, from the Greek of the Septuagint.—The author of the version is not known, nor so much as guessed at.

It was a long time known by the name of the *Italic*, or old version; as being of very great antiquity in the Latin church.—It was the common, or vulgar version, before S. Jerom made a new one; whence it has its name *vulgate*.

Nobilius, in 1588, and F. Morin, in 1628, gave new editions of it; pretending to have restored, and re-collated it, from the antients who had cited it.—The *vulgate* was held by S. Augustine, to be preferable to all the other Latin versions then extant; as rendering the words and sense of the sacred text, more closely and justly than any of the rest. It has since been retouched from the corrections of S. Jerom; and it is this mixture of the ancient Italic version, and some corrections of S. Jerom, that is now called the *vulgate*, and which the council of Trent has declared to be authentic. It is this *vulgate* alone that is used in the Romish church, excepting for some passages of the ancient *vulgate* left in the missal, and the psalms; which are still sung, according to the old Italic version.

VULGATE of the New Testament.—This the Romanists generally hold preferable to the common Greek text; in regard it is this alone, and not the Greek text, that the council of Trent has declared authentic: accordingly, that church has, as it were, adopted this edition: and the priests read no other at the altar, the preachers quote no other in the pulpit, nor the divines in the schools.

Yet some of their best authors, F. Bouhours, for instance, own, that among the differences that are found between the common Greek, and the *vulgate*, there are some wherein the Greek reading appears more clear and natural, than that of the Latin; so that the second might be corrected from the first, if the holy see should think fit.—But those differences, for the generality, only consist in a few syllables, or words they rarely touch the sense. Besides, in some of the most considerable, the *vulgate* is authorized by several ancient manuscripts.

Bouhours spent the last years of his life, in giving a French translation of the New Testament, according to the *vulgate*. In 1675, a new edition of the Greek Testament was published by the university of Oxford; and great care taken therein, to compare the common Greek text, with all the most ancient manuscripts in England, France, Spain, and Italy; and to note the differences observed therein.

In the preface of this work, the editors speaking of the divers versions of the Bible in the vulgar tongues, observe of the *vulgate*, that there is no version in any language to be compared with it.—And this they justify, by comparing passages that occur in the most celebrated Greek manuscripts, with the same passages in the *vulgate*, where there is any difference between that, and the common printed Greek copy. In effect, it is probable, that at the time the ancient Italic, or *vulgate* version of the New Testament was made, and at the time it was afterwards compared with the Greek manuscripts, by S. Jerom; as they were then nearer the times

of the Apostles, they had juster Greek copies, and those better kept, than any of those used when printing was first set on foot, two centuries ago.

M. Simon calls the Greek version of the Septuagint, before it was revised and reformed by Origen, *The ancient vulgate Greek*.—Origen's correction got the upper hand of the ancient Greek, and jostled it out of use; so that we have now scarce any copies thereof. See SEPTUAGINT.

VULNERARY*, in medicine, an epithet given to remedies, proper for the cure of wounds, and ulcers.

* The word is formed from the Latin *vulnus*, wound.

There are divers *vulnerary* herbs; as aristolochia, or birthwort; sanicle, or self-heal; plantain, mouse-ear, veronica, or fluellin, agrimony, vervein, or the holy herb. &c. There are also *vulnerary* potions, composed of various simples.—*Vulnerary* ballams, unguents, plasters, &c. See BAL-SAM, &c.

VULNERARY Water. See the article WATER.

VULTUS de Luca, the same with *veronica*. See VERNICA.

VULVA*, a name which some physicians give to the vagina, and others to the uterus, or womb.

* The word is Latin, *unlova*, quasi *valve*, doors.

VULVA is sometimes also, used for the cunnus, or whole pudendum muliebree.

UVULA, in anatomy, a round, soft spongy body, like the end of a child's finger; suspended from the palate, near the foramina of the nostrils, perpendicularly over the glottis.

Its use is to break the force of the cold air, and prevent its entering too precipitately into the lungs.

It is formed of a duplicature of the membrane of the palate; and is called by some authors, *columella*. and, by others, *gurgulis*. It is moved by two pair of muscles, and suspended by as many ligaments.—The muscles are, the *external*, called the *spheno-staphylinus*, which draws the *uvula* upwards, and backwards; and hinders the masticated aliment from passing into the foramina of the nostrils in deglutition. See SPHENOSTAPHYLINUS.

And the *internal*, called the *pterygo-staphylinus*; which draws the *uvula* upwards and forwards. See PTERYGOSTAPHYLINUS.

Both these muscles move the *uvula* upwards, to give room for swallowing; and serve to raise it, when relaxed and fallen down.—In which case, it is usual to promote its rising, by applying a little beaten pepper on the end of a spoon, or some other warm aromatic powder to it.

Bartholin says, that such as have no *uvula* are subject to the phthisic, and usually die thereof; by reason the cold air, entering the lungs too hastily, soon injures them. See PHTHISIS.

UVULA Precidentia. See the article PROCIDENTIA.

UXORIUM, in antiquity, a fine, or forfeit paid by the Romans for not marrying.

UZIFIR, **UZUFAR**, or **UZIFUR**, in chymistry, a name which some authors give to cinabab.



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W, A letter peculiar to the northern languages, and people; as the English, Dutch, Polish, and others of Teutonic and Slavonic original.

The *w* is also sometimes admitted into the French, Italian, &c. in proper names, and other terms borrowed from the languages in which it is originally used.

In English, the *w* is usually a consonant; and as such, may go before all the vowels, except *u*; as in *want*, *weapon*, *winter*, *world*, &c.

It is sometimes also a vowel; and as such, follows any of the vowels *a*, *e*, *i*, and unites with them into a kind of double vowel, or diphthong; as in *law*, *ewe*, *few*, &c.

The English *w* is founded as in Latin, *u*, in *quantum*, *suadeo*, *lingua*.—Its sound is also commonly like the *grofs*, or full *u* rapidly pronounced.—In French, the sound of the *w* does not differ from that of the single *v*. See *U*.

WADD, or **WADDING**, in gunnery, a stopple of paper, hay, straw, old clouts, or the like, forced into a gun upon the powder, to keep it close in the chamber; or put up close to the shot, to keep it from rolling out.

WAFE. See the article **WAIF**.

WAF.—*To waft a ship*, is to convoy her safe, as men of war do by merchants ships.

To make a waft, is to hang out some coat, sea-gown, or the like, in the main shrouds of the ship; as sign for the men to come on board, &c.

Such *waft* is frequently intended to shew that a ship is in distress, by a leak, &c. and therefore wants help from the shore, or from other ships.

WAFTERS, **WAFTORES**, conductors of vessels at sea.

King Edward IV. constituted a triumvirate of officers with naval power, whom the patent styles *custodes*, *conductores*, and *waftores*; their business chiefly was to guard our fishermen on the coasts of Norfolk, and Suffolk.

WAGA, or **VAGA**. See the article **WEIGH**.

WAGAR, **WAGING**, in law, *vadari*, signifies, the giving security for the performance of any thing.

Thus, *to wage law*, is to put in security that you will make law at the day assigned.

WAGGON, a kind of vehicle, or carriage, in common use.

There are divers forms of *waggons*, accommodated to the divers uses they are intended for.—The common *waggon* consists of the *shafts*, or *radi*, which are the two pieces the hind horse bears up; the *welds*; the *flotes*, which are the cross pieces that hold the shafts together; the *bolster*, being that part on which the fore wheels and axletree turn, in wheeling the *waggon* across the road; the *chests*, or body of the *waggon*, having the flaves or rails fixed thereon; the *bolers*, or hoops, which compose the top; the *tilt*, the place covered with cloth at the end of the *waggon*: besides the *wheels*, *axletree*, &c.

The larger the wheels of the *waggon*, and their circumference, the easier the motion; and the less, the heavier, and more uneasy and joggling they go.—But still, the higher a *waggon*, &c. is set, the apter it is to overturn.—The only reason why the fore wheels of *waggons*, &c. are made less than the hind wheels, is for the conveniency of turning.

The more upright or square the spokes of the wheels are from the box, or centre, the weaker they are when they come to bear on either side: on which account, as also to secure a wheel from breaking in a fall, they are made concave, or dishing.

WAGGONER, in astronomy, a kind of constellation, called also *Charles's wain*. See **CHARLES'S WAIN**.

WAGGONER is also used for a routier, or book of charts, describing the seas, their coasts, &c.

WAIF, or **WAFE**, a term primarily applied to stolen goods, which a thief, being either pursued, or over-burthened, flies, and leaves behind him, or drops in the way.

The king's officer, or the bailiff of the lord within whose jurisdiction such *waifs* or *waif* goods were left (having by grant, or prescription, the franchise of *waif*) may seize the goods to his lord's use; except the owner come with fresh suit after the felon, and sue an appeal of robbery within a year and a day, or give in evidence against him, and he be attainted.—In which cases, the owner shall have his goods again.

Waifs, things lost, and estrays, are said to be *pecus vagrans*, and are *nullius in bonis ubi non apparet dominus*. And therefore they belong to the lord of the franchise where they are found; who must cause them to be cried, and published in the markets, and churches near about: else the year and

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day does not run to the prejudice of him that lost them.—Though *waif* be properly spoken of things stolen, yet it may also be understood of goods not stolen.—As, if a man be pursued with hue and cry, as a felon, and he flies, and leaves his own goods; these shall be forfeited as goods stolen: and they are properly called *fugitive goods*.

WAIN. See the article **CHARLES'S WAIN**.

WAINSCOT, in building, the timber-work serving to line the walls of a room; being usually made in pannels, and painted, to serve in lieu of hangings.

Even in halls, it is common to have *wainscot* breast high; by reason of the natural humidity of walls.

Some joiners put charcoal behind the pannels of the *wainscot*, to prevent the sweat of stone and brick-walls from ungluing the joints of the pannels.—Others use wool for the same purpose.—But neither the one nor the other is sufficient in some houses: the only sure way, is, by priming over the back-sides of the joints with white lead, or Spanish brown, and linseed oil.

According to Neve, *wainscotting* with Norway oak, the workman finding stuff, is valued at six or seven shillings per yard square.—Plain square *wainscotting*, the workman finding deal, is valued at three shillings, or three shillings sixpence per yard.—Large bisection *wainscotting*, with Dantzick stuff, is valued at six or seven shillings per yard; and ordinary bisection work, at three shillings sixpence per yard. In taking dimensions, they use a string, which they press into all the mouldings; it being a rule that they are to be paid for all where the plane goes.

WAIVE, in law, a woman that is put out of the protection of the law.

She is called *waive*, as being forsaken of the law: and not *outlaw*, as a man is; by reason women cannot be of the decenna, and are not sworn in leets to the king, nor to the law, as men are; who therefore are within the law: whereas women are not; and so cannot be outlawed, since they never were within it.

In this sense we meet with *waviaria mulieris*, as of the same import with *utlagatio viri*.

WAKE of a ship, is the smooth water a-stern, when she is under sail.

By this, a guess may be made of the speed she makes.

They also judge from this, whether the ship goes as she looks; that is, whether she makes her way right a-head, as she lies; as the doth when her *wake* is right a-stern: but if this *wake* be a point or two to leeward, they judge that she falls to the leeward of her course.

When, in a ship's staying the is so quick, that she does not fall to leeward upon a tack, but that when tacked, her *wake* is to the leeward, they say, *She stays to the weather of her wake*; which is a sign she feels her helm well, and is nimble of steerage.

Also, when one ship, giving chase to another, is got as far into the wind as she, and falls directly after her, they say, *She is got into her wake*.

WAKEFULNESS, or **WATCHING**, *insomnia*. See **WATCHING**.

WAKES*, **VIGILS**, or **COUNTRY-WAKES**, are certain anti-anniversary feasts, in several parishes; wherein the people were to be awake at the several vigils, or hours to go to prayer.

* The word is formed from the Saxon, *Wæcce*, *vigilia*, *excubie*, watch.

They are usually observed, in the country, on the Sunday next before the saint's day to whom the parish-church is dedicated.

Cowel defines them by *vigils*, in the dedications of churches, where men sat drinking in the choir all night.

WALDENSES. See the article **VAUDOIS**.

WALKERS, a sort of forest officers, appointed by the king to walk about a certain space of ground, committed to their care, and inspection.

Walkers, are the same with what we otherwise call *foresters*. See **FORESTER**.

WALKS, in gardening. See the article **ALLEYS**.

To keep the weeds from growing upon *walks*, Mr Switzer directs, that the bottoms thereof be filled with lime-rubbish, or coarse gravel, flint stones, or other rocky stuff, eight or ten inches deep; over which may be laid a like depth of gravel, not too fine.

To keep them the drier, they are to be made rounding, or convex.—The usual proportion is, that a *walk* 20 feet wide,

be four inches higher in the middle, than at the sides; a *walk* 25 feet wide, 5 inches, &c.

After laying a *walk*, it is to be rolled, both lengthwise and cross-wise; and to lay it the firmer, it must have three or four water-rollings; that is, it must be so often rolled when it rains to very fall, that the *walk* swims with water; which, when dry weather comes, will make the gravel bind as hard as terrace.

To make the gravel bind the better, some mix a little lime with it; but this being apt to stick to the heels of the shoes in wet weather, others grind or pound sea-shells, and lay a thin coat thereof on the gravel; which being rolled, incorporates with the gravel, and hinders its hanging to the shoes.

—Others beat smiths cinders to dust, and others bricks; strewing the dust on the *walks*, which dries up the moisture, and gives them a good colour.

Gravel-WALK.

Ring-WALK, among hunters. } See { GRAVEL.

Terrace-WALK. } See { RING-WALK.

WALKING-Fire. See the article *Ignis FATUUS*.

WALL, in architecture, &c. a work of stone, brick, or the like; making the principal part of a building; as serving both to inclose it, and to support the roof, floors, &c. See BUILDING, HOUSE, &c.

Walls, though built very thick and strong, and their foundations laid deep, yet, if carried on freight in a line, are inclined to lean, or fall; and such as are built crooked, though thin and weak, are much more lasting.—A wall raised over a river, on arches of pillars, stands as firm as others, whose foundation is entire.

Hence it appears, that a wall built much thinner than usual, by only having at every 20 feet's distance an angle set out about two feet, or more, in proportion to the height of the wall; or by having at the like distance, a column, or pillar erected along with it, fix or eight inches on each side, over and above the thickness of the rest of the wall: such wall will be much stronger, than if five times the quantity of materials were used in a direct wall.

Walls are distinguished into divers kinds, from the matter whereof they consist; as *plastered*, or *mud-walls*, *brick-walls*, *stone-walls*, *flint* or *boulder-walls*, and *board-walls*.—In all which these general rules are to be regarded.

1°. That they be built exactly perpendicular to the ground-work.

2°. That the massiest and heaviest materials be the lowest; as being fitter to bear, than be born.

3°. That the walls, as they rise, diminish proportionally in thickness, for ease both of weight and expence.

4°. That certain courses, or ledges, of more strength than the rest, be interlaid, like bones, to strengthen the whole fabric.

Mud and Plastered-WALLS, are chiefly used in ordinary timber-buildings.—These walls, being quartered and lathed between the timber, or sometimes lathed over all, are plastered over again with white mortar.

Brick-WALLS, are the most usual among us.—In these, particular care is to be taken about the laying of the bricks, viz. That in summer they be laid as wet, and in winter as dry as possible; to make them bind the better with the mortar: that in summer, as fast as they are laid, they be covered up, to prevent the mortar, &c. from drying too fast; and that in winter they be covered well, to protect them from rain, snow, and frost, which are all enemies to the mortar: that they be laid joint on joint in the middle of walls, as seldom as may be; but, good bond made there, as well as on the out-sides.—Care is likewise to be taken, that the angles be firmly bound: in order to which, in working up the walls of a building, it is not advisable to raise any wall above three feet high, before the next adjoining wall be wrought up to it; that good bond may be made in the progress of the work.

Lastly, in building a house in the city of London, the walls are to be of such thicknesses, as are enjoined by the act of parliament for rebuilding that city.

Flint, or Boulder-WALLS, are frequently used in divers parts for fence-walls, a-round courts, gardens, &c. and even for walls of out-houses.—Sir Henry Wotton observes, that the building of walls of flint, was a thing utterly unknown to the antients; who observing in that material a kind of metallic nature, at least a fusibility, reserved it for nobler uses. These walls are usually raised by a right and left-handed man, who have a hod of mortar poured down on the work, which they part betwixt them; each spreading it towards himself, and so they lay in the flints.—The mortar for this work is to be very stiff.

Angle of a WALL.

Coping of a WALL.

Plinth of a WALL.

Scenography of WALLS.

Painting on WALLS.

ANGLE.

COPING.

PLINTH.

SCENOGRAPHY.

PAINTING.

Party-WALLS.

Pitts WALL.

Fence-WALLS.

} See the article { PARTITION.

} See the article { FENCE.

WALL, in fortification, &c. See the article RAMPART. WALL, in gardening, &c.—The position, matter, and form of walls, for fruit-trees, are found to have a great influence on the fruit: though authors differ as to the preference.

The reverend Mr Lawrence directs, that the walls of a garden be not built directly to face the four cardinal points, but rather between them, viz. south-east, south-west, north-east, and north-west: in which the two former will be good enough for the best fruit, and the two latter for plums, cherries, and baking pears.

Mr Langford, and some others, propose garden-walls to consist chiefly of semicircles; each about six or eight yards in front, and including two trees; and between every two semicircles, a space of two feet of plain wall.—By such a provision every part of a wall will enjoy an equal share of the sun, one time with another; beside, that the warmth will be increased, by the collecting and reflecting of the rays in the semicircles; and the trees within will be screened from injurious winds.

As to the materials of walls for fruit-trees, brick, according to Mr Switzer, is the best; as being the warmest and kindest for the ripening of fruit, and affording the best convenience for nailing.

Mr Lawrence, however, asserts, on his own experience, that mud-walls, made of earth and straw tempered together, are better for the ripening of fruit, than either brick or stone walls: he adds, that the coping of straw laid on such walls, is of great advantage to the fruits, in sheltering them from perpendicular blights, rains, &c. This answers all the purposes of the late invention of placing tiles horizontally to hang over from the tops of the walls.

M. Fatio, in a particular treatise on the subject, instead of the common perpendicular walls, proposes to have the walls built sloping, or reclining from the sun; that what is planted against them, may be more exposed to his perpendicular rays; which must contribute greatly to the ripening of fruit in our cold climate.

The angle of reclamation, is to be that of the latitude of the place; that, when the sun is in the meridian at the equinoxes, his rays may strike just perpendicularly.

Yet some others prefer perpendicular walls, and even inclining ones, or such as hang forwards to the sun; as such receive the sun's rays perpendicularly when he is low; as in spring and autumn, or in the evening and morning: which they imagine of more service, than the greatest heats of the sun at midsummer, upon reclining walls.

Add, that in autumn the sun is most wanted to ripen winter pears; in order to which, they should be kept dry, which against sloping walls cannot be; the dews, &c. lying much longer thereon, than on those that are perpendicular.

One great advantage, however, of M. Fatio's sloping walls, is that fruit-trees, as vine, &c. being planted against them, melon glasses may be set on the fruit; which will much forward their ripening.

Sea-WALLS.

WALL-Trees.

Planting WALL fruit-trees

} See the article { DIKE.

} See the article { TREE.

} See the article { PLANTING.

WALLOON, or WALLOON, a kind of old French; being the language spoke by the Walloons, or the inhabitants of a considerable part of the French and Austrian Low-Countries, viz. those of Artois, Hainault, Namur, Luxemburg, and part of Flanders and Brabant.

The Walloon is held to be the language of the antient Gauls, or Celts.

The Romans having subdued several provinces in Gaul, established prætors, or proconsuls, &c. to administer justice in the Latin tongue. On this occasion, the natives were brought to apply themselves to learn the language of their conquerors; and thus they introduced abundance of the Roman words and phrases into their own tongue.

Of this mixture of Gaulish and Latin, was formed a new language, called *Romani*; in contradistinction to the antient unadulterated Gaulish, which was called *Walon*, or *Walloon*. This distinction is kept up to this day; for the inhabitants of several of the low-country provinces say, that in France they speak Romans; whereas they speak the *Walloon*, which comes much nearer the simplicity of the antient Gaulish.

WANDASS. See the article WINDASS.

WANDERING Stars. See the article PLANET.

WANLASS, in hunting.—Driving the *wanlass*, is the driving of deer to a stand, that the lord may have a shoot: which is one of the customary services of fiefs.

WAPENTAKE, or WEAPENTAKE, a division of certain northern counties, particularly those beyond the Trent, answering to what in other places is called a *hundred*, or a *cantred*.

Authors differ as to the origin of the word.—Brompton brings

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brings it from the Saxon *waspen*, and *tascan*, to deliver, by reason the tenants antiently delivered their arms to every new lord as a token of their homage.

Sir Thomas Smith gives a different account.—Musters, he observes, were antiently taken of the armour and weapons of the several inhabitants of every hundred; and from such as could not find sufficient pledges for their good abearing, their *weapons* were taken away, and delivered to others. Others give a different account of its rise, *viz.* That when first the kingdom was divided into *wapentakes*; he who was the chief of the division, and whom we now call *high-constable*, as soon as he entered upon his office, appeared in the field, on a certain day, on horse-back, with a pike in his hand; and all the chief men of the hundred met him with their lances; who alighting, touched his pike with their lances, as a signal they were firmly united to each other, by the touching their weapons.—Whence the denomination *wapentake* from the Saxon *waspen*, and *tac*, touching.

WAR, *Bellum*, a contest, or difference between princes, states, or large bodies of people; which not being determinable by the ordinary measures of justice and equity, is referred to the decision of the sword.

Hobbes's great principle is, that the natural state of man, is a state of *warfare*; but most other politicians hold *war* to be a preternatural, and extraordinary state.

Civil, or *Intestine WAR*, is that between subjects of the same realm; or between parties in the same state.

In this sense, we say, the *civil wars* of the Romans destroyed the republic: the *civil wars* of Granada ruined the power of the Moors in Spain: the *civil wars* in England begun in 1641, and ended in the king's death, 1648.

King's WAR, *Bellum regis*.—At the time when particular lords were allowed to make *war* with one another, to revenge injuries, instead of prosecuting them in the ordinary courts of justice; the appellation *king's war* was given to such war as the king declared against any other prince, or state: on which occasion, the lords were not allowed to make private *war* against each other; as being obliged to serve the king, with all their vassals.

Religious WAR, is a *war* maintained in a state, on account of religion; one of the parties refusing to tolerate the other.

Holy WAR, is that antiently maintained by leagues and croifades, for the recovery of the holy land.

Art of WAR. See the article *MILITARY ART*.

Council of WAR, is an assembly of great officers, called by a general or commander, to deliberate with him on enterprises, and attempts to be made.

On some occasions, *council of war* is also understood of an assembly of officers, sitting in judgment on delinquent soldiers, deserters, coward-officers, &c.

Habitments of WAR. } See the article { **HABILLIMENT.**
Man of WAR. } **SHIP, RATE, &c.**
Officers of WAR. } **OFFICERS.**

Place of WAR, is a place fortified, on purpose to cover and defend a country, and stop the incursion of an enemy's army: or, it is a place wherein are disposed the provisions of *war*, for an army incamped in the neighbourhood; or whither an army retires into winter quarters.

WARBLING of the wings, in falconry, is when a hawk, after having mantled herself, crosses her wings over her back.

WARD, *WARDA*, *custody* or *keeping*. See *GUARD*.
WARD, is a word used in our law-books, in divers significations.—Thus, a *ward*, in London is a part of the city, committed to the special charge of one of the aldermen of the city. There are 26 *wards* in London, which are as hundreds, and the parishes thereof as towns.

A forest is also divided into *wards*; so also are most of our hospitals.

A prison is sometimes also called a *ward*.
The heir of the king's tenant, who held by knights-service, or in capite, was also called a *ward*, during his non-age.—But this sort of wardship is taken away by the statute, 12 Car. II. cap. 24. See *WARDS*.

Castle WARD. See the article *CASTLE*.

WARD, *WARDA*, or *WARDAGIUM*, is also used in our antient writers, for the custody of a town or castle, which the tenants and inhabitants were bound to keep at their own charge.

WARDA Ecclesiasticum, denotes the guardianship of churches; which is in the king during vacancies, by reason of the regalia, or temporalities.

WARDAGE, *WARDAGIUM*, is sometimes used in our antient law-writers, in the same sense with *wardpenny*. See *WARDPENNY*.

Sometimes it also seems to denote a being free from wardship.
WARDECORNE, among our antient writers, a duty incumbent on the tenants, to guard the castle, by founding a horn upon the approach of an enemy; called also *corneage*.

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WARDEN, *Guardian*, one who has the charge, or keeping of any person, or thing, by office.

Such is the *warden of the fleet*, who is the keeper of the fleet prison; and has the charge of the prisoners there; especially such as are committed from the court of chancery for contempt.

Such also are, the *warden of the fellowships*, *warden of the marshes*, *wardens of peace*, *warden of the welf marches*, *warden of the forest*, *warden of the alnage*, *warden of the king's wardrobe*, &c.

WARDEN, in an university, is the head of a college; answering to what in other colleges we call the *master* thereof.

WARDEN, or *Lord WARDEN of the cinque-ports*, is the governor of those noted havens; who has the authority of an admiral, and sends out writs in his own name. See *CINQUE-PORTS*.

WARDEN of the mint, is an officer, whose business to receive the gold and silver bullion brought in by the merchants; to pay them for it, and oversee the other officers.—He is also called *keeper of the exchange*, and *mint*.

Church WARDENS. } See the article { **CHURCH.**
Renter-WARDEN. } **RENTER.**

WARDER.—*Yeomen warders of the Tower*, are officers, forty in number, who are accounted the king's domestic servants, and are sworn by the lord chamberlain: their duty is, to attend prisoners of state, and to wait at the gates. Ten of them are usually upon the day's wait, to take an account of all persons who come into the tower; to enter their names, and the names of the persons they go to, in a book, to be perused by the constable or lieutenant.

WARDFOEH, or *WARDFEGH*, the value of a ward, or heir under age; or the money paid to the lord of the fee, for his redemption.

WARD-HOOK, in gunnery, a rod, or staff, with an iron end, turned serpent-wise, or like a screw, to draw the wads or ockam out of a gun, when it is to be unloaded.

WARDMOTE, in London, is a court so called, which is kept in every ward of the city; answering to the *curia comitatus*, in antient Rome.

WARD-PENNY, *WARDPENI*, was formerly a customary due, paid to the sheriff, or other officer, for maintaining watch and ward.

It was payable at the feast of S. Martin; and is still paid within the manor of Sutton Colfield in Warwickshire; and that with some very singular ceremonies.

WARDROBE, a closet, or little room adjoining to a bed-chamber; serving to dispose and keep a person's apparel in; or for a servant to lodge in, to be at hand to wait, &c.

WARDROBE, in a prince's court, is an apartment wherein his robes, wearing apparel, and other necessities, are preserved; under the care and direction of proper officers.

His majesty has a great *wardrobe*, a *removing wardrobe*, and divers *standing wardrobes*, belonging to his bed-chamber, in each of his places, *viz.* at Whitehall, Kensington, Windsor, Hampton-Court, and the Tower; each under its respective keeper.

The *removing wardrobe* always attends on the king's person; as also on ambassadors, at christenings, masques, plays, &c.—It is under the command of the lord chamberlain: the under-officers are, a yeoman, two grooms, and three pages.

The *great wardrobe* is of great antiquity.—Antiently it was kept near puddle-wharf, in a house purchased for that purpose, by king Edward III. but after the fire of London, it was kept in York-buildings.

The master or keeper thereof, is an officer of great dignity: high privileges were conferred on him by Hen. VI. and king James I. enlarged the same, and erected the office into a corporation.

The officers are, the *master* or keeper, his *deputy*, and his *clerk*; besides several under-officers; and above sixty tradesmen, all sworn servants to the king.

This office is to provide for coronations, marriages, and funerals of the royal family; to furnish the court with beds, hangings, carpets, &c. to furnish houses for ambassadors, at their first arrival here; presents for foreign princes and ambassadors; furniture for the lord lieutenant of Ireland, and our ambassadors abroad; robes for the knights and officers of the garter, heralds, pursuivants, ministers of state, liveries for the officers of the bed-chamber, and other servants; liveries for the lord chief justices, and barons of the Exchequer; and other officers in those courts: as also yeomen, warders, trumpets, kettle-drums, messengers, coachmen, grooms, &c. with coaches, harnesses, saddles, &c. The watermen, game-keepers; linen and lace for the king's person; tilts, &c. for his barges, &c.

WARDS, a court first erected by king Henry VIII. and after augmented by him with the office of liveries: but now absolutely taken away and abolished, by a statute made 12 Car. II. cap. 24.

WARD-

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WARD-STAFF, the constable or watchman's staff.

The manor of Lambourn in Essex, is held by service of the *ward-staff*, viz. by the carrying a load of straw in a cart with six horses, two ropes, and two men in harness, to watch the said *ward-staff*, when it is brought to the town of Abridge, &c. Camd. tit. Essex.

WARD-WIFE *, is defined by Fleta, as signifying a being exempted from the duty of watching—Others rather take it for a duty paid towards the charge thereof.

* The word is compounded of the Saxon *ward*, *vigilia*, watch; and *wife*, mulct.

WARECTUM, in antient writings, signifies land that has lain long neglected, and untilld.

In antient records, we meet with *tempus warecti*, for the time wherein land lies fallow, or else the season of fallowing.

WARREN. See the article **WARREN**.

WARMTH. See the article **HEAT**.

WARN, in law, to summon a person to appear in a court of justice.

WARNING-Wheel, in a clock, is the third or fourth, according to its distance from the first wheel. See **CLOCK**.

WARP, in the manufactures, is the threads, whether of silk, wool, linen, hemp, cotton, or the like, that are extended, lengthwise on the weaver's loom; and across which the workman, by means of his shuttle, passes the threads of the woof, to form a cloth, ribband, fustian, or other matter.

For a woollen stuff, &c. to have the necessary qualities, it is required, that the threads of the *warp* be of the same kind of wool, and of the same fineness throughout; that they be sized with flanders or parchment size, well prepared; and that they be in sufficient number, with regard to the breadth of the stuff to be wrought. See **WOOF**, **CLOTH**, &c.

To **WARP a ship**, is to hale her to a place, when the wind is wanting, by means of a hawser, a cable, and an anchor fixed thereto.

WARPENI. See the article **WARDPENNY**.

WARRANT, an act, instrument, or obligation, whereby a person authorizes another to do something, which he had not otherwise a right to do.

WARRANT of Attorney, is that whereby a man appoints another to do something in his name, and warrants his action. It seems to differ from a *letter of attorney*, which passes under hand and seal of him that makes it, before credible witnesses; whereas *warrant of attorney*, in personal, mixed, and some real actions, is put in of course by the attorneys for the plaintiffs, or defendants.

Though a *warrant of attorney*, to suffer a common recovery by the tenant, or vouchee, is to be acknowledged before such persons as the commission for the doing thereof directs.

In the court of common pleas, there is a *clerk of the warrants*, who enters all *warrants of attorney* for plaintiff, and defendant.

WARRANTIZANDUM. See the article **SUMMONS** ad *Warrantizandum*.

WARRANTO. See the article *Quo Warranto*.

WARRANTY, **WARRANTIA**, a promise, or covenant, by deed, made by the bargainer for himself and his heirs, to *warrant* and secure the bargainee and his heirs, against all men, for enjoying the thing agreed on between them.

Such *warranty* passes from the seller to the buyer; from the feoffee to the feoffee; from him that releases, to him that is released from an action real.—The form of it is thus: *Et ego vero prefatus A. & heredes mei predestilas quinque acres terre cum pertinentiis suis prefato B. hereditibus & assignatis suis contra omnes gentes warrantizabimus in perpetuum, per presentes.*

Note, under *heredes*, heirs, are comprized all such as the first *warranter's* lands come to, whether by descent, purchase, or the like.

Warranty is either *real*, or *personal*.—*Real*, when it is annexed to lands and tenements granted for life, &c. which, again is either in *deed*, or in *law*.

Personal, either respects the property of the thing sold, or the quality of it.

Real warranty, again, in respect of the estate, is either *lineal*, *collateral*, or *commencing by disfranchisement*.

WARRANTIA Charta, a writ that lies for a person who is infeoffed in lands and tenements, with clause of *warranty*; and is implied in an assize, or writ of entry, wherein he cannot vouch, or call to *warranty*. See **VOUCER**.

WARRANTIA Diet, a writ which lies in case where a man having a day assigned personally to appear in court to an action wherein he is sued, is, in the mean time, by commandment, employed in the king's service; so that he cannot come at the day assigned.—It is directed to the justices, ordering them not to find or record him in default.

WARREN, **WARENNA**, a franchise, or place privileged, either by prescription, or grant from the king, to keep beasts

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and fowl of *warren* in; as rabbits, hares, partridges, pheasants, &c.

By a statute 21 Edw. III. a *warren* may lie open, and there is no need of closing it in; as there is of a park.

If any person be found an offender in any such *free warren*, he is punishable for the same at common law.

Beasts of **WARREN**. See the article **BEASTS**.

WART, *Verruca*, a little round, hard excrescence, arising on the flesh, like a pea.

Warts are more frequent on the hands than any other part.—There are divers sorts: the most usual are called *porraceæ*; as having heads like leeks, and consisting of little threads, resembling the roots thereof.

Another sort is called *myrmecia*, this is a little round, calous eminence on the hands of young children; rising suddenly, and disappearing again.

A third sort is the *acrochordon*. See **ACROCHORDON**. Some physicians also rank the corns growing on the toes under the class of *warts*: these the Latins call *clavi*; because occasioning shooting pains, as if one were pricked with the point of a nail.

Warts, if only rooted in the cutis, are easily taken away; but if they arise from the tendons underneath, there is scarce any extirpating them without great danger.—The juices of chelidon majus, or efula, or dens leonis, or tithymal, frequently applied, are said to take off *warts*.

Borelli commends water wherein fal armoniac has been dissolved: which Dr Mapletost, late professor of physic at Gresham-College, makes no scruple to say, is the only sure remedy he knows of in all medicine.

WASHING. See the articles **ABLUTION**, **LOTION**, &c.

Washing the feet, was a common piece of civility among the Jews, practised in regard to strangers, visitors, &c. at their arrival.

Washing the feet of twelve poor people, is an anniversary ceremony, to be performed both by the kings of England and France; in commemoration of our Saviour's *washing* the feet of his apostles.

Arnobius, *adv. Gentes*, Lib. VII. mentions a feast in use among the antients, called *lavatio matris deum*, the *washing* of the mother of the gods, held on the 30th of March.

Washing one's hands. See the article **HAND**.

Washing of a ship, in the sea language, is when all the guns are brought to one side; and the men, getting upon the yards, *wash* her other side, and scrape her as far as they can reach.

WASHING, in painting, is when a design drawn with a pen, or crayon, has some one colour laid over it with a pencil; as Indian ink, bistre, or the like; to make it appear the more natural, by adding the shadows of prominences, apertures, &c. and by imitating the particular matters, whereof the thing is supposed to consist.

Thus, they *wash* with a pale red, to imitate brick and tile; with a pale Indian blue, to imitate water and slate; with green, for trees and meadows; with taffron or French berries, for gold and brags; and with several colours, for marbles.

These *washes* are usually given in equal teints, or degrees, throughout; which are afterwards brought down, and softened over the lights with fair water, and strengthened with deeper colours for the shadows.

WASHINGS, or **WASHES**, among goldsmiths, coiners, &c. are the lotions whereby they recover the particles of gold and silver out of the sweep, i. e. ashes, earths, sweepings, &c.

This is either performed by simply *washing* them again, and again, or by putting them in the *washing* mill.

To make one of these *washes*, they not only gather together the ashes of the furnaces, and sweepings of the work-houses; but they also break and pound the old earthen crucibles, and the very bricks whereof the furnaces are built; little particles of gold, &c. being found to stick to them, by the flying off natural to those metals, when in their last degree of heat.

These matters being well ground, and mixed together, are put in large wooden basons, where they are *washed* several times, and in several waters, which run off, by inclination, into troughs underneath; carrying with them the earth, and the insensible particles of the metals, and only leaving behind them the larger and more considerable ones, which are visible to the eye, and are finally taken out with the hand without more trouble.

To get out the finer parts, gone off with the earth, they use quicksilver, and a *washing* mill.—This mill consists of a large wooden trough, at bottom of which are two metalline parts, serving as mill-stones; the lower being convex, and the upper, which is in form of a cross, concave.

At the top is a winch, placed horizontally, which turns the upper piece round; and at bottom is a bung, to let out the water and earth, when sufficiently ground.

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To have a *wash*, then, the trough is filled with common water; into which they cast thirty or forty pounds of quicksilver, and two or three gallons of the matter remaining from the first lotion. — Then turning the winch, they give motion to the upper mill-stone, which grinding the matter and the quicksilver violently together, the particles of gold and silver become the more easily amalgamated therewith: This work they continue for two hours; when opening the bung, the water and earths run out, and a fresh quantity is put in.

The earths are usually passed thus through the mill three times; and the same quantity of mercury usually serves all the three times. — When there is nothing left in the mill but the mercury, united with the gold and silver which it has amalgamated, they take it out, and *washing* it in divers waters, they put it in a ticken bag, and lay it in a press, to squeeze out the water, and the loose quicksilver: the remaining quicksilver they evaporate by fire, in a retort, or an alembick. And the metal which remains, they refine with lead, or part it with aqua fortis.

WASSAILE, or **WASSEL**, a festival song, sung heretofore from door to door, about the time of Epiphany. See **WASSEL-Bowl**.

WASSEL-Bowl, or **WESTEL-Bowl**, was a large cup or bowl of silver or wood, wherein the Saxons, at their public entertainments, drank a health to one another, in the phrase *was-beal*; that is, *health be to you*.

This *wassel-bowl*, seems plainly to be meant by the word *vasellum*, in the lives of the abbots of S. Albans, by Matt. Paris; where he saith, *abbas solus prandebat supremus in refectorio habens vasellum*: "He had set by him the *wassel-bowl* to drink a health to the fraternity; or the poculum charitatis."

And hence the custom of going a *wasseling*, still used in Suffex, and some other places, seems to have taken its name.

WAST, or **WASTE**, *Vastum*, in law, has divers significations. — 1^o. It is used for a spoil, made either in houses, woods, lands, &c. by the tenants for life, or for years, to the prejudice of the heir, or of him in reversion, or remainder. — Upon this, the writ of *waste* is brought for recovery of the thing *wasted*, and treble damages.

WASTE of the forest, is, properly, where a man cuts down his own woods within the forest, without license of the king, or lord-chief-justice in eyre.

WASTE, is also taken for those lands which are not in any man's occupation; but lie common.

They seem to be so called, because the lord cannot make such profit of them as of his other lands; by reason of the use others have thereof, for passing to and fro. — Upon this none may build, cut down trees, dig, &c. without the lord's license.

Year Day and WASTE. See **YEAR Day and Waste**.

WASTE of a ship, is that part of her between the main-mast, and the fore-mast.

WASTE-BOARDS, are boards sometimes set upon the side of a boat, or other vessel, to keep the sea from breaking into her.

WATCH, *Guet*, a person posted as a spy in any place, to have an eye thereto, and to give notice of what passes.

WATCH, is also used for a *corps de garde* posted at any passage; or for a company of guards who go on the patrol. — Some officers are exempted from *watch*, and guard.

In the same sense they say, *night-watch*, *guet de nuit*: *watch-word*, *mot de guet*: *royal-watch*, and *city-watch*.

Chevalier de guet, is a name given by the French, to the officer who commands the *royal-watch*, &c.

WATCH, at sea, signifies a measure, or space of four hours; because half the ship's crew *watch*, and do duty in their turns so long at a time.

The ship's company is divided into two parts, the *larboard-watch*, and the *starboard-watch*. — The master of the ship commands the latter, and the chief mate the former.

Sometimes, when a ship is in harbour, they *watch* but a *quarter-watch*, as they call it; that is, but a quarter of the company *watch* at a time.

The *watch-glass*, being four hours, is used at sea to shift or change their *watches*. — There are also *half-watch* hour-glasses; minute and half-minute glasses; by which last they count the knots when they heave the log, in order to find the ship's way.

Death-WATCH. See the article **DEATH**.

WATCH, is also used for a small portable movement, or machine, for the measuring of time; having its motion regulated by a spiral spring.

Watches, strictly taken, are all such movements as shew the parts of time; as clocks are such as publish it, by striking on a bell, &c. But, commonly, the name *watch* is appropriated to such as are carried in the pocket; and *clock* to the large movements, whether they strike the hour, or not.

Spring, or **Pendulum WATCHES**, stand pretty much on the same principle with pendulum clocks; whence their denomi-

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nation. — If a pendulum, describing little arches of a circle, make vibrations of unequal lengths, in equal times; it is by reason it describes the greater with a greater velocity. For the same reason, a spring put in motion, and making greater or less vibrations, as it is more or less stiff, and as it has a greater or less degree of motion given it, performs them nearly in equal times. — Hence, as the vibrations of the pendulum had been applied to large clocks, to rectify the inequality of their motions; so, to correct the unequal motions of the balance of *watches*, a spring is added; by the isochronism of whose vibrations, the correction is to be effected.

The spring is usually wound into a spiral; that, in the little compass allotted it, it may be as long as possible; and may have strength enough, not to be matted and dragged about, by the inequalities of the balance it is to regulate.

The vibrations of the two parts, *viz.* the spring and balance, should be of the same length; only so adjusted, as that the spring, being the more regular in the length of its vibrations than the balance, may, on occasion, communicate its regularity thereto.

The invention of *spring*, or *pocket-watches*, is owing to the present age. — It is true, we find mention made of a *watch* presented to Charles V. in the history of that prince: but this, in all probability, was no more than a kind of clock to be set on a table; some resemblance whereof, we have still remaining in the ancient pieces made before the year 1670. In effect, it is between Dr Hooke, and M. Huygens, that the glory of this excellent invention lies: but to which of them it properly belongs, is greatly disputed; the English ascribing it to the former; and the French, Dutch, &c. to the latter.

Mr Derham, in his *Artificial Clockmaker*, says roundly, that Dr Hooke was the inventor; and adds, that he contrived various ways of regulation. — One way was with a loadstone. — Another with a tender straight spring, one end whereof played backwards and forwards with the balance; so that the balance was to the spring, as a bob to a pendulum; and the spring as the rod thereof. — A third method was with two balances, of which there were divers sorts; some having a spiral spring to the balance for a regulator, and others without.

But the way that prevailed, and which continues in mode, was with one balance, and one spring running round the upper part of the verge thereof. Though this has a disadvantage, which those with two springs, &c. were free from; in that a sudden jerk, or confused shake, will alter its vibrations, and put it in an unusual hurry.

The time of these inventions was about the year 1658; as appears, among other evidences, from an inscription on one of the double balance *watches*, presented to king Charles II. *viz.* Rob. Hooke Inven 1658. T. Tompion fecit, 1675. The invention presently got into reputation, both at home and abroad; and two of them were sent for by the dauphin of France.

Soon after this, M. Huygens's *watch* with a spiral spring got abroad, and made a great noise in England, as if the longitude could be found by it. — It is certain, however, that his invention was later than the year 1673, when his book *de Horol. Oscillat.* was published; wherein he has not one word of this, though he has of several other contrivances in the same way.

One of these the lord Brouncker sent for out of France, where M. Huygens had got a patent for them. — This *watch* agreed with Dr Hooke's, in the application of the spring to the balance; only M. Huygens's had a longer spiral spring, and the pulses and beats were much slower. The balance instead of turning regularly round, as Dr Hooke's, turns several rounds every vibration.

Mr Derham suggests, that he has reason to doubt M. Huygens's fancy first was set to work, by some intelligence he might have of Dr Hooke's invention, from Mr Oldenburg, or some other of his correspondents in England. tho' Mr Oldenburg vindicates himself against that charge, in *Philosophical Transactions*, N^o 118, and 129.

Huygens invented divers other kinds of *watches*, some of them without any string or chain at all; which he called, particularly, *pendulum watches*.

As it was in England that *watches* had their first rise; so it is there, too, they have arrived at their greatest perfection. — Witness that exceeding value put on an English *watch* in all foreign countries, and that vast demand made for them.

M. Savary, in his *Diction. de commerce*, pretends to match the French *watchmakers* against the English. — He asserts, "That if the English be in any condition to dispute it with them, they owe it entirely to the great number of French workmen, who took shelter here upon the revocation of the edict of Nantz." He adds, "That three fourths of the *watches* made in England, are the work of Frenchmen." — From what authorities he says this, we know not:

not: but it need not be told Englishmen that it is false; there not being one French name, that we know of, among all our famed watchmakers: nor, in the body of watchmakers, is there one eighth part French.

It is certain the French people prefer our watches vastly to their own; inasmuch, that to have them with the more ease, a number of English workmen were invited over in 1719, and established with great countenance at Versailles, under the direction of the famous Mr Law. — But the establishment, though every thing promised well for it, and the French watch and clockmakers seemed undone by it, fell to the ground in less than a year's time. — M. Savary imputes its fall, intirely, to that strong prejudice of the French people, in behalf of the English workmen, and to the knowing that the watches did not come from England. But the truth is, the workmen sent over being most of them men of loose characters, grew dissolute, quarrelled with the priests, insulted the magistrates, and were dismissed, of necessity.

Striking-WATCHES, are such, as besides the proper watch-part, for measuring of time, have a clock-part, for striking the hours, &c.

These are real clocks; only moved by a spring instead of a weight — Properly speaking, they are called *pocket-clocks*.

Repeating WATCHES, are such as by pulling a string, &c. repeat the hour, quarter, or minute, at any time of the day or night.

This repetition was the invention of Mr Barlow, and was first put in practice by him in larger movements, or clocks, about the year 1676. — The contrivance freighted for the other artists to work, who soon contrived divers ways of effecting the same. — But its application to pocket-watches, was not known before king James the second's reign; when the ingenious inventor abovementioned, having directed Mr Thompson to make a repeating watch, was soliciting a patent for the same.

The talk of a patent engaged Mr Quare to resume the thoughts of a like contrivance, which he had had in view some years before: he now effected it; and being pressed to endeavour to prevent Mr Barlow's patent, a watch of each kind was produced before the king and council; upon trial of which, the preference was given to Mr Quare's.

The difference between them was, that Barlow's was made to repeat, by pushing in two pieces on each side the watch-box; one of which repeated the hour, and the other the quarter: whereas Quare's was made to repeat by a pin that stuck out near the pendant; which being thrust in, (as now it is done by thrusting in the pendant itself) repeated both the hour and quarter with the same thrust.

WATCHING, WAKEFULNESS, insomnia, among physicians, denotes a disorder whereby a person is disabled from going to sleep.

It is occasioned by a continual and excessive motion of the animal spirits in the organs of the body, whereby those organs are prepared to receive, readily, any impressions from external objects, which they propagate to the brain; and turnish the soul with divers occasions of thinking.

This extraordinary flux of spirits may have two causes: for, 1°. The sensible objects may strike the organ with too much force. In which case, the animal spirits being violently agitated, and those agitations continued by the nerves to the brain, they give a like motion to the brain itself; the necessary consequence of which is, that the animal must wake. Thus, a loud shriek, pains, head-ach, gripes, coughing, &c. cause waking. — Add, that the mind's being oppressed with cares, or deeply engaged in thinking, contributes to the same: since, as it acts by the ministry of the spirits, any cares or meditations that keep those in motion, must produce watchfulness. — Of this kind are those inveterate wakings of melancholic persons; some of whom have been known to pass three or four weeks without a wink of sleep.

2°. The other cause is in the spirits themselves; which have some extraordinary disposition to receive motion, or to persist in it: as, from their too great heat, or that of the brain in fevers, &c. — Hence it is, that the disorder is most frequent in summer, in the heat of youth, &c.

Long fasting has the same effect; the want of food subtilizing the spirits, and drying the brain. — The same is likewise an ordinary symptom in old age, by reason the pores of the brain, and the nerves, having been much widened by the continual passage of spirits, for a great number of years, the spirits now pass and repass through them with too much ease; and need not any extraordinary motion to keep the mind awake.

There are instances of peoples waking for forty-five nights successively: and we even read of a melancholy person, who never slept once in fourteen months. — Such wakings usually degenerate into mania.

WATCH-WORK, is that part of the movement of a clock or watch, which is designed to measure, and exhibit the time on a dial-plate; in contradistinction to that part which contributes to the striking of the hour, &c. which is called *clock-work*.

The several members of the watch-part, are, 1°. The *balance*, consisting of the *rim*, which is its circular part; and the *verges*, which is its spindle; to which belong the two *pallets* or *leaves*, that play in the teeth of the crown-wheel.

2°. The *potence*, or *potance*, which is the strong stud in pocket-watches, whereon the lower pivot of the verge plays, and in the middle of which, one pivot of the balance-wheel plays; the bottom of the potance is called the *foot*, the middle part the *nose*, and the upper part the *shoulder*.

3°. The *cock*, which is the piece covering the balance.

4°. The *regulator*, or *pendulum spring*, which is the small spring in the new pocket-watches, underneath the balance. See **REGULATOR**.

5°. The *pendulum*; whose parts are, the *verge*, *pallets*, *cocks*, and the *bob*.

6°. The *wheels*, which are the *crown-wheel*, in pocket-pieces, and *swing-wheel* in pendulums; serving to drive the balance or pendulum.

7°. The *contrate wheel*, which is that next the crown-wheel, &c. and whose teeth and hoop lie contrary to those of other wheels; whence the name.

8°. The *great*, or *first wheel*, which is that the fusee, &c. immediately drives: after which are the *second wheel*, *third wheel*, &c.

Lastly, between the frame and dial-plate, are the *pinion of report*, which is that fixed on the arbor of the great wheel; and serves to drive the *dial-wheel*, as that serves to carry the hand.

Theory, and Calculation of WATCH-WORK. — Preliminaries necessary to the calculating of the watch-part of a movement, are laid down under the articles **BEATS, MOVEMENT, and CLOCKWORK**; see also **TURN**.

Preliminary rules, common to the calculation of all movements, the clock as well as the watch-parts; see under the article **MOVEMENT**. — Particular rules for the *striking part*; see under the article **CLOCKWORK**. — Those for the *watch-part* we have from the Rev. Mr Derham, as follow.

1°. The same motion, it is evident, may be performed either by one wheel, and one pinion, or many wheels, and many pinions; provided the number of turns of all the wheels bear the proportion to all the pinions, which that one wheel bears to its pinion: or, which is the same thing, if the number, produced by multiplying all the wheels together, be to the number produced by multiplying all the pinions together, as that one wheel, to that one pinion. — Thus suppose you had occasion for a wheel of 1440 teeth, with a pinion of 28 leaves; you may make it into three wheels of 36, 8, and 5, and three pinions of 4, 7, and 1. For the three wheels, 36, 8, and 5, multiplied together, give 1440 for the wheels; and the three pinions 4, 7, and 1, multiplied together, give 28 for the pinions. — Add, that it matters not in what order the wheels and pinions are set, or which pinion runs in which wheel; only for convenience-sake, the biggest numbers are commonly put to drive the rest.

2°. Two wheels, and pinions of different numbers, may perform the same motion — Thus, a wheel of 36, drives a pinion of 4, the same as a wheel of 45, a pinion of 5; or a wheel of 90, a pinion of 10. — The turns of each being 9.

3°. If in breaking the train into parcels, any of the quotients should not be liked; or if any other two numbers to be multiplied together, are desired to be varied; it may be done by this rule. — Divide the two numbers, by any other two numbers which will measure them; multiply the quotients by the alternate divisors; the product of these two last numbers found, will be equal to the product of the two numbers first given — Thus, if you would vary 36 times 8, divide these by any two numbers which will evenly measure them: so, 36 by 4, gives 9; and 8 by 1, gives 8: now, by the rule, 9 times 1 is 9, and 8 times 4, 32; so that for 36 x 8, you have 32 x 9; each equal to 288. If you divide 36 by 6, and 8 by 2, and multiply as before, you have 24 x 12 = 36 x 8 = 288.

4°. If a wheel and pinion fall out with cross numbers, too big to be cut in wheels, and yet not to be altered by these rules; in seeking for the pinion of report, find two numbers of the same, or a near proportion, by this rule: as either of the two given numbers, is to the other, so is 360, to a fourth. Divide that fourth number, as also 360, by 4, 5, 6, 8, 9, 10, 12, 15, (each of which numbers exactly measures 360) or by any of those numbers that bring a quotient nearest an integer. — As suppose you had 147 for the wheel, and 170 for the pinion; which are too great to be cut into small wheels, and yet cannot be reduced into less, as having no other common measure but unity: say, as 170: 147:: 360: 311. Or, as 147: 170:: 360: 416. Divide the fourth number, and 360 by one of the foregoing numbers; as 311, and 360 by 6, it gives 52 and 60; divide them by 8, you have 39, and 45: and, if you divide 360 and 416, by 8, you have 45 and 52 exactly. Wherefore, instead of the two numbers 147, and 170, you may take 52, and 60; or 39 and 45; or 45 and 52, &c.

5°. To come to practice in calculating a piece of *watch-work*, first pitch on the train or beats of the balance in an hour; as, whether a swift one, of about 20000 beats, (the usual train of a common 30 hour *ocket-watch*) or a slower, of about 16000, (the train of the new pendulum *ocket-watches*) or any other train.—Next, resolve on the number of turns the fufy is intended to have, and the number of hours the piece is to go: fuppofe, *e. gr.* 12 turns, and to go 30 hours, or 192 hours, (*i. e.* 8 days) &c. Proceed now to find the beats of the balance or pendulum in one turn of the fufy, by the direction given under the word BEATS.—Thus in numbers; 12 : 16 :: 20000 : 26666. Wherefore, 26666 are the beats in one turn of the fufy, or great wheel, and are equal to the quotients of all the wheels into the balance multiplied together.—Now this number is to be broken into a convenient parcel of quotients; which is to be done thus: first, halve the number of beats, *viz.* 26666, and you have 13333; then pitch on the number of the crown-wheel, fuppofe 17 : divide 13333 by 17, and you have 784 for the quotient (or turns) of the reft of the wheels and pinions; which being too big for one or two quotients, may be beft broken into three.—Chufe therefore three numbers; which, when multiplied all together continually, will come neareft 784: as fuppofe 10, 9, and 9, multiplied continually, gives 810, which is fomewhat too much; therefore try again other numbers, 11, 9, and 8: thefe drawn one into another continually, produce 792; which is as near as can be, and is a convenient quotient.—Having thus contrived the piece from the great wheel to the balance; but the numbers not falling out exactly, as you first propofed, correct the work thus: first, (by the direction given under the word BEATS) multiply 792, the product of all the quotients pitched upon, by 17, (the notches of the crown-wheel, the product is 13464, which is half the number of beats in one turn of the fufy; then (by a rule given under the word BEATS) find the true number of beats in an hour.—Thus, 16 : 12 :: 13464 : 10098; which is half the beats in an hour.—Then find what quotient is to be laid upon the pinion of report, (by the rule given under that word)—Thus, 16 : 12 :: 12 : 9, the quotient of the pinion of report.—Having thus found your quotients, it is eafy to determine what numbers the pinions fhall have; for, chufing what numbers the wheels fhall have, and multiplying the pinions by their quotients, the produce is the number for the wheels.

—Thus, the number of the pinion of report is 4, and its quotient is 9; therefore the number for the dial-wheel muft be 4×9 , or 36: fo the next pinion being 5, its quotient 11, therefore the great wheel muft be $5 \times 11 = 55$; and fo of the reft.

Such is the method of calculating the numbers of a 16 hour *watch*.—Which *watch* may be made to go longer, by leffening the train, and altering the pinion of report.—Suppofe you would conveniently flacken the train to 16000; then, by the rule given under the word BEATS, fay, As $\frac{1}{2}$ 16000, or 8000 : 13464 :: 12 : 20. So that this *watch* will go 20 hours.—Then for the pinion of report, fay, (by the rule given under that word) As 20 : 12 :: 12 : 7. So that 7 is the quotient of the pinion of report. And as to the numbers, the operation is the fame as before; only the dial-wheel is but 28, for its quotient is altered to 7.

—If you would give numbers to a *watch* of about 10000 beats in an hour, to have 12 turns of the fufy, to go 170 hours, and 17 notches in the crown-wheel: the work is the fame, in a manner, as in the laft example; and confequently thus: As 12 : 170 :: 10000 : 141666, which fourth number is the beats in one turn of the fufy; its half, 70833, being divided by 17, gives 4167 for the quotients: and becaufe this number is too big for three quotients, therefore chufe four, as 10, 8, 8, 6 $\frac{1}{2}$; whole product into 17 makes 71808, nearly equal to half the true beats in one turn of the fufy.—Then fay, As 170 : 12 :: 71808 : 5069, which is half the true train of your *watch*.—And again, 170 : 12 :: 12 : $\frac{17}{4}$, which exprefles the pinion of report, and the number of the dial-wheel.—But thefe numbers being too big to be cut in fmall wheels, they muft be varied by the fourth rule, above, thus:

As 144 : 170 :: 360 : 425;
Or 170 : 144 :: 360 : 305.

Then dividing 360, and either of thefe two fourth proportionals, (as directed by the rule;) fuppofe by 15, you will have $\frac{24}{5}$, or $\frac{305}{3}$; then the numbers of the whole movement will ftand as in the margin.

Such is the calculation of ordinary *watches*, to fhew the hour of the day: in fuch as fhew minutes, and feconds, the procefs is thus.

1°. Having refolved on the beats in an hour; by dividing the defigned train by 60, find the beats in a minute; and

accordingly, find proper numbers for the crown-wheel, and quotients, fo as that the minute-wheel fhall go round once in an hour, and the fecond wheel once in a minute.

Suppofe, *e. gr.* you fhall chufe a pendulum of fix inches to go eight days, with 16 turns of the fufy; a pendulum of 6 inches vibrates 9368 in an hour; and confequently, dividing it by 60, gives 156, the beats in a minute. Half thefe fums are 4684, and 78. Now, the first work is to break this 78 into a good proportion, which will fall into one quotient, and the crown-wheel. Let the crown-wheel have 15 notches, then 78, divided by 15, gives 5; fo a crown-wheel of 15, and a wheel and pinion, whole quotient is 5, will go round in a minute to carry a hand to fhew feconds.—For a hand to go round in an hour to fhew minutes; becaufe there are 60 minutes in an hour, it is but breaking 60 into good quotients; (fuppofe 10 and 6, or 8 and $7\frac{1}{2}$ &c.) and it is done.—Thus, 4684 is broken, as near as can be, into proper numbers.—But fince it does not fall out exactly into the above-mentioned numbers, you muft correct, as before directed) and find the true number of beats in an hour, by multiplying 15 by 5, which makes 75; and 75 by 60, makes 4500, which is half the true train.—Then find the beats in one turn of the fufy; thus, 16 : 192 :: 4500 : 54000; which left is half the beats in one turn of the fufy.

—This 54000 being divided by 4500, (the true numbers already pitched on) the quotient will be 12; which not being too big for a fingle quotient, needs not be divided into more; and the work will ftand as in the margin.—As to the hour-hand, the great wheel, which performs only one revolution in 12 turns of the minute-wheel, will fhew the hour; or it may be done by the minute-wheel.

WATER, Aqua, in phyfics, a fimple, fluid, and liquid body; reputed the third of the four vulgar elements.

Sir Ifaac Newton defines *water* to be a fluid falt, volatile, and void of tafte: but this definition Boerhaave fetts afide; inafmuch as *water* is a menftrum, or diffolvent of falts and faline bodies, which does not agree with the notion of its being a falt itfelf; for we do not know of any falt that diffolves another.

Whether water be originally fluid?—Though *water* be defined a *fluid*, it is a point controverted among philofophers, whether fluidity be its natural ftate, or the effect of violence: we fometimes find it appear in a fluid, and fometimes in a folid form; and as the former in our warmer climate is the more ufual, we conclude it the proper one, and afcribe the other to the extraneous action of cold.—Boerhaave, however, afferts the contrary, and maintains *water* to be naturally of the cryftalline kind; fince, wherever a certain degree of fire is wanting to keep it in fufion, it readily grows into a hard glebe, under the denomination of *ice*.

Mr Boyle is much of the fame opinion.—Ice, he obferves, is commonly reputed to be *water* brought into a preternatural ftate by cold: but, with regard to the nature of things, and fetting afide our arbitrary ideas, it might as juftly be faid, That *water* is ice preternaturally thawed by heat.—If it be urged that ice, left to itfelf, will, upon the removal of the freezing agents, return to *water*; it may be answered, that, not to mention the fnow and ice which lie all fummer long on the Alps, and other high mountains, even in the torrid zone, we have been affured, that, in fome parts of Siberia, the furface of the ground continues more months of the year frozen by the natural temperature of the climate, than thawed by the heat of the fun; and a little below the furface of the ground, the *water* which chances to be lodged in the cavities there, continues in a ftate of ice all the year round: fo that when, in the heat of fummer, the fields are covered with corn, if you dig a foot or two deep, you fhall find ice, and a frozen foil.

No pure water in all nature.—*Water*, if it could be had alone, and pure, Boerhaave argues, would have all the requifites of an element, and be as fimple as fire; but there is no expedient hitherto difcovered for procuring it fo pure.—*Rain-water*, which feems the pureft of all thofe we know of, is replete with infinite exhalations of all kinds, which it imbibes from the air: fo that if filtered and diffilled a thoufand times, there ftill remain feces.—Further, the *rain-water* gathered from the roofs of houfes, is a lixivium of the falt of tytes, flate, or the like; impregnated with the dung, and feces of the animals, birds, &c. depofited thereon; and the exhalations of numerous other things.—Add, that all the *rain-water* gathered in cities, muft at leaft be fatuated with the fmoke of a thoufand chimneys, and the various effluvia of numbers of perfons, &c.—Befide this, there is fire contained in all *water*; as appears from its fluidity, which is owing to fire alone. See FIRE.

As what is in the air neceffarily mixes itfelf with *water*, it

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hence appears impossible to have such a thing as pure *water*.—If you percolate it through sand, or squeeze it through pumice, or pass it through any other body of the like kind, you will always have salt remaining. —Nor can distillation render it pure; since it leaves air therein, which necessarily abounds in corpules of all sorts.

The purest of all *waters* we can any way arrive at, is that distilled from snow, gathered in a clear, still, pinching night, in some very high place; taking none but just the outer or superficial part thereof. —By a number of repeated distillations, the greatest part of the earth, and other feces, may be separated from this: and this is what we must be contented to call *pure water*.

Mr Boyle, indeed, relates, that a friend of his, by distilling a quantity of *water* an hundred times, found, at length; that he had got six tenths of the first quantity in earth: Whence he concludes, that the whole *water*, by further prosecuting the operation, might be converted into earth. See EARTH.

But it should be considered, that *water* cannot be removed, or poured into a vessel, without mixing some dust therewith; neither can the luting of the vessel be so close, that it can be distilled, without losing something every time. —Boerhaave, therefore, rather concludes, that the *water* thus often distilled, might acquire still new earth from the dust floating in the air, and the instruments employed in the operation; and lose, in proportion, by getting out at the junctures of the vessels.

That author assures us, that after distilling some very pure *water*, by a gentle fire, the space of four months, it appeared perfectly pure; and yet, leaving it to rest in vessels exactly closed, it would conceive a slender kind of weedy matter, somewhat like the stamina of plants, or the little tufts of a mucilage: yet Schottus saw *water*, in Kircher's museum, that had been kept in a vessel, hermetically sealed, upwards of fifty years; yet still remained clear and pure, and stood to the same height in the vessel as at first, without the least sign of sediment.

Boerhaave adds, that he is convinced no body ever saw a drop of pure *water*; that the utmost of its purity known, only amounts to its being free from this or that sort of matter: and that it can never, for instance, be quite deprived of salt; since air will always accompany it, and air always contains salts.

Water in all places and bodies.—*Water* seems to be diffused every where, and to be present in all space where there is matter. —Not a body in all nature but will yield *water*: It is even asserted, that fire itself is not without *water*. —A single grain of the most fiery salt, which in a moment's time will penetrate through a man's hand, readily imbibes half its weight of *water*; and melts, even in the driest air imaginable. —Thus, salt of tartar, placed near the hottest fire, will attract or imbibe *water*; and, by that means, increase considerably its weight, in a small time: so, in the driest summer's day, a power vessel with ice in it, brought up from some cold subterraneous place, into the hottest room, will immediately be covered over with little drops of *water*, gathered from the contiguous air, and condensed by the coldness of the ice.

It is surprising to consider the plenteous stock of *water* which even dry bodies afford. —Oil of vitriol, being exposed a long time to a violent fire, to separate all the *water*, as much as possible, from the same; will, afterwards, by only standing a few minutes in the air, contract fresh *water* so fast, as soon to afford it as plenteously as at first. —Hartthorn, kept forty years, and turned as hard and dry as any metal; so that if struck against a flint, it will yield sparks of fire; yet, being put into a glass vessel, and distilled, will afford one eighth part of its quantity of *water*. —Bones dead and dried twenty-five years, and thus become almost as hard as iron; yet, by distillation, have afforded half their weight of *water*. —And the hardest stones, ground and distilled, do always discover a portion thereof.

Eels, by distillation, yielded Mr Boyle some oil, spirit, and volatile salt, besides the caput mortuum; yet all these were so disproportionate to the *water*, that they seemed to have been nothing but that coagulated: the same strangely abounds in vipers, though they are esteemed very hot in operation; and will, in a convenient air, survive, for some days, the loss of their heads and hearts. —Human blood itself, as spirituous and elaborate a liquor as it is reputed, so abounds in *water*, that out of seven ounces and an half, the same author, by distillation, drew near six ounces of phlegm; before ever any of the other principles began to rise.

Whether water be the common matter of all bodies? —From considerations somewhat of this kind, Thales, and some other philosophers, have been led to hold, that all things were made of *water*: which opinion, probably, had its rise from the writings of Moses, where he speaks of the spirit of God moving upon the face of the *waters*. —But Mr Boyle does not conceive the *water* here mentioned by Moses as the universal matter, to be our elementary *water*: we need only sup-

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pose it an agitated congeries of a great variety of seminal principles, and of other corpuscles fit to be subdued and fashioned by them; and it may yet be a body fluid like *water*, in case the corpuscles it was made up of were, by their creator, made small enough, and put into such an actual motion, as might make them roll, and glide easily over one another.

—However, Basil, Valentine, Paracelsus, Van Helmont, Sendivogius, and others, have maintained the same principle, viz. that *water* is the elemental matter, or flamen of all things, and suffices alone for the production of all the visible creation. —Thus Sir Isaac Newton, "All birds, beasts, and fishes, insects, trees, and vegetables, with their several parts, do grow out of *water*, and watery tinctures, and salts; and, by putrefaction, they all return again to watery substances."

Helmont endeavours to prove this doctrine from an experiment; wherein, burning a quantity of earth, till all the oil was consumed, and then mixing it up with *water*, to draw out all the salt; and putting this earth, thus prepared, into an earthen pot, which nothing but rain-*water* could enter; a willow, planted therein, grew up to a considerable height and bulk, without any sensible diminution of the earth: whence he concluded, that the *water* was the only nutriment of the vegetable kind, as vegetables are of the animal. —The same thing is inferred by Mr Boyle, from a parallel experiment: and the whole is countenanced by Sir Isaac Newton, who observes, that *water*, standing a few days in the open air, yields a tincture; which, like that of malt, by standing longer, yields a sediment, and a spirit; but before putrefaction, is fit nourishment for animals and vegetables.

But Dr Woodward endeavours to shew the whole a mistake: *water* containing extraneous corpuscles, some of these, he shews, are the proper matter of nutrition; the *water* being still found to afford so much the less nourishment, the more it is purified by distillation. —Thus, a plant in distilled *water* will not grow so fast as in *water* not distilled; and if the *water* be distilled three or four times over, the plant will scarce grow at all, or receive any nourishment from it. So that *water*, as such, does not seem the proper nutriment of vegetables; but only the vehicle thereof, which contains the nutritious particles, and carries them along with it, through all the parts of the plant.

Hence, a *water-plant*, e. gr. the common *water cress*, brought up in a vessel of *water*, will be found to contain the more salt and oil, the muddier the *water* is: in effect, *water* nourishes the less, the more it is purged of its sapaceous salts; in its pure state, it may suffice to extend or swell the parts, but it thus affords no new vegetable matter.

Helmont, however, carries his system still further, and imagines, that all bodies may be re-converted into *water*. —His alkahest, he affirms, adequately resolves plants, animals, and minerals, into one liquor, or more, according to their several internal differences of parts: and the alkahest, being abstracted from these liquors, in the same weight, and with the same virtues as when it dissolved them, the liquors may, by frequent cohobations from chalk, or some other proper matter, be totally deprived of their seminal endowments, and return at last to their first matter, which is insipid *water*.

Thus much is confessed, that mixed bodies do all resolve by fire, into phlegm or *water*, oil, spirit, salt, and earth; each of which principles is found, at least, to contain *water*.

Spirits, for instance, cannot be better represented, than by spirit of wine; which, of all others, seems freest from *water*: yet, Helmont affirms, it may be so united with *water*, as to become *water* itself. —He adds, that it is materially *water*; only under a sulphurous disguise. —According to him, in making Paracelsus's balsamum-famech, which is nothing but sal tartari dulcified, by distilling spirit of wine from it, till the salt be sufficiently saturated with its sulphur, and till it suffers the liquor to be drawn off, as strong as it was poured on; when the salt of tartar, from which it is distilled, hath retained, or deprived it of the sulphurous parts of the spirit of wine, the rest, which is incomparably the greatest part of the liquor, will turn to phlegm. In effect, corrosive spirits, according to Mr Boyle's observation, abound in *water*; which may be observed, by entangling, and so fixing their saline parts, as to make them corrode some proper body; or else by mortifying them with some contrary salt: which will turn them into phlegm.

And as to salts; salt of tartar well calcined, being laid to liquify in the air, will deposit an earth; and if it be then committed to distillation, will yield a considerable quantity of insipid *water*; inasmuch, that if it be urged with a vehement fire, the salt will almost all vanish, and nothing saline remain, either in the *water*, or the earth. —Whence Helmont concludes, that all salts might be converted into *water*. Add, that sea-salt, recovered from its own acid spirit, and oil of tartar, resolves into *water*, as much as oil of tartar.

Lastly, oils run, in great measure, into *water*; and it is probable, might be converted wholly into the same. See OIL, SULPHUR, &c.

No standard for the weight and purity of water.—*Water* scarce ever continues two moments exactly of the same weight, by reason of the air and fire contained therein. Thus, a piece of pure limped ice, laid in a nice balance, never continues in equilibrio.—In effect, the expansion of *water* in boiling, shews what effect the different degree of fire has, on the gravity of *water*.—This makes it difficult to fix the specific gravity of *water*, in order to settle its degree of purity; but this we may say in the general, that the purest *water* we can procure, is that which is 880 times as heavy as air.—However, neither have we any tolerable standard in air; for *water* being so much heavier than air, the more *water* is contained in the air, the heavier of course must the air be: as, in effect, the principal part of the weight of the atmosphere seems to arise from the *water* in it.

Properties and effects of *water*.—1°. *Water* is found the most penetrative of all bodies, after fire, and the most difficult to confine; so that a vessel through which *water* cannot pass, may retain any thing. Nor is it any objection, that syrups and oils will sometimes pass through bodies which will hold *water*; this not being owing to the greater subtilty and penetration of their particles, but to the resin, wherewith the wood of such vessels abounds, to which oils and syrups are as menstruums; so that dissolving the resin, they make their way through the spaces left thereby: whereas *water*, not acting on resins, is retained in them.

And yet, *water* gradually makes its way, even through all woods, and is only retainable in glass and metals; nay, it was found by experiment at Florence, that when shut up in a spherical vessel of gold, and then pressed with a great force, it made its way through the pores even of the gold: so that the most solid body in nature, is permeable to *water* under certain circumstances.

Water is even found more fluid than air; a body being reputed more fluid than another, when its parts will find way through smaller pores: now air, it is known, will not pass through leather, as is evident in the case of an exhausted receiver covered therewith; whereas *water* passes with ease.—Again, air may be retained in a bladder, but *water* oozes through. In effect, it is found, that *water* will pass through pores ten times smaller than air will.

It must not be omitted, however, that M. Homberg accounts for this passage of *water* through the narrow pores of animal substances which will not admit the air, on another principle, *viz.* its moistening and dissolving the glutinous matter of the fine fibres of the membranes, and rendering them more pliable and diffractile; which are things that the air, for want of a wetting property, cannot do.—As a proof of this doctrine, he filled a bladder, and compressed it with a stone, and found no air to come out; but placing the bladder thus compressed in *water*, the air easily escaped. *Hist. de l'Acad. An. 1700. p. 45.*

2°. *Water*, then, may even hence, *viz.* from its penetrative power, be argued to enter the composition of all bodies, both vegetable, animal, and fossil; with this peculiar circumstance, that it is easily, and with a gentle heat, separable again from bodies it had united with: which cannot be said of any other body.—Fire, indeed, will penetrate more than *water*; but it is difficult to procure it again from the bodies, it is once fixed in, as is evident in red lead, &c.

This property of *water*, joined with its smoothness and lubricity, fits it to serve as a vehicle for the commodious and easy conveyance of the nutritious matter of all bodies: being so fluid, and passing and repassing so readily, it never stops up the pores, and leaves room for the following *water*, to bring on a new supply of nutritious matter.

3°. And yet the same *water*, as little cohesive as it is, and as easily separated from most bodies, will cohere firmly with some others, and bind them together into the most solid masses: though it appears wonderful, that *water*, which will be shewn an almost universal dissolvent, should withal be a great coagulator.

Water, we see, mixed up with earth or ashes, gives them the utmost firmness and fixity.—The ashes, *e. gr.* of an animal, incorporated with pure *water* into a paste, and baked with a vehement fire, grow into a coppel; which is a body remarkable for this, that it will bear the utmost effort of a refiner's furnace.—It is, in effect, upon the glutinous nature of *water* alone that our houses stand: for take but this out of wood, and it becomes ashes; or out of tiles, and they become dust.

Thus, a little clay dried in the sun, becomes a powder, which, mixed with *water*, sticks together again, and may be fashioned at pleasure; and this dried again by a gentle fire, or in the sun, and then baked in a potter's oven by an intense fire, becomes little other than a stone.—So the Chinese earth, whereof our porcelain vessels are made, which hold all liquors, and even melted lead itself, is diluted and wrought up with *water*.

To say no more, all the stability and firmness seen in the universe, is owing to *water* alone.—Thus, stone would be

an incoherent sand, did not *water* bind it together; and thus, again, of a fat gravelly earth, wrought up with *water*, and baked or burnt, we make bricks, tiles, and earthen vessels, of such exceeding hardness and closeness, that *water* itself cannot pass through them. And these bodies, though to appearance perfectly dry, and destitute of *water*, yet, being pulverized and put in a retort, and distilled, yield an incredible quantity of *water*.

The same holds of metals; for the parings or filings of lead, tin, antimony, &c. by distillation, yield *water* plentifully; and the hardest stones, sea-salt, nitre, vitriol, sulphur, &c. are found to consist chiefly of *water*, into which they resolve by force of fire.

The lapis calcarius, or lime-stone, being exposed to the fire, affords a prodigious quantity of pure *water*; and the more of this *water* is extracted, the more friable does it become, till at length it commences a dry calx or lime, wherein, in lieu of the *water* so expelled, the fire, in the course of calcination, enters; and this is expelled again, in its turn, by pouring on cold *water*. Yet, the same *water* and calx, tempered together, produce a mass, scarce inferior, in point of solidity, to the primitive lime-stone.

4°. That *water* is not elastic, is evident hence, that it is incompressible, or incapable, by any force, of being reduced into less compass: this easily follows from that famous experiment abovementioned, made by order of the great duke of Tuscany.—The *water*, being incapable of condensation, rather than yield, transfused through the pores of the metal, so that the ball was found wet all over the outside; till at length, making a cleft in the gold, it spun out with great vehemence.—From this last circumstance, indeed, some have weakly concluded it was elastic. For the impetus wherewith the *water* darted forth, was more probably owing to the elasticity of the gold, which communicated that impression to the *water*.

And hence we see the reason why blocks of marble sometimes burst in cold weather; and why a vessel filled with *water*, and afterwards, by any means, reduced to a less compass, the *water* bursts the vessel, though ever so strong.—This is observable in a piece of brass cannon, which being filled with *water*, and the mouth exactly stopped, so as to prevent all egress of *water*; if a cold night happens, sufficient to contract and conflate bodies; the metallic matter undergoing the common fate, and the *water* refusing to give way, the cannon is burst asunder with incredible violence.

Some bring an argument for the elasticity of *water* hence, that hot *water* takes up more room than cold; but no legitimate conclusion can be formed from hence: for in the hot *water*, there is a good quantity of fire contained, which interposing between the particles of the *water*, makes it extend to a greater space, without any expansion of parts from its own elasticity. This is evident hence, that if *water* be once heated, there is no reducing it to its former dimensions, but by letting it cool again: which plainly shews, that the expansion depends not on the elasticity of parts, but on the presence of fire.—*Water*, then, though incapable of compression or condensation, may yet be rarefied by heat, and contracted by cold.

It may be added, that a further degree of cold, that is, such a one as congeals *water*, or turns it into ice, does expand it.—There are many ways to manifest this expansion of *water*, by freezing.—Mr Boyle having poured a proper quantity of *water* into a strong cylindrical earthen vessel, exposed it, uncovered, both to the open air in frosty nights, and the operation of snow and salt; and found, that the ice produced in both cases, reached higher than the *water* did before it was froze. Add, that it has been found, that the rain soaking into marble, and violent frosts coming on, have burst the stones: and even implements made of bell-metal, carefully exposed to the wet, have been broken and spoiled by the *water*; which entering at little cavities of the metal, was there afterwards froze, and expanded into ice.

From the whole we may be enabled to settle something, as to the nature of the component particles of *water*; and, 1°. That they are, as to our senses, infinitely small; whence their penetrative power: 2°. Exceedingly smooth and slippery, void of any sensible asperities; witness their fluidity, and their being so easily separable from other bodies which they adhere to: 3°. Extremely solid: 4°. Perfectly transparent, and as such invisible; which we gather hence, that pure *water*, inclosed in a vessel hermetically sealed, projects no shadow; so that the eye shall not be able to discover whether the vessel have *water* in it or not; and in that the crystals of salts, when the *water* is separated from them, lose their transparency.—5°. Hard, rigid, and inflexible; as appears from their not being compressible.—If it be asked, how a body so light, fluid, and volatile, and which so easily a fire suffices to rarefy, should be so stubborn and incompressible? We see no other cause to assign, but the homogeneity of its parts.—If *water* be considered as consisting of spherical, or cubical particles, hollow withinside, and of a firm

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firm texture; here will be enough to account for the whole: Its firmness and familiarity will make it resist sufficiently; and its vacuity renders it light enough, &c.—And the little contact between spherules, will account for the weakness of its cohesion, &c.

Salt melted in *water*, does not fill the vessel in proportion to its bulk: whence it follows, that there are little spaces between the particles of water, to admit those of the salt.—And hence, again, we gather, that the *watry* particles are extremely solid and inflexible; since, though they have intermediate spaces, no force or weight can compress, or crowd them nearer.

5°. *Water* is the most insipid of all bodies; the taste we sometimes observe therein, arising not from the mere *water*; but from salt, vitriol, or other bodies mixed therewith: and accordingly, all the *lapid waters*, recommended for medicinal uses, are found to deposite a quantity of some of those fossils.

6°. *Water* is perfectly inodorous, or void of the least smell.—*Water*, then, neither affects sight, taste, nor smell, provided it be pure; and consequently it might remain for ever imperceptible to us, but for the sense of feeling.

Whether water be convertible into air?—It has been disputed, whether or no *water* be convertible into air; there being numerous instances of, at least, an apparent transmutation.—In the vapours daily raised, we find *water* rarefied to such a degree, as to take place in the atmosphere, and help to compose a considerable part of what we call air; and even to contribute to many of the effects ascribed to the air.—But such a vapour-air has not the characters of true permanent air, being easily reducible into *water* again. So, in digestions and distillations, though *water* may be rarefied into vapours, yet it is not really changed into air, but only divided by heat, and diffused into very minute parts; which, meeting together, presently return to such *water* as they constituted before.

Yet, *water* rarefied into vapour in an æolipile, will, for a while, have an elastic power, the great and last characteristic of true air, and will stream out perfectly like a blast of air: The elastic power of this stream, is manifestly owing to nothing else but the heat, that expands and agitates the aqueous particles thereof; and when the heat is gone, the elasticity, and other aerial properties disappear likewise.

Rapid winds thus made, seem to be no more than mere *water*, broke into little parts, and put into motion; since, by holding a solid, smooth, and cold body against it, the vapours condensing thereon, will presently cover the body with *water*.—Indeed, though no heat intervenes, motion alone, if vehement, may perhaps suffice to break *water* into minute parts, and make them ascend upwards in form of air.—Mr Boyle observes, that between Lyons and Geneva, where the Rhone is suddenly straitened by two rocks very near each other, that rapid stream, dashing with great impetuosity against them, breaks part of its *water* into minute corpuscles, and gives it such a motion, that a mist may be observed at a considerable distance, arising from the place, and ascending high into the air.

WATER, in geography and hydrography, is a common, or general name applied to all liquid transparent bodies, gliding or flowing on the earth.

In this sense, *water* and earth are said to constitute our terraqueous globe. See **EARTH**.

Some authors have rashly and injuriously taxed the distribution of *water* and earth in our globe as unnatural, and not well proportioned: supposing that the *water* takes up too much room.

An inundation, or overflowing of the *waters*, makes a deluge.

Cataract of WATER. See the article **CATARACT**.

Water is distinguished, with regard to the places where it is found, into *marina*, *sea-water*; *pluvialis*, *rain-water*; *fluviatilis*, *river-water*; *fontana*, *spring-water*; *putealis*, *well-water*; *cisternina*, that of *cisterns*; and *palustris*, that of *lakes*, *marshes*, &c.—which are each more impure, and heterogeneous than other.

Sea-WATER, is an assemblage of bodies, wherein *water* can scarce be said to have the principal part: it is an universal colluvies of all the bodies in nature, sustained and kept swimming in *water*, as a vehicle.

Dr Lister considers it as the fund or source, out of which all bodies arise. He gives, in some measure, into the opinion of Thales, and Van Helmont; and imagines the *sea-water* to have been the only element created at the beginning, before any animal, or vegetable; or even before the sun himself.—*Fresh-water*, he supposes to have rose accidentally after the creation of these, and to owe its origin to the vapours of plants, the breath of animals, and the exhalations raised from the sun. *De Font. Med. Ang.*

Dr Halley is of another opinion.—He takes it for granted, that the saltness of the sea, arises from the saline matter dis-

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solved and imbibed by the rivers in their progress, and discharged with their *waters*, into the ocean; and consequently, that the degree of saltness is continually and gradually increasing.—On this hypothesis, he even proposes a method for determining the age of the world: for two experiments of the degree of saltness, made at a large interval of time, will, by the rule of proportion, give the time wherein it has been acquiring its present degree. *Philos. Transact.* N° 344.

The *water* of the sea is liable to several periodical changes.

See **TIDES**.

High-WATER.

Low-WATER.

Ebb-WATER.

See the articles **FLUX**, **EBB**, &c.

Rain-WATER, is the *water* of the sea, purified by a sort of distillation; or rather, it is the *watery* vehicle, separated from the saline, and other matters residing therein, by evaporation.

The *water*, which descends in rain and snow, is of all others, the purest, in a cold season, and a still sky; and this we must be contented to take for elementary *water*.

The *rain-water*, in summer, or when the atmosphere is in commotion, it is certain, must contain infinite kinds of heterogeneous matter: Thus, gathering the *water* that falls after a thunder-clap, in a sultry summer's day, and letting it settle, a real salt is found sticking at the bottom. But in winter, especially when it freezes, the exhalations are but few, so that the rain falls without much adulteration: and hence, what is thus gathered in the morning-time, is found of good use for taking away spots in the face; and that gathered from snow, against inflammation of the eyes.

Yet this *rain-water*, with all its purity, may be filtered and distilled a thousand times, and it will still leave some feces behind it.

Spring-WATER is the next, in point of purity.—This, according to Dr Halley, is collected from the air itself; which being saturated with *water*, and coming to be condensed by the evening's cold, is driven against the cold tops of the mountains; where, being further condensed and collected, it gleets down, or distils, much as in an alembic.

This *water*, which before floated in the atmosphere, in form of a vapour, being thus brought together, at first forms little streams; several of which meeting together, form rivulets; and these, at length, rivers.

River-WATER, on some occasions; is to be esteemed purer than that of springs.—Indeed if the stream, in descending from its spring, chance to flow over strata, or beds, wherein there is salt, sulphur, vitriol, iron, or the like, it dissolves and imbibes part thereof.—Otherwise, spring-*water* becomes purer and better as it runs; for while the river drives on its *waters* in an uninterrupted stream, all its salts, with the vegetable and animal matters drained into it, either from exhalations, or from the ground it wathes, gradually either sink to the bottom, or are driven to the shore: and hence, the ancient poets and painters represent the deities of springs and rivers, as combing and carding their *waters*.

With regard to the qualities of *water*, it is further distinguished into *salina*, *salt-water*; *dulcis*, *fresh-water*, &c.

Salt-WATER, or **Sea-WATER**. See **SALT**, and **SEA-WATER**.

Fresh-WATER.—It is generally granted, that those *waters*, ceteris paribus, are the best, as well for wholesomeness, as various other oeconomical uses, &c. that are freeest from saltness; which is an adventitious, and, in most cases, a hurtful quality of *waters*.—Mr Boyle, therefore, contrived a very extraordinary method of examining the freshness and saltness of *waters*, by a precipitant, which was a solution of silver, which could discover one part of salt in 1000, may, 2 or 3000 parts of *water*.

The thawed ice of *sea-water* is often used in Amsterdam for brewing; and Bartholine, in his book *De Nivis Usu*, confirms the relation: "It is certain, says he, that if the ice of the *sea-water* be thawed, it loses its saltness; as has been lately tried by a professor in our university."

Uses of WATER.—The uses of *water* are infinite; in food, in medicine, in agriculture, in navigation, in divers of the arts, &c.

As a *food*, it is one of the most universal drinks in the world; and, if we may credit many of our latest and most judicious physicians, one of the best too.—For this use, that which is purest, lightest, most transparent, simple, colourless, void of taste and smell, and which warms and cools fastest, and wherein herbs and pulse-boil and yield their virtues soonest, is best.

Hippocrates, in his treatise *De Aero, Aquis & Locis*, speaks much in behalf of light *water*.—Herodotus relates, that, among the antients, some nations drank a *water* so very light, that all woods readily sunk therein.—And Mr Boyle mentions some *water* brought out of Africa into England, which was specifically lighter than ours, by four ounces in a pint, *i. e.* by one third.

It is esteemed a good quality in *water*, to bear soap, and make

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make a lather therewith.—This our river waters readily do, but the pump and spring-waters are found too hard for it; yet may this be remedied in them, by barely letting them stand for four or five days.

As a medicine, it is found, internally, a powerful febrifuge; and excellent against colds, coughs, the stone, scurvy, &c.

—Externally, its effects are no less considerable. In agriculture, and gardening, water is allowed absolutely necessary to vegetation; whence Varro places it in the number of the divinities he invokes in his first book *de re Rustica*: *Etiā, says he, precor lymphas, quoniam sine aqua omnis misera est agricultura.*

The changes water is liable to, and the different forms it appears under, are very numerous.—Sometimes as ice, then as a vapour, then as a cloud, flower, snow, hail, fog, &c. Many naturalists have even maintained water to be the vegetable matter, or the only proper food of plants; but Dr Woodward has overturned that opinion, and shewn, that the office of water in vegetation, is only to be a vehicle to a terrestrial matter, whereof vegetables are formed; and that it does not itself make any addition to them.—All water, he allows, contains more or less of this terrestrial matter; spring and rain-water near an equal quantity, and river-water more than either of them.

Water is of the utmost use in chymistry; being one of the great instruments by means whereof its operations are all performed.

It acts in various manners and capacities; as a menstruum, a ferment, a putrefacient, a vehicle, a medium, &c.

1°. As a menstruum, it dissolves all kinds of salts.—Air also seems to dissolve salts; but it is only in virtue of the water it contains.—Nor has any other body the power of dissolving salts, further than as it shares in this fluid.

The particles of salts, we have observed, insinuate themselves into the interstices between the particles of water; but when those interstices are once filled, the same water will not any longer dissolve the same salt; but it will then still dissolve a salt of another kind, by reason of the different figure of the particles, which enter and occupy the vacancies left by the former: and thus it will dissolve a third, or fourth salt, &c.

—So, when water has imbibed its fill of common salt, it will still dissolve nitre; and when saturated with nitre, it will still dissolve sal ammoniac, and so on.

Water dissolves all saline bodies, it being the constituent character of this class of bodies, that they are uninflamable, and dissoluble in water.—Hence, water may dissolve all bodies, even the heaviest and most compact, as metals; inasmuch as those are capable of being reduced into a saline form: in which state they may be so intimately dissolved by water, as to be sustained therein.

Water dissolves all saponaceous bodies, i.e. all alkalious salts and oils blended together: though oil itself be not dissoluble in water, the admixture of salt herewith, rendering it saline, brings it under the power of water.

Now, all the humours in the human body are apparently saline, though none of them are salt itself; and the same may be said of the juices of all vegetables, excepting their oils; and accordingly, they all dissolve in water.

Water dissolves glass itself.—This being melted with salt of tartar, becomes soluble in water.

It dissolves all gums, and gummy bodies; it being a characteristic of a gum, that it dissolves in water; in contradiction from a resin.

Further, water mixed with alkali salts, dissolves oil and oily bodies.—Thus, though mere water poured on greasy wool, be repelled thereby; yet a strong lixivium, or alkali salt being mixed with the water, it readily dissolves and absorbs all that was greasy and oleaginous: and thus it is that woollen cloths are usually scoured.

But, water does not dissolve resins; as we conceive a resin to be no other than an inspissated, or concentrated oil.

Oils and sulphurs water leaves untouched; and what is more extraordinary, it repels them; and by repelling, it drives the oily particles into eddies.—Add, that it seems to repel all oleaginous, sulphurous, fatty, and adipose bodies, wherein oil predominates; and hence also it is, that the fatty parts in our bodies escape being dissolved by water.—And it is, in all probability, by this means that fat is collected in the adipose cells of all animals.

Nor does it dissolve terrene or earthy bodies, but rather unites and consolidates them; as we see in tiles; &c. After dissolving a body, the water unites and hardens together with it; and, if the body be of the saline kind, forms crystals, and retains the salts in that form.

Salts, while thus joined with water, assume various figures; the crystals of sea-salt, &c. are pyramidal; those of nitre, prismatical; those of sal gemmæ, cubical, &c. But, that water is the cause of these salts being in crystals, is evident hence, that upon separating the water, the crystals are no more; their form is lost, and their transparency ceases.

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2°. Without water, there can no fermentation be raised.—Thus, if you grind a plant into a dust, or farina, it will never ferment; even though you add yeast, or spirit of wine thereto: but water being poured on it, the fermentation readily arises.

3°. All putrefactions, both of animal and vegetable bodies, are likewise performed by means of water alone; and without it, there could be no such effect in all nature.

4°. Water is indispensibly required to effervescence; which is an intestine motion arising between contrary salts; for no such motion can arise from a mixture of contrary salts, unless there be water to dissolve and keep them in solution.

5°. A farther use is in the making separations of oily from saline parts, which is a thing of the last service: thus, any oleaginous substance, incorporated with salt, being shook sometimes in a proper quantity of water, the salts dissolving, will be extracted from the oil, and imbibed by the water: and thus is the body dulcified.—So butter, by a continued lotion in fair water, becomes insipid; and aromatic oils, agitated a long time in warm water, lay aside their saline spirituous parts, and become inert, and inodorous.

Spirit of wine, mixed with oil, makes one body, therewith; but if you pour water thereon, it will repel the oil, and draw all the spirit to itself: nay, frequently, what the spirit had dissolved in other bodies, water will separate from them, by diluting the spirit, and letting the other matters precipitate.

6°. Water is of great service in directing and determining the degree of fire, or heat.—This was first discovered by M. Amontons, from an observation, that water over the fire grows gradually more and more hot, till it comes to boil; but then ceases to increase, and only maintains its present degree of heat, even though the fire were ever so much enlarged, or were continued ever so long.—This, therefore, affords a standard, or fixed degree of heat all over the world; boiling water, provided it be equally pure, being of the same heat in Greenland, as under the equator.

By means hereof, they make baths of divers degrees of heat, accommodated to the various occasions.

Water is of the utmost use in divers of the mechanical arts, and occasions of life; as, in the motion of mills, and other machines.—And the laws, properties, &c. of this fluid with respect thereto; as its motion, gravitation, pressure, elevation, action, &c. And the construction of divers engines subservient thereto, or founded thereon; as siphons, pumps, &c. make the subject of hydraulics, and hydrostatics.

The quantity of water on this side our globe, Dr Cheyne suspects to be daily decreasing; “some part thereof being continually turned into animal, vegetable, metalline, or mineral substances; which are not easily dissolved again into their component parts.—Thus, if you separate a few particles of any fluid, and fasten them to a solid body, keep them asunder one from another, they are no fluid; to produce fluidity, a considerable number of such particles together is required.”

Most of the fluids or liquids we know of, are formed by the cohesion of particles of different figures, magnitudes, gravities, and attractive powers, swimming in pure water, or an aqueous fluid; which seems to be the common basis of all.—Wine is only water impregnated with particles of grapes; and beer with particles of barley: all spirits seem to be nothing but water, saturated with saline or sulphurous particles: and all liquids are more or less fluid, according to the greater or smaller cohesion of the particles, which swim in the aqueous fluid.—And there is hardly any fluid without this cohesion of particles: not even pure water itself; as is apparent from the bubbles which sometimes will stand on its surface, as well as on that of spirits, and other liquors.” *Philosoph. Princip. of Relig.*

Ascent of WATER. See ASCENT, and CAPILLARY.

WATER-Bearer.	See the article	AQUARIUS.
WATER-Column.		COLUMN.
WATER-Clock.		CLEPSYDRA.
WATER-Level.		LEVEL.
WATER-Machine.		MACHINE.
WATER-Microscope.		MICROSCOPE.
WATER-Mill.		MILL.
WATER-Organ.		ORGAN.
WATER-Spout.		SPOUT.

WATER, in natural history, &c. is distinguished into pure, called also elemental; mineral; and artificial, or factitious.

As to the pure, we have already observed, that there is, perhaps,

haps, none absolutely so; all water being found to contain more or less particles, such as those in terrestrial bodies; not earthy particles, we mean, but oils, salts, &c.

Mineral Waters, are those which contain such, and so many particles of different natures from water, as thence to derive some notable property beyond what common water has: or, *mineral waters* are those which have contracted some virtue extraordinary, by passing through beds of minerals, as allum, vitriol, sulphur, &c. or by receiving the fumes thereof.

The kinds of *mineral waters* are various, as are the kinds of compositions of the minerals they are impregnated withal. See Fossils.

Some are *simple*, as only containing mineral particles of one sort; others *mixed*, of two, three, four, or more sorts.

Hence, we have, 1°. *Metallic waters*, in different parts; as *golden, silver, copper, tin, leaden, and iron waters*.

2°. *Saline waters*, viz. nitrous, aluminous, vitriolate, and those of common salt.

3°. *Bituminous, sulphureous, antimonial, carbonaceous, and amber waters*.

4°. *Earthy and stony waters*, viz. lime, chalk, ocher, cinabar, marble, and alabaster waters.

To which some add *mercurial waters*.

This division of *mineral waters*, is taken from their essences; that is, from the mineral particles they contain: but the most usual and celebrated division, is borrowed from the manner wherein they affect our senses; with regard to which there are ten kinds; viz. *acid, bitter, hot, cold, oily and fat, poisonous, coloured, boiling, petrifying, incrustating, and saline*.

Acid Waters, called also *acidulae*, arise from the admixture of vitriol, nitre, allum, and salt in them.—These are cold, and are very frequent, there being not reckoned less than 1000 in Germany alone: some of which are said to be four as vinegar, and to be used instead thereof; others vinous, and serving for wine; others astringent, &c.

Hot Waters, called *thermae*, arise from the admixture of sulphurous particles and fumes.—Of these, the hottest is that in Japan, wherein, it is said, no fire can bring water to equal; and which keeps not thence as long as common water boiled.

Oily and Fat Waters, owe their virtues to a bituminous and sulphurous matter; as ambers, petroleum, pitch, naphtha, &c.

Bitter Waters, are produced from an impure sulphur, bitumen, nitre, and sometimes copper.—Such are the lacus asphaltites.

Very cold Waters, have their rise from a mixture of nitre and allum; or of mercury, iron, &c. The depth of the source or spring too may have some effect.

Waters which change the nature of bodies.—Of these there is great variety.

1°. Near Airmagh in Ireland, is a lake, wherein a staff being fixed some months, it is affirmed, that the part which stuck in the mud will be turned into iron; and that part incompassed with the water into bone flint; the rest remaining as before.—Thus Gyradius and Magnus; but Briccius very rightly denies it.

2°. In the northern part of Ulster is said to be a spring, which, in the space of seven years, petrifies wood, or converts it into stone.—The like waters are also said to be found in divers other parts, as in Hungary, Burgundy, &c. And Vitruvius mentions a lake in Cappadocia, which converts wood into stone in one day: but these accounts are not sufficiently attested. See PETRIFICATION.

3°. There are also waters supposed to transmute, or turn iron into copper. See Supplement, article ZIMENT.

4°. Others are said to change the colour of the hair.—Gyradius mentions a spring in Ireland, wherein if a person were washed, he instantly became grey; but this is incredible.

Poisonous Waters, are occasioned by their creeping through arsenical, antimonial, and mercurial earths; or being impregnated by their fumes.—Such are the lacus asphaltites, and divers waters about the Alps, &c. which immediately kill those who drink of them: but these are most or them filled up with stones; which is one reason why so few are known.

Saline Waters, are generated two ways; either they are derived from the sea, by some subterraneous passage; or they are generated from mineral salts, which they meet withal in their passage, ere they arrive at their springs.

Boiling, or Bubbling Waters, are produced either by a current of air, or else by a sulphurous, or a nitrous spirit, mixed with the water in the earth: if it be sulphurous, the water is hot; if nitrous, cold. For all the waters that boil as it hot, are not so, but some few are cold: we read both of *thermae* and *acidulae* that boil.

There are others called *waters* which have very singular properties not reducible to any of these classes: such—1°. is that spring in Portugal, which absorbs all bodies cast into it, though the heaviest: and not far from it, there is said to have

been antiently another, in which no bodies, not the heaviest, could sink.—2°. In Andalusia, we are assured by Euseb. Nierembergensis, there is a lake where turtles approaching storms, by making a terrible roaring, that may be heard 18 or 20 miles distance.—3°. In Granada is said to be a well, whose water dissolves stones.—4°. We read of a spring in Arcadia, which rendered those who drank of it abstemious.—5°. In the island of Chio is said to be a spring, which converts those who drink of it into tools.—6°. There are springs in divers parts of England, Wales, Spain, &c. which ebb and flow daily with the flux and reflux of the seas; and some are even said to ebb and flow against the tide.—Add, 7°. *Stalactical waters*, which form stony icicles from the tops of caverns. See Supplement, articles SPAR, and PETRIFICATION.

Bath-WATER. } See the article { **BATH.**
Spaw-WATER. } **SPAW.**
Petrifying WATER. } **PETRIFYING.**

Interdiction of Fire and WATER. See INTERDICTION.

WATER, in chymistry, by the chymists called more usually *phlegm*; is the fourth of the five chymical principles, and one of the passive ones.

It is never drawn pure, and unmixed; which, Dr Quincy observes, makes it usually a little more detestive than common water.

This principle, probably, contributes much to the growth of bodies, in that it both renders and keeps the active principles fluid; so that they are capable of being conveyed by circulation into the pores of the mixed: and also because it tempers their exorbitant motion, and keeps them together; so that they are not so easily or so soon dissipated.

In all such bodies whose active substances are joined and united pretty closely together; as in common salt, tartar, all plants that are not odoriferous, and in many animal bodies, this principle is the first that comes over in distillation: but when water is mixed with volatile salts, or with spirit of wine, or is in any odoriferous mixture; then the volatile particles will rise and come away first.

WATERS, in medicine, pharmacy, chymistry, &c. called also *artificial, and medicated waters*; are a kind of liquors, procured or prepared by art from divers bodies, principally of the vegetable tribe; having various properties, and serving various purposes.

These waters are either *simple, or compound*.

Simple Waters, are those procured from some one vegetable body.

A *simple water* is not supposed to be the mere water, or phlegm of the body it is drawn from, as is evident from the taste and smell thereof.—The intention of making such water, is to draw out the virtues of the herb, seed, flower, root, or the like, so as it may be more conveniently given in that form, than any other. But the phlegm, or watery part of any medicinal simple, is no better than common water undistilled: so that all those ingredients, which in distillation raise nothing but phlegm, as may be discovered from the scent and taste of what comes over, are not fit for the skill.—On this principle, a great part of the waters retained in the dispensatories, will appear good for nothing, at least not worth distilling.

The means whereby this separation is effected, are either *evaporation, infusion, decoction, or distillation*.—The first is performed by exposing the vegetable in a cold still, to a gentle heat, like that of a summer's sun; and catching the effluvia which exhale from it.

The effect of this operation, is a water, or fluid matter, which is the most volatile, fragrant, and aromatic part of the plant; and that wherein its specific virtue resides.—And thus is it, that the finest aromatic or odoriferous waters of vegetables are to be procured.

The second means, viz. *infusion*, is performed by putting the vegetable in hot rain-water, below the degree of boiling; keeping it to this degree by an equable heat, for the space of half an hour; and then drawing it off.—The only waters procured this way, in much use in the modern practice, are those of frog-spawn, and oak-buds.

The third means, viz. *decoction*, only differs from the second in this, that the water is kept to the degree of boiling.

The fourth means, viz. *distillation*, is performed by infusing the subject in an alembic, with a gentle warmth, for some time; and then increasing the heat, so as to make it boil; and lastly, catching and condensing the steam, or vapour arising therefrom.

This process furnishes what we call the *distilled waters*, of so much use in medicine, &c.—The vegetable subject best fitted for it, are the sapid and odoriferous, or those of the aromatic tribe; a angelica, aniseed, bium, caraway, carduus, camomile, dittany, fennel, hyssop, majorana, mint, roses, rotamary, saffron, sage, scurvy-grass, thyme, cinnamon, citron, juniper, lime, myrtle, orange, peach, &c.

The medicinal virtues of waters prepared after this manner,

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are the same as those of the respective plants, &c. they are drawn from. — Thus, the distilled water of mint is stomachic; that of wormwood, vermifugous, &c.

The materia medica, it may be observed, affords no remedies in this way, but for the intentions either of cordials, emmenagogues, diuretics, or diaphoretics. — Were it practicable to raise a balsamic, cathartic, or opiate in this manner, yet would those properties be much more conveniently brought forth by other processes; so that nothing is to be looked for in a distilled water, but such subtle and light parts of a medicinal simple, as may fall in with the forementioned intentions: indeed, very little comes over under that division, weighty enough to affect even the urinary secretions.

The simple waters, of chief virtue, are the following ones, viz. *Dill-water*, aqua anethi; *angelica-water*, aqua angelicæ; *mint-water*, aqua menthæ; *rosemary-water*, aqua anthos; *orange-flower-water*, aqua naphæ; *black-cherry-water*, aqua cerasor. nig. *parish-water*, aqua petroselinæ; *camomile*, chamom. *penroyal*, pulegii; *fennel-water*, aqua fœniculi; *damask-rose-water*, aqua rosarum dam. *hyssop-water*, aqua hyssopi; *rose-water*, aqua rosæ; *juniper-water*, aqua juniperi bacc. *elder-water*, aqua sambuci flor. *leaves-water*, aqua levisnici; *carminative-water*, aqua carminativa, &c.

It may be here proper to note, that whatever properties any simple has from the grossness or solidity of its parts, which make it act as an emetic, cathartic, or astringent; the residue left after distillation, will remain in full possn in thereof. — Thus the purging syrup of roses, is as well made after the damask-rose water is drawn off, as if the flowers were put into infusion; because nothing of a cathartic quality rises with the water.

Sometimes, the subject is fermented, by the addition of yeast, honey, or the like ferment, to the hot water, before the distillation begins: in which case, if the ferment added were in sufficient quantity to effect a thorough fermentation, the liquid afterwards exhaled and drawn off, would be thin and inflammable; which makes what we call a *spirit*; otherwise, thick, white, sapid, &c. and called a *water*.

The waters procured in this manner, contain the oil of the plant in great perfection; which makes them of considerable use in medicine, further than those raised without fermentation; beside that they keep better and longer; the spirit in them preventing their corrupting or growing mouldy.

Compound Waters, or those wherein several ingredients are used, are very numerous, and make a large article in commerce; some prepared by the apothecaries, according to the dispensatory prescriptions, for medicinal uses; others by the distillers, to be drank by way of dram, &c. and others by the perfumers, &c.

They are distinguished by different epithets, taken from the Latin, Greek, Arabic, English, &c. in respect either of the specific virtues of the waters; or the parts of the body, for the cure whereof they are intended; or the diseases they are good against; or the ingredients they are compounded of; or their different uses, &c.

The most considerable among the class of *compound-waters*, we shall here enumerate. — The manner of making them, it is true, is not always the same; especially those intended for drinking; for which every one gives his own method as the best. — Those we here deliver, are taken from such as have the greatest reputation in preparing these things; or from those who have wrote best of them.

We have only three general remarks to add, with regard to those intended for drinking: 1°. That such wherein any thing is infused, as bruised fruits, pounded herbs, or ground spices, must be always passed through a filter, to make them finer and purer. — 2°. That those made with brandy, or spirit of wine, are usually distilled after mixing their ingredients; which renders those liquors exceedingly strong and dangerous, and confirms the proverb; *Plures occidit gula quam gladius*. In effect, some of them are so penetrating, that they burn the tongue when taken. — 3°. That the waters which take their name from any particular thing, as *cinnamon*, &c. have often some other ingredients joined with them, according to the taste or smell required.

Alexipharmic, or **Alexiterial Waters**, are waters that resist poisons and the plague. — Such are those of angelica, scorzonera, citron, orange, scordium, rue, &c. Such also are *treacle-water*, *plague-water*, *milk-water*, *poppy-water*, &c.

Alum-Water, is a vulnerary water, thus called, by reason the basis, or principal ingredient thereof, is alum.

Angelica-Water, is usually prepared of brandy, angelica-roots and seeds, carduus, baum, fennel-seed, &c. the whole beat together in a mortar; infused for a night in French brandy, and then distilled. — It is reputed a good carminative, and cordial, as also a cephalic, &c.

Aniseed-Water. — To fix ounces of bruised anniseeds, add a gallon of molasses spirit, and two quarts of water; distil a

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gallon, and if you require it sugared, add half a pound of clarified sugar; but many prefer it without: and strain the whole.

Apricot-Water. — To a quart of water, put six or eight apricots sliced, and the kernels bruised; boil the whole, to extract the taste; and when cold, add four or five ounces of sugar. — When that is dissolved strain it.

Aromatic-Waters, we have already spoke of among the simple waters.

Arthritic-Waters, are waters good against the gout, palsy, tremors, pains in the joints, &c. — Such are those of piony, chamæpitys, betony, rosemary, &c.

Bryony-Water, is one of the compound waters prescribed in the college dispensatory; prepared from bryony-roots, rue, mugwort, fennel, feverfew, dittany, &c. — It is a good hysteretic, opens menstrual obstructions, &c.

Carduus-Water, is made from cardus benedictus pounded in a mortar, and put in an alembic. — Then, a sufficient quantity of the juice of the same plant, drawn by expression, is poured into the alembic, that the herbs swimming in the juice, may be in no danger of sticking to the bottom of the cucurbit in distillation. Lastly, sitting on the head, and luting the joints, distil half as much as you put in. — This water is said to be sudorific; and good against the plague, malignant fevers, &c.

Water of separation, or **depart**, is only aqua fortis; thus called, because serving to separate gold from silver. See **DEPART**. It is also called,

Caulitic-Water, and is prepared of a mixture of spirit of nitre and vitriol, drawn by force of fire; to which are sometimes added allum, &c.

It dissolves all metals, gold only excepted. — The invention of aqua fortis is usually referred to the thirteenth century: though some hold it to have been known in the time of Moses.

Cephalic-Waters, are waters proper to strengthen and comfort the brain. — Such are those of rosemary, marjoram, sage, piony, betony, baum, &c.

Chalheat-Water, is a water wherein red-hot steel has been quenched. — It is astringent, and good, like ferruginous, or iron waters, for diarrhoeas, &c.

Cherry-Water. — In a quart of water crush half a pound of cherries, with four or five ounces of sugar. Strain the whole through a cloth, till it be very clear.

Cinnamon-Water. — In a gallon of spirit, distil a pound of cinnamon: add four ounces of sugar. — Or thus: take a pound of cinnamon, three pounds of rose-water, and as much white-wine: bruise the cinnamon, infuse it fourteen days, then distil it. — The first quart that rises is the best; then the second; then the third.

Clary-Water, is composed of brandy, sugar, clary-flowers, and cinnamon, with a little ambergrease dissolved in it. — It helps digestion, and is cardiac. — This water is rendered either purgative or emetic, by adding resin of jallap and scammony, or crocus metallorum. — Some make clary-water of brandy, juice of cherries, strawberries, and gooseberries, sugar, cloves, white pepper, and coriander-seeds; infused, sugared, and strained.

Clove-Water, is prepared of brandy, and cloves bruised therein and distilled. See **CLOVE**.

Cordial, or **Cardiac Waters**, are waters proper to strengthen and comfort the heart. — Such are those of endive, chicory, bugloss, burrage, marigolds, &c.

Cosmetic-Waters, are waters proper to cleanse, smoothen, and beautify the skin.

Fennel-Water. — Distil a pound of dried fennel, with a gallon of water.

Gentian-Water. — Take four pounds of gentian roots, either green or dried; mince them small, infuse them in white-wine, or only sprinkle them therewith; then distil them, with the addition of a little centaury the lesser.

This is frequently used as a stomachic, and is also commended for a detergent; serving in dropies, jaundice, obstructions of the viscera, &c. but it is really of very little virtue.

Gum-Water, is that made by letting gum-arabic, inclosed in a linnen rag, infuse in common water. — The ladies also make a thick water for their hair, of quince-kernels steeped in water.

Hepatic-Waters, are those used to cleanse, strengthen, and refresh the liver. — Such are those of chicory, the capillaries, purslain, agrimony, fumitory, &c.

Honey-Water, is a water prepared of honey and ambergrease, distilled with spirit of wine. — The poor people also have a drink, which they call b, this name: they procure it in places where much honey is made, by washing out the honey-combs, and the vessels they have been in, in common water. — This gives it a honey-taste, and it afterwards becomes very clear, and the people use it as their common drink.

Horse-raddish-Water, aqua raphani, is prepared of the juices of scurvygrass, brook-lime, water-cresses, white-wine, lemon-juice,

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juice, briony-root, horse-raddish, winter's-bark, and nutmeg, digested in spirits, and distilled.—It is a good diuretic; cleansing, and removing obstructions of the viscera, promoting perspiration, &c.

Hungary-WATER, is a liquor distilled in balneo marie, from rosemary-flowers, and spirit of wine well rectified.—It has its name from the wonderful effects it is said to have had on a queen of Hungary, at the age of 72 years.—It is good against faintings, palsies, lethargies, apoplexies, and hysterical disorders.—There are divers other ways of preparing it, but none is better than this.

Hysterical WATERS, are those proper to strengthen the matrix, or womb, and remedy the disorders that befall it.—Such are those of briony, matricary or motherwort, hyssop, fennel, baum, mugwort, smallage, &c.

Ice, or Frozen WATERS, are certain agreeable and wholesome waters, as orange-waters, or the like, artificially froze in summer-time, particularly in hot countries, to be used in collations, &c. as coolers.—The way of making them is thus: the vessels containing the liquors designed to be froze, are first set in a pail, in such manner, as not to touch each other; then they are covered up, and the void space in the pail filled with common ice, beaten, and mixed with salt.—Every half hour they clear out what water the thawing ice sends to the bottom of the pail, by means of a hole at bottom; and at the same time stir up the liquors with a spoon, that they may freeze into snow: for were they to shoot in form of ice, or icicles, they would have no taste.—Then, covering the vessels again, they fill up the pail with more beaten ice, and salt, in lieu of that dissolved and evacuated. The more expeditious the freezing is required to be, the more salt is to be mixed with the ice.

Imperial-WATER, *Aqua imperialis*, is a water distilled from cinnamon, nutmeg, citron-peel, cloves, calamus aromaticus, fantal, and divers other simples, infused in white-wine and baum-water.—It is a pleasant cordial drink, and is good against d seases of the brain, stomach, and womb.

Juniper-WATER, is a compound water, made of brandy, and juniper berries beaten therein, and distilled. This is commonly called *geneva*.

Lime-WATER, is common water, wherein quick lime has been slaked; afterwards filtered.

Milk-WATER, *Aqua laticis*, is prepared of mint, wormwood, carduus benedictus, goat's-rue, and meadow-sweet, bruised, infused in milk, and drawn off by distillation.—It is held alexipharmic, and cephalic.

Aqua Mirabilis, or the wonderful WATER, is prepared of cloves, galangals, cubeb, mace, cardomums, nutmeg, ginger, and spirit of wine, digested twenty-four hours, then distilled.—It is a good and agreeable cordial, carminative, &c.

Nephritic-WATERS, are such as strengthen the reins, and help them to discharge, by urine, any impurities therein.—Such are those of the honey-suckle, pellitory, raddish, beans, mallows, &c. See NEPHRITIC.

The *nephritic-water* of Dr Radcliff, popularly called *Dr Radcliff's water*, was taken into one of the editions of the college dispensatory.—It is prepared from the kernels of black cherries, peaches, and bitter almonds, beaten in a mortar into a paste, with rhenish wine; and seeds of smallage, treacle, mustard, growel, and parley, beaten likewise, and added thereto: to the mixture are put juniper-berries, garlic, onions, leeks, pimpernel, horse-raddish, calamus aromaticus, cinnamon, wall-rue, mace, and nutmegs: the whole macerated in rhenish, spirit of black cherries, &c. and thus distilled.—It is said to be one of the most powerful detergers and cleansers known; and good in the dropsy, jaundice, asthma, pleurisy, &c.

Ophthalmic, or Eye-WATERS, are such as are good in disorders of the eyes.—Such are those of eye-bright, fennel, vervain, plantain, celandine, cyanus, &c.

Orange-flower-WATER, is made of common water and orange-flowers infused, and then distilled.—After the like manner, one may make waters of divers other flowers; as violets, jonquils, jessamines, tuberoses, &c.

Peach-WATER, is made after the same manner as apricot-water; only with peaches.

Phagedenic-WATER, is *lime water*, to every pound whereof is added twenty or thirty grains of corrosive sublimate, in powder.—It serves to cleanse old ulcers, to eat off fungous flesh, &c.

Plague-WATER, *Aqua epidemica*, is prepared from the roots of mallowwort, angelica, pyony, and butter-bur; viper-grass, Virginia-snakeroot, rue, rosemary, baum, carduus, water-germander, marigold, dragon, goat's-rue, and mint; the whole infused in spirit of wine, and distilled.—It is of frequent use, as an alexipharmic: it revives the spirits, and promotes a diaphoresis. It is the basis of many juleps prescribed, especially in seventh cases.

Poppy-WATER, is prepared from the flowers of wild poppies,

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infused in white-wine, or brandy, and drawn off in a cold still.—It is a cordial, and is good against the colic, and by some called *red plague-water*.

Pyony-WATER, is made of pyony and lime-flowers, and lilly of the valley steeped in canary, and distilled: to these ingredients are added the root of male pyony, white dittany, birthwort, mulletree, rue, castor, cubeb, cinnamon, betony, &c.—It is a good cordial, and is much used in nervous cases.

Rose-WATER, is made of damask roses distilled with common water.

Scordium-WATER, is prepared from the juices of goats-rue, sorrel, scordium, citrons, and Venice treacle, digested and distilled.—It is an alexipharmic.

Secund-WATER. See the article *SECUNDA Aqua*.

Specific-WATERS, are such as have some peculiar virtue, appropriate to certain diseases.—Thus *purflain-water*, wherein mercury has been infused, is said to be a specific against worms in young children.

Splenetic-WATERS, are those proper against diseases of the spleen.—Such are those of the tamarisk, cuscuta, harts-tongue, hops, &c. See SPLEEN.

Stephen's-WATER, *Aqua Stephani*, is made from cinnamon, ginger, galangals, cloves, nutmegs, paradise-grains, aniseeds, sweet-fennel, carraway, thyme, mint, sage, pennyroyal, pellitory, rosemary, red roses, camomile, origany, and lavender, steeped in French brandy, or spirit of wine, and distilled.—It is a good cephalic and cardiac, and is also reputed an hystric.

Stomachic WATERS, are such as have the virtue to cleanse, strengthen, and confirm the stomach.—As red *rose-water*, mint water, aniseed water, &c.

Syrigan-WATER. See the article *Aqua Regalis*.

Sypic-WATER, is a dissolution of calcined vitriol, or the colcothar remaining in the retort, after the spirit has been extracted; with burnt allum and sugar-candy.—With thirty grains of each of these three drugs, some mix half an ounce of urine of a young man, as much *rose-water*, and two ounces of *plantain-water*.—Its use is to stop bleeding. See STYPTIC.

Surfeit-WATER. See the article *SURFEIT*.

Treacle-WATER, *Aqua theriacalis*, is usually made of green walnuts, rue, carduus, marigold, baum, butter-bur-roots, burdock, angelica, mallowwort, water-germander, Venice-treacle, mithridate, canary-vinegar, and lemon-juice, steeped and distilled.—It is the most used of any in the shops; though Dr Quincy decries it as one of the worst concerted of all.—Its intention is to be an alexipharmic, and sudorific.

Other dispensatories give a more simple *treacle-water*, made from Venice-treacle, with an equal quantity of brandy, and vinegar.—It is also good for ulcers, and eruptions of the mouth; especially if a little Armenian bole be mixed therein.

Vulnerary WATER, is a water proper for the healing of wounds, prepared from the juice of vulnerary plants; as fennel, and the like.

WATER, in anatomy, &c. is applied to divers liquors, or humours in the human body.

Such is the aqua phlegmatica, *phlegmatic water*; which is a soft ferous humour contained in the pericardium, and wherein the heart swims.

Anatomists are divided about it: some will not have it natural, but suppose it separated forcibly during the pangs of death: their reason is, the difficulty they meet withal in tracing its passage, or how it is carried off.—The latest anatomists, however, seem to agree to its being a natural and necessary humour: and one reason is, that is found even in the pericardiums of foetus's.

It has likewise been disputed whence it should be separated.—The most probable opinion is, that it is secreted by some glands about the basis of the heart; and that it distils thence, drop by drop, into the cavity of the pericardium, in such quantity, as just to supply what is expended daily by the motion and warmth of the heart; and so needs no evacuation.—Its use is to moisten, lubricate, and cool the heart, and prevent any inflammation that might arise from the dry friction of the heart and pericardium.—So that it does the same office to the heart, that the water does wherein the foetus swims; which, without it, would not have liberty to move at all.

WATER is also used in divers ceremonies, both civil and religious.—Such is the *baptismal water*, *holy water*, &c.

Holy WATER, is a water prepared every Sunday in the Romish church, with divers prayers, exorcisms, &c. used by the people to cross themselves withal at their entrance, and going out of church; and pretended to have the virtue of washing away venial sins, driving away devils, preserving from thunder, dissolving charms, securing from, or curing diseases, &c.

The use of *holy water* appears to be of a pretty antient standing

ing in the church: witness S. Jerom, in his life of S. Hilari-
on, and Greſer, *de Benedic.* cap. x, &c. — M. Godeau
attributes it originally to Alexander, a martyr under the
emperor Adrian.

Many of the reformed take the use of *holy water* to have
been borrowed from the *lustral water* of the antient Ro-
mans. See *LUSTRAL*.—Though it might as well be taken
from the sprinkling in use among the Jews. See *Numbers*
xix. 17.

Urban Godfrey Siber, a German, has a dissertation printed
at Leipzig, to shew, by proofs brought from church-history,
that one may give *holy water* to drink to brutes.

Bitter Waters of Jealouſy. — In the Levitical law, we find
mention made of a *water*, which served to prove whether or
no a woman were an adulteress. — The formula was this:
the priest, offering her the *holy water*, denounced, — “If
“thou haſt gone aſide to another, inſtead of thy husband,
“and if thou be deſiled, &c. the Lord make thee a curſe
“and an oath among thy people, by making thy thigh
“to rot, and thy belly to ſwell: and this *water* ſhall go
“into thy bowels, to make thy belly to ſwell, and thy
“thigh to rot.” And the woman ſhall ſay, *Amen*. —
“Theſe curſes the prieſt ſhall write in a book, and
“blot them out with the *bitter water*.” — “When he
“haſt made her drink the *bitter water*, it ſhall come
“to paſs, that, if ſhe be deſiled, the *water* ſhall enter
“into her, and become bitter, and her belly ſhall ſwell,
“&c.” — “If ſhe be not deſiled, ſhe ſhall be free, and
“conceive ſeed.” *Numbers*, ch. v.

WATER Ordeal, or Trial, was of two kinds; by hot, and
by cold *water*.

Trial or Purgation by boiling, or hot WATER. — Among our
anceſtors, there was a way of proving crimes, by immerging
the body, or the arm, in hot *water*, with divers religious ce-
remonies.

In the judgment by *boiling water*, the accused, or he who
perſonated the accused, was obliged to put his naked arm in-
to a cauldron full of *boiling water*; and to draw out a ſtone
thence, placed at a greater or leſs depth, according to the
quality of the crime. — This done, the arm was wrapped up,
and the judge ſet his ſeal on the cloth; and at the end of
three days they returned to view it; when, if it were found
without any ſeal, the accused was declared innocent.

The nobles and great perſons purged themſelves thus by *hot*
water; and the populace by *cold water*.

F. Mabillon will have this ceremony to have been intro-
duced by pope Eugenius II. in lieu of making oath with
the hand laid on the relics of ſome ſaint; which, having
been abuſed, was prohibited by Innocent III. at the coun-
cil of Lateran.

“Theotberge, wife of Lothaire of France, having been ac-
“cused of inceſt, committed before marriage with her bro-
“ther duke Hubert; as ſhe could not be convinced by any
“witnesses, certain of the biſhops were conſulted as to the
“manner wherein the judges ſhould proceed, in an affair
“where the crime, though very dubious, did diſhonour to
“the king. — The biſhops were of opinion, they ſhould
“have recourſe to the proof by *boiling water*; which con-
“ſiſted in this: that the accused, to prove her innocence,
“ſhould plunge her hand into a baſon of *boiling water*, and
“take out a ring put therein. — Sometimes, indeed, they
“ſubſtituted another perſon to make the trial, in the room
“of the accused: accordingly, the rank and quality of Theot-
“berge excuſing her from making the proof herſelf, ſhe
“choſe a man to do it for her; who, either out of zeal for
“the life and honour of the princeſs, or for money, ſtood
“the teſt, and drew out his hand with the ring, without
“harm.” F. Daniel’s *Hiſt. of France*. Probably the *wa-
ter* was heated in a favourable manner.

Trial or Purgation by cold WATER. — After certain prayers,
and other ceremonies, the accused was ſwadled, or tied up
all in a peltoon, or lump; and thus caſt into a river, lake,
or veſſel of *cold water*; where, if he ſunk, he was held cri-
minal; if he floated, innocent.

WATER, among jewelers, is properly the colour or luſtre of
diamonds, and pearls; thus called, by reaſon theſe were an-
tiently ſuppoſed to be formed, or concreted of *water*.
Thus, they ſay, ſuch a pearl is of a fine *water*.
The *water* of ſuch a diamond is muddy.

The term is ſometimes alſo uſed, though leſs properly, for
the colour or hue of other precious ſtones.

WATER-Bailiff, is an officer antiently eſtabliſhed in all por-
towns, for the ſearching of ſhips; as appears from 28 Hen.
VI. cap. v.

There is ſuch an officer ſtill on foot in the city of London,
who ſuperwiſes and ſearches all ſhips brought thither; and ga-
thers the toll ariſing from the river of Thames. — He at-
tends alſo on the lord mayor in his expeditions by *water*,
and hath the principal care of marſhalling the gueſts at the
table. — He alſo arreſts men for debt, or other perſonal or

criminal matters on the river of Thames, by warrant of his
ſuperiors, &c.

WATER-Borne, in the ſea language. — A ſhip is ſaid to be *wa-
ter-borne*, when ſhe is where there is no more *water* than will
barely bear her from ground; or when lying even with the
ground, the ſhip begins to float, or swim.

WATER Camblets. See the article *CAMBLET*.

WATER-Colours, in painting, are ſuch colours as are only di-
luted and mixed up with *gum-water*. — Thus called, in con-
tradiction to oil colours.

The uſe of *water-colours*, makes what we call *limning*; as
that of oil-colours does *painting*, properly ſo called.

Cut-WATER. See the article *CUT-WATER*.

Dead-WATER, in the ſea language, is the *eddy water* that
follows the ſtern of the ſhip, not paſſing away ſo faſt as that
which ſlides by her ſides.

WATER-Farcin. See the article *FARCIN*.

WATER-Gage, an inſtrument to meaſure the depth, or quan-
tity of any *water*. See *GAGE*.

WATER-Gang, a channel cut to drain a place, by carrying off
a ſtream of *water*.

WATER-Gilding. See the article *GILDING*.

WATER-Line, of a ſhip, is a line which diſtinguiſhes that
part of her under *water*, from that above, when ſhe is duly
laden.

WATER-Meaſure. — Salt, ſea-coal, &c. while aboard veſſels
in the pool, or river, are meaſured with the corn-buſhel heap-
ed up; or elſe five ſtriked pecks are allowed to the buſhel. —
This is called *water-measure*; and this exceeds Wincheſter-
meaſure by about three gallons in the buſhel.

WATER-Poſe. See the article *HYDROMETER*.

Dr Hooke has contrived a *water-poſe*, which may be of
good ſervice in examining the purity, &c. of *water*. — It
conſiſts of a round glaſs ball, like a bolt-head, about three
inches in diameter, with a narrow ſtem or neck, $\frac{1}{2}$ of an
inch in diameter; which being poſed with red lead, ſo as to
make it but little heavier than pure ſweet *water*, and thus
fitted to one end of a fine balance, with a counterpoſe at
the other; upon the leaſt addition, of $\frac{1}{1000}$ h part of falt to
a quantity of *water*, half an inch of the neck will emerge
above the *water*, more than did before. *Philof. Tranſact.*
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WATER-Rocket. See the article *ROCKET*.

WATER-Scape, of the Saxon *waterſchap*, denotes an aqueduct,
drain, or paſſage for *water*. See *AQUEDUCT*.

WATER-Shoot, a young ſprig, which ſprings out of the root or
ſtock of a tree.

WATER-Shot, in the ſea language, a fort of riding at anchor,
when a ſhip is moored neither croſs the tide, nor right up
and down; but quartering betwixt both.

WATER-Table, in architecture, is a fort of ledge, left in ſtone
or brick walls, about 18 or 20 inches from the ground: from
which place, the thickneſs of the wall begins to abate. See
WALL.

WATER-Way, in a ſhip, is a ſmall ledge of timber, lying fore
and aft on the deck, cloſe by her ſides; to keep the *water*
from running down there.

WATER-Wheel, an engine for raiſing *water* in great quantity
out of a deep well. See *PERSIAN Wheel*.

WATERING, in gardening, &c. the application of *water* to
the ſoil of plants, &c. when not ſufficiently moiſtened
with rain, dew, &c.

After ſowing ſeed of any kind, though the ground be ever ſo
dry, they ſhould never be *watered* till they have been forty-
eight hours in the ground, and the ground is a little ſettled
about them; otherwiſe, a too great glut of nourishment at
firſt will be apt to burſt them.

Care is to be taken, that the leaves of young and tender
plants be not *watered* at all while the weather is cold; only
the ground to be wet about them. — For hardy plants and
ſeeds, if the nights be cold, *water* in the forenoon; other-
wiſe, in the evening.

Water that comes out of pits, or deep wells, ſhould ſtand a
day in an open veſſel, before it be applied to tender plants in
the ſpring. — Dung of ſheep, pigeons, or hens, or aſhes, lime, &c.
infuſed in the *water*, will forward the growth of plants.

WATERING, in the manufactures. — To *WATER a Struff*, is
to give it a luſtre, by wetting it lightly, and then paſſing it
through the preſs, or the calender, whether hot or cold.

WATERY Humour. See the articles *AQUEOUS*, and *HU-
MOUR*.

WATTLES, among husbandmen, grates or hurdles, for
folds for ſheep.

The word is alſo uſed for the gills of a cock — and for the
naked red fleſh that hangs under a turkey’s neck.

WAVE, *Unda*, in physics, a cavity in the ſurface of *water*,
or other fluid, with an elevation aſide thereof. See *FLUID*,
and *WATER*.

The origin of *waves* may be thus conceived. — The ſurface
of a ſtanding *water* being naturally plain, and parallel to the
horizon;

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horizon; if by any means it be rendered hollow, as at A, (*Tab. Hydrostatics*, fig. 30.) its cavity will be surrounded with an elevation BB; this raised water will descend by its gravity, and with the celerity acquired in descending, will form a new cavity; by which motions, the water will ascend at the sides of this cavity, and fill the cavity A, while there is a new elevation towards C; and when this last is depressed, the water rises a-new towards the same part.—Thus arises a successive motion in the surface of the water; and a cavity, which carries an elevation before it, is moved along from A, towards C.—This cavity, with the elevation next it, is called a *wave*; and the space taken up by the *wave* on the surface of the water, and measured according to the direction of the *wave's* motion, is called the *breadth of the wave*.

The Motion of WAVES makes an article in the new philosophy; and the laws thereof being now pretty well determined, we shall give the reader the substance of what is taught thereon.

1°. Then, the cavity, as A, is compassed every way with an elevation; and the motion above-mentioned expands itself every way: therefore the *waves* are moved circularly.

2°. Suppose, now, AB, (*fig. 31.*) an obstacle, against which the *wave*, whose beginning is at C, strikes; and we are to examine what change the *wave* suffers in any point, as E, when it is come to the obstacle in that point.—In all places through which the *wave* passes in its whole breadth, the *wave* is raised; then a cavity is formed, which is again filled up; which change while the surface of the water undergoes, its particles go and return through a small space: the direction of this motion is along CE, and the celerity may be represented by that line.—Let this motion be contrived to be resolved into two other motions, along GE and DE, whose celerities are respectively represented by those lines.—By the motion along DE, the particles do not act against the obstacle; but after the stroke, continue their motion in that direction with the same celerity; and this motion is here represented by EF, supposing EF and ED to be equal to one another: but by the motion along GE, the particles strike directly against the obstacle, and this motion is destroyed; for though the particles are elastic, yet, as in the motion of the *waves* they run through but a small space, going backward and forward, they proceed so slowly, that the figure of the particles cannot be changed by the blow; and so are subject to the laws of percussion of bodies perfectly hard. See PERCUSSION.

But there is a reflection of the particles from another cause: the water which cannot go forward beyond the obstacle, and is pushed on by that which follows it, gives way where there is the least resistance; that is, it ascends: and this elevation, which is greater in some than other places, is caused by the motion along GE; because it is by that motion alone that the particles impinge against the obstacle.—The water, by its descent, acquires the same velocity with which it was raised; and the particles of water are repelled from the obstacle, with the same force in the direction EG, as that with which they struck against the obstacle.—From this motion, and the motion above-mentioned along EF, arises a motion above EH, whose celerity is expressed by the line EH, which is equal to the line CE: and by the reflection the celerity of the *wave* is not changed; but it returns along EH, in the same manner, as if, taking away the obstacle, it had moved along Ee.

If from the point C, CD be drawn perpendicular to the obstacle, and then produced, so that Dc shall be equal to CD, the line HE continued will go through c: and as this demonstration holds good in all points of the obstacle, it follows, that the reflected *wave* has the same figure on that side of the obstacle, as it would have had beyond the line AB, if it had not struck against the obstacle.—If the obstacle be inclined to the horizon, the water rises and descends upon it, and suffers a friction, whereby the reflection of the *wave* is disturbed, and often wholly destroyed: and this is the reason why very often the banks of rivers do not reflect the *waves*.

If there be a hole, as I, in the obstacle BI, the part of the *wave* which goes through the hole continues its motion directly, and expands itself towards QQ; and there is a new *wave* formed, which moves in a semicircle, whose centre is the hole. For the raised part of the *wave*, which first goes through the hole, immediately flows down a little at the sides; and by descending, makes a cavity, which is surrounded with an elevation on every part beyond the hole, which moves every way in the same manner as was laid down in the generation of the first *wave*.

In the same manner, a *wave* to which an obstacle, as AO, is opposed, continues to move between O and N; but expands itself towards R, in a part of a circle, whose centre is not very far from O.—Hence, we may easily deduce what must be the motion of a *wave* behind an obstacle, as MN.

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Waves are often produced by the motion of a tremulous body, which also expand themselves circularly, though the body goes and returns in a right line; for the water which is raised by the agitation, descending, forms a cavity, which is every where surrounded with a rising.

Different *waves* do not disturb one another, when they move according to different directions.—The reason is, that whatever figure the surface of the water has acquired by the motion of the *waves*, there may in that be an elevation and depression; as also such a motion as is required in the motion of a *wave*.

To determine the celerity of the *waves*, another motion, analogous to theirs, must be examined.—Suppose a fluid in the bent cylindric tube EH, (*fig. 32.*) and let the fluid in the leg EF, be higher than in the other leg by the distance lE; which difference is to be divided into two equal parts at i.—The fluid, by its gravity, descends in the leg EF, while it ascends equally in the leg EH, so that when the surface of the fluid is arrived at i, it is at the same height in both legs; which is the only position wherein the liquid can be at rest: but by the celerity acquired in descending, it continues its motion, and ascends higher in the tube GH; and in EF is depressed quite to l, except so much as it is hindered by the friction against the sides of the tube.—The fluid in the tube GH, which is higher, also descends by its gravity, and so the fluid in the tube rises and falls, till it has lost all its motion by the friction.

The quantity of matter to be moved, is the whole fluid in the tube; the moving force, is the weight of the column lE, whose height is always double the distance Ei; which distance, therefore, increases and diminishes in the same ratio with the moving force.—But the distance Ei, is the space to be run through by the fluid, in order to its moving from the position EH, to the position of rest; which space, therefore, is always as the force continually acting upon the fluid: but it is demonstrated, that it is on this account that all the vibrations of a pendulum, oscillating in a cycloid, are isochronal; and therefore, here also, whatever be the inequality of the agitations, the fluid always goes and returns in the same time.—The time in which a fluid thus agitated ascends, or descends, is the time in which a pendulum vibrates, whose length is equal to half the length of the fluid in the tube, or to half the sum of the lines EF, FG, GH. This length is to be measured in the axis of the tube. See PENDULUM.

From these principles, to determine the celerity of the *waves*, we must consider several equal *waves* following one another immediately; as A, B, C, D, E, F, (*fig. 33.*) which move from A towards F: the *wave* A has run its breadth, when the cavity A is come to C; which cannot be, unless, the water at C ascends to the height of the top of the *wave*, and again descends to the depth C; in which motion, the water is not agitated sensibly below the line bi: therefore, this motion agrees with the motion in the tube above-mentioned; and the water ascends and descends, that is, the *wave* goes through its breadth, while a pendulum of the length of half BC performs two oscillations, or while a pendulum of the length BCD, that is, four times as long as the first, performs one vibration. Therefore, the celerity of the *wave* depends upon the length of the line BCD; which is greater, as the breadth of the *wave* is greater, and as the water descends deeper in the motion of the *waves*.—In the broadest *waves*, which do not rise high, such a line as BCD, does not much differ from the breadth of the *wave*; and in that case, a *wave* moves its breadth, while a pendulum, equal to that *wave*, oscillates once. See OSCILLATION.

In every equable motion, the space gone through increases with the time and the celerity; wherefore, multiplying the time by the celerity, you have the space gone through; whence it follows, that the celerities of the *waves*, are as the square roots of their breadths: for as the times in which they go through their breadths are in that ratio, the same ratio is required in their celerities, that the products of the times, by their celerities, may be as the breadths of the *waves*, which are the spaces gone through.

WAVE Camblets. See the article CAMBLET.

WAVED, or *WAVY*, a term in heraldry, when a bordure, or any ordinary or charge in a coat of arms, has its outlines indented, in manner of the rising and falling of *waves*.

—This is also called *wavy*, *undul*, or *undul*.

To WAVE, is used in the sea language, for the making signs, for a vessel to come near, or keep off.

WAVESON, in the admiralty law, a term used for such goods, as, after shipwreck, appear swimming on the waves.

WAVY. See the article *WAVED*.

WAX, *Cera*, a soft yellowish matter, whereof the bees form cells to receive their honey.

Wax is not the excrement of this laborious insect, as the antients, and after them many of the moderns, have imagined.

WAX

—It is properly a juice, exuding out of the stamina and apices of flowers; from which it is scraped off by the bees, to build their combs withal.—It is chiefly afforded by such plants as have flowers containing great numbers of apices, and the bee often uses no other art to procure it out of the flower, than rubbing herself among the stamina, by means of which it is shaken off and falls on her body, and from hence she wipes it with her legs, and, in fine, collects it in lumps, and carries it to her cells. See *Supplement*, article *WAX*.

The honey is formed of a liquid matter, sucked into the body of the little animal: whereas the *wax*, being a hard substance, is gathered only with the fore legs, chaps, &c. conveyed thence to the middle legs, and thence to the middle joint of the hind legs, where there is a small cavity, like the bowl of a spoon, to receive it; and where it is collected into heaps, of a shape and size of lentils.

The bee arrived at the hive with its load of *wax*, finds some difficulty in unburdening himself of so tenacious a matter.—Frequently, being unable to lay it down himself, he calls for assistance, by a particular motion of the legs and wings; upon which, a number of his companions freight run to his succour, and each with his jaws takes off a small quantity of the *wax*; others succeeding, till their laden fellow be quite disburdened.

Wax makes a very considerable article in commerce; the consumption thereof, throughout the several parts of Europe, being incredible.—There are two kinds, *white*, and *yellow*; the yellow is the native *wax*, just as it comes out of the hive, after expressing the honey, &c. the white is the same *wax*, only purified, washed, and exposed to the air. The preparation of each follows.

Yellow-Wax.—To procure the *wax* from the combs for use; after separating the honey from them, in the manner described under the article *HONEY*; they put all the matter remaining in a large kettle, with a sufficient quantity of water; where, with a moderate fire, they melt it, and then strain it through a linen cloth, by a press: before cold, they scum it with a tile, or a piece of wet wood, and cast it, while yet warm, in wooden, earthen, or metalline moulds; having first anointed them with honey, oil, or water, to prevent the *wax* from sticking.—Some, to purify it, make use of Roman vitriol, or copperas; but the true secret is to melt, scum it, &c. properly, without any ingredients at all. The best is that of a high colour, an agreeable smell, brittle, and that does not stick to the teeth when chewed. It is often sophisticated with resin, or pitch, coloured with rocou, or turmeric.

By chymistry, *wax* yields a white thick oil, resembling butter; whence the chymists call it *butter of wax*.—From this oil is drawn a second, as clear as water; both the one and the other are excellent for chilblains.—The scæces remaining in the bag, after expressing the *wax*, is used both by surgeons and farriers, with success, against strains.

White-Wax.—The whitening or blanching of *wax*, is performed by reducing the yellow sort, first, into little bits or grains, by melting it, and throwing it, while hot, into cold water, or else by spreading it into very thin leaves, or cakes. This *wax*, thus granulated, or flattened, is exposed to the air on linen cloths; where it remains night and day, having equally need of sun and dew.—Then they melt and granulate it over again several times; still laying it out to the air, in the intervals, between the meltings.

When the sun and dew have at length perfectly blanched it, they melt it, for the last time, in a large kettle; out of which they cast it, with a ladle, upon a table, covered over with little round dents or cavities, of the form of the cakes of *white wax*, as sold by the apothecaries, &c. having first wetted those moulds with cold water, that the *wax* may be the easier got out.—Lastly, they lay out these cakes to the air for two days and two nights, to render it more transparent and drier.

This *wax* is used in the making of torches, tapers, flambeaux, figures, and other *wax-works*. See *TAPER*, *FLAMBEAU*, &c.

It is also an ingredient in plaisters, cerats, and divers pomatums, and unguents, for the complexion. See *CERATE*, &c.

Yellow wax is made soft with turpentine, yet retains its natural colour.—Red *wax*, is only the white melted with turpentine, and reddened with vermilion or alkanett.—Verdegrease makes it green; and burnt paper, or lampblack, black.—Some travellers tell us of a natural black *wax*; assuring us there are bees, both in the East and West-Indies, that make an excellent honey, included in black cells.—On this *wax*, they say, it is, that the Indians make these little vases, wherein they gather their balsam of Tolu.

Chafe Wax. See the article *CHAFE*.

Virgin Wax, *Propolis*, is a sort of reddish *wax*, used by the bees to stop up the clefts, or holes of the hive.—It is applied just as taken out of the hive, without any art, or prepara-

WAY

tion of boiling, &c.—It is the most tenacious of any, and is held good for the nerves.

Sealing Wax, or *Spanish Wax*, is a composition of gum-lacca, melted and prepared with resins, and coloured red with ground cinnabar. See *LACCA*.

Wax-Candler. See the article *CANDLE*.

Wax-work.—Here we must not forget that pretty invention of M. Benoist, a man famous at Paris for his figures of *wax*.—Being, by profession, a painter, he found the secret of forming moulds on the faces of living persons, even the fairest and most delicate, without any danger, either to their health, or complexion: in which moulds he cast masks of *wax*; to which, by his colours, and glass eyes imitated from nature, he gave a sort of life: inasmuch, as when clothed in proper habits, they bore such a resemblance, that it was difficult distinguishing between the copy and the original.

Grafting Wax, is a composition serving to bind or fix the bud, or graft in the cleft of the stock.

Instead of *grafting wax*, the country gardeners, &c. only use clay, over which they lay a piece of linen cloth, and to keep it moist; and to prevent its cracking with the heat of the sun, they tie moist over it.—But the *wax* ordinarily used, is a compo of one pound and a half of pitch, a quarter of a pound of *wax*, and an ounce of oil of almonds, melted and mixed together; with the addition, in spring or autumn, of a moderate quantity of turpentine.

For cleft-grafting, whip-grafting, and grafting by approach, Mr Mortimer recommends tempered clay, or soft *wax*; but for rind-grafting, clay and horse-dung.

WAXING, *Ceratic*, in chymistry, the preparation of any matter to render it fit and disposed to liquify, or melt, which of itself it was not.

This is frequently done, to enable things to penetrate into metals, or other solid bodies.

WAX-SCOT, or *WAX-SHOT*, *Ceragium*, in our antient customs, money paid twice a year towards the charge of maintaining lights, or candles in the church.

WAY, Via. See *ROAD*, and *VIA*; see also *WEGH*.

Roman *ways* are divided into *consular*, *prætorian*, *military*, and *public*.

We have four notable ones of these in England; antiently called *chimini quatuor*, and entitled to the privileges of pax regis. The first is *Watling-street*, or *Watling-street*, leading from Dover to London, Dunstable, Towcester, Atterton, and the Severn, near the Wrekin in Shropshire, extending as far as Anglesea in Wales.—The second, called *Hikenild*, or *Ikenild-street*, reaches from Southampton, over the river Isis at Newbridge, thence by Camden and Litchfield, then passes the Derwent near Derby, to to Bultover-Castle, and ends at Timmouthe.—The third, called *Posse-Way*, because in some places it was never perfected, but lies as a large ditch; leads from Cornwall through Devonshire, by Tebury near Stow in the Wolds; and beside Coventry to Leicester, Newark, to Lincoln.—The fourth, called *Ermings*, or *Ermings-street*, stretches from S. David's in West-Wales, to Southampton.

Milky Way. See the article *GALAXY*.

Way of a ship, is sometimes used for the same with the *rate*, or run of her, forward and afterward on.

But the term is more commonly understood, in respect of her sailing.—When she goes apace, they say, *she has a good way*; and they call the account how fast she sails by the log, *keeping an account of her way*.

And because most ships are apt to fail a little to the lee-ward of their true course; they always, in casting up the log-board, allow something for her *lee-ward way*: which is one point, or more, according to her way of sailing.

Way of the rounds, *chemin des roudes*, in fortification, is a space left for the passage of the rounds, between the rampart, and the wall of a fortified town.

This is not now much in use; because the parapet not being above a foot thick, it is soon overthrown by the enemy's cannon.

Covert Way.

Fosse-Way.

Gang-Way.

Hatch-Way.

Spur-Way.

Water-Way.

COVERT.
FOSSE-Way.
GANG-Way.
HATCH-Way.
SPUR-Way.
WATER-Way.

See the article

WAY-WISER, an instrument for measuring the road, or distance gone; called also *perambulator*, and *podometer*, or *pedometer*. See *PERAMBULATOR*, and *PEDE-METER*.

WAYWODE, is properly a title given the governors of the chief places in the dominions of the czar of Muscovy. The palatine, or governors of provinces in Poland, also bear the quality of *waywodes*, or *waywodes*. See *PALATINE*.

The Poles likewise call the princes of Walachia and Moldavia, *waywodes*; as effecting them no other, than on the foot of governors; pretending that Walachia and Moldavia

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are provinces of Poland, which have withdrawn themselves from the obedience of the republic.—Every where else these are called *hospodars*.

Du Cange says, that the name *waywode* is used in Dalmatia, Croatia, and Hungary, for a general of an army; and Leunclavius, in his *Pandects of Turkey*, tells us, it usually signifies captain, or commander.

WEAK Pulse. See the article PULSE.

WEALD, or WELD, the woody part of a country; as the *Weald of Kent*—It is mis-printed in some books and maps, *The Wilds of Kent*, Suffex, and Surry.

WEANEL, a country word for a young beast newly weaned, or taken from sucking its dam.

WEANING, Ablactation. See ABLACTATION.

WEAPONS. See the articles ARM, and ARMOUR.

WEAPON-Salve, a kind of unguent, supposed to cure wounds sympathetically, by being applied, not to the wound, but to the *weapon* that made it. See SYMPATHETIC Powder, and TRANSPLANTATION.

WEAR, or WEER, a great flank, or dam in a river; fitted for the taking of fish, or for conveying the stream to the mill. See FISHING.

WEATHER, the state or disposition of the atmosphere, with regard to the moisture or drought, heat or cold, wind or calm, rain, hail, frost, snow, fog, &c. See ATMOSPHERE, RAIN, HEAT, WIND, HAIL, FROST, &c. As it is in the atmosphere that all plants and animals live and breathe, and as that appears to be the great principle of most animal and vegetable productions, alterations, &c.—There does not seem any thing in all philosophy, of more immediate concernment to us, than the state of the *weather*.—In effect, all living things are only assemblages, or bundles of vessels, whose juices are kept moving by the pressure of the atmosphere; and which by that motion maintain life. So that any alterations in the rarity or density, the heat, purity, &c. of that, must necessarily be attended with proportionable ones in these.

What vast, yet regular alterations, a little turn of *weather* makes, in a tube filled with mercury, or spirit of wine, or in a piece of string, &c. every body knows, in the common instance of barometers, thermometers, hygrometers, &c. and it is owing partly to our inattention, and partly to our unequal, intemperate course of living, that we do not feel as great as and as proper ones in the tubes, chords, and fibres, of our own bodies.

It is certain, a great part of the brute creation have a sensibility, and sagacity this way, beyond mankind, and yet, without any means or disposition thereto, more than we; except that their vessels, fibres, &c. being, in other respects, in one equable habitude; the same, or a proportionable cause from without, has always a like, or proportionable effect on them: that is, their vessels are regular barometers, &c. affected only from one external principle, *viz.* the disposition of the atmosphere; whereas ours are acted on by divers from within, as well as without; some of which check, impede, and prevent the action of others.

We know of nothing more wanting than a just theory of the *weather*, on mechanical principles.—But, in order to that, a complete history of the *weather* will be required.

Were registers carefully kept in divers parts of the globe, for a good series of years, we should be enabled to determine the directions, breadth, and bounds of the winds, and of the *weather* they bring with them; the correspondence between the *weather* of divers places, and the dependence between one fort and another at the same place.—In time, no doubt, we might learn to foretel divers great emergencies; as, extraordinary heats, rains, frosts, droughts, dearths, plagues, and other epidemical diseases, &c.

The members of our Royal society, the French academy of sciences, and divers other authors of note, have made some essays this way; but the dullest and quaintest of the subject, has induced them all to drop it.

Eraf. Bartholin, for instance, has observations of the *weather* for every day throughout the year 1671: Mr W. Merle made the like at Oxford, for seven years, with a very remarkable care and accuracy. Dr Plot did the same at the same place, for the year 1684: Mr Hillier, at Cape Corfe, for the years 1686, 1687: Mr Hunt, &c. at Gresham College, for the years 1693, 1695, 1697, 1699, 1701, 1703, 1704, 1705; Mr Townley, in Lancashire, in 1697, 1698; Mr Cunningham, at Emin in China, for the years 1698, 1699, 1700, 1701; Mr Locke, at Oats in Essex, 1692; Dr Scheuchzer, at Zurich, in 1703; and Dr Tilly, at Pisa, the same year. See the *Philosoph. Transact.*

The form of Mr Derham's observations, we give as a specimen of a journal of this kind; observing that he notes the strength of the winds, by 0, 1, 2, 3, &c. and the quantity of rain, as it fell through a tunnel, in pounds and centimals.

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Phænomena of the WEATHER, October 1697.

Day.	Hour.	Weather	Wind	Barometer.	Rain
27	7	Fair	S. W. 2	29 37	1 52
	12	Rain	S. W. by W 5	29 34	
	9	stormy	0	29 88	0 11

As a specimen of the use of such histories, we shall add some general remarks, drawn from them by Mr Derham; and,—1^o. That foggy *weather* makes the mercury rise in the barometer, as well as the north wind.—The cause, he suggests, probably enough, to be the accession of the load of vapour, to the former weight of the atmosphere. *Misting weather*, he likewise observes to have the like effect.

2^o. The colds and heats in England and Switzerland, begin and end nearly about the same time: nay, and any remarkable *weather*, especially if it continue any while, affects one place as well as the other.

3^o. That the remarkably cold days in June, anno 1708, were found, in Switzerland, to precede ours, commonly by above five days, or more; and that the remarkable heats in the following months, began to abate in both places about the same time; only somewhat sooner here than there.

4^o. That though the winds in both places frequently agree, yet they oftener differ.

5^o. That the barometer is always lower at Zurich than at Upminster, by sometimes one, and sometimes above two English inches; but the common difference is about half an inch. Which may be solved, either by supposing Zurich situate one fourth of a mile higher above the level of the sea than Upminster; or else, by supposing that part of the terraqueous globe, as lying nearer the line, to be higher, and more distant from the centre than ours is, which lies nearer the pole.

6^o. That the barometers generally rise and fall together at far distant places: though this agreement of the barometer is not so constant between Zurich and Upminster, as in places nearer home, *viz.* at London and Paris; where again the agreement is not so great as between Upminster and Lancashire.

7^o. That the variations of the barometer are greatest, as the places are nearest the pole.—Thus, *e. gr.* the mercury at London has a greater range by two or three lines than at Paris; and at Paris, a greater than at Zurich.—In some places near the equinoctial, there is scarce any variation at all. See BAROMETER.

8^o. That the rain in Switzerland and Italy is much greater in quantity, throughout the year, than that in Essex; yet the rains are more frequent, *viz.* there are more rainy days in Essex, than at either of those places.—The proportion of the annual rains that fall in several places we have any good observations of, stand thus: At Zurich, the depth of the annual rain, at a medium, is about 32 $\frac{1}{2}$ English inches; at Pisa, 43 $\frac{1}{2}$; at Paris, 23; at Lille in Flanders, 23 $\frac{1}{2}$ inches; at Townley in Lancashire, 42 $\frac{1}{2}$; at Upminster, 19 $\frac{1}{2}$. See RAIN.

9^o. That cold contributes greatly to rain; and that, apparently, by condensing the suspended vapours, and making them descend.—Thus, very cold months, or seasons, are generally followed immediately by very rainy ones; and cold summers are always wet ones.

10^o. That high ridges of mountains, as the Alps, and the snows they are covered withal, not only affect the neighbouring places by the colds, rains, vapours, &c. they produce, but even distant countries, as England, often partake of their effects.—Thus, the extraordinary colds, December 1708, and the relaxations thereof, were felt in Italy and Switzerland, several days before they reached us: an indication, Mr Derham thinks, that they were derived from them to us.

Prognostics of the WEATHER.—We do not here mean to obtrude the idle, arbitrary observations of fanciful people upon our reader.—That cloud of popular predictions from the brute world, which partly the sagacity, and partly the credulity of our countrymen have established, we set aside; as not flowing from any natural, necessary relations, that we know of, in the things themselves.—Such is the foretelling of rain and wind, from water-fowls flocking to land, or land-fowls to the water; from birds pruning their feathers, geese cackling, crows cawing loud, and flying in companies, swallows chattering, and flying low, peacocks crying *such*, asses braying, deer fighting, foxes and wolves howling, fishes playing, ants and bees keeping within doors, moles casting up earth, earthworms creeping out, &c.—We shall offer nothing on this head, but what has some visible foundation in the nature of things; and which lets some light into the cause and reason of the *weather* itself, or discovers some notable effect thereof.

1^o. Then,

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10. Then, a thick, dark sky, lasting for some time, without either sun or rain, always becomes first fair, then foul, i. e. it changes to a fair clear sky, before it turns to rain.—Thus, the Rev. Mr Clarke observed, who kept a register of the weather for 30 years, since put into Mr Derham's hands by his grandson the learned Dr Samuel Clarke; he says, he scarce ever knew it to fail; at least, when the wind was in any of the easterly points; but Mr Derham has observed the rule to hold good be the wind where it will. And the cause is obvious.—The atmosphere is replete with vapours, which though sufficient to reflect and intercept the sun's rays from us, yet want density to descend; and while the vapours continue in the same state, the weather will do so too.—Accordingly, such weather is generally attended with moderate warmth, and with little or no wind to disturb the vapours, and an heavy atmosphere to sustain them; the barometer being commonly high.—But when the cold approaches, and, by condensing, drives the vapours into clouds or drops, then, way is made for the sun-beams; till the same vapours, being by further condensation formed into rain, fall down in drops.

20. A change in the warmth of the weather, is generally followed by a change in the wind.—Thus, the northerly and southerly winds, commonly esteemed the causes of cold and warm weather, are really the effects of the cold or warmth of the atmosphere: of which Mr Derham assures us he has had so many confirmations, that he makes no doubt of it.—Thus, it is common to see a warm southerly wind suddenly changed to the north, by the fall of snow or hail; or to see the wind, in a cold frosty morning, north, when the fun has well warmed the earth and air, wheel towards the south; and again turn northerly or easterly in the cold evening.

30. Most vegetables expand their flowers and down in sunny weather; and towards the evening, and against rain, close them again; especially at the beginning of their flowering, when their seeds are tender and sensible.—This is visible enough in the down of dandelion, and other downs; and eminently in the flowers of pimpnel, the opening and shutting of which, Gerard observes, are the countryman's weather-wisdom, whereby he foretells the weather of the following day.—The rule is, if the flowers be close shut up, it betokens rain and foul weather: if they be spread abroad, fair weather. Ger. Herb. Lib. II.

Est et alia [arbor in Tyllis] similis, foliosor tamen, roseique floris; quem noctu comprimens, aperire incipit solis exortu, meridie expandit. Incolæ dormire eum dicunt. Plin. Nat. Hist. Lib. XII. cap. 11.

The stalk of trefail, my lord Bacon observes, swells against rain, and grows more upright; and the like may be observed, though not so sensibly, in the stalks of most other plants.—He adds, that in the stubble fields there is found a small red flower, called, by the country-people, *pimpnel*; which opening in a morning, is a sure indication of a fine day. That vegetables should be affected by the same causes that affect the weather, is very conceivable; if we consider them as so many hygrometers, and thermometers, consisting of an infinite number of tracheæ, or air-vessels; by which they have an immediate communication with the air, and partake of its moisture, heat, &c.—These tracheæ are very visible in the leaf of the scabiose, vine, &c. See PLANT, VEGETABLE, &c.

Hence it is, that all wood, even the hardest and most solid, swells in moist weather; the vapours easily insinuating into the pores thereof; especially of that which is lightest and driest.—And hence we derive a very extraordinary use of wood, viz. for breaking rocks for mill-stones.

The method at the quarries is this.—Having cut a rock into a cylinder, they divide that into several lesser cylinders, by making holes at proper distances round the great one: these holes they fill with so many pieces of fallow wood, dried in an oven; which, in moist weather, becoming impregnated with the humid corpuscles of the air, swell; and, like wedges, break or cleave the rock into several fones.

PREDICTIONS OF THE WEATHER from the barometer. See BAROMETER.

WEATHER-COCK, or WEATHER-VANE, a moveable vane, in form of a cock, or of other shape, placed on high, to be turned round according to the direction of the wind, and point out what quarter the wind blows from.

WEATHER-GLASSES, are instruments contrived to indicate the state, or disposition of the atmosphere, as to heat, cold, gravity, moisture, &c. to measure the changes befalling in those respects; and, by those means, to predict the alteration of weather, as rains, winds, snow, &c.

Under the class of weather-glasses, are comprehended barometers, thermometers, hygrometers, manometers, and anemometers, of each whereof there are divers kinds: see their theories, constructions, uses, kinds, &c. under the respective articles, BAROMETER, THERMOMETER, HYGROMETER, &c.

WEATHER-BOARD, in the sea language, that side of a ship which is to the windward.

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WEATHER-GAGE at sea.—A ship is said to have the weather-gage of another, when she is to windward of her.

WEATHERING, a doubling, or sailing by a point, or place.

To weather a ship, is to get to the windward of her.

The WEATHERING of a hawk, among falconers, is the setting her abroad to take the air.

WEAVING, the art or act of working a web of cloth, silk, linen, or other stuff, on a loom, with a shuttle. It is difficult to say, with any assurance, who it is we owe this admirable invention to, unless we chuse to ascribe it to the spider, that poisonous, but ingenious little insect, which draws certain infinitely fine threads from its own substance through papillæ near its anus. See SILK.

WEAVING of Cloth.
WEAVING of Tapestry, &c. See TAPESTRY, &c.
Stocking WEAVING. See STOCKINGS.

WEB, a sort of plexus, or texture, formed of threads interwoven with each other; some whereof are extended in length, and called the *warp*; and others drawn across them, called the *woof*.

Spider's WEB, or Cob-WEB, is a very delicate and wonderful plexus, which that insect spins out of its own bowels; serving it as a sort of toil, or net to catch flies, &c. withal. For the manner wherein the spider spins his web, the admirable mechanism of the parts subservient thereto, and the uses thereof, see SILK.

Dr Lister tells us, that attending nearly to a spider weaving a net, he observed it suddenly to desert in the mid-work; and turning its tail to the wind, it darted out a thread, with the violence and stream we see water spout out of a jet: this thread, taken up by the wind, was immediately carried to some fathoms long; still issuing out of the belly of the animal.—By and by the spider leaped into the air, and the thread mounted her up swiftly.—After this discovery, he made the like observation in near thirty different sorts of spiders; and found the air filled with young and old, sailing on their threads, and doubtless seizing gnats and other insects in their passage: there being often manifest signs of slaughter, legs and wings of flies, &c. on these threads, as well as in their webs below.

Dr Hulse discovered the same thing about the same time.—In a letter of Dr Lister to Mr Ray, he thinks there is a fair hint of the darning of spiders in Aristotle, *Hist. An. Lib. IX. cap. 39.* and in Pliny, *Lib. X. cap. 74.* But for their falling, the antients are silent, and he thinks it was first seen by him.—In another letter to Mr Ray, dated January 1670, speaking of the height spiders are able to fly to, he says, “Last October, &c. I took notice that the air was very full of webs; I forthwith mounted to the top of the highest steeple on the Minster, [in York] and could there discern them yet exceeding high above me.”

Pin and WEB. See PANNUS.

WEDGE, Cuneus, in mechanics, the last of the five powers, or simple machines.

The wedge is a triangular prism, whose bases are equilateral acute-angled triangles.

Authors are divided about the principle whence the wedge derives its power.—Aristotle considers it as two levers of the first kind, inclined toward each other, and acting opposite ways.—Guido Ubaldus, Mercennus, &c. will have them levers of the second kind.—But Fr. de Lanis shews, that the wedge cannot be reduced to any lever at all.

Others refer the wedge to the inclined plane.—Others, again, with De Stair, deny the wedge to have scarce any force at all; and ascribe much the greatest part to the mallet that drives it.—But the latest authors agree to refer the effect of the wedge, to the cochlea, or screw.

Its doctrine is contained in this proposition.—“If a power be applied to a wedge, in such manner, as that the line of direction CD, (*Tab. Mechanicæ, fig. 53.*) perpendicular to AB, is to the resistance to be overcome, as AB to CD; the power will be equal to the resistance.”

Or thus: “If the power directly applied to the head of the wedge, be to the resistance to be overcome by the wedge, as the thickness of the wedge is to its height; then the power will be equivalent to its resistance; and, if increased, will overcome it.”

For the firmness whereby the parts of the obstacle, suppose wood, adhere to one another, is the resistance to be overcome by the wedge. See FIRMNESS, and RESISTANCE. Now it is evident, that while the wedge is drove into the wood, the way or length it has gone is BH, (*fig. 54.*) and DC is the way or length gone in the same time, by the impediment; that is, the parts C and D of the wood, are so far divided asunder: and according as the wedge is drove down farther and farther along its height; so the parts C and D of the wood, are distanced more and more, along the thickness of the wedge.

Hence,

Hence, if the thickness of the *wedges*, (that is, the way of the impediment, and consequently its velocity) be to the height of the *wedge* (that is, the way, and consequently the velocity of the power) as the power to the impediment, or resistance; then the momentum of the power, and the impediment, will be equal the one to the other; and consequently the power, being increased, will overcome the resistance.

Hence, 1^o. the power equivalent to half the resistance, is to it as AC to DC, *fig. 53*. that is, as the whole sine to the co-tangent of half the angle of the *wedge* ADC.—And, 2^o. as the tangent of a less angle is less than that of a greater, the power must have a greater proportion to half the resistance, if the angle be greater, than if less.—Consequently, the acuter the *wedge* is, the more does it increase the power.

To the *wedge* may be referred all edge-tools, and instruments which have a sharp point, in order to cut, cleave, slit, chop, pierce, bore, or the like; as knives, hatchets, swords, bodkins, &c.

WEDLOCK. See MARRIAGE, WIFE, HUSBAND, &c.

WEDNESDAY. See the article MONTH, DAY, &c.

WEDNESDAY. See the article ASH-Wednesday.

WEED, a common name of all rank and wild herbs, that grow of themselves, to the detriment of other useful herbs they grow among. See PLANT, HERB, &c.

Dyer's WEED, *woodwax*, or *genista tinctoria*. See DYING.

Fuller's WEED. See the articles THISTLE, and TEAZLE.

WEED, in the miners language, denotes the degeneracy of a load or vein of fine metal, into an useless magnatite.

WEEDS, also denote a peculiar habit, worn by the relicts of persons deceased, by way of mourning. See MOURNING.

WEEK, *Septimana*, *Hekdomada*, in chronology, a division of time, comprising seven days.

The origin of this division of *weeks*, or of computing time by sevenths, is greatly controverted.—Some will have it take its rise from the four quarters or intervals of the moon, between her changes of phases, which being about seven days distant, gave occasion to the division.

Be this as it will, the division is certainly very ancient.—The Syrians, Egyptians, and most of the oriental nations, appear to have used it from all antiquity: though it did not get footing in the west, till Christianity brought it in. the Romans reckoned their days not by sevenths, but by nines; and the ancient Greeks by decads or tenths.

Indeed, the Jews divided their time by *weeks*, but it was upon a different principle from the other eastern nations.—God himself having appointed them to work six days, and to rest the seventh, in order to keep up the sense and remembrance of the creation; which being effected in six days, he rested the seventh.

Some authors will even have the use of *weeks*, among the other eastern nations, to have proceeded from the Jews; but with little appearance of probability.—It is with better reason that others suppose the use of *weeks* among the heathens of the east, to be a reman of the tradition of the creation, which they had still retained with divers others.

This is the opinion of Grotius, *De Veritat. Relig. Christi*. Lib. I. who likewise proves, that not only throughout the east, but even among the Greeks, Italian, Celtic, Sclavi, and even the Romans themselves, the days were divided into *weeks*; and that the seventh day was in extraordinary veneration.—This appears from Joseph. *adv. Apion.* H. Philo. *De Creatione*, Clem. Alexand. *Strom.* Lib. V.—Though Heliodorus, Lib. I. cap. 24. Philostratus, Lib. III. cap. 13. Dion. Lib. XXXVIII. Tibullus, Lucian, Homer, Callimachus, Suetonius, Herodotus, &c. who mention the septenary division of days as very ancient, suppose it to have been derived from the Egyptians.

The *Days of the week* were denominated by the Jews, from the order of their succession from the sabbath.—Thus, the day next after the sabbath, they called the *first of the sabbath*, the next, the *second of the sabbath*, and so of the rest; except the sixth, which they call *paradeise*, or preparation of the sabbath.

The like method is still kept up by the Christian Arabs, Persians, Ethiopians, &c.—The ancient heathens denominated the days of the week from the seven planets; which names are still generally retained among the Christians of the west.—Thus, the first day was called *mon-day*, *dis solis*, the second *mon-day*, *dis lunæ*, &c. a practice the more natural on Dion's principle, who says, the Egyptians took the division of the week itself from the seven planets.

In effect, the true reason of these denominations seems to be founded in astrology.—For the astrologers, distributing the government and direction of all the hours in the week among the seven planets, $\text{H} \text{U} \text{O} \text{S} \text{S} \text{D}$, so as that the government of the first hour of the first day fell to Saturn, that of the second day to Jupiter, &c. they gave each day the name of the planet which, according to their doctrine, presided over the first hour thereof; and that, according to the order specified above; and which is included in the following technical verse.

V. L. II.

Post SIM SUM sequitur, pallida Luna subest.

Wherein, the capital letters SIM SUM and L, are the initial letters of the planets.—So that, the order of the planets in the *week*, bears little relation to that in which they follow in the heavens: the former being founded on an imaginary power each planet has, in its turn, on the first hour of each day.

Dion, Cassius gives another reason of the denomination, fetched from the celestial harmony.—For it being observed that the harmony of the diatessaron, which consists in the ratio of 4 to 3, is of great force and effect in music; it was judged meet to proceed directly from Saturn to the Sun; because, according to the old system, there are three planets between Saturn and the Sun, and four from the Sun to the Moon.

To find the accomplishment of Daniel's prophecy of the Messiah, the destruction, extending $\text{C} \text{C}$ of the temple. chap. ix. ver. 24, &c. the critics generally agree to understand *weeks of years*, instead of *weeks of days*.

EMER WEEKS. See the article EMBER.

Passion WEEK, or the *holy WEEK*, is the last *week* in Lent, wherein the church celebrates the mystery of our saviour's death and passion.

This is also sometimes called the *great week*.—Its institution is generally referred, both by Protestants and Papists, to the times of the apostles.—All the days of that *week* were held as fasts; no work was done on them; no justice distributed; but the prisoners were ordinarily set at liberty, &c. even pleasures otherwise allowed, were at this time prohibited. The oculum charitatis was now forbore; and divers mortifications practised by all sorts of people, and even the emperors themselves.

ROGATION WEEK. See the article ROGATION.

WEEK, or **WEEK** of a candle, &c. the cotton match in a candle or lamp. See CANDLE, LAMP, &c.

WEeping. See the article TEARS.

WEER. See the article WEAR.

WEFT, a kind of web, or thing woven: as, a *weft* or tress of hair. See WEB, HAIR, TRESS, &c.

WEIT. See the article WAIF.

WEIGHT, WAY, or **WEY,** *Waga*, a weight of cheese, wool, &c. containing 250 pounds avoirdupois.—Of corn, the *weight* contains 40 bushels; of barley or malt, 6 quarters.—In some places, as Essex, the *weight* of cheese is 300 pounds. See MEASURE.

* — *Et decimam casti sui de Hebraeis, prout in m. passim que pertinet ad ecclesiam de A. Mon. Angl. where passim seems to be a slip for a weight.*—Coke also speaks of *weights* of bay salt.

WEIGHHER, an officer in divers cities, appointed to weigh the commodities bought or sold, in a public balance, &c.

These *weighers* are generally obliged by oath, to do justice to both parties; and to keep a register of the things they weigh.—In Amsterdam there are twelve *weighers*, established into a kind of office.

As it was formerly allowed them to touch the fringes of the balance in weighing, it was easy for them to favour either the buyer or seller, according as the one gave them more money than the other.—To prevent which abuse, it was charged on them, by an ordinance of the burghmasters, in 1719, not to touch the balance in any manner whatever.

WEIGHING, the act of examining a body in the balance, to find its weight.

The distiller in London weigh their vessels when full; and for half a hoghead, which is 31 gallons and an half, allow 200 one quarter and 11 pounds for the cask and liquor.—For a puncheon, they allow 600 one quarter and 2 pounds; for a canary pipe 800 a half and 17 pounds.

WEIGHING-Chair, a machine contrived by Sanctiorius, to determine the quantity of matter carried off from the body, and that of food taken at a meal; and to warn the feeder when he had eat his quantum.

That ingenious author having observed, with many others, that a great part of our disorders arise from the excess in the quantity of our food, more than in the quality thereof; as also how much a fixed portion, once well used, a *weight*, if kept to regularly, continues to health; but on the smallest excess an expectation to that purpose.—The result was a *weighing-chair*: which was a chair fixed at one arm or a sort of balance, wherein a person being seated at meals, as soon as he had eat his allowance, the *weight* of his seat made his seat preponderate: so that descending to the ground, he felt his table, vitals, and all out of order.

WEIGHING of the air. See the article WEIGHT of air.

WEIGHING anchor, in the sea language, is the drawing up the anchor out of the ground it has been cast into; in order to fit sail, or quit a port, road, or the like. See ANCHOR.

The anchor is ordinarily *weighed*, or recovered by means of the capstan; sometimes by a *weight*.

WEIGHT, Gravity, Pondus, in physics, a quality in natural bodies, whereby they tend downwards, toward the centre of the earth.

Or, *weight* may be defined, in a less limited manner, to be a power inherent in all bodies, whereby they tend to some common point, called the *centre of gravity*; and that with a greater or less velocity, as they are more or less dense, or as the medium they pass through is more or less rare.

In the common use of language, *weight* and *gravity* are considered as one and the same thing. — Some authors, however, make a difference between them; and hold *gravity* only to express a *nisus*, or endeavour to descend; but *weight* an actual descent.

But there is room for a better distinction. — In effect, one may conceive gravity to be the quality, as inherent in the body; and *weight*, the same quality, exerting itself, either against an obstacle, or otherwise.

Hence, *weight* may be distinguished, like gravity, into *absolute*, and *specific*.

Sir Isaac Newton demonstrates, that the *weights* of all bodies, at equal distances from the centre of the earth, are proportionable to the quantities of matter each contains. — Whence it follows, that the *weights* of bodies have not any dependence on their forms, or textures; and that all spaces are not equally full of matter.

Hence also it follows, that the *weight* of the same body is different, on the surface of different parts of the earth; by reason its figure is not a sphere, but a spheroid.

The law of this difference, the same author gives in the following theorem. — “The increase of *weight* as you proceed from the equator to the poles, is, nearly, as the versed sine of double the latitude; or, which amounts to the same, as the square of the right sine of the latitude.”

Therefore, since the latitude of Paris is $48^{\circ} 50'$, that of a place under the equator $00^{\circ} 00'$; and that of a place under the pole $90^{\circ} 00'$; and the versed sines of the double latitudes are 11334.00000 and 20000, the radius being 10000; and the *weight* at the pole, is to the *weight* at the equator, as 230 to 229; and the excess of *weight* at the pole, to that at the equator, as 1 to 229: the excess of gravity in the latitude of Paris, to that under the equator, will be as $1 \times \frac{11334}{229}$ to 229, or as 5667, to 2290000; and therefore, the whole *weights* in those places, will be to each other as 2295667, to 2290000.

Hence, also, as the lengths of pendulums that perform their vibrations in equal times, are as their *weights*; and the length of a pendulum, which in the latitude of Paris vibrates seconds, is three Paris feet, and eight lines $\frac{3}{4}$: the length of a pendulum, that vibrates seconds under the equator, will be short of a synchronous pendulum at Paris, by one line, and an 87000th part of a line. — *Phil. Nat. Princ. Math. Lib. III. p. 382, &c.*

A body immersed in a fluid specifically lighter than itself, loses so much of its *weight*, as is equal to the *weight* of a quantity of the fluid of the same bulk with itself.

Hence, a body loses more of its *weight* in a heavier than in a lighter fluid; and therefore weighs more in a lighter, than a heavier fluid.

To find the *weight* of any quantity of a fluid, a. gr. of the wine contained in a hoghead. — Find the bulk or quantity of the liquor by the rules of gauging. See GAUGING.

Suspend a cubic inch of lead therein by a horse-hair; and by a balance note the *weight* lost. — This will be the *weight* of a cubic inch of the fluid.

Wherefore, since in a homogeneous fluid, the *weight* is proportionable to the bulk; the *weight* of the fluid will be found by the rule of three. — Thus, if the capacity of the hoghead be 88 cubic feet, and the cubic foot of wine be 68 pounds; the whole *weight* of the wine will be 5984.

The *weight* of a cubic foot of water, has been determined by several; but as in different springs, &c. the *weight* of the water is different, and there is even a difference in the same water at different times; it is no wonder the observations of the several authors should be found very different. — Dr Wiberd, by repeated experiments, found a cubic foot of water to weigh 76 pounds troy.

WEIGHT, Pondus, in mechanics, is any thing to be raised, sustained, or moved by a machine; or any thing that in any manner resists the motion to be produced. See MOTION, &c. In all machines, there is a natural ratio between the *weight* and the moving power. — If the *weight* be increased, the power must be so too; that is, the wheels, &c. are to be multiplied, and so the time increased, or the velocity diminished.

The centre of gravity F, (*Tab. Mechanicæ, fig. 55.*) of a body IH, together with the *weight* of the body, being given; to determine the point M, in which, lying on an horizontal plane, a given *weight* G, hung in L, cannot remove the body IH out of its horizontal situation.”

Conceive a *weight* hung in the centre of gravity F, equal to the *weight* of the whole body IH, and find the common centre of gravity M, of that and the given *weight* G. — If the point M be laid on the horizontal plane; the *weight* G will not be able to move the body IH out of its place.

Suppose, *z. gr.* F the centre of gravity of the staff, which is distant from its extremity, by the space IF 20 inches; the bucket of water to weigh 24 pounds, and the *weight* of the staff to be 2 L F = 18 ounces: we shall find $LM = LF.F.$ $(G + F) = 18.2 : 27 : 18 : 11 = 16\frac{2}{3}$; so that it is no wonder the bucket hung on the staff IH, laid on the table, does not fall.

“The centre of gravity C, (*fig. 56.*) of a body AB, together with its *weight* G, being given; to determine the points L and M, wherein props N and O are to be placed, that each may bear any given proportion of the *weight*.”

In the horizontal line AB, passing through the centre of gravity C, assume the right lines MC and CL in the given ratio. — Props, then, N, O, placed in these points, will be pressed in the given ratio.

Hence, if in the points M, L, in stead of props, you place the shoulders, or arms of porters, &c. they will be able to bear the burden alike; if their shares be proportioned to their strengths. — Thus we have a way of distributing a burden in any given ratio.

WEIGHT of the atmosphere. See ATMOSPHERE.

WEIGHT, in commerce, denotes a body of a known weight, appointed to be put in the balance against other bodies, whose weight is required.

These *weights* are usually of lead, iron, or brass; though in divers parts of the East-Indies they are common flints, and in some places, a sort of little beans.

The security of commerce depending, in good measure, on the justness of these *weights*; there is scarce any nation, but has taken proper measures to prevent the falsification thereof. — The surest means are the stamping, or marking them by proper officers, from some original or standard, deposited where recourse may be had to them.

This expedient is very ancient; and many authors are of opinion, that what among the Jews was called *shekel of the sanctuary*, was not any particular kind of *weight*, different from the common one; but a standard or original *weight*, preserved by the priests in the sanctuary. See SHEKEL, and SANCTUARY.

Thus, also, in England, the standard of *weights* is kept in the Exchequer, by a particular officer, called the *clerk*, or *comptroller of the market*. — In France, the standard *weight* is kept under several keys, in the cabinet of the court des Monnoyes. See STANDARD.

Most nations, wherein there is any thing of commerce flourishing, have their particular *weights*; and even sometimes different *weights* in the different provinces, and for the different kinds of commodities.

This diversity of *weights*, makes one of the most perplexing articles in commerce; but it is irremediable. — The reducing the *weights* of different nations to one, is not only impracticable; but even the reduction of those of the same nation: witness those vain attempts made for reducing the *weights* in France, by so many of their kings, Charlemain, Philip the long, Louis XI. Francis I. Henry II. Charles IX. Henry III. Louis XIV.

Weights may be distinguished into *antient*, and *modern*, *foreign*, and *domestic*.

Modern WEIGHTS, used in the several parts of Europe, and the Levant.

English WEIGHTS. — By the twenty seventh chapter of *Magna Charta*, the *weights* are to be the same all over England; but for different commodities there are two different sorts, *viz.* troy *weight*, and *avordupois weight*.

The origin from which they are both raised, is the grain of wheat, gathered in the middle of the ear.

In Troy **WEIGHT**, 24 of these grains make a penny *weight* sterling; 20 penny *weight* make an ounce; and 12 ounces a pound.

By this *weight* we weigh gold, silver, jewels, seeds, and liquors. — The apothecaries also use the troy pound, ounce, and grain; but they differ from the rest, in the intermediate divisions. — They divide the ounce into 8 drachms; the drachm into 3 scruples; and the scruple into 20 grains.

In **Avordupois WEIGHT**, the pound contains 16 ounces; but the ounce is less by near $\frac{1}{12}$ than the troy ounce; this latter containing 490 grains, and the former only 448. — The ounce contains 16 drachms — 80 ounces avordupois, are only equal to 73 ounces troy; and 17 pounds troy, equal to 14 pounds avordupois.

By *avordupois weight*, are weighed mercury and grocery wares, base metals, wool, tallow, hemp, drugs, bread, &c.

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Table of *Troy weight*, as used by the Goldsmiths, &c. Apothecaries.

Grains.			Grains.		
24	Penny-weight.		20	Scruple.	
480	20	Ounce.	60	3	Drachm.
5760	240	12 Pound.	480	24	8 Ounce.
			5760	288	96 12 Pound.

Table of *Averdupois weight*.

Scruples.			Grains.		
3	Drachm.		20	Scruple.	
24	8	Ounce.	60	3	Drachm.
384	128	16 Pound.	480	24	8 Ounce.
43008	14336	1792 112 Quintal, or Hundred.	5760	288	96 12 Pound.
86016	286720	35840 2240 20 Tun.			

The moneyers, jewellers, &c. have a particular class of weights, for gold and precious stones, viz. *carat*, and *grain*; and for silver, the *penny-weight*, and *grain*. The moneyers have also a peculiar subdivision of the *grain troy*: Thus;

The	{	Grain	into	{	20 Mites.
		Mite			24 Droits.
		Droit			20 Perits.
		Perit			24 Blanks.

The dealers in wool have likewise a particular set of weights, viz. the *jack*, *weigh*, *rod*, *stone*, and *clove*. See **WEIGH**, &c. — The proportion of which, see under the article **WOOL**.

French WEIGHTS. — The common or *Paris pound*, is 16 ounces; which they divide two ways: the first division is into two *marcs*, the marc into 8 ounces; the ounce into 8 *gras*; the *gras* into 3 *penny-weights*; the penny-weight into 24 grains; the grain equivalent to a grain of wheat. — The second division of the pound, is into 2 *half-pounds*; the half-pound into 2 *quarters*; the quarter into 2 *half-quarters*; the half-quarter into 2 ounces; and the ounce into two *half-ounces*.

The weights of the first division are used to weigh gold, silver, and the richer commodities: and the weights of the second division, for commodities of less value.

Grains.			Grains.		
24	Penny-weight.		24	Penny-weight.	
72	3	Gros.	72	3	Gros.
576	24	8 Ounce.	576	24	8 Ounce.
7008	192	64 8 Marc.	7008	192	64 8 Marc.
9216	384	128 16 2 Pound.	9216	384	128 16 2 Pound.

Half-ounce.			Half-ounce.		
2	Ounce.		2	Ounce.	
4	2	Half-quarter pound.	4	2	Half-quarter pound.
8	4	2 Quarter pound.	8	4	2 Quarter pound.
16	8	4 2 Half pound	16	8	4 2 Half pound
32	16	8 4 2 Pound.	32	16	8 4 2 Pound.
1200	160	800 400 200 100 Quintal.	1200	160	800 400 200 100 Quintal.

But the pound is not the same throughout France. — At Lyons, *c. gr.* the city pound is only 14 ounces: so that 100 Lyons pounds, make only 83 Paris pounds. — But beside the city pound, they have another at Lyons for silks, containing 16 ounces. — At Tholouse, and throughout the Upper Languedoc, the pound is 13 ounces and $\frac{1}{2}$ of Paris weight. — At Marfeilles, and throughout Provence, the pound is 13 ounces of Paris weight. — At Rouen, beside the common Paris pound and marc, they have the weight

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of the *viconte*; which is 16 ounces and $\frac{1}{2}$ and $\frac{1}{3}$ of the Paris weight.

The weights enumerated under the two articles of English and French weights, are the same that are used throughout the greatest part of Europe; only under somewhat different names, divisions, and proportions.

Particular nations, have also certain weights peculiar to themselves: Thus, Spain has its *arabos*, containing 25 Spanish pounds, or $\frac{1}{2}$ of the common quintal; its *quintal macho*, containing 150 pounds, or $\frac{1}{2}$ common quintal, or 6 *arabos*: its *adarme*, containing $\frac{1}{8}$ of its ounce. — And for gold, it has its *castellan*, or $\frac{1}{10}$ of a pound. — Its *toinin*, containing 12 grains, or $\frac{1}{4}$ of a castellan. The fame are in use also in the Spanish West-Indies.

Portugal has its *arropa*, containing 32 Lisbon *arratels*, or pounds: Savary also mentions its *feratelle*, containing two Lisbon pounds: and its *rottoli*, containing about 12 pounds. — And for gold, its *chebo*, containing four *carats*. — The same are used in the Portuguese East-Indies.

Italy, and particularly Venice, have their *migliaro*, containing four mirrs; the mirr containing 30 Venice pounds: the *faggio*, containing a sixth part of an ounce. — Genoa has five kinds of weights, viz. *large weights*, whereby all merchandizes are weighed at the custom-house: *cash-weights*, for plaisters, and other species: the *cantara*, or *quintal*, for the coarsest commodities: the large balance, for raw silks; and the small balance for the finer commodities. — Sicily has its *rottolo*, 32 and a half pounds of Messina. — Savary. Germany, Flanders, Holland, the Hanse towns, Sweden, Denmark, Poland, &c. have their *schippounds*, which at Antwerp and Hamburgh is 300 pounds; at Lubeck, 320; and at Coningsberg, 400 pounds. — In Sweden, the *schippund* for copper is 320 pounds; and the *schippund* for provisions 400 pounds. — At Riga, and Revel, the *schippund* is 400 pounds; and at Dantzic, 340 pounds; in Norway, 300 pounds; at Amsterdam, 300; containing 20 *lypponds*, each weighing 15 pounds. *ld.*

In Muscovy, they weigh their large commodities by the *bercheroll*, or *berkewits*, containing 400 of their pounds. — They have also the *poet*, or *poede*, containing 40 pounds, or $\frac{1}{5}$ of the *bercheroll*. *ld.*

In Turkey, at Smirna, &c. they use, what they call the *batman*, or *battemant*, containing six *occos*; the *occo* weighing 3 pounds $\frac{1}{2}$ English. — They have another *batman* much less, consisting, as the former, of six *occos*: but the *occo* only containing 15 ounces English: 44 *occos* of the first kind, make the Turkish *quintal*. — At Cairo, Alexandretta, Aleppo, and Alexandria, they use the *rotto*, *rottos*, or *rotoli*. The *rotoli* at Cairo, and other parts of Egypt, is 144 drachms; being somewhat over an English pound. — At Aleppo there are three sorts of *rotto*; the first 720 drachms, making about seven pound English, and serving to weigh cottons, galls, and other large commodities: the second is 624 drachms, used for all silks but white ones, which are weighed by the third *rotto* of 700 drachms. — At Seyda the *rotto* is 600 drachms.

The other ports of the Levant, though not named here, use some of these weights; particularly the *occo*, or *acqua*; the *rottoli*, and *rotto*.

To shew the proportion of these several weights to one another, we shall add a reduction of the divers pounds used throughout Europe, by which the other weights are estimated, to one standard pound, viz. the pound of Amsterdam, Paris, and Bourdeaux; as calculated with great accuracy by M. Ricard, and published in the new edition of his excellent *Traite de Commerce*, in 1723.

Proportion of the WEIGHTS of the chief cities in Europe, to those of Amsterdam.

An hundred pounds of Amsterdam, are equal to

108 Pounds of Alicant.	151 lb. of Bologna.
105 lb. of Antwerp.	100 lb. of Bourdeaux.
120 lb. of Archangel, or three poedes.	104 lb. of Bourg en Bresse.
105 lb. of Arschot.	103 lb. of Bremen.
120 lb. of Avignon.	125 lb. of Breslaw.
98 lb. of Bahl in Switzerland.	105 lb. of Bruges.
100 lb. of Bayonne in France.	105 lb. of Brussels.
166 lb. of Bergamo.	105 lb. of Cadiz.
97 lb. of Berg ap zom.	105 lb. of Cologne.
95 lb. $\frac{1}{2}$ of Bergen in Norway.	125 lb. of Coningsberg.
111 lb. of Bern.	107 lb. and $\frac{1}{2}$ of Copenhagen.
100 lb. of Befancon.	87 Rottos of Constantinople.
100 lb. of Bilbao.	113 lb. and $\frac{1}{2}$ of Dantzic.
105 lb. of Bois le duc.	100 lb. of Dort.
	97 lb. of Dublin.
	97 lb. of Edinburgh.
	143 lb. of Florence.

An

An hundred pounds of Amsterdam, are equal to

98 l. of Francfort on the Maine.	125 Berchervits of Muscovy.
105 l. of Gaunt.	100 l. of Nantes.
89 l. of Geneva.	106 l. of Nancy.
163 l. of Genoa, <i>cast-weight</i> .	109 l. of Naples.
102 l. of Hamburg.	98 l. of Nuremberg.
106 l. of Leiden.	100 l. of Paris.
105 l. of Leipzig.	112 l. and $\frac{1}{2}$ of Revel.
105 l. and $\frac{1}{2}$ of Liege.	109 l. of Riga.
114 l. of Lille.	100 l. of Rochel.
143 l. of Leghorn.	146 l. of Rome.
106 l. and $\frac{1}{2}$ of Lisbon.	100 l. of Rotterdam.
109 l. of London, <i>Averdu-pois weight</i> .	96 l. of Rouen, <i>Vicounty-weight</i> .
105 l. of Lovaine.	100 l. of S. Malo.
105 l. of Lubec.	100 l. of S. Sebastian.
141 l. and $\frac{1}{2}$ of Lucca, <i>light-weight</i> .	158 l. and $\frac{1}{2}$ of Saragosa.
116 l. of Lyons, <i>city-weight</i> .	106 l. of Seville.
114 l. of Madrid.	114 l. of Smirna.
105 l. of Malines.	110 l. of Stetin.
124 l. and $\frac{1}{2}$ of Marfeilles.	81 l. of Stockholm.
153 l. of Messina, <i>light-weight</i> .	118 l. of Tholouze, and Upper Langueadoc.
168 l. of Milan.	151 l. of Turin.
120 l. of Montpellier.	158 l. and $\frac{1}{2}$ of Valencia.
	182 l. of Venice, <i>small weight</i> .

WEIGHTS used in the several parts of the East-Indies, China, Persia, &c.—The Chinese weights are.—The *pie*, for large commodities; this is divided into 100 *cattis*, or *cattis*, though some say into 125: the *cattis* into 16 *taels*, or *tales*; each *tael* equivalent to $\frac{1}{16}$ of an ounce English, or the weight of one rial and $\frac{1}{2}$, and containing 10 *maus*, or *maffis*; and each *mau* 10 *condrins*. So that the Chinese *pie* amount to 13 pounds English *Averdupois*, and the *cattis* to 1 pound 8 ounces.—The *pieol*, for silk, containing 66 *cattis* and $\frac{1}{2}$: the *bahar*, *bakair*, or *barr*, containing 300 *cattis*.

Tonquin has all the same weights, measures, &c. as China. Japan has only one weight, viz. the *cattis*; which, however, is different from that of China, as containing 20 *taels*.—At Surat Agra, and throughout the states of the great mogul, they use the *man*, or *maund*, whereof they have two kinds; the *king's man*, or *king's weight*; and the *man*, simply so called: the first used for the weighing of common provisions, containing 40 *seers*, or *serres*; and each near a just Paris pound.

Though Tavernier will have the *seer* near a seventh less than the Paris pound.—The common *man*, used in the weighing of merchandize, confists likewise of 40 *seers*, but each *seer* is only estimated at 12 Paris ounces, or $\frac{1}{2}$ of the other *seer*.

The *man* may be looked on as the common weight of the East-Indies, though under some difference of name, or rather of pronunciation; it being called *mau* at Cambaya, and in other places *mein*, and *maun*.—The *seer* is properly the

Indian pound, and is of universal use: the like may be said of the *labar*, *tael*, and *cattis* abovementioned.

The weights of Siam are the *pie*, containing two *seham*, or *cattis*; but the Siamese *cattis* is only half the Japanese, the latter containing 10 *taels*, and the former only 10: though some make the Chinese *cattis* only 16 *taels*, and the Siamese 3. The *tael* contains 4 *baats*, or *ricals*; each about a Paris ounce: the *baat* 4 *selings*, or *mayons*: the *mayon* 2 *fouangs*: the *fouang* 4 *payes*: the *paye* 2 *clams*: the *sempaye*, half a *fouang*. Savar.

It is to be observed, that these are the names of their coins, as well as weights; silver and gold being, there, commodities sold, as other things, by their weights. See COIN, &c. In the Isle of Java, and particularly at Bantam, they use the *gantan*, which amounts to near three Dutch pounds.—In Golconda, at Visapur and Goa, they have the *suratelle*, containing 1 pound 14 ounces English: as also the *mangalis*, or *mangelin*, for weighing diamonds and precious stones; weighing at Goa 5 grams, at Golconda, &c. 5 $\frac{1}{2}$ grains.—They have also the *ratelo*, containing 14 $\frac{1}{2}$ ounces English: the *metriol*, containing the sixth part of an ounce: the *vall*, for plaques and ducats; containing the 73d part of a rial.

In Persia, they use two kinds of *latmans*, or *mans*; the one, called *cabi*, or *cheray*, which is the king's weight; and the other *batman* of *Tauris*, from the name of one of the chief cities of Persia.—The first weighs, according to Tavernier, 13 pounds 10 ounces English; the second, 6 pounds 2. According to Sir J. Chardin, the king's *batman* is 13 pounds 14 ounces, and the *batman* of *Tauris* 6 pounds 2.—Its divisions are the *ratel*, or a 16th; the *derhem*, or drachm, which is the 50th; the *mesfal*, which is half the *derhem*; the *dung*, which is the 8th part of the *mesfal*; being equivalent to 6 carat-grains; and lastly, the *grain*, which is the 4th part of the *dung*.—They have also the *calie*, which exceeds a little out ounce; the *fab-chway*, equal to the 1100th part of the *derhem*; and the *toman*, used to weigh out large payments or money, without telling: its weight is that of 50 *abalists*. Savar. See TOMAN.

African and American WEIGHTS.—We have little to say as to the weights of America: the several European colonies there, making use of the weights of the states or kingdoms of Europe which they belong to. For as to the *arene* of Peru, which weighs 27 pounds, it is evidently no other than the Spanish *arroba*, with a little difference in the name.

As to the weights of Africa, there are few places have any, except Egypt and the coasts of Africa, whose weights are enumerated among those of the ports of the Levant, &c.

As to the coasts beyond Cape Verde, viz. Guinea, Congo, to Sofala, Mozambique, &c. they have no weights; only the English, French, Dutch, Portuguese, and Danes have introduced their own weights in their respective settlements. The Isle of Madagascar, indeed, has its particular weights; but it has none that exceed the drachm, nor are they used for any thing but gold and silver.—Other commodities they never weigh.

Antient WEIGHTS.

Jewish Weights reduced to English Troy Weight.

Shekel.				l. oz. pwt. gr.
				00 : 00 : 09 : 02 $\frac{1}{2}$
60	Maneh.			02 : 03 : 06 : 10 $\frac{1}{2}$
3000	50	Talent.		113 : 10 : 01 : 10 $\frac{1}{2}$

Note, in reckoning money, 50 shekels made a maneh, but in weight, 160 shekels.

Grecian and Roman WEIGHTS reduced to English Troy Weight.

Lentes.										l. oz.	pwt.	gr.								
										0	00	00	$00\frac{1}{2}$							
4	Siliquæ									0	00	00	$03\frac{3}{4}$							
12	3	Obolus								0	00	00	$09\frac{1}{8}$							
24	6	2	Scriptulum								0	00	00	$18\frac{1}{4}$						
72	18	6	3	Drachina								0	00	02	$06\frac{2}{5}$					
96	24	8	$1\frac{1}{2}$	Sextula								0	00	03	$00\frac{6}{7}$					
144	36	12	6	2	$1\frac{1}{2}$	Sicilius								0	00	04	$13\frac{3}{4}$			
192	48	16	8	$2\frac{1}{2}$	2	$1\frac{1}{2}$	Duella								0	00	06	$01\frac{1}{4}$		
576	144	48	24	8	5	4	3	Uncia								0	00	18	$05\frac{1}{2}$	
12	1728	576	288	96	72	48	36	12	Libra								0	10	18	$13\frac{3}{4}$

The subdivisions of the Roman as, libra, or pound.

Unciæ, or ounces.
1 As, libra, &c. contained 12
$\frac{1}{12}$ Deunx --- 11
$\frac{1}{6}$ Dextans --- 10
$\frac{1}{4}$ Dodrana --- 9
$\frac{1}{3}$ Bes --- 8
$\frac{1}{2}$ Septunx --- 7
$\frac{1}{2}$ Semis --- 6
$\frac{1}{4}$ Quincunx --- 5
$\frac{1}{2}$ Triens --- 4
$\frac{1}{4}$ Quadrans --- 3
$\frac{1}{8}$ Sexans --- 2
$\frac{1}{16}$ Uncia --- 1

WEL

The Roman ounce is the English averdupoise ounce, which they divided into seven *denarii*, as well as eight *drachms*; and since they reckoned their denarius equal to the Attic drachm, this will make the Attic *weights* one eighth heavier than the correspondent Roman *weights*. Arbutn.

Note, The Grecians divided their *obolus* into *chali* and *halia*. Some, as Diodorus, and Suidas, divided the *obolus* into six *chali*, and every *chalcus* into seven *halia*. Others divided the *obolus* into eight *chali*, and every *chalcus* into eight *halia*, or *minuta*.

WEIGHT of the Air, is equal to the elasticity thereof.

To find the weight of a cubic inch of Air.—Weigh a round glass vessel full of common air, very accurately: then exhaust the air out of it: weigh the exhausted vessel, and subtract the latter weight from the former; the remainder is the weight of the air exhausted.

Find, then, the content of the vessel by the laws of measuring.—And the ratio of the remaining air to the primitive air. This done, the bulk of the remaining air is found by the rule of three; which being subtracted from the capacity of the vessel, the remainder will be the bulk of air extracted.—Or, if the air-pump be very tight, and the exhaustion continued as long as any air is got out, the remaining air will be so small, that it may be very safely neglected, and the content of the vessel taken for the bulk of the exhausted air. Having, therefore, the weight and bulk of the whole exhausted air, the weight of one cubic inch is easily had by the rule of three.

This method was first used by Otto Gueric, and afterwards by Burcher de Volder, who gives us the following particulars in his experiment.—1°. That the weight of the glass spherical vessel he made use of, full of common air, was 7 pounds, 1 ounce, 2 drams, 48 grains; when exhausted of air, 7 l. 10 s. 1 dr. 31 gr. and when full of water, 16 l. 12 oz. 7 dr. 14 gr. The weight of the air, therefore, was 1 dr. 12 gr. or 77 gr. the weight of the water 9 l. 11 oz. 5 dr. 43 gr. or 74743 gr. Consequently, the ratio of the specific gravity between water and air is 74743 : 77 : 1. Now, de Volder having found a cubic foot of water to weigh 64 pounds, by inferring, as 970 is to 1, so is 64 pounds to a fourth proportional; which, found by the rule of three, is the weight of a cubic foot of air, viz. one ounce, 27 gr. or 507 grains nearly. See AIR.

The weight of sea-water is different in different climates.—Mr Boyle having furnished a learned physician, going on a voyage to America, with a hydrostatic balance, and recommended him to observe, from time to time, the difference of weight he might meet withal, this account was returned him: That the sea-water increased in weight the nearer he came to the line, till he arrived at a certain degree of latitude, he remembers, about the 30th; beyond which, it retained the same specific weight, till he came to Barbadoes. See *Philosoph. Transact.* N° 18.

Gross WEIGHT.	} See the article	GROSS.
Neat WEIGHT.		NEAT.
Penny WEIGHT.		PENNY.
Assay of WEIGHT.		ASSAY.
Auncel WEIGHTS.		AUNCCEL Weight.

WELD, or **WOLD**, a plant used by the dyers to give a yellow colour; and for this reason called in Latin *Isotela*, of *Isotus*, yellow.

This plant grows wild on dry grounds: but it is also sown for use in a light ground, in the months of March or September; and is ripe in June, or July.—In hot countries it is frequently dry enough when gathered; but in colder, care must be taken to dry it.—Great circumspection is to be used, that it be not gathered before thorough ripe; as also to prevent its getting wet when gathered.

Weld is much cultivated in Kent, for the use of the London dyers.—With the help of pot-ashes, it yields a deep lemon colour; but either by the largeness of the proportion put into the liquor, or by taking from it a stronger, or lighter tincture, it serves to dye all colours between white and a deep yellow.—Its dye will hold well, except against urine and tartarous liquors.

WELD, or **WEALD**, in a chorographical sense. See **WEALD**.

WELDING Heat, a degree of heat which smiths give their iron in the forge, when there is occasion to double up the iron, and to weld a work in the doubling; so that the iron should grow into a lump thick enough for the purpose. It is also used when two bars of iron are to be joined together at the ends to make a length.

WELL, a hole dug under ground, below the level or surface of the water collected in the strata.

It is usually of a cylindrical figure, and commonly walled with stone, and lined with mortar.

M. Blondel informs the royal academy of sciences of a device they use in the lower Austria, which is unaccompanied with the mountains of Stiria, to fill their wells with water, viz. That they dig in the earth to the depth of 20 or 25 feet,

WER

till they come to a clammy earth, which they bore into, continuing the operation till the water breaks forcibly out: which water, in all probability, comes from the neighbouring mountains, in subterraneous channels.—Cassini observes, that in many places of Modena, and Bologna, they make themselves wells by the same artifice.—Mr Durham adds, that the like has been sometimes found in England, particularly in Essex. In the *Philosophical Transactions*, we are informed by Mr Norwood, that in Bermudas, wells of fresh water are dug within twenty yards of the sea, and even less, which rise and fall with the tides as the sea itself does.—He adds, that in digging wells in that island, they dig till they come almost to a level with the surface of the sea; and then they certainly find either fresh water or salt: if it prove fresh, yet by digging two or three feet deeper, they always come at salt-water. If it be sandy ground, they usually find fresh water; but if hard lime-stone rock, the water is commonly salt or brackish.

In the diocese of Paderborn in Westphalia, is a well which loses itself twice in 24 hours; returning always, after six hours absence, with great noise, and that so forcibly, as to drive three mills not far off.—The inhabitants call it the *bilderbourn*, q. d. the boisterous spring.—*Lay-well*, near Torbay, ebbs and flows very often every hour; though somewhat oftener in winter than in summer. Dr Oliver observes, its flux and reflux sometimes returns every minute, though at other times not above 26, or 28 times in an hour. *Philosoph. Transact.* N° 104.

WELL-Water. See the article **WATER**.

WELL, in the military art, denotes a depth which the miner sinks into the ground, from which he runs out branches or galleries, either to prepare a mine, or find out, and disappoint the enemy's mine.

WELL-HOLE, in building, is the hole left in a floor, for the stairs to come up through. See **STAIRS**.

WEN, a tumor, or excrescence, growing on divers parts of the body; consisting of a cystis, or bag, filled with some peculiar matter.

Of this, physicians usually reckon three kinds, according to the matter it is formed of, i. e. the humor contained therein.—If soft, resembling a pulp, the wen is called *atheroma*; if like honey, *meliceris*; and if like fuet, *steatoma*.

M. Laitre, in *Mem. de l'Acad. des Sciences*, adds a fourth kind, which he calls *lipoma*; by reason, the wen is formed of soft fat.

Wens are all, usually, of the like colour with the rest of the body; they begin from very little, and grow gradually. They are not dangerous, but frequently last a long while. Sometimes they degenerate into abscesses.—The cure is, to cut off the cystis by the root, which is always narrow.

In the *Philosophical Transactions*, we have an account of a very extraordinary wen, on the lower jaw of one Alexander Patmar, of Keith in Scotland.—It was 27 years in growing; as long as its enormous bulk, and the pain it gave him, together with its emaciating him exceedingly, determined him to have it cut off.—Dr Bowers assures us, its basis was five inches over, which should seem too large for the whole face, and that, with blood and all, it weighed one or two and twenty pounds.—Its form was spheroidal; and when measured, it was 34 inches about, one way, and 28 another.—It seemed to be an atheroma, being a glandulous substance, with several large blood-vessels in it, and hair growing on it. It was as sensible as any other part.—The hæmorrhage, after cutting it off, was stopped by the vitriolic powder, and the ordinary dressing being used, a cure was completed in six weeks time.

WENS of pearl. See the article **PEARL**.

WERE, **WERA**, in our old law books, signifies as much as *estimation capitis*, or *pretium hominis*; that is, so much as was antiently paid for killing a man.

When such crimes were punished with pecuniary mulcts, not death; the price was set on every man's head, according to his condition and quality.—*Were suum*, id est, *pretium, seu redemptionis*, his ransom. See **RANSOM**.

WERELADA, among our Saxon ancestors, the denying a homicide on oath, in order to be quit of the fine, or forfeiture called *were*.

Where a man was slain, the price at which he was valued was to be paid to the king, and his relations. For in the time of the Saxons, the killing a man was not punished by death, but by a pecuniary mulct, called *weru*.

If the party denied the fact, he was to purge himself by the oaths of several persons, according to his degree and quality.

—If the guilt amounted to four pounds, he was to have 18 jurors on his father's side, and four on his mother's: if to 24 pounds, he was to have fifty jurors. And this was called *werelada*.—*Homicidium weru solvatur aut werelada negetur*.

WERGILD, **WEREGILD**, in our antient customs, the price of a man's head: *pretium pro capite hominis occisi, homicidii*.

cedit pretium; which was paid partly to the king for the loss of his subject, partly to the lord whose vassal he was; and partly to the next of kin.

The *vergild* of an archbishop, and of an earl, was 15000 thrimils. Selden's *Titles of Honour*.---That of a bishop, or alderman, 8000; that of a general, or governor, 4000; that of a priest, or thane, 2000; that of a king, 30000; half was to be paid to his kindred, and the other half to the nation.

WEST, *Occidens, Ocasus*, in cosmography, one of the cardinal points of the horizon; diametrically opposite to the east.

West is strictly defined, the intersection of the prime vertical with the horizon, on that side the sun sets in. See *SETTING*. To draw a true west-line. See *MERIDIAN*.

WEST, in astronomy, is chiefly used for the place in, or towards which the sun or stars sink under the horizon.---Thus, we say, the Sun, Mars, &c. are in the *west*.

The point the sun sets in, when in the equator, is particularly called the *equinoctial west*, or *point of true west*.

WEST, and WESTERN, in geography, are applied to certain countries, &c. situate towards the point of sun-setting with respect to certain others.

Thus, the empire of Rome, antiently, and of Germany, at present, is called the *empire of the west*, or *western empire*; in opposition to that of Constantinople, which is called the *empire of the east*.

The Latin or Roman church, is called the *western church*; in opposition to the Greek church.

The French, Spaniards, Italians, &c. are called *western nations*, in respect to the Asiatics; and America, the *West-Indies*, in respect of the East-Indies.

WEST-WIND, is also called *zephyrus*, and *favonius*. See *WIND*.

WEST-SAXONLAGE, or the law of the West-Saxons. See *LAW*.

WEST-India Companies.	} See the article	COMPANY.
WEST Dial.		DIAL.
Mooring for WEST.		MOORING.
WESTERN Amplitude.		AMPLITUDE.
WESTERN Church.		CHURCH.
WESTERN Horizon.		HORIZON.
WESTERN Ocean.		OCEAN.

WESTPHALIA-Ham. See the article HAM.

WET-GLOVER, a dresser of the skins of sheep, lambs, goats, &c. which are slender, thin, and gentle.

WET Dock. See the article DOCK.

WEY. See the article WICK.

WHALE, in astronomy, one of the constellations. See *CETUS*.

WHALE-Bone, a commodity procured from the *whale*, used as a stiffening in stays, fans, busks, screens, &c.

There are many kinds of *whales*; but two principal; one retaining that name, the other called *cachalot*.---The difference consists in this, that the *cachalot* has teeth, and the *whale*, properly so called, instead of teeth, has a kind of whiskers in his throat, about a span broad, and 15 feet long, ending in a sort of fringe, much like swine's bristles. They are set in the palate, and do in some measure, the office of teeth.---These whiskers, split and fashioned, are what we call *whalebone*.---The pizzle, or genital member of the animal, serves also for the same sort of uses.

WHALE-Fins, a name improperly given to *whalebone*.

WHALE-Fishery. See the article FISHERY.

WHARF, a space on the banks of a haven, creek, or hithe; provided for the convenient loading and unloading of vessels upon.

The fee paid for the landing of goods on a *wharf*, or for shipping them off, is called *wharfage*.---And the person who has the oversight and direction of the *wharf*, receives *wharfage*, &c. is called the *wharfinger*.

WHORLES of flowers, among herbalists, are rows of lesser flowers, set at certain distances about the main stalk or spike, as in penny-royal, &c.

WHEAT, *Triticum*. See the article CORN.

WHEEL, *Rota*, in mechanics, a simple machine, consisting of a round piece of wood, metal, or other matter; which revolves on an axis.

The *wheel* is one of the principal mechanic powers.---It has place in most engines; in effect, it is of an assemblage of wheels, that most of our chief engines are composed.---Witnells clocks, mills, &c.

Its form is various, according to the motion it is to have; and the use it is to answer.---By this it is distinguished into *simple*, and *dented*.

Simple WHEELS, are those whose circumference and axis is uniform, and which are used singly, and not combined.---Such are the *wheels* of carriages; which are to have a double motion: the one circular about their axis; the other rectilinear; by which they advance a long the road, &c. which two motions they appear to have; though, in effect, they have

but one: it being impossible the same thing should move or be agitated two different ways at the same time.

This one is a spiral motion; as is easily seen, by fixing a piece of chalk on the face of a *wheel*, so as it may draw a line on a wall, as the *wheel* moves.---The line it here traces, is a just spiral, and fill the more curve, as the chalk is fixed nearer the axis.---For a very nice phenomenon, in the motion of these *wheels*, see *ROY A. Aristotelica*.

We shall add, that in *wheels* of this kind, the height should always be proportioned to the stature of the animal that draws or moves them.---The rule is, that the load, and the axis of the *wheels* be of the same height with the power that moves them: otherwise, the axis being higher than the beast, part of the load will lie upon him; or, if it be lower, he pulls to disadvantage, and must exert a greater force. Though Stevinus, Dr Wallis, &c. shew, that to draw a vehicle, &c. over waste, uneven places, it were best to fix the traces to the *wheels* somewhat lower than the horse's breast.

The power of these *wheels* results from the difference of the radii of the axis, and circumference.---The canon is this: "As the radius of the axis is to that of the circumference, so

"is any power, to the weight it can sustain hereby."

This is also the rule in the axis in *peritrochio*; and, in effect, the *wheel*, and the axis in *peritrochio*; are the same thing; only, in theory, it is usually called by the latter name, and in practice, by the former.

Dented WHEELS, are those either whose circumference, or axis, is cut into teeth, by which they are capable of moving and acting on one another, and of being combined together.

The use of these is very conspicuous in clocks, jacks, &c. The power of the *dented wheel* depends on the same principle, as that of the simple one.---It is only that to the simple axis in *peritrochio*, which a compound lever is to a simple lever.

Its doctrine is comprised in the following canon, *viz.*---"The ratio of the power to the weight," in order for that to be equivalent to this, "must be compounded of the ratios of the diameter of the axis of the last *wheel* to the diameter of the first; and of the ratio of the number of revolutions of the last *wheel*, to those of the first, in the same time."---But this doctrine will deserve a more particular explication.

1°. Then, if the weight be multiplied into the product of the radii of the axis, and that product be divided by the product of the radii of the *wheels*, the power required to sustain the weight will be found.---Suppose, *e. gr.* the weight *A*, (*Tab. Mechanicæ*, fig. 63.) = 6000 pounds, BC = 6 inches, CD = 34 inches, EF = 5 inches, EG = 35 inches, HI = 4 inches, HK = 27 inches. Then will BC, EF, HI = 120; and CD, EG, IK = 32130.---Hence the power, required to sustain the weight, will be 6000, 120 : 32130 = 22 $\frac{1}{3}$ very nearly; a small addition to which will raise it.

2°. If the power be multiplied into the product of the radii of the *wheels*, and the factum be divided by the product of the radii of the axis; the quotient will be the weight which the power is able to sustain.---Thus, if the power be 22 $\frac{1}{3}$ of a pound, the weight will be 6000 pounds.

3°. "A power and a weight being given, to find the number of *wheels*, and in each *wheel*, the ratio of the radius of the axis, to the radius of the *wheel*." So, as that the "power being applied perpendicularly to the periphery of the last *wheel*, may sustain the given weight."

Divide the weight by the power: resolve the quotient into the factors which produce it.---Then will the number of factors, be the number of *wheels*; and the radii of the axes will be to the radii of the *wheels*, as unity to the several *wheels*.---Suppose, *e. gr.* a weight of 3000 pounds, and a power of 60, is 500, which resolves into these factors, 4.5.5.5. Four *wheels* are to be made, in one of which, the radius of the axis is to the radius of the *wheel*, as 1 to 4: in the rest, as 1 to 5.

4°. If a power move a weight by means of two *wheels*, the revolutions of the slower *wheel*, are to those of the swifter, as the periphery of the swifter axis, is to the periphery of the *wheel* that catches on it.

Hence, 1°. the revolutions are as the radius of the axis F E, to the radius of the *wheel* D C.---2°. Since the number of teeth in the axis F D, is to the number of teeth in the circumference of the *wheel* M, as the circumference of that to the circumference of this: the revolutions of the slower *wheel* M, are to the revolutions of the swifter N, as the number of teeth in the axis, to the number of teeth in the *wheel* M it catches into.

5°. If the factum of the radii of the *wheels* G D, D C, be multiplied into the number of revolutions of the slowest *wheel* M; and the product be divided by the factum of the radii of the axes which catch into them, G H, D E, &c. the quotient will be the number of revolutions of the swiftest wheel

W H E

wheel O. E. gr. $HGE=8$, $DC=12$, $GH=4$, $DE=3$, and the revolution of the *wheel* M be one; the number of revolutions of the *wheel* O will be 8.

6°. If a power move a weight by means of divers *wheels*, the space passed over by the weight, is to the space of the power, as the power to the weight.—Hence, the greater the power, the faster is the weight moved; and vice versa.

7°. The spaces passed over by the weight and the power, are in a ratio compounded of the revolutions of the slowest *wheel*, to the revolutions of the swiftest; and of the periphery of the axis of that, to the periphery of this.—Hence, since the space of the weight and the power are reciprocally as the sustaining power is to the weight; the power that sustains a weight, will be to the weight, in a ratio compounded of the revolutions of the slowest *wheel*, to those of the swiftest, and of the periphery of the axis of that, to the periphery of this.

8°. "The periphery of the axis of the slowest *wheel*, with "the periphery of the swiftest *wheel*, given; as also, the "ratio of the revolutions of the one, to those of the other: "to find the space which the power is to pass over, while "the weight goes any given length."

Multiply the periphery of the axis of the slowest *wheel*, into the antecedent term of the ratio, and the periphery of the swiftest *wheel*, into the consequent term; and to these two products, and the given space of the weight, find a fourth proportional: this will be the space of the power.—Suppose, *e. gr.* the ratio of the revolutions of the slowest *wheel*, to those of the swiftest, to be as 2 to 7; and the space of the weight 30 feet: and let the periphery of the axis of the slowest *wheel*, be to that of the swiftest, as 3 to 8. The space of the power will be found 280.

9°. "The ratio of the peripheries of the swiftest *wheels*, and "of the axis of the slowest; together with the ratio of their "revolutions, and the weight, being given: to find the "power able to sustain it."

Multiply both the antecedents, and the consequents of the given ratios into each other: and to the product of the antecedents, the product of the consequents, and the given weight, find a fourth proportional. That will be the power required.—Suppose, *e. gr.* the ratio of the peripheries 8:3, that of the revolutions 7:2; and the weight 2000: the power will be found 214 $\frac{2}{3}$.—After the same manner may the weight be found; the power and the ratio of the peripheries, &c. being given.

10°. "The revolutions the swiftest *wheel* is to perform, "while the slowest makes one revolution, being given; "together with the space the weight is to be raised, and the "periphery of the slowest *wheel*; to find the time that will "be spent in raising it."

Say, as the periphery of the axis of the slowest *wheel* is to the space of the weight given; so is the given number of revolutions of the swiftest *wheel*, to a fourth proportional; which will be the number of revolutions, performed while the weight reaches the given height.—Then, by experiment, determine the number of revolutions the swiftest *wheel* performs in an hour; and, by this, divide the fourth proportional found before.—The quotient will be the time spent in raising the weight.

WHEELS of a clock, &c. are the crown *wheel*, contrat *wheel*, great *wheel*, second *wheel*, third *wheel*, striking *wheel*, dent *wheel*, &c.

WHEELS of coaches, waggons, &c.—In the *Philosophical Transactions*, we have some experiments, shewing the advantages of high *wheels* in carriages of all kinds: the results of the experiments amount to this:

1°. That, four *wheels* of 5 $\frac{1}{2}$ inches high, viz. one half of the ordinary height of the *wheels* of a waggon, draw a weight of 50 $\frac{1}{2}$ l. averdupoise up an inclined plane, with less power by six ounces, than two of them matched with two smaller ones of 4 $\frac{1}{2}$ inches height.

2°. That any vehicle might be much more easily drawn in rough ways, if the fore *wheels* were as high as the hind *wheels*, and the thills fixed under the axis.

3°. That such a vehicle would likewise be drawn more easily where the *wheels* cut in clay, sand, &c.

4°. That high *wheels* would not cut so deep as low *wheels*.

5°. That low *wheels* are indeed best for turning in a narrow compass.

Potter's WHEEL. See the article POTTERY.

Aristotle's WHEEL.

Measuring WHEEL.

Persian WHEEL.

Water WHEEL.

WHEEL is also the name of a kind of punishment, which great criminals are put to in divers countries.

In France, their assassins, parricides, and robbers on the highway, are condemned to the *wheel*, i. e. to have their bones first broke with an iron bar on a scaffold, and then to be expoled, and left to expire on the circumference of a *wheel*.—In Germany, they break their bones on the *wheel* itself.

W H I

This cruel punishment was unknown to the antients; as is observed by Cujas.—It is not certain who was the inventor.—Its first introduction was in Germany. It was indeed but rarely practised any where else, till the time of Francis I. of France; who, by an edict of the year 1534, appointed it to be inflicted on robbers on the highway. Richetlet dates the edict in the year 1538, and quotes Brodæus, *Miscell.* L. II. c. 16.

WHEEL, in the military art, is the word of command, when a battalion or squadron is to alter its front, either one way, or the other.

To *wheel to the right*, the man in the right angle is to turn very slowly, and every one to *wheel* from the left to the right, regarding him as their centre: and vice versa, when they are to *wheel to the left*.

When a division of men are on the march, if the word be *wheel to the right*, or to the left, then the right or left-hand man keeps his ground, turning only on his heel, and the rest of the rank move about quick, till they make an even line with the said right or left-hand man.

Squadrons of horse *wheel* much after the same manner.

WHEEL-BAROMETER. See the article BAROMETER.

WHEEL-Fire, among chymists, a fire used for calcining metallick substances; properly called *ignis rote*.

It is a fire which only encompasses the crucible, coppel, or melting-pot, around the sides, without touching it in any part.

WHERLICOTES, a sort of open chariots, of the antient Britons invention, used by persons of quality, before the invention of coaches.

WHERRY. See the articles VESSEL, BOAT, &c.

WHETSTONE, *Cor.* a sort of stone of a lax composition, and coarse grain; serving for the whetting or sharpening knives, and other tools upon.

WHEY, the serum or watery part of milk.

WHIFFLER, of a company in London, a young freeman, who goes before, and waits on the company, on occasions of public solemnity.

WHIGS, a party or faction in England, opposite to the *tories*.

The origin of the names of these two mighty factions is very obscure.—If some little trivial circumstance, or adventure which escapes the knowledge of mankind, give the name to a party, which afterwards becomes famous, posterity labours in vain to find the original of such a name: it searches the sources, forms conjectures, invents reasons, and sometimes indeed meets the truth, but always without knowing it assuredly.

Thus, in France, the Calvinists are called *Huguenots*; yet no body was ever able certainly to assign the cause of that appellation.

Whip is a Scottish, and some say, too, an Irish word, literally signifying *why*—*Tory* is another Irish word, signifying a *robber*, or *highwayman*.

Under the reign of king Charles the second, while his brother, then duke of York, was obliged to retire into Scotland, there were two parties formed in that country.—That of the duke, was strongest, persecuted the other, and frequently reduced them to fly into the mountains and woods, where those unhappy fugitives had often no other subsistence for a long time, but cows milk.—Hence, they called these their adversaries, *tories*, *q. d.* robbers; and the *tories* upbraiding them with their unhappiness, from the milk whereof they lived, called them *whigs*.—From Scotland the two names came over with the duke into England.

Others give the origin and etymology of the two words thus:

—During the unhappy war which brought king Charles I. to the scaffold, the partizans of that prince were at first called *cavaliers*; and those of the parliament, *round-heads*.—Now, *tory* was a name for a kind of banditti in Ireland, who sheltered themselves in the mountains, and the islands formed by the bogs; as, then, the king's enemies charged him with favouring the rebellion in Ireland, which broke out at that time, they changed the name *cavalier* into that of *tory*.—And these last, to be even with their enemies, who were strictly leagued with the Scots, changed *round-heads* for *whigs*, the name of a sort of enthusiasts in Scotland, who living in the open fields and woods, fed much on milk.—*Disfert. de Al. Rapin l'obayes sur les whigs & les torys. Hays Au. 1717.*

WHINE, a hunting term, used in respect of the cry of an otter.

WHIP, or **WHIP-STAFF**, in a ship, a piece of timber in form of a strong staff, fastened into the helm, for the steersman, in small ships, to hold in his hand; thereby to move the rudder, and direct the ship.—See *Tau. Ship. fig. 2. n. 103.*

WHIP-Grafting. } See the article } **INGRAFTING.**

WHIP-Saw. } **WHIP-SAW.**

WHIPPER. See the article FISHING.

WHIPPING, a term used by anglers, when they fasten a line to the hook, or rod.

The word is also taken for the casting in of the hook, and drawing it gently on the water.

WHIPT

WHIPT Syllab. See the article SYLLABUS.
WHIRL-POOL, an eddy, vortex, or gulph, where the water is continually turning round. See GULPH, EDDY, VORTEX, &c.

WHIRL-WIND, a wind that rises suddenly, and is exceedingly rapid, and impetuous when risen, but is soon spent. There are divers sorts of *whirl-winds*, distinguished by their peculiar names; as the *prester*, *typho*, *turbo*, *exhydia*, and *cenephias*.

The *prester* is a violent wind, breaking forth with flashes of lightning.—This is rarely observed; scarce ever without the *cenephias*.—Seneca says, it is a *typho*, or *turbo*, kindled or ignited in the air.

The *cenephias* is a sudden and impetuous wind, breaking out of some cloud; frequent in the *Aethiopic* sea, particularly about the Cape of Good Hope.—The seamen call them *travados*.

The *exhydia* is a wind bursting out of a cloud, with a great quantity of water.—This only seems to differ in degree from the *cenephias*, which is frequently attended with showers.

A *typho* or *vortex*, most properly called a *whirl-wind*, or *hurricane*, is an impetuous wind, turning rapidly every way, and sweeping all round the place.—It frequently descends from on high.—The Indians call it *orancari*, the Turks, &c. *aliphant*.—It is frequent in the eastern ocean, chiefly about Siam, China, &c. and renders the navigation of those parts exceeding dangerous.

WHISPERING. See HEARING, ATTENTION, &c.

WHISPERING-Places depend on this principle, that the voice being applied to one end of an arch, easily rolls to the other.

Accordingly, all the contrivance in a *whispering-place* is, that near the person who whispers there be a smooth wall, arched either cylindrically, or elliptically.—A circular arch will do, but not so well.

Places famed for the conveyance of *whispers*, are the prison of Dionysius at Syracuse, which increased a soft *whisper* to a loud noise, the clap of one's hand to the found of a cannon, &c.—The aqueducts of Claudius, which carried a voice sixteen miles; and divers others, enumerated by Kucher in his *Phonurgia*.

The most considerable in England, are, the dome of St Paul's, London, where the ticking of a watch may be heard from side to side; and a very easy *whisper* be sent all round the dome.—This Mr Derham found to hold not only in the gallery below, but above upon the scaffold, where a *whisper* would be carried over one's head round the top of the arch, though there be a large opening in the middle of it into the upper part of the dome.

And the famous *whispering-place* in Gloucester cathedral, which is no other than a gallery above the east end of the choir, leading from one side thereof to the other.—It consists of five angles, and six sides, the middlemost of which is a naked window; yet two *whisperers* there hear each other at the distance of twenty five yards.

WHITE, one of the colours of natural bodies.

White is not so properly said to be any one colour, as a composition of all the colours; it being demonstrated by Sir Isaac Newton, that those bodies only appear *white*, which reflect all the kinds of coloured rays alike.

Hevelius affirms it as a thing most certain, that in the northern countries, animals, as hares, foxes, bears, &c. become *white* in the winter-time; and in summer resume their natural colours.

Black bodies are found to take heat sooner than *white* ones; by reason the former absorb or imbibe rays of all kinds and colours, and the latter reflect all.

Thus, black paper is sooner put into flame by a burning-glass, than *white*; and hence black clothes hung up by the dyes in the sun, dry sooner than *white* ones.

WHITE Arsenic.	} See the article	ARSENIC.
WHITE Ashes.		ASHES.
WHITE Cinnamon.		CINNAMON.
WHITE Copperas.		COPPERAS.
WHITE Cordage.		CORDAGE.
WHITE Diachylon.		DIACHYLON.
WHITE Eagle.		EAGLE.

WHITE of the Eye, denotes the first tunic or coat of the eye, called *albuginea*, and *conjunctiva*, because serving to bind together, or inclose the rest.

WHITE Flag. } See the article } FLAG.
WHITE Frost. } FROST.

WHITE-Friars, a name common to several orders of monks, from their being clothed in a *white* habit. See MONK, HABIT, &c.

Such are the regular canons of S. Augustin, the Premonstratenses, and Bernardines.

WHITE Glass. See the article GLASS.

WHITE-hart Silver, *candidi corvi Argentum*, a tribute or mulct paid into the exchequer, out of certain lands in or near the

forest of *White-hart* in Dorsetshire; which was continued from Henry the third's time, who first imposed it upon Thomas de la Linde, and others, for killing a beautiful *white hart*, which that king had purposely spared in hunting.

WHITE Hellebore. See the article HELLEBORE.

WHITE Lead, is a sort of rust of lead; or lead dissolved with vinegar; much used by the painters.

It is prepared two ways:—either by reducing the lead into thin laminae, steeping them in strong vinegar, and every ten days scraping off the rust formed on the surface: and repeating this till the lead be quite consumed.

Or, by rolling the laminae into cylinders like sheets of paper, only so as that there be a little space left between the several folds or turns.—These laminae they suspend in the middle of earthen pots, at the bottom of which is vinegar.—The pots being well closed, are buried in a dunghill for thirty days; after which, being opened, the lead is found, as it were, calcined, and reduced into what they call *cerusse*, or *white lead*, this is to be broke into pieces, and dried in the sun.

It is used both in painting in oil and in water-colours, and makes a good colour in each.—But it is somewhat mischievous both in the grinding and using it, as being a dangerous poison.

Of this *white lead* it is that the paint used by the ladies, called *cerusse*, is made.

WHITE Line, among printers, a void space greater than usual, left between two lines. See PRINTING.

WHITE Line, in anatomy. See the article LINEA ALBA.

WHITE Linen, is cloth of hemp, or flax, bleached by divers lyes, and waterings on the ground.

WHITE Meats, include milk, butter, cheese, white-pots, custards, and other foods coming of milk, or eggs. Some add also fish, veal and chickens.

WHITE Money, Libra alba. See the article MONEY.

WHITE Mortar. } Mortar.

WHITE Order. } See the article } ORDER.

WHITE Paper, is that intended for writing, printing, &c. in contradistinction to brown paper, marbled paper, blotting paper, &c.

WHITE Pepper. See the article PEPPER.

WHITE-Pot, denotes milk or cream baked with the yolks of eggs, fine bread, sugar, and spice, in an earthen pot.

The cooks furnish us with a variety of dishes under this form and denomination, such are *Norfolk white-pot*, *Westminster white-pot*, *rice white-pot*, &c.

WHITE Precipitate. See the article MERCURY.

WHITE Rent, a rent or duty of 8 d. payable yearly, by every tinner in the county of Devon, to the duke of Cornwall.

WHITE Salt, is common, or sea-salt, dried and calcined by the fire, so as not to leave any moisture therein.—The chymists call it *depreciated salt*.

There are some salts naturally *white*; and others that need to be *whitened*, either by dissolving and purifying them in fair water, which is afterwards evaporated; or by means of fire; or by the sun.

WHITE Sauce, a sort of sauce made of blanched almonds, and the breast of a capon, pounded together with cloves, cinnamon, &c.—We also hear of *white broth*, which is a sort of broth enriched with sack, and spices, having blanched almonds scraped into it, and the whole thickened with the yolks of eggs, &c.

WHITE Soap. See the article SOAP.

Spanish WHITE, is a kind of fucus used by the ladies to *whiten* the complexion, and hide the defects thereof.—It is made of tin-galls dissolved in spirit of nitre, and precipitated into a very fine powder, by means of salt-water. See BIS-MUTH, &c.

WHITE Spurs. } Esquire.

WHITE Star. } Star.

WHITE Sugar. } Sugar.

WHITE Tartar. } Tartar.

WHITE Varnish. } Varnish.

WHITE Vitriol. } Vitriol.

WHITE Wax, is yellow wax blanched, and purified by the sun and dew. See WAX.

WHITE Wine, is that of a clear, bright, transparent colour, bordering on white.—It is thus called, to distinguish it from the red wines, or clarets.

The generality of *white-wines* are made from white grapes; though there are some from black ones, only the skins are carefully kept from tinging them.

WHITENESS, Albedo, the quality which denominates a body *white*. See WHITE, and COLOUR.

Sir Isaac Newton shews, that *whiteness* consists in a mixture of all the colours; and that the light of the sun is only *white*, because consisting of all colours.

From the multitude of rings of colours, which appear upon compressing two prisms, or object-glasses of telescopes together, it is manifest, that these do so interfere and mingle with one another at last, as, after eight or nine reflexions, to dilute

dilute one another wholly, and constitute an even and uniform *whiteness*: whence, as well as from other experiments, it appears, that *whiteness* is certainly a mixture of all colours; and that the light which conveys it to the eye, is a mixture of rays indued with all those colours.

The same author shews, that *whiteness*, if it be most strong and luminous, is to be reckoned of the first order of colours; but if less, as a mixture of the colours of several orders: of the former sort he reckons white metals; and of the latter, the *whiteness* of froth, paper, linen, and most other white substances. — And as the white of the first order is the strongest that can be made by plates of transparent substances, so it ought to be stronger in the denser substances of metals, than in the rarer ones of air, water, and glass.

Gold or copper mixed either by fusion, or amalgamation with a very little mercury, with silver, tin, or regulus of antimony, become white; which shews, both that the particles of white metals have much more surface, and therefore are smaller than those of gold or copper; and also, that they are so opaque, as not to suffer the particles of gold or copper to shine through them. — And as that author doubts not, but that the colours of gold and copper are of the second or third order, therefore the particles of white metals cannot be much bigger than is requisite to make them reflect the white of the first order.

WHITENING. } **BLEACHING.**

WHITENING of Hair. } See the article } **HAIR.**

WHITENING of Wax. } See the article } **WAX.**

WHITES, in medicine. See the article **FLUOR ALBUS**.

WHITLOW, or **WHITLOE**, the popular name for what the physicians commonly call *paranis*. Which see.

WHITSUN Farthings. See the article **PENTECOSTALS**.

WHITSUNTIDE, the fiftieth day after Easter. See **EASTER**, **FEAST**, &c.

The season properly called *Pentecost*, is popularly called *Whitsuntide*; some say, because in the primitive church, those who were newly baptized came to church between Easter and Pentecost in white garments.

Whitsunday always falls between the 9th of May, and the 14th of June, exclusive.

WHOLE, *Totum*, in arithmetic, &c. See **PART**, **DIVISION**, **PARTITION**, &c.

WHOLE Measure. } **MEASURE.**

WHOLE Number. } See the article } **NUMBER.**

WHOLE Sine. } **SINE.**

WHODDINGS, or **HOODINGS**, a sea term, used for planks joined and fastened along the ship's sides into the stem.

WHORE. See **COURTESAN**, **HARLOT**, **CONCUBINE**, &c.

WHORLBAT, or **HURLBAT**, a kind of gauntlet, or leathern strap laden with plummets; used by the ancient Romans in their solemn games, and exercises; and by them called *castrus*. See **CÆTUS**.

WHUR, in falconry, denotes the fluttering of partridges, or pheasants, as they rise.

WIC, denotes a place on the sea-shore, or on the bank of a river—though, in the original Saxon, it more properly signifies a *street*, *village*, or *dwelling-place*; as also a *castle*. See **WYKE**.

We often meet with *wic* in the Saxon writers, as a termination of the name of a town, which had a complete name without it: — as, *Lunden-wic*; that is, London town; which signifies no more than *London*. — In the Saxon *Annals*, it is mentioned, that king Æthelbert made Melitus bishop of *Lunden-wic*. — So, Ipswich is written in some old charters, *villa de Gippo*, and sometimes *villa de Gippo wico*; which is no variance, but the same thing; for *Gippo* is the complete name, and *Gippo-wic* is *Gippo town*.

WICKER, a twig of the osier shrub, single or wrought.

WICKET, of the French *guichet*, a little door within a gate; or a hole in a door, through which to view what passes without.

WICKLIFFISTS, or **WICKLIFFITES**, a religious sect, who had their rise in England, and their name from their leader *John Wickliff*; a professor of divinity in the university of Oxford.

To that immortal author it is we owe the first hint of the great reformation, effected 200 years after him.

Wickliff maintained, that the substance of the sacramental bread and wine still remained such after consecration. — He also opposed the doctrine of purgatory, indulgences, the invocation of saints, and the worship of images.

He made an English version of the Bible; and composed two large volumes, called *Altheia*; that is, *truth*; which was the source whence John Hus first learned most of his doctrines.

The archbishop of Canterbury called a council against *Wickliff*, and he was condemned therein; but the good reformer set the condemnation at naught. — After this, king Richard banished him out of England; but he was afterwards recalled, and died in his own country in the year 1384.

Forty years afterwards, his doctrines, and the adherers thereto, were condemned by the council of Constance; in consequence of which, his bones were dug up, and the council condemned him for forty errors.

WIDOW, *Vidua*, a woman that has lost her husband.

Some also use the term **WIDOWER**, for a man who has lost his wife. — Marriage with a *widow*, is a kind of bigamy in the eye of the canon law. See **BIGAMY**.

WIDOW of the King, was she, who, after her husband's death, being the king's tenant in capite, was driven to recover her dower by the writ *de Dote Assignanda*; and could not marry again without the king's consent.

WIDOW Bench, in the county of Suffex, is that share which a *widow* is allowed of her husband's estate, besides her jointure.

WIECK. See the article **WEEK**.

WIFE, *Uxor*, a married woman; or one joined with, and under the protection of a husband.

A *wife*, in our English law, is termed *feme covert*; and, in the judgment of the law, is reputed to have no will, as being supposed entirely under, and subject to that of her husband: *uxor fulget radiis mariti*.

If any goods or chattels be given her, they all immediately become her husband's. — She cannot let, sell, give away, or alienate any thing, without her husband's consent. — Her very necessary apparel is not her's in property. — All her personal chattels which she held at her marriage, are so much her husband's, that after his death they shall not return to her, but go to the executor, or administrator of her husband; except only her paraphernalia, or præter-dotalia, being her necessary apparel; which, with the consent of her husband, she may demise by will. See **PARAPHERNALIA**.

The *wife* can make no contract without her husband's consent; and in all law matters, *sine viro respondere non potest*.

The law supposes in the husband, the full power over his *wife*, as over his child or servant; and therefore he must answer for all her faults, and trespasses.

If a *wife* bring forth a child during her husband's absence, though of many years; yet if he lived all the time *inter quatuor maria*, within the island, he must father the child; and the child, if first born, shall inherit.

If a *wife* bring forth a child begot by a former husband, or any other person, before marriage, but born after marriage with another man; this latter must own the child; and that child shall be his heir at law.

The *wife*, after her husband's death, having no jointure settled before marriage, may challenge the third part of his yearly rents of land, during her life; and, within the city of London, a third part of all her husband's moveables for ever.

The *wife* partakes of the honour, and condition of her husband; but none of the *wife's* dignities come, by marriage, to her husband.

Yet, the husband, for getting his *wife* with child, which must appear by its being born alive, shall have all his *wife's* lands for life.

The English laws are generally esteemed by foreigners, as very hard, in respect of the women; and yet Chamberlayne is of a very different opinion, asserting, that the condition of *wives* in England, is better than in any other country.

Tertullian has two books, on the ornaments and attire of *wives*. — In the second, he labours to prove, that a Christian *wife* cannot, in conscience, endeavour to please by her beauty, which she knows to be naturally liable to raise loose desires; and that she ought not only to avoid all affected beauty, but even to conceal and cover her natural beauty.

Mid Wife, *Obstetrix*. See **DELIVERY**.

WILDERNESS. See **LABYRINTH**, &c.

WILD-FIRE, *Ignis Grægalis*, or *Græcus*. See **FIRE**.

WILD-FIRE Arrows, such as were trimmed with *wild-fire*, and shot burning, to stick in the sails or rigging of ships in a fight.

WILD-Fire, also denotes a disease in cattle; which is infectious, deadly, and even reputed incurable.

WILD-Honey. See the article **HONEY**.

WILL, *Voluntas*, is usually defined a faculty of the mind, whereby it embraces or rejects any thing represented to it, as good or evil, by the judgment.

Others will have it to be the mind itself, considered as

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embracing or refusing; adding, that as the understanding is nothing else but the soul, considered as *perceiving*; so the *will* is nothing else but the soul considered as *willing*, &c.

Mr Locke more intelligibly defines the *will*, a faculty which the soul has of beginning, or forbearing, continuing or ending several actions of the mind, and motions of the body, barely by a thought or preference of the mind, ordering, or as it were, commanding the doing, or not doing, such and such a particular action. — This power the mind has, to order the consideration of any idea, or the forbearing to consider it; or to prefer the motion of any part of the body to its rest, and vice versa, is what we call the *will*.

The actual exercise of that power, is what we call *volition*, or *willing*; and the doing or forbearing any action consequent on such order of the mind, is called *voluntary*.

Father Malebranche lays it down, that the *will* is that to the soul, which motion is to the body; and argues, that as the author of nature is the universal cause of all the motions in matter, so he is of all the inclinations in the mind: and that as all motions are direct, unless their course be diverted and changed by some foreign cause: so all inclinations are right, and could have no other end, but the enjoyment of truth and goodness, were there not some foreign cause, to determine the natural impression to evil ends.

Accordingly, he defines *will* to be the impression or natural motion, which carries us towards good indeterminately, and in the general; and the power the mind has, to direct this general impression towards any particular object that pleases it, is what he calls *liberty*.

Aristotle distinguishes two kinds of acts of the *will*; viz. *bonum*, *willing*, *volition*; and *comparatio*, *election*. — The first, that employed about the ultimate end; the latter, about the means.

The schoolmen also distinguish the actions of the *will*, into *elicited* and *commanded*. — Elicited acts, *actiones elicite*, are those immediately produced by the *will*, and really inherent therein; such are *willing*, and *willing*. — Commanded acts, *actiones imperate*, are effects produced by other powers; viz. *gr.* the sensitive, intellectual, or locomotive powers, at the command or instigation of the *will*. — As, to *follow*, *stay*, *fight*, *fly*, &c.

But others will have the former kind properly to belong to the understanding; and only the latter to the *will*.

The word *will* is taken in three senses; 1°. For the power, or faculty of *willing*; in which sense it is, we have considered it above. — 2°. For the act, or exercise of this power; as, when we say, No man *wills* his own destruction. — 3°. For a habit, or a constant disposition and inclination to do any thing. — In which sense, justice is defined a constant *will*, to give every one what belongs to him: *justitia est constantis & perpetua voluntas jus suum unicuique tribuendi*. Instit. Justin.

Antecedent WILL. See the article ANTECEDENT.

Free WILL. See LIBERTY, and FREEDOM.

WILL, Last WILL, or Testament, in law, a solemn act, or instrument, whereby a person declares his mind and intention as to the disposal of his goods, effects, &c. after his death.

Wills are of two kinds: A *will* in writing — And a *will* by word of mouth only, called a *nuncupative will*; which being proved by three or more witnesses, may be of as good force as that in writing; except for lands, which are only devisable by testament in writing, during the life of the testator.

Probate of a Will. See the article PROBATE.

WILL with a will, a meteor known among the people under this name; but more usually among authors, under that of *ignis fatuus*. See IGNIS FATUUS.

WIMPLE, of the Dutch *wimpel*, a muffler, or plaited linen cloth, which nuns wear to cover their necks and breast.

The word is also sometimes used for a streamer, or flag.

WIN, in the beginning or end of the names of places, signifies that some great battle was fought, or a victory gained there. — The word is formed from the Saxon *winnan*, to win or overcome.

WIND, Ventus, a sensible agitation of the air, whereby a large quantity thereof flows out of one place, or region, into another.

The winds are divided into *perennial*, *stated*, and *variable*. — They are also divided into *general*, and *particular*.

Perennial, or constant WINDS, are such as always blow the same way. — Of these we have a very notable one between the two tropics, blowing constantly from east to west; called the *general trade-wind*.

Stated, or periodical WINDS, are such as constantly return at certain times. — Such are the sea and land breezes, blowing from sea to land in the evening; and from land to sea in the morning.

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Such also are the *shifting*, or *particular trade-winds*, which, for certain months of the year, blow one way, and the rest of the year, the contrary way.

Variable, or erratic WINDS, are such as blow now this, now that way; and are now up, now hushed, without any rule or regularity, either as to time or place.

Such are all the winds observed in the inland parts of England, &c. Though several of these claim their certain times of the day. — Thus, the *west-wind* is most frequent about noon; the *south-wind* in the night; the *north* in the morning, &c.

General WIND, is such a one, as at the same time blows the same way, over a very large tract of ground, almost all the year. — Such only is the *general trade-wind*.

But even this has its interruptions: for, 1°. At land it is scarce sensible at all, as being broke by the interposition of mountains, valleys, &c. 2°. At sea, near the shore, it is disturbed by vapours, exhalations, and particular winds, blowing from landward; so that it is chiefly considered as *general*, only at mid-sea: Where, 3°. It is liable to be disturbed, by clouds driving from other quarters.

Particular WINDS, include all others, excepting the general trade-winds.

Those peculiar to one little canton, or part, are called *local* or *provincial winds*. — Such is the *north-wind*, on the western side of the Alps, which does not blow above one or two leagues lengthwise, and much less in breadth: such also is the *pontias* in France, &c.

Physical cause of WINDS. — Some philosophers, as Des Cartes, Kolaut, &c. account for the general wind, from the diurnal rotation of the earth; and from this general wind derive all the particular ones. — The atmosphere, say they, investing the earth, and moving round it; that part will perform its circuit soonest, which has the smallest circle to describe: The air therefore, near the equator, will require a somewhat longer time to perform its course in, from west to east, than that nearer the poles. — Thus, as the earth turns eastward, the particles of the air near the equinoctial, being exceeding light, are left behind; so that, in respect of the earth's surface, they move eastwards, and become a constant easterly wind.

This opinion seems confirmed by this, that these winds are found only between the tropics, in those parallels of latitude, where the diurnal motion is swiftest. — But the constant calms in the Atlantic sea, near the equator, the westerly winds near the coast of Guinea, and the periodical westerly monsoons, under the equator in the Indian sea, declare the insufficiency of this hypothesis.

Besides, the air being kept close to the earth by the principle of gravity, would, in time, acquire the same degree of velocity, that the earth's surface moves with, as well in respect of the diurnal rotation, as of the annual about the sun, which is about thirty times swifter.

Dr Halley, therefore, substitutes another cause, capable of producing a like constant effect, not liable to the same objections, but agreeable to the known properties of the elements of water and air, and the laws of the motion of fluid bodies. — Such a one is the action of the sun's beams upon the air and water, as he passes every day over the ocean, considered together with the quality of the soil, and the situation of the adjoining continents.

According to the laws of statics, the air, which is less rarefied or expanded by heat, and consequently is more ponderous, must have a motion towards those parts thereof, which are more rarefied, and less ponderous, to bring it to an equilibrium; also the presence of the sun, continually shifting to the westward, that part towards which the air tends, by reason of the refraction made by his greatest meridian heat, is, with him, carried westward; and, consequently, the tendency of the whole body of the lower air is that way.

Thus a general easterly wind is formed, which being impressed upon the air of a vast ocean, the parts impel one the other, and so keep moving till the next return of the sun, whereby so much of the motion, as was lost, is again restored; and thus the easterly wind is made perpetual.

From the same principle it follows, that this easterly wind should, on the north side of the equator, be to the northwards of the east, and in south latitudes, to the southwards thereof; for near the line, the air is much more rarefied, than at a greater distance from it; because the sun is twice in a year vertical there; and at no time distant above 23 1/2 degrees: at which distance, the heat being as the sine of the angle of incidence, is but little short of that of the perpendicular ray; whereas under the tropics, though the sun stay longer vertical, yet he is a long time 47 degrees off; which is a kind of winter, wherein the air so cools, as that the summer heat cannot warm it to the same degree with that under the equator. Wherefore, the air towards the northward and southward, being less rarefied than that in the middle,

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it follows, that from both sides, it ought to tend towards the equator.

This motion, compounded with the former easterly *wind*, accounts for all the phenomena of the general trade-winds; which, if the whole surface of the globe was sea, would undoubtedly blow quite round the world, as they are found to do in the Atlantic, and the Ethiopic oceans. — But seeing the great continents do interpose, and break the continuity of the oceans, regard must be had to the nature of the soil, and the position of the high mountains, which are the two principal causes of the vibration of the *wind*, from the former general rule: for if a country lying near the sun prove to be flat, sandy, and low land; such as the deserts of Libya are usually reported to be; the heat occasioned by the reflections of the sun's beams, and the retention thereof in the sand, is incredible to those who have not felt it; whereby the air being exceedingly rarefied, it is necessary, that the cooler, and more dense air, should run thitherwards to restore the equilibrium.

This is supposed to be the cause, why, near the coast of Guinea, the *wind* always sets in upon the land, blowing westerly instead of easterly; there being sufficient reason to believe, that the inland parts of Africa are prodigiously hot, since the northern borders thereof were so very intemperate, as to give the antients cause to conclude that all beyond the tropics was uninhabitable by excess of heat.

From the same cause it happens, that there are so constant calms in that same part of the ocean, called the *raïns*; for this tract being placed in the middle, between the westerly winds blowing on the coast of Guinea, and the easterly trade-winds, blowing to the westwards thereof; the tendency of the air here, is indifferent to either, and so stands in equilibrio between both: and the weight of the incumbent atmosphere being diminished by the continual contrary winds blowing from hence, is the reason that the air here holds not the copious vapour it receives, but lets it fall in so frequent rains.

But, as the cold and dense air, by reason of its greater gravity, presses upon the hot and rarefied, it is demonstrable, that this latter must ascend in a continued stream, as fast as it rarefies; and that being ascended, it must disperse itself, to preserve the equilibrium; that is, by a contrary current, the upper air must move from those parts where the greatest heat is: so, by a kind of circulation, the north-east trade-wind below, will be attended with a south-westerly wind above; and the south-east, with a north-west wind above.

That this is more than a bare conjecture, the almost instantaneous change of the *wind* to the opposite point, which is frequently found in passing the limits of the trade-winds, seems strongly to assure us; but that which above all confirms this hypothesis, is the phenomenon of the monsoons, by this means most easily solved, and without it hardly explicable. Supposing therefore, such a circulation as above; it is to be considered, that to the northward of the Indian ocean, there is every where land, within the usual limits of the latitude of 30°, viz. Arabia, Persia, India, &c. which, for the same reason as the mediterranean parts of Africa, are subject to insufferable heats, when the sun is to the north, passing nearly vertically; but yet are temperate enough, when the sun is removed towards the other tropic, because of a ridge of mountains at some distance within the land, said to be frequently, in winter, covered with snow, over which the air, as it passes, must needs be much chilled. — Hence it happens, that the air coming, according to the general rule, out of the north-east, to the Indian sea, is sometimes hotter, sometimes colder, than that which, by this circulation, is returned out of the south-west; and, by consequence, sometimes the under-current, or *wind*, is from the north-east, sometimes from the south-west.

That this has no other cause, is clear from the times wherein these winds set, viz. in April: when the sun begins to warm these countries to the north, the south-west monsoons begin, and blow, during the heats, till October, when the sun being retired, and all things growing cooler northward, and the heat increasing to the south, the north-east winds enter and blow all the winter, till April again. And it is, undoubtedly, from the same principle, that to the southward of the equator, in part of the Indian ocean, the north-west winds succeed the south-east, when the sun draws near the tropic of Capricorn.

But, the industry of some late writers, having brought the theory of the production and motion of winds, to somewhat of a mathematical demonstration; we shall here give it the reader in that form.

Laws of the production of WINDS.—If the spring of the air be weakened in any place, more than in the adjoining places; a *wind* will blow through the place where the diminution is.

For, since the air endeavours, by its elastic force, to expand itself every way; if that force be less in one place than another, the nîsus of the more, against the less elastic, will be greater than the nîsus of the latter, against the former.—

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The less elastic air, therefore, will resist with less force than it is urged by the more elastic: consequently, the less elastic will be driven out of its place, and the more elastic will succeed.

If, now, the excess of the spring of the more elastic, above that of the less elastic air, be such as to occasion a little alteration in the baroscope; the motion both of the air expelled, and that which succeeds it, will become sensible, i. e. there will be a *wind*.

2°. Hence, since the spring of the air increases, as the compressing weight increases; and compressed air is denser than air less compressed: all winds blow into rarer air, out of a place filled with a denser.

3°. Wherefore, since a denser air is specifically heavier than a rarer; an extraordinary lightness of the air in any place, must be attended with extraordinary winds, or storms.

Now, an extraordinary fall of the mercury in the barometer, shewing an extraordinary lightness of the atmosphere; it is no wonder if that foretels storms.

4°. If the air be suddenly condensed in any place, its spring will be suddenly diminished: hence, if this diminution be great enough to affect the barometer, there will a *wind* blow through the condensed air.

5°. But since the air cannot be suddenly condensed, unless it have before been much rarefied; there will a *wind* blow thro' the air, as it cools, after having been violently heated.

6°. In like manner, if air be suddenly rarefied, its spring is suddenly increased; wherefore, it will flow through the contiguous air, not acted on by the rarefying force. — A *wind*, therefore, will blow out of a place, in which the air is suddenly rarefied: and on this principle, in all probability, it is, that,

7°. Since the sun's power in rarefying the air is notorious, it must necessarily have a great influence on the generation of winds.

8°. Most caves are found to emit *wind*, either more or less. The rising and changing of the *wind*, is determined experimentally, by means of weather-cocks, placed atop of houses, &c. — But these only indicate what passes about their own height, or near the surface of the earth: Wolfius assures us, from observations of several years, that the higher winds, which drive the clouds, are different from the lower ones, which move the weather-cocks. — And Mr Derham observes something not unlike this. *Phys. Theol.* L. I. c. 2.

The author last mentioned relates, upon comparing several series's of observations made of the winds in divers countries, viz. England, Ireland, Switzerland, Italy, France, New-England, &c. that the winds in those several places seldom agree; but when they do, it is commonly when they are strong, and of long continuance in the same quarter; and more, he thinks, in the northerly and easterly, than in other points. — Also, that a strong *wind* in one place, is oftentimes a weak one in another; or moderate, according as the places are nearer, or more remote. *Philosoph. Transactions*, N° 267, and 321.

Laws of the force and velocity of WIND.—*Wind* being only air in motion, and air being a fluid, subject to the laws of other fluids, its force may be regularly brought to a precise computation: thus — “The ratio of the specific gravity of any other fluid to that of air, together with the space that fluid, impelled by the pressure of the air, moves in any given time, being given; we can determine the space thro' which the air itself, acted on by the same force, will move in the same time.” By this rule:

1°. As the specific gravity of air, is to that of any other fluid; so, reciprocally, is the square of the space, which that fluid, impelled by any force, moves in any given time, to the square of the space which the air, by the same impulse, will move in the same time.

Supposing, therefore, the ratio of the specific gravity of that other fluid to that of air, to be $b:c$; the space described by the fluid to be called f ; and that which the air will describe by the same impulse, x . The rule gives us $x = \sqrt{(b^2 : c)}$.

Hence, if we suppose water impelled by the given force, to move two feet in a second of time; then will $f = 2$; and since the specific gravity of water to the air, is as 970 to 1; we shall have $b = 970$, and $c = 1$; consequently, $x = \sqrt{970 \cdot 4} = \sqrt{3880} = 62.3$ feet. The velocity of the *wind*, therefore, to that of water, moved by the same power, will be as 62.3 to 2; i. e. if water move two feet in a second, the *wind* will fly 62.3 feet.

2°. Add, that $f = \sqrt{(cx^2 : b)}$; and therefore the space any fluid, impelled by any impression, moves in any time, is determined, by finding a fourth proportional to the two numbers that express the ratio of the specific gravity, and the square of the space the *wind* moves in, in the given time. — The square root of that fourth proportional is the space required.

M. Mariotte, &c. gr. found, by various experiments, that a pretty

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pretty strong *wind* moves 24 feet in a second of time; wherefore, if the space which the water, acted on by the same force as the air, will describe in the same time, be required; then will $c=1$, $x=24$, $b=970$; and we shall find $f=\sqrt{(576:970)}=34$.

3°. "The velocity of *wind* being given, to determine the "pressure required to produce that velocity;" we have this rule:—The space the *wind* moves in one second of time, is to the height a fluid is to be raised in an empty tube, in order to have a pressure capable of producing that velocity; in a ratio compounded of the specific gravity of the fluid to that of the air, and of quadruple the altitude a body descends in the first second of time, to the aforesaid space of the air.

Suppose, e. gr. the space the air moves in a second, $a=24$ feet, or 288 inches; call the altitude of the third x , and the ratio of mercury to air $b:c=13580:1$, $d=181$ inches; x will be less than that number by one line, or $\frac{1}{16}$ of an inch.—And hence we see, why a small, but sudden change in the barometer, is followed with violent *winds*.

The force of the *wind* is determined experimentally by a peculiar machine, called an *anemometer*, or a *wind-measurer*; which being moved by means of sails, like those of a wind-mill, raises a weight, that, still the higher it is raised, receding further from the centre of motion, by sliding along an hollow arm fitted on to the axis of the sails, becomes heavier and heavier, and presses more on the arm, till being a counter-poise to the force of the *wind* on the sails, it stops the motion thereof.—An index then, fitted upon the same axis, at right angles with the arm, by its rising or falling, points out the strength of the *wind*, on a plane divided like a dial-plate into degrees.

Qualities and Effects of WIND.—1°. "A *wind* blowing from "the sea, is always moist: in summer, it is cold; and in "winter, warm; unless the sea be frozen up."—This is demonstrated thus: There is vapour continually rising out of all *water* (as appears even hence, that a quantity of *water* being left a little while in an open vessel, is found sensibly diminished) but especially if it be exposed to the sun's rays; in which case, the evaporation is beyond all expectation. By this means, the air incumbent on the sea becomes impregnated with a deal of vapour. But the *winds* blowing from off the sea, sweep these vapours along with them; and consequently they are always moist.

Again, water in summer, &c. conceives less heat than terrestrial bodies, exposed to the same rays of the sun, do; but in winter, sea-water is warmer than the earth covered with frost and snow, &c. Wherefore, as the air contiguous to any body, is found to partake of its heat and cold, the air contiguous to sea-water will be warmer in winter, and colder in summer, than that contiguous to the earth.—Or thus: Vapours raised from water by the sun's warmth in winter, are warmer than the air they rise in (as appears from the vapours condensing, and becoming visible, almost as soon as they are got out into air.) Fresh quantities of vapour, therefore, continually warming the atmosphere over the sea, will raise its heat beyond that of air over the land.—Again, the sun's rays reflected from the earth into the air, in summer, are much more than those from the water into air: the air, therefore, over the earth, warmed by the reflection of more rays than that over water, is warmer.—Hence, *sea-winds* make thick, cloudy, hazy weather.

2°. "Winds blowing from the continent, are always dry; "in summer, warm; and cold in winter."—For there is much less vapour arising from the earth, than from water; and therefore the air over the continent will be impregnated with much fewer vapours.—Add, that the vapours, or exhalations, raised by a great degree of heat out of the earth, are much finer, and less sensible, than those from water.—The *wind* therefore, blowing over the continent, carries but little vapour with it; and is therefore dry.

Further, the earth in summer is warmer than water exposed to the same rays of the sun.—Hence, as the air partakes of the heat of contiguous bodies, that over the earth in summer will be warmer than that over the water: therefore the *wind*, &c.

After the like manner it is shewn, that the *land-winds* are cold in winter.—Hence, we see why *land-winds* make clear, cold weather.

Our northerly and southerly *winds*, however, which are commonly esteemed the causes of cold and warm weather, Mr Derham observes, are really rather the effect of the cold or warmth of the atmosphere.—Hence it is, that we frequently see a warm southerly wind, on a sudden, changed to the north, by the fall of snow or hail; and that in a cold, frosty morning, we see the *wind* north, which afterwards wheels about towards the southerly quarter, when the sun has well warmed the air; and again, in the cold evening, turns northerly, or easterly.

For the manner wherein north easterly *winds* contribute to

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blights, see BRIGHT.—For the effect of winds on the barometer, and thermometer. See BAROMETER, &c.

WIND, in navigation, is the same agitation of the air, considered as serving for the motion of vessels on the water.

The *winds* are divided, with respect to the points of the horizon from which they blow, into *cardinal* and *collateral*.

Cardinal WINDS, are those blowing from the four cardinal points; east, west, north, and south.

Collateral WINDS, are the intermediate *winds* between any two cardinal *winds*.—The number of these is infinite, as the points from which they blow are, but only a few of them are considered in practice: i. e. only a few of them have their distinguishing names.

The ancient Greeks, at first, only used the four cardinal ones; at length they took in four more.—Vitruvius gives us a table of twenty, besides the cardinals, which were in use among the Romans.

The moderns, as their navigation is much more perfect than the ancients, have given names to twenty eight collateral *winds*; which they range into *primary* and *secondary*—and the secondary, they subdivide into those of the *first* and *second* order.

The English names of the primary collateral *winds* and points, are compounded of the names of the cardinal ones, north and south being still prefixed.

The names of the secondary collateral *winds* of the first order, are compounded of the names of the cardinals, and the adjacent primary one.—Those of the second order, are compounded of the names of the cardinal, or the next adjacent primary; and the next cardinal, with the addition of the word (*by*).—The Latins have distinct names for each; all which are expressed in the following table.

Names of the winds, and points of the compass.		Distances of the points, &c. from the north.	
English.	Latin and Greek.		
1. North.	Septentrio, or Boreas.	0°	0'
2. North by east.	Hyperboreas.	11	15
	Hypaquilo, Gallicus.		
3. North-north-east.	Aquilo.	22	30
4. North-east by north.	Mesoboreas.	33	45
	Mesaquilo.		
	Supernas.		
5. North-east.	Arctopelates.	45	
	Borapeliotes.		
	Græcus.		
6. North-east by east.	Hypocæcias.	56	15
7. East-north-east.	Cæcias, hellepontius.	67	30
8. East by north.	Mefocæcias.	78	45
	Carbas.		
9. East.	Solanus, subolanus, apeliotes.	From the east.	
10. East by south.	Hypeurus, or hyper-eurus.	11	15
11. East-south-east.	Eurus, or voltumnus.	22	30
12. South-east by east.	Mefeurus.	33	45
13. South-east.	Notapeliotes, eurafter.	45	
14. South-east by south.	Hypophœnix.	56	15
15. South-south-east.	Phoenix, phœnicias, leuco-notus, gangeticus.	67	30
16. South by east.	Mefophœnix.	78	45
17. South.	Auster, notus, merides.	From the south.	
18. South by west.	Hypolibonotos, alfanus.	11	15
19. South-south-west.	Libonotos, notolibycus, austro-africus.	22	30
20. South-west by south.	Mefolibonotos.	33	45
21. South-west.	Notozephyrus.	45	
	Notolibycus.		
	Africus.		
22. South-west by west.	Hypolibis.	56	15
	Hypatricus.		
	Subvesperus.		
23. West-south-w.	Libis.	67	30
24. West by south.	Mefolibis.	78	45
	Mefozephyrus.		

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Names of the winds, and points of the compass.		Distances of the points, &c. from the west.	
English.	Latin, and Greek.		
25. West.	Zephyrus, favonius, occident.	0°	0'
26. West by north.	Hypargestes. Hypocorus.	11	15
27. West-north-west.	Argestes. Caurus, corus, japyx.	22	30
28. North-west by west.	Mefargestes. Melocorus.	33	45
29. North-west.	Zephyre-boreas, borolibus, olimpias.	45	
30. North-west by north.	Hypocircius. Hypothracias. Scirem.	56	15
31. North-north-west.	Circius, thracias.	67	30
32. North by west.	Mefocircius.	78	45

Note. The antient names are here, after Ricciolus, adapted to the modern ones; not that the winds formerly denoted by those, were precisely the same with these, (for the antient number and division being different from the modern, the points they refer to will necessarily be somewhat different) but as these are what come the nearest. — Thus, Vitruvius only reckoning twenty four winds, disposes the points they refer to in a different order; as in the following table.

Names of the winds.	Distance from north.	Names of the winds.	Distance from east.
1 Septentrio.	0° 0'	7 Salenus.	0° 0'
2 Gallicus.	15	8 Ornithias.	15
3 Supernas.	30	9 Cacias.	30
4 Aquilo.	45	10 Eurus.	45
5 Boreas.	60	11 Volturus.	60
6 Carbas.	75	12 Euronotus.	75

Names of the winds.	Distance from south.	Names of the winds.	Distance from west.
13 Aufer.	0° 0'	19 Favonius.	0° 0'
14 Allianus.	15	20 Etesie.	15
15 Libonotus.	30	21 Circius.	30
16 Africus.	45	22 Caurus.	45
17 Subvesper.	60	23 Corus.	60
18 Argestes.	75	24 Thracias.	75

For the use of the winds in navigation, &c. see SAILING.

Quarter WIND. See the article QUARTER.

Whirl-WIND. See the article WHIRL-WIND.

WIND-COLIC. } See the article COLIC.

WIND-DROPSY. } See the article TYMPANITES.

WIND-EGG, an adde egg, or an egg that has taken WIND. See EGG.

WIND-FALL, denotes fruit blown off the tree by the wind.

WIND-FURNACE. See the article FURNACE.

WIND-GALL, in horses, a soft, flatulent tumor, or bladder, arising on the fetlock joint, and causing great pain, especially in hot weather, and hard ways.

It is usually owing to a violent strain, extreme labour, and heat, a horse's standing on a sloping floor, a blow from another, or the like.

WIND-GUN, a machine, serving to explode bullets, and other shot, with great violence, by the force of the air.

This sort of arm, charged with air, has an effect scarce inferior to that of a common fire-arm charged with gun-powder; but it discharges itself with a much less report: and it is this which, in all probability, gave occasion to the fable of white gun-powder.

There are wind-guns of divers contrivances; the most easy and portable one, and the most in use, is represented, Tab.

Pneumatics, fig. 14. It consists of a round metalline tube, 3, 3, open at the end c c, and exactly stopped at the other end a, like the barrel of other guns; 1, 1, 1, is another larger metalline tube, wherein the former is disposed, so as to leave a space between them 4, 4, wherein air may be in closed. — The two tubes are joined together at the common aperture c c, by a circular plate exactly folded to both, so as to prevent the air from escaping out of the space 4, 4, &c. — At 3 is a spring valve, which opening inwardly, lets the air pass through from 2 into the space 1, but prevents its return from 1 to 2. — Near the close end of the inner tube are two

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holes, 6 and 5; by the first, the space 1 and the inner tube communicate, so that the air would pass out of that into this; but that the passage is stopped by a valve opening outwardly; by the latter, there is a communication between the open air, the space 4, and the inner barrel: only the air pent up in the space cannot escape at this hole, by reason of a little tube exactly folded to both barrels, which stops the communication: nor can air escape out of the inner barrel through this little tube, by reason of a little moveable pin, which exactly fills the cavity of the tube.

Lastly, the part 2, 2, 2, 2, represents the body of a syringe, or sucking pump; by which, as much air as possible, is to be intruded into the space 4, 4, &c. — After which a bullet being put into a cavity of the inner barrel as high as the little tube 5, the gun is charged. See SYRINGE.

Now, to discharge it, the little valve 6 is pushed up by means of the pin that plays in the little tube 5. Upon this, the compressed air in the cavity of the outer barrel 4, rushing through the hole 6 into the cavity of the inner barrel, expels the bullet with a vast force, sufficient to penetrate a thick board.

Note, to give the machine a greater resemblance of a fire-arm, the part 2, 2, 2, 2, is usually fashioned like the butt-end of a musquet; and on the part 2, 2, 2, 2, is fitted a lock; by turning the trigger of which, the pin 5 is made to push back the valve, and so discharge the piece. — By the lock too, it is contrived, that either the whole charge of air may be spent at one explosion, or only part of it, and the rest reserved for fresh bullets. — By this piece of mechanism, we can have half a dozen good, effective shoots, with one charge of air.

WIND-INSTRUMENTS, in music, are instruments played by wind, chiefly by the breath; in contradistinction to string-instruments, and instruments of the psaltery kind.

The wind-instruments known to the ancients, were the tibia, fistula, or syringe of Pan, consisting of seven reeds joined side-wise; also organs, tubæ, cornua, and the lituus.

Those of the moderns, are the flute, bagpipe, hautboy, trumpet, &c.

WIND-MILL, a kind of mill which receives its motion from the impulse of the wind.

The wind-mill, though a machine common enough, has yet somewhat in it more ingenious than is usually imagined. — Add, that it is commonly allowed to have a degree of perfection, which few of the popular engines have attained to, and which the makers are but little aware of. — Though the new geometry, &c. has furnished ample matter for its improvement.

Structure of the WIND-Mill. — The internal structure of the wind-mill, is much the same with that of water-mills. — The difference between them lies chiefly in an external apparatus, for the application of the power.

This apparatus consists of an axis E F (Tab. Pneumatics, fig. 15.) through which pass two arms, or yards, A B, and C E, intersecting each other at right angles in E, whose length is usually about 32 feet: on these yards are formed a kind of sails, vanes, or flights, in the figure of trapeziums, with parallel bases, the greater whereof, H I, is about six feet, and the less, F G, determined by radii drawn from the centre E, to I and H.

These sails are to be capable of being always turned to the wind, that they may receive its impression: in order to which, there are two different contrivances, which constitute the two different kinds of wind-mills in use.

In the one, the whole machine is sustained upon a moveable arbor or axis, perpendicular to the horizon, on a stand, or foot; and turned occasionally this way, or that, by means of a lever.

In the other, only the cover, or roof of the machine, with the axis and sails, turn round. — In order to which,

The cover is built turret-wise, and the turret encompassed with a wooden ring, wherein is a groove, at the bottom whereof are placed, at certain distances, a number of brass truckles, and within the groove is another ring, upon which the whole turret stands. — To the moveable ring are connected beams a b and f c; and to the beam a b, in b is fastened a rope, which at the other extreme thereof, is fitted to a windlass, or axis in peritrochio: this rope being drawn through the iron hook G, and the windlass turned, the sails will be moved round, and put in the direction required.

Theory of the motion of a WIND-Mill, with the position of the sails, or vanes thereof. — The angle the sails are to make with their common axis, so as the wind may have the greatest effect, is a matter of nice enquiry, and has much employed the thoughts of the mathematicians.

To conceive why a wind-mill moves at all, the theory of compound motions must be supposed. — A body moving perpendicularly against any surface, strikes it with all its force. If it move parallel to the surface, it does not strike it at all: And if it move obliquely, its motion being compounded of

the perpendicular and parallel motion, only acts on the surface, considered as it is perpendicular, and only drives it in the direction of the perpendicular. So that every oblique direction of a motion, is the diagonal of a parallelogram, whose perpendicular and parallel directions, are the two sides. Add, that if a surface, when being struck obliquely, has only received the perpendicular direction, be fastened to some other body, so as that it cannot pursue its perpendicular direction, but must change it for some other; in that case, the perpendicular itself becomes the diagonal of a new parallelogram, one of whose sides is the direction the surface may follow, and the other, that which it cannot.

Thus, a rudder fastened obliquely to the keel of a vessel, being struck by the current of water parallel to the keel, and, of consequence, obliquely with regard to itself; it will appear, by drawing the line of perpendicular impulse, that it tends to tear the rudder from the keel, and to carry it away: and that this direction perpendicular to the rudder, is oblique to the keel. — The rudder, then, would be carried off in an oblique direction: but, as in reality, it is so secured, that it cannot be torn or carried off; we are only to consider, in this compound motion, that of the two directions, where-with it can move without being torn from the keel: and leave the other, which would tear it off, as useless.

Now, the direction in which it can move without parting from the keel, is that which carries it circularly about its extremity, as about a centre. So that the effect of the oblique impulse of the water on the rudder, is reduced, first to a perpendicular impression, which is again reduced to the mere turning the rudder round; or, if the rudder be immovable, to the turning of the vessel.

Now, in an oblique and compound motion, where only one of the directions is of service; the greater ratio the other has thereto, the less effect will the motion have; and vice versa. — In examining the compound motions of the rudder, we find, that the more oblique it is to the keel, the ratio of the direction that serves to turn it to the other, is the greater. But, on the other hand, the more oblique it is to the keel, and, of consequence, to the course of the water which is supposed parallel thereto, the more weakly it strikes. The obliquity of the rudder, therefore, has, at the same time, both an advantage and a disadvantage; but as those are not equal, and as each of them is still varying with every different position of the rudder, they become complicated variously, so that sometimes the one prevails, and sometimes the other.

It has been a point of enquiry to find the position of the rudder, wherein the advantage should be the greatest. — M. Renau, in his famous theory of the working of ships, has found, that the best situation of the rudder is, when it makes an angle of 55 degrees with the keel.

If, now, a wind-mill, exposed directly to the wind, should have its four sails perpendicular to the common axis wherein they are fitted, they would receive the wind perpendicularly; and it is visible that impulse would only tend to overturn them. — There is a necessity, therefore, to have them oblique to the common axis, that they may receive the wind obliquely.

For the greater ease; let us only consider one vertical sail. — The oblique impulse of the wind on this sail, is reducible to a perpendicular impulse: and that direction, as the sail cannot absolutely keep to it, is compounded of two; one where-of tends to make it turn on its axis, and the other to fall backwards. — But it is only the first of these directions can be obeyed. — Of consequence, the whole impulse of the wind on the sail has no other effect, but to make it turn from right to left, or from left to right, as its acute angle turns this way or that. And the structure of the machine is so happy, that the three other sails are determined, from the same reasons, to move the same way.

The obliquity of the sails, with regard to their axis, has precisely the same advantage, and disadvantage, with the obliquity of the rudder to the keel. — And M. Parent, seeking by the new analysis, the most advantageous situation of the sails on the axis, finds it precisely the same angle of 55 degrees. Yet, in practice, this rule is very little observed; as, indeed, being little known. — The sails are usually fixed at an angle of about 60 degrees, which is very much out of the way.

Elliptical Wind-Mill. — M. Parent considers farther, what figure the sails of a wind-mill should have, to receive the greatest impulse from the wind; and he determines it to be a sector of an ellipse, whose centre is that of the axis or arbor of the mill; and the little semi-axis, the height of thirty-two feet: As for the greater, it follows necessarily from the rule that directs the sail to be inclined to the axis in an angle of 55 degrees.

On this foot he assumes four such sails, each whereof is one fourth of an ellipse; which, he shews, will receive all the wind, and lose none, as the common case is. — These four surfaces multiplied by the lever, with which the wind acts on one of them, express the whole power the wind had

to move the machine, or the whole power the machine has when in motion.

The same manner of reasoning, applied to a common wind-mill, whose sails are rectangular, and their length about five times their breadth; shews that the elliptic wind-mill has above seven times the power of the common one. A prodigious advantage! and worthy, sure, to have the common practice set aside for, could so common a practice be easily changed.

A wind-mill, with six elliptic sails, he shews, would still have more power than one with only four. — It would only have the same surface with the four; since the four contain the whole space of the ellipse, as well as the six. But the force of the six, would be greater than that of the four, in the ratio of 245 to 231. — If it were desired to have only two sails, each being a semi-ellipse, the surface would be still the same, but the power would be diminished, by near one third of that with six sails; by reason the greatness of the sectors would much shorten the lever with which the wind acts.

Best form and proportion of rectangular Wind-Mills. — But, as elliptical sails would be something so new, that there is little room to expect they will come into common use; the same author has considered which form, among the rectangular ones, will be the most advantageous, i. e. which, the product of whole surface by the lever of the *maximis & minimis*, he finds it very different from the common ones.

The result of his enquiry is, that the width of the rectangular sail should be nearly double its length; whereas the length is usually made almost five times the width. — Add, that as we call height or length, the dimension which is taken from the centre of the axis; the greatest dimension of the new rectangular sail, will be turned towards the axis, and the smallest from it: quite contrary to the position of the common sails.

The power of a wind-mill, with four of these new rectangular sails, M. Parent shews, will be to the power of 4 elliptic sails, nearly as 13 to 23; which leaves a considerable advantage on the side of the elliptic ones: yet will the force of the new rectangular sails, be considerably greater than that of the common ones.

M. Parent likewise considers what number of the new sails, will be most advantageous, and finds that the fewer the sails, the more surface there will be, but the less power. — The ratio of the power of a wind-mill with 6 sails, will be to another with 4, nearly as 14 to 13. And the power of another with 4, will be to that with 2, nearly as 13 to 9. As to the common wind-mill, its power still diminishes as the breadth of the sails is smaller, in proportion to the length. The usual proportion, therefore, of 5 to 1, is exceedingly disadvantageous.

The uses of this new theory of wind-mills are very obvious.

— The more power a wind-mill has, the swifter it turns, the more it dispatches, and, the less wind it needs. — Add, that on this theory, one may have a wind-mill, whose sails shall be a deal shorter, and yet the power greater, than in the common one.

WIND Tumors, &c. See the article TUMOR.

WINDASS*, WANDASS, or WANLASS, an antient term in hunting. — Thus, to drive the windass, signifies the chasing a deer to a stand, where one is ready with a bow or gun to shoot.

* — Omnes illi qui tenuerunt in bondagii tenura solebant ceteri cultuarii: et quotiescunque dominus ad venandum venerat, illi cultuarii solebant fugare windassum, ad stabulum, in venatione servarum bestiarum jecundam quantitatem tenuræ suæ, MS. de Conlectud. Manerij de Sutton Colfield, An. 3. Ed. II.

WINDERS of wool. See the article WOOL-Winders.

WINDING Stairs. See the article STAIR.

WINDLASS, or WINDLAGE, a machine used to raise huge weights withal, as guns, stones, anchors, &c. It is very simple, consisting only of an axis, or roller, supported horizontally at the two ends by two pieces of wood; and a pulley. — The two pieces of wood meet at top; being placed diagonally, so as to prop each other. — The axis or roller goes through the two pieces, and turns in them. — The pulley is fastened at top, where the pieces join.

Lastly, there are two flaves, or hand-spikes which go thro' the roller, whereby it is turned; and the rope, which comes over the pulley, is wound off and on the flave.

WINDLASS in a ship, is an instrument in a small vessel, placed upon the deck, abait the fore-mast: it consists of a piece of timber, having six or eight squares. It is turned by hand-spikes, put into holes made for that purpose.

This windlass will purchase more than any capstan in the weighing of an anchor or the like, and that without any danger to those that heave. — Since if any of the hand-spikes should break, the windlass would fall of itself.

WINDOW, q. d. *Wind-door*, an aperture, or open place in the

WIN

the side of an house, to let in the air and light. — See *Tab. Archit.* fig. 49. see also the articles **BUILDING**, **APER-
TURE**, and **LIGHT**.

We have various kinds and forms of *windows*; as *glass win-
dows*, *wire windows*, *horn windows*, &c. — *Arched win-
dows*, *circular windows*, *elliptical windows*, *square and flat
windows*; *round windows*, *oval windows*, *gothic windows*,
regular windows, *ruffic windows*, to which add sky-lights.
The chief rules, with regard to *windows*, are — 1°. That
they be as few in number, and as moderate in dimensions
as may consist with other respects; inasmuch as all openings
are weakenings.

2°. That they be placed at a convenient distance from the
angles, or corners of the building; because those parts ought
not to be opened and infeebled, whose office is to support and
fasten all the rest of the building.

3°. That care be taken the *windows* be all equal one with
another, in their rank and order; so that those on the right
hand may answer to those on the left, and those above, be
right over those below: for this situation of *windows* will
not only be handsome and uniform, but also the void being
upon the void, and the full upon the full, it will be a
strengthening to the whole fabric.

As to their dimensions, care is to be used, neither to give
them more, or less light than is needful; therefore regard is
to be had to the bigness of the rooms which are to receive the
light. — It is evident, that a great room needs more light,
and consequently, a greater *window* than a little room; and
e contra.

The apertures of *windows*, in middle-sized houses, may be
four and a half, or five feet between the jambs; and in the
greater buildings, six and a half, or seven feet; and their
height may be double their length at the least. — But in
high rooms or larger buildings, their height may be a third,
a fourth, or half their breadth, more than double the
length.

Such are the proportions for *windows* of the first story; and
according to these must those in the upper stories be for
breadth: but, as to height, they must diminish; the second
story may be one third part lower than the first, and the
third story one fourth part lower than the second.

Arbitraire WINDOWS. See the article **ARCHITRAVE**.

Dormer WINDOWS, or Lutherns. See **LUTHERN**, &c.

Transom WINDOWS. See the article **TRANSOM**.

Scenography of WINDOWS. See the article **SCENOGRAPHY**.

WINDOW, in anatomy, &c. See **FENESTRA**.

WIND-TACKLE-Blocks, in a ship, are the main double
blocks or pulleys; which, being made fast to the end of a
small cable, serve for the hoisting of goods into the ship, &c.

To wind, or wend a ship, signifies to bring her head about.

How winds, or wends the ship? is a question asked by mari-
ners, concerning a ship under sail, signifying as much as,
upon what point of the compass does the lie with her head?

WIND-TAUGHT, a sea term, implying as much as,
stiff in the wind.

Too much rigging, high masts, or any thing catching or
holding wind aloft, is said to hold a ship *wind-taught*; by
which they mean, that she stops too much in her sailings,
in a stiff gale of wind.

Again, when a ship rides in a main stress of wind and wea-
ther, they strike down her top-masts, and bring her yards
down, which else would hold too much wind, or be too
much distended, and *wind-taught*.

WINDWARD Tide, in the sea language, a tide which runs
against the wind.

WINDY Tumors. See the article **TUMOR**.

WINE, *Vinum*, a brisk, agreeable, spirituous, and cordial li-
quor, drawn from vegetable bodies, and fermented.

The character of a *wine*, according to Boerhaave, is, that
the first thing it affords by distillation, be a thin, oily, in-
flammable fluid; called a *spirit*.

This distinguishes *wines* from another class of fermented
vegetable juices, viz. *vinegars*; which, instead of such spirit,
yield, for the first thing, an acid, un-inflammable matter.

All sorts of vegetables, fruits, seeds, roots, &c. may be
made to afford *wine*; as grapes, currants, mulberries, elder,
cherries, apples, puffs, beans, pease, turnips, radishes, and
even grass itself.

Hence, under the class of *wines*, or vinous liquors, come not
only *wines*, absolutely so called, but also ale, cider, &c.

WINE is, in a more particular manner, appropriated to that
which is drawn from the fruit of the vine, by stamping its
grapes in a vat, or crushing and expressing the juice out of
the in a press, and then fermenting, &c.

The goodness of *wine* consists in its being neat, dry, fine,
bright, and brisk, without any taste of the soil, of a clean
steady colour; having a strength, without being heavy;

WIN

a body, without being sour; and keeping, without growing
hard or eager.

Wine being a liquor mostly of foreign produce; the divers
names, forms, kinds, distinctions, &c. thereof, are borrowed
from the countries where it is produced; the principal where-
of, at this day, is France: to *wines* of which country, a
good part of what we have to say of this noble liquor, will
more immediately belong.

Wine, in France, is distinguished, from the several degrees
and steps of its preparation, into

Mere-goutte, mother-drop; which is the virgin *wine*, or that
which runs of itself out of a tap of the vat wherein the grapes
are laid, before the vintager enters to tread, or stamp the
grapes.

Must, *surmust*, or *stun*; which is the *wine* or liquor in the vat,
after the grapes have been trod, or stamped.

Pressed WINE, *vin de pressurage*, which is that squeezed with
a press out of the grapes, when half bruised by the treading.

The husks left of the grapes, are called *rape*, *mark*, or *mark*;
by throwing water upon which, and pressing them afresh,
they make a liquor for servants use, answerable to our cide-
kin, and called *biisson*; which is also of some use in medicine,
in the cure of disorders occasioned by vifid humours.

Sweet WINE, *vin doux*, is that which has not yet worked, or
fermented.

Bourne, that which has been prevented working, by casting in
cold water.

Cuvé, or *worked wine*, that which has been let-work in the vat.

Cuit, or *boiled wine*; that which has had a boiling before it
worked; and which, by that means, still retains its native
sweetness.

Past, or *strained wine*, a sort of raisin wine, made by steeping
dry grapes in water, and letting it ferment of itself.

Wines are also distinguished, with regard to their colour, into
white wine, *red wine*, *claret wine*, *pale wines*, *rosa*, or *black
wine*. — And with regard to their country, or the soil that
produces them, into *French wines*, *Spanish wines*, *Rhenish
wines*, *Hungarian wines*, *Greek wines*, *Canary wines*, &c. —
And more particularly into *Port wine*, *Madeira wine*, *Bur-
gundy wine*, *Champaign wine*, *Palernian wine*, *Tokay wine*,
Schiras wine, &c.

Wines, again, are distinguished, with regard to their quality,
into *sweet wines*, *rough or dry wines*, and *rich or luscious
wines*, *vins de liqueur*; of which last, some are exceedingly
sweet, others sweet and poignant; and all chiefly used by
way of dram after meals, &c.

Such are *French Frontignac*, *Madeira*, the *Canary*, the
Hungary, *Tokay*, the Italian *Montefiascone*, the Persian *Schi-
ras*, the *Malmsey wines* of Candia, Chio, Lesbos, Tenados,
and other islands of the Archipelago, which antiently belong-
ed to the Greeks, but now to the Turks. — These are some-
times called *Greek wines*, and sometimes *Turkey wines*.

Wine is also variously denominated, according to its state,
circumstances, qualities, &c.

Natural WINE, is such as comes from the grape, without
further mixture, or sophistication.

Brewed, or adulterated WINE, is that wherein some drug is
added to give it a strength, fineness, flavour, briskness, sweet-
ness, or some other quality which is wanted.

Pricked, or eager WINE, is that tanned fourth.

Flat WINE, is that fallen weak and vappid, for want of being
drank in time.

Sulphured WINE, is that put in casks wherein sulphur has
been burnt; in order to fit it for keeping, or for carriage by
sea.

Colour WINE, is a thick *wine*, of a very deep colour, serving
to dye the *wines* that are too pale, &c. as the *black wine*,
in use among our vintners.

Chip WINE, is that poured on chips of beech wood, to fine,
or soften it.

Rape WINE, is that put in a cask half full of fresh grapes
picked for the purpose, to recover the strength, briskness,
&c. which it had lost by keeping, &c.

Burnt WINE, is that boiled up with sugar; and sometimes
with a little spice.

There is also a sort of *Malmsey wine*, made by boiling of
muscadine.

Method of making and firing WINE. — In the southern parts of
France, their way is, for *red wines*, to tread, or squeeze the
grapes between the hands, and to let the whole stand, juice
and husks, till the tincture be to the change: after which
they press it. — But for *white wines*, they press the grapes
immediately.

When pressed, they tun the must, and stop up the vessel;
only leaving the depth of half a foot or more empty, to give
room for it to work. — At ten days ens, they fill this space
with some other proper *cider*, that will not provoke it to
work again. — Thus they repeat from time to time; new
wine always spending itself a little ere it comes to perfection.
About Paris, and the northern parts of France, they let the
must

mark and must stand two days and nights for *white-wines*, and at least a week for *claret-wines*, before they tun it.—While it continues working, it is kept as warm as possible. Some, upon stopping it up for good and all, roll the cask about the cellar, to mix the liquor with the lees; and, after settling a few days, rack it off with great improvement. To fine it down, they put flavings of green beech into the vessel; having first taken off all the rind, and boiled them an hour in water, to extract their rankness; and afterwards dried them in the sun, or in an oven: a bushel of these serve for a tun of *wine*. These put the liquor in a gentle working, and purify it in twenty four hours. They also give it an agreeable flavour.—The same chips being washed, serve again and again, till almost quite consumed. Some sweeten their *wines* with raisins of the sun, trod in the vat with the grapes, having been first plumped by boiling; others, by boiling half the must, scumming it, and tanning it up hot with the other.

For English *wine*, the method recommended by Mr Mortimer, is, first, to gather the grapes when very dry, to pick them from the stalks, then to press them, and let the juice stand twenty four hours in the vat covered. Afterwards to draw it off from the gross lees, and then put it up in a cask, and to add a pint or quart of strong red or white port to every gallon of juice; and let the whole work, bunging it up close, and letting it stand till January; and then bottle it in dry weather.

By this method, he assures us, he has made English *wine* as good as any the best and purest French *wine*, drank either in Paris or Champaign.

Mr Bradley chuses to have the liquor, when pressed, stand with the husks, stalks and all, in the vat to ferment for fifteen days.

He adds, that according as the vines have been managed, the *wine* will be stronger or weaker.—Those, *e. gr.* which run at liberty up high trees, and are never pruned, make the smallest *wines*: those kept tied to stakes about four feet high, and which have their branches duly pruned, yield stronger *wines*: And those nearest the ground, the strongest.

The force of the fermenting *wine* is very great; being able, if close stopped up, to burst through the strongest cask.—The readiest and only way to stop or abate the fermentation, is by the fume of burning sulphur.

Add, that when *wine* already made is upon the fret, or, by any alteration in the air, begins to ferment again; the way used by the vintners and wine-coopers to save it, is by the flame of common sulphur, or a lighted match dipped in it; this, held under a cask just ready to burst its hoops, calms its fury, and makes it immediately subside. See SULPHUR.

Piece of WINE.

Prisage of WINE.

Racking of WINE.

Spirit of WINE.

Steaming of WINE.

The use of WINE are very great; not only as a drink, but as a medicine.—Several physicians recommend it as an excellent cordial, and particularly serviceable in fevers, the lues venerea, &c.

Pliny mentions Staphylus, as the first who mixed *wine* with water; but Athenæus gives the credit thereof to Amphitryon, king of Athens.—On this occasion a fable was invented, that Bacchus having been struck with a thunderbolt, and being all inflamed, was presently cast into the nymph's bath, to be extinguished.

The age of WINE is properly reckoned by leaves.—Thus, they say, *wine* of two, four, six leaves, to signify a *wine* of six, four, or two years old; taking each new leaf put forth by the vine, since the *wine* was made, for a year.

Among the Romans, the age of *wines* was, as it were, the criterion of their goodness.—Horace, in his *Odes*, which one may call *Bacchic songs*, boasts of his drinking Falernian *wine*, born, as it were, with him, or which reckoned its age from the same consuls.

Pliny mentions *wines* kept above an hundred years, and yet potable.—Others he speaks of, kept two hundred years, which, by that time, were reduced to the consistence of honey. But the moderns keep no *wines* to any such age.—Where they are kept the longest, as in Italy and Germany, there are scarce any to be found of above fifteen leaves.—In France, the *wines* that keep best, as those of Dijon, Nantz, and Orleans, are reckoned superannuated at five or six years old.

Lees of WINE, are the impurities thereof, or the thick sediment, remaining at the bottom of the casks, when the *wine* is drawn out.

WINE is also a denomination, applied in medicine and pharmacy, to divers mixtures or compositions, wherein the juice of the grape is a principal ingredient. See VINUM.

These medicated *wines* make a considerable article in our dispensatories, in quality of diet-drinks; some being denomi-

nated from the ingredients used in them; some from the intentions wherewith they are prescribed; and some from their qualities, &c.

Bitter WINE, *vinum amarum*, is an infusion of certain bitter stomachic herbs, as gentian root, juniper berries, tops of centaury, orange and lemon peel, in white port, or some other *white wine*; taken by way of whet in a morning, to restore the palled stomach after a debauch, and bring the fibres to their due tension.

Chalybeate, or Steel WINE, is prepared of steel-filings, and saffron infused in *wine*, and filtered.—It is good for removing obstructions in the viscera, as in the chlorosis, &c.

Vinum benedictum, the blessed WINE, is made of crocus metallorum, and mace, infused in *wine*.—It was formerly a celebrated emetic, but now is almost out of use for its roughness.

Elecampane WINE, *vinum enulatum*, is an infusion of the root of that plant, with sugar and currants, in white port.—It cleanses the viscera, prevents disorders and obstructions of the lungs, and is good in asthmatic cases, cachexies, &c.

Hog-lie WINE, *vinum millepedum*, is prepared of hog-lie put alive in white port; and after some infusion, pressed and strained out: to the liquor is added saffron, salt of steel, &c.—It is recommended against the jaundice, dropsy, cachectic habits, &c.

Pectoral WINE, *vinum pectorale*, is prepared of liquorice, saffron, coriander-seeds, carraway, anise, salt of tartar, pennyroyal, and hyssop leaves, digested with canary *wine*, and strained.—It is a good expectorant, helping to deterge and cleanse the lungs, &c.

Emetic WINE, *vinum emeticum*. See the article EMETIC. Hippocrates's WINE, *vinum Hippocraticum*, or Hippocras. See HIPPOCRAS.

Viper WINE, *vinum viperinum*, is a preparation of female vipers, infused six months in canary *wine*.—It is a great restorative, and provokes to venery; and is also good against cutaneous eruptions, &c.

Vinum Scilliticum, WINE of Squills, is an infusion of those roots in white *wine* for forty days; after which the squills are taken out, and the liquor preserved for use.—It is a gentle emetic, and is good against delusions of rheum, &c.

WINE-Measure. See the article MEASURE.

WING. See the articles FEATHER, and FLYING.

Warbling of the WINGS. See the article WARBLING.

WINGS, in heraldry, are born sometimes single, sometimes in pairs, in which case they are called *conjoined*; when the points are downward, they are said to be *inverted*; when up, *elevated*.

WING, *Ala*, or *Asilla*, in botany, the angle which the leaves of a plant, or the pedicles of the leaves, form with the stem, or a branch of the plant.

This angle is commonly acute, and always turned upward.—It has its name from its resembling the angle which the wings of a bird form with the body; or rather, from the angle which a man's arms make with his trunk, which is also called *ala*, wing.

WINGS, in gardening, &c. denote such branches of trees, or other plants, as grow up aside of each other.

La Quintiny says, the term is particularly applied to artichokes, whose wings, or *ala*, are the lesser heads or fruits that grow up with the principal one, on the same stalk.

WINGS, *alæ*, in the military art, are the two flanks or extremes of an army, ranged in form of battle; being the right and left sides thereof, and including the main body.

The cavalry are always posted in the wings; *i. e.* on the flanks, on the right and left sides of each line; to cover the foot in the middle.

Pan, one of Bacchus's captains, is said to have been the first inventor of this method of ranging an army; whence, say they, it is, that the antients painted him with horns on his head; what we call wings, being by them called *cornua*, horns. This, at least, is certain, that the method of arranging in wings is very antient.—The Romans, we know, used the term *alæ*, or wings, for two bodies of men in their army; one on the right, the other on the left, consisting each of 400 horse, and 4200 foot usually, and wholly made up of confederate troops.—These were designed to cover the Roman army, as the wings of a bird cover its body.

The troops in these wings, they called *alares*, and *alares copie*; and we, at this day, distinguish our armies into the main-body, the right and left wings.

WINGS are also used for two files that terminate each battalion, or squadron, on the right and left.—The pikes used to be ranged in the middle, and the musqueteers in the wings.

WINGS, in fortification, denote the longer sides of horn-works, crown-works, tenailles, and the like out-works; including the ramparts and parapets, with which they are bounded on the right and left, from the gorge to their front.

These wings, or sides, are capable of being flanked, either with the body of the place, if they stand not too far distant;

or with certain redoubts; or with a traverse made in their ditch.

S. Michael's WING, is the name of a military order in Portugal, instituted, according to the jesuit Mendo, in 1165; or according to di Micheli, in his *Tejoro Militar. de Cavalleria*, in 1171. Its institutor was, Alphonsus Henry I. king of Portugal; and the occasion was a victory gained by him over the king of Sevil, and his Saracens; for which he thought himself beholden to S. Michael, whom he had chose for his patron in the war against the infidels.

The banner they bore was a wing resembling that of the arch-angel, of a purple colour, encompassed with rays of gold.—Their rule was that of S. Benedict; the vow they made was to defend the Christian religion, and the borders of the kingdom, and to protect orphans.—Their motto, *Quis ut Deus*.

WINGED, in botany, a term applied to such stems of plants as are furnished, all their length, with a sort of membranous appendage.

Several kinds of thistles have winged stalks, and branches.

WINGED Leaver, are such as consist of divers little leaves, ranged in the same direction, on each side of a rib or stalk, so as to appear no more than one and the same leaf.—Such are the leaves of agrimony, acacia, ash, &c.

WINGED Seeds, are such as have down or hairs on them; whereby the wind taking hold, blows them to a distance.

WINGED Stalk. See the article **STALK**.

WINGED, in heraldry, is applied to a bird, when its wings are of a different colour, or metal, from the body.

Winged is also applied to any thing represented with wings, though contrary to its nature; as a winged, or flying hart, &c.

WINNOW, signifies to fan, or separate corn from the chaff by wind.

WINTER, one of the four seasons, or quarters of the year.

Winter properly commences on the day when the sun's distance from the zenith of the place is the greatest, and ends on the day when its distance is at a mean between the greatest and least.

Notwithstanding the coldness of this season, it is proved, in astronomy, that the sun is really nearer to the earth in winter than in summer.—The reason of the decay of heat, &c. see under the articles **HEAT**, and **LIGHT**.

Under the equator, the winter, as well as the other seasons, return twice every year; but all other places have only one winter in the year; which, in the northern hemisphere, begins when the sun is in the tropic of Capricorn; and in the southern hemisphere, when in the tropic of Cancer: so that all places in the same hemisphere have their winter at the same time.

WINTER, among printers, that part of the printing-press, serving to sustain the carriage, &c. See **PRINTING-Press**.

WINTER's Bark, *Cortex Winteri*, or *WINTERANUS*. See **CORTEX**.

WINTER-Quarters. See the article **QUARTERS**.

WINTER-Kiz, among husbandmen, signifies to fallow, or till the land in winter. See **FALLOW**, &c.

WINTER-Solstice. See the article **SOLSTICE**.

WINTONIE Rotulus. See the article **ROTULUS**.

WIRE, **WIAR**, **WIER**, or **WYRE**, a piece of metal, drawn through the hole of an iron, into a thread, of a fineness answerable to the hole it is pulled through.

Wires are frequently drawn so fine, as to be wrought along with other threads of silk, wool, or hemp: and thus they become a considerable article in the manufactures.

The metals most commonly drawn into wire are gold, silver, copper, and iron.—And hence we have gold wire, silver wire, iron wire, &c. as in the following articles.

Gold and silver WIRE.—What we call gold wire, is made of cylindric ingots of silver, covered over with a skin of gold; and thus drawn successively through a vast number of holes, each smaller and smaller, till at last it is brought to a fineness exceeding that of a hair.

That prodigious ductility which makes one of the distinguishing characters of gold, is no where more conspicuous than in this gilt wire.—A cylinder of 48 ounces of silver, covered with a coat of gold, only weighing one ounce, Dr Hally informs us, is commonly drawn into a wire, two yards of which only weigh one grain: whence 98 yards of the wire only weigh 49 grains; and one single grain of gold covers the said 98 yards.—So that the ten thousandth part of a grain is above half an inch long.

The same author, computing the thickness of the skin of gold, found it to be only $\frac{1}{134720}$ part of an inch—yet so perfectly does it cover the silver, that even a microscope does not discover any appearance of the silver underneath.

M. Robault observes, that a like cylinder of silver covered with gold, 2 feet 8 inches long, and 2 inches 9 lines in cir-

cumference, is drawn into a wire 307200 feet long; that is, into 115200 times its former length.

Mr Boyle relates, that 8 grains of gold covering a cylinder of silver, is commonly drawn into wire thirteen thousand feet long.—The method of drawing it, see further illustrated under the article **DUCTILITY**.

Silver WIRE is the same with gold wire, except that the latter is gilt, or covered with gold, and the other is not.

There are also counterfeit gold and silver wires: the first made of a cylinder of copper, silvered over, then covered with gold; and the second of a like cylinder of copper silvered over, and drawn through the iron, after the same manner as gold and silver wire.

Brass WIRE is drawn after the same manner as the former.—Of this, there are divers sizes, suited to the divers kinds of works. The finest is used for the strings of musical instruments, as spinets, harpsichords, manichords, &c.

The pinmakers likewise use vast quantities of wire of several sizes, to make their pins of. See **PIN**.

Iron WIRE, is called, by the French, *fil d'archal*; the reason of which, their authors are not agreed about.—That celebrated etymologist, M. Menage, derives it from *filum* & *aurichalcum*; but others, more conversant in the commerce thereof, deduce it from one Richard Archal, the first inventor thereof.

There are various sizes of this wire, from $\frac{1}{2}$ an inch, to $\frac{1}{16}$ of an inch diameter. The smallest sizes are used to string musical instruments withal, particularly harpsichords, plateries, &c.—Vast quantities of iron wire are brought yearly hither from the Baltic; and are partly spent at home, and partly exported to France, &c.

Wire-Drawing.—For the several manners of drawing gold and silver, see **DUCTILITY**.

The first iron that runs from the stone, when melting, being the softest, and toughest, is usually preferred to make wire of.

WISDOM, *Sapientia*, usually denotes a higher and more refined knowledge of things, immediately presented to the mind, as it were by intuition, without the assistance of ratiocination.

In this sense, wisdom may be said to be a faculty of the mind or at least a modification and habit thereof.

Sometimes the word is more immediately used in a moral sense, for what we call *prudentia* or *discretion*; which consists in the soundness of the judgment, and a conduct answerable thereto.

The school-divines, sometimes restrain wisdom to the knowledge of the more sublime and remote objects, as that of God, &c. In which sense, theology is properly said to be wisdom.

The Latin word for wisdom, is *sapientia*, which literally expresses the sense of tasting; to which *idem* is supposed to have some conformity.—The sight, and other senses, only represent to us the surface of things: taste goes deeper, penetrates into the substances; so that what, *e. gr.* to the feeling seemed cold, to the taste will be found hot: so wisdom, arising from a deep attention to our ideas, goes further, and frequently judges otherwise than the common apprehensions of men would reach to.

WIST, **WISTA**, a quantity, or measure of land among our Saxon ancestors; of different dimensions, in different places.—In the *Monasticon*, it is said to be half a hide, or sixty acres: in an old chronicle of the monastery of Batle, it is said to be forty eight acres.

WIT, a faculty of the mind, consisting, according to Mr Locke, in the assembling, and putting together of those ideas with quickness and variety, wherein can be found any resemblance or congruity; whereby to make up pleasant pictures, and agreeable visions to the phantasy.

This faculty, the same great author observes, is just the contrary of judgment, which consists in the separating carefully from one another, such ideas wherein can be found the least difference, thereby to avoid being misled by similitude, and, by affinity, to take one thing for another.

It is the metaphor, and allusion, wherein, for the most part, lies the entertainment and pleasantry of wit; which strikes so lively on the fancy, and is therefore so acceptable to all people, because its beauty appears at first sight, and there is required no labour of thought, to examine what truth or reason there is in it.—The mind, without looking any further, rests satisfied with the agreeableness of the picture, and the gaiety of the imagination; and it is a kind of affront to go about to examine it by the severe rules of truth, or reason.—Whence it should seem, that wit consists in something that is not perfectly conformable to them. *Essay on Hum. Underst.* Lib. I. c. p. 11.

WIT is also an appellation, given to persons possessed of the faculty called wit, *esprit*.

A French author, who, in 1695, published a treatise of wit, *du bel esprit*, lays down four characteristics thereof.—

1st. A man, who, with an open air, and easy motions, affects those he converses withal agreeably; and on any subject that presents itself, advances new thoughts, and adorns them with a spritely turn; is, all the world over, a *wit*.

2nd. Another, who, less solicitous about the choice and delicacy of his sentiments, knows how to make himself valued by I know not what elevation of discourse; who draws a deal of attention, and shews a deal of vivacity in his speaking, and readiness in his answers; is likewise acknowledged a *wit*.

3rd. A third, who takes less care about thinking, than about speaking well; who affects fine words, though perhaps low and poor in matter; who pleases by an easy pronunciation, and a certain tone of voice, is placed in the same rank.

4th. Another, whose chief aim is not to make himself esteemed, so much as to raise mirth and laughter: who jokes pertinently, rallies pleasantly, and finds something to amuse himself withal in every petty subject; is likewise allowed a *wit*.

Yet, it may be observed, that in all these cases, there is nothing of real *wit*, as above defined; but the whole is *imagination*, or *memory* at most: nay the whole is no more than what temperament may give.

A true *wit* must have a just faculty of discernment; must have, at the same time, both a deal of energy, and of delicacy in his sentiments; his imagination must be noble, and withal happy and agreeable; his expressions polite and well turned; without any thing of parade or vanity in his discourse, or his carriage.—It is not at all essential to a *wit*, to be ever hunting after the brilliant; still studying fine thoughts, and affecting to say nothing but what may strike and surprise.

This is a fault very frequent in dramatic persons: the duke of Buckingham rallies it very justly.—

"What is that thing which we *sheer wit* do call?"

"'Tis when the *wit* of some great writer shall

"So overflow, that is, be none at all,

"That ev'n his fools speak sense —"

Humour, say our critics, is the genuine *wit* of comedy.
Child-Wit. See the article *CHILD-WIT*.

WITCHCRAFT, the crime of sorcery, especially in women.

Many think there may be some foundation for what we call *fascination*, and *witchcraft*.—We have infinite instances, and histories to this purpose; which it would not be fair to set aside, merely because they are not reconcilable to our philosophy: but, as it happens, there seems to be something in philosophy to countenance some of them. What the writers in favour of the opinion advance, as their reasons, is as follows.

All living things, they say, emit effluvia, both by the breath, and the pores of the skin.—All bodies, therefore, within the sphere of their perspiratory, or expiratory effluvia, will be affected by them; and that, in this or another manner, according to the quality of the effluvia; and in this or that degree, according to the disposition of the emittent, and recipient parts.

Thus far is incontestable; nor need we produce instances of animals exhaling sweet, or stinking smells; or of infectious diseases conveyed by effluvia, &c. in confirmation thereof. Now, of all parts of an animal body, the eye, we know, is the quickest.—It moves with the greatest celerity, and in all the variety of directions.—Again, its coat and humours are permeable as any other part of the body, (witness the rays of light it so copiously receives).—The eye, therefore, no doubt, emits its effluvia like the other parts.—The fine humours of the eye must be continually exhaling.—The heat of the pervading rays will rarefy and attenuate them; and that, with the subtle juice, or spirit of the neighbouring optic nerve, supplied, in great abundance, by the vicinity of the brain, must make a fund of volatile matter to be dispensed, and, as it were, determined by the eye.

Here, then, we have both the dart, and the hand to fling it.—The one furnished with all the force and vehemence, and the other with all the sharpness and activity, one would require. No wonder if their effects be great!

Do but conceive the eye as a fling, capable of the swiftest and intensest motions and vibrations: and, again, as communicating with a source of such matter, as the nervous juice elaborated in the brain; a matter so subtle and penetrating, that it is supposed to fly instantaneously through the solid capillaments of the nerves; and so active and forcible, that it distends and convulses the muscles, and distorts the limbs, and alters the whole habitude of the body, giving motion and action to a mass of inert, inactive matter.—A projectile of such a nature, flung by such an engine as the eye, must have an effect wherever it strikes: and the effect will be limited and modified by the circumstances of distance, the impetus of the eye, the quality, subtilty, acrimony, &c. of the

juices, and the delicacy, coarseness, &c. of the object it falls on.

This theory, it is supposed by many, may account for some of the phenomena of *witchcraft*, particularly of that branch called *fascination*.—It is certain the eye has always been esteemed the chief seat, or rather organ of *witchcraft*; tho', by most, without knowing why, or wherefore. The effect was apparently owing to the eye; but, how was not dreamed of.—Thus, the phrase, to have an *evil eye*, imports as much as to be a *witch*.—And hence Virgil—*Nescio quis teneros oculus mihi fascinat agnos*.—Again, old, blious persons, are those most frequently supposed to have the faculty; the nervous juice in them being depraved, and irritated by a vicious habitude of body; and so rendered more penetrating, and malignant.—And young persons, chiefly children and girls, are most affected by it; by reason their pores are patent, their juices incoherent, and their fibres delicate, and susceptible. Accordingly, the *witchcraft* mentioned by Virgil, only reaches to the tender lambs.—Lastly, the faculty is only exercised when the person is displeased, provoked, irritated, &c. It requiring more extraordinary itself, and emotion of mind, to dart a proper quantity of the effluvia, with a sufficient impetus, to produce the effect at a distance. That the eye has some very considerable powers, is past dispute.—The ancient naturalists assure us, that the basilisk, and opoblea, kill other animals merely by staring at them. If this tale of credit, a late author assures us to have seen a mouse running round a large snake, which stood looking earnestly at it, with its mouth open: still the mouse made less and less circles about it; crying all the while, as if compelled thereto; and, at last, with a deal of seeming reluctance, ran into the gaping mouth, and was straight swallowed.

Who has not observed a setting-dog, and the effects of its eye on the partridge? The poor bird, when once its eyes meet those of the dog, stands a if confounded, regardless of itself, and easily lets the net be drawn over it.—We remember to have read of squirrels also stupified, and overcome by a dog's staring hard at them, and thus made, to drop out of their trees into his mouth.

That man is not secure from the like affections, is matter of easy observation. Few people but have, again and again, felt the effects of an angry, a fierce, a commanding, a disdainful, a lascivious, an intreating eye, &c.—These effects of the eye, at least, make a kind of *witchcraft*.

WITENA-MOT, or **WITENA-GENOT**, among our Saxon ancestors, a term literally signifying council, or assembly of sages, or wise men; applied to the great council of the land, of latter days called *parliament*.

WITHERNAM*, in law, a reprisal, or taking of other goods or cattle, in lieu of those unjustly taken and effoined, or otherwise withheld.

* The word is compounded of the Saxon *wither*, contra, against, and *nam*, captis, taking. See *NAM*.

Where goods are taken by colour of distress, and driven to an hold, or out of the county; so that the sheriff cannot, upon replevin, make deliverance thereof to the party distrained: in this case the writ of *withernam*, or *de wito natio*, is issued, directed to the sheriff, for the taking as many of the party's beasts, as he did thus unlawfully restrain; or as much goods of his, till he had made deliverance of the first distress.

Homine capto in WITHERNAMUM. See *HOMINE*.

WITHERS of an horse, the juncture of the shoulder-bones at the bottom of the neck and main, towards the upper part of the shoulder.

WITNESS, *Testis*, a person who certifies, or asserts the truth of any fact.

Among the Romans, it was a custom to pull or pinch the ears of witnesses present at any transaction; that they might remember it when they were called to give in their testimony. Two *eye-witnesses*, or *de visu*, not suspected, are to be deemed a conclusive proof.

False witnesses, suborners of witnesses, &c. in England, are punished with the pillory; in several other countries, with death. See *PERJURY*, *SUBORNATION*, &c.

In a synod at Rome, under Constantine, in the year 320, it was decreed, that there should be 72 witnesses heard, to condemn a bishop; which was called *libra testium*, a pound of witnesses. Accordingly there were 72 witnesses heard against Pope Marcellinus; who, says the historian, *erant electi libra occidia*.

Antiently there were synodal witnesses, *testes synodales*, in each parish, chose by the bishop, to enquire into the heresies, and other crimes of the parishioners; and to make oath thereof on the relics of the saints.

Attic WITNESS. See the article *ATTIC*.

WOAD, *Guadam*, or *Gleffum*, a drug used by the dyers, to give a blue colour.

It arises from seed, sown annually in the spring; which puts forth a plant called *glafum jativum*, whose leaves resemble those of ribwort-plantain.—They have usually three, four,

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four, or five crops of leaves every year; but only the two or three first are of any value; whereof the first is best, and the rest in their order.

When the leaves are ripe, they crop or gather them; after which they carry them to a wood-mill to grind them small after this, they are laid eight or ten days in piles or heaps; and at last made into a kind of balls, which are laid in the shade, on hurdles, to dry.

This done, they break or grind them to powder; and when ground, spread it on a floor, and water it, which they call *couching* it.

Here they let it smoke and heat, till, by torrefying it every day, it becomes quite dry, which they call *silvering*. A week after which, it is in a condition to be used in dying. The ancient Britons used to dye their bodies herewith; and some hold, that it was from this plant, glass took its denomination; though others derive both *glass*, and *glassum*, from the British *glasi*, which, to this day, denotes a blue colour.

A *wood blue*, is a very deep blue, almost black; and is the base of so many sorts of colours, that the dyers have a scale, whereby they compose the divers casts or degrees of *wood*, from the brightest to the deepest. See Supplement, article *WOOD*.

WOLD *, signifies a plain down, or open champain-ground, hilly, and void of wood.

* Hence the names, *Stow* in the *Wold*, and *Cotswold* in Gloucestershire; whence also that part of Leicestershire, which lies northward beyond the Wrekin, is called the *Wold* of Leicestershire.

WOLD, or **WELD**, among dyers. See the article **WELD**. **WOLFESHEAD** *, or **WULVESHEAD**, *Caput lupinum*, denoted the condition of those out-lawed for criminal matters in the Saxon time, and not yielding themselves to justice.

—For if they could have been taken alive, they must have been brought to the king; and if they, for fear of being apprehended, did defend themselves, they might be slain, and their heads brought to the king; for their head was no more to be accounted of than a *wolf's-head*. *LL. Edw.* in *Lamb. fol. 127. and Bract. Lib. III. Tract. 2. cap. 11.* See **UTLAWRY**.

* The word is originally Saxon, *wulfer-head*, compounded of *wulf*, wolf, and *head*, head.

WOLVES Teeth, of an horse, are over-grown grinders, the points of which being higher than the rest, prick the creatures tongue and gums in feeding, so as to hinder the chewing of the meat.

They are seldom met with but in young horses; but if they be not daily worn by chewing, they will grow up even to pierce the roof of the mouth.

Root of Wolves. See the article **ROOT**.

WOMAN, **FORMINA**, *Mulier*, the female of man.

S. Augustin calls *women* the *devoid sex*: at east this is the common opinion; though others rather think, that in the prayer usually attributed to that father, and still rehearsed in the Romish church to the holy virgin, the words *intercede pro devoto famine sexu*, are to be understood of *women* devoted, or consecrated to God in religious houses; which had been sufficiently expressed by the words, *ora pro populo, interveni pro clero*.

It is a popular tradition among the Mahometans, which obtains to this day, that *women* shall not enter paradise.

An anonymous author, about the close of the sixteenth century, published a little Latin dissertation, to prove that *women* are not man; that is, are not reasonable creatures: *Dissertatio perjuranda qua anonymus probare nititur mulieres homines non esse*. —He also endeavours to prove, what naturally follows from this principle, *viz.* that *women* shall not be saved; that there is no future life, or happiness for them. His proofs are all taken from scripture, or founded on scripture. —Though, after all, his aim is not so much to degrade *women* to the condition of brutes; as to ridicule the principle or method of many Protestants, who, in points of controversy, admit of no proofs or considerations, but what are taken from scripture alone. —This appears from the conclusion of the work. —*Probat, opinor, invictissimis SS. literarum testimoniis, mulierem non esse hominem, nec eam salvari: quod si non effeci, ostendi tamen universo mundo quo modo hujus temporis heretici, & presertim Anabaptistae, sacram solent explicare scripturam, & quo utuntur methodo ad stabilienda sua execranda dogmata.*

Yet, Simon Gedecus, a Lutheran divine, wrote a serious confutation of this piece in 1595; wherein the *women* are restored to the expectation of heaven, on their good behaviour.

The ancient Marcionites allowed their *women* to baptize; as we are assured by S. Epiphanius, *Haer. 42. c. 4.* —The Montanists admitted *women* to the priesthood, and even the episcopate. *Epiph. Haer. 49. c. 2.* —The modern Quakers also permit their *women* to preach and prophesy, on an equal footing with the men.

WOO

It is a point much controverted, how far learning and study become the sex? — Erasmus handles the question at large in one of his letters to Budeus. — Lud. Vives, in his *Institutio Famine Christianae*, has a chapter express on the same subject. — Madam Schurman, a German lady, has gone beyond them both, in a treatise on this problem; *Num Famine Christianae conveniat studium literarum?*

Several of the *women* remarkable for learning, have been also distinguished for their want of conduct. — The reason, no doubt, lay in this; that their first studies lying in books of gallantry and intrigue, the imagination was early turned that way, and the memory filled with a sort of ideas, which a favourable disposition, and age, adopted too easily, and improved too fast. — It is not that study in itself has any natural tendency to produce such effects; rather the contrary: The close abstracted researches of metaphysics, logics, mathematics, physics, criticism, &c. no doubt, would be the surest means to secure and establish the virtue of continency in a *woman*.

A *woman*, in England, as soon as she is married, with all her moveables, is wholly in *possession* of her husband, or at the will and disposal of her husband.

There are divers considerable things relating to *women* in the laws of England; which see under the article **WIFE**.

WOMB. See the article **MATRIX**.

Suffocation of the WOMB. See the article **SUFFOCATION**.

WONDER. See the article **MIRACLE**.

The *seven wonders of the world*, as they are popularly called, were, the Egyptian pyramids; the *mausoleum*, erected by Artemisia; the temple of Diana at Ephesus; the walls and hanging gardens of the city of Babylon; the *colossus*, or brazen image of the sun at Rhodes; the statue of Jupiter Olympius; and the pharos, or watch-tower, of Ptolemy Philadelphus. See **PYRAMID**.

WONDERFUL Water. See the article **WATER**.

WOOD, *lignum*, a solid substance, whereof the trunks and branches of trees consist; deriving its growth from certain juices in the earth.

The *wood* is all that part in a tree, included between the bark and the pith.

Dr Grew, in his *Anatomy of Plants*, has discovered, by means of the microscope, that what we call *wood* in a vegetable, notwithstanding all its solidity, is only an assemblage of infinite minute canals, or hollow fibres; some of which rise from the root upwards, and are disposed in form of a circle; and the others, which he calls *injections*, tend horizontally from the surface to the centre; so that they cross each other, and are interwove like the threads of a weaver's web.

Woods are distinguished into divers kinds, with regard to their natures, properties, virtues, and uses. — Of *wood*, considered according to its qualities, whether useful, curious, medicinal, &c. the principal is that called *timber*, used in building houses, laying floors, roofs, machines, &c. See **TIMBER**.

Woods valued on account of their curiosity, are *cedar*, *ebony*, *bux*, *calamita*, &c. which, by reason of their extraordinary hardness, agreeable smell, or beautiful polish, are made into tables, combs, beads, &c.

The medicinal *woods* are, *guaiac*, which the Spaniards call *ligno sancto*; *aloes*, or *agalochum*; *sessifera*, *nephriticum*, *santal*, *legwood*, *asphaltum*, *eagle wood* or *pao d'aquila*, &c.

Woods used in dying, are the *Indian wood*, *Brazil*, *Cumpeche*, &c.

Cord Wood, denotes *wood* for the fire, generally made of the branches or loppings of trees, piled up in order.

This is limited to be, below, fifteen inches, and above, six inches thick, and, at least, three feet and a half long. See **CORD**.

Fossil, subterraneous Wood. — There are divers places where *wood* is found under ground; but all this has been overturned, and buried there from the time of the deluge, or some later period; not formed and produced there, as jet is.

Not long ago, there were found in England, at above a hundred feet depth, several huge oaks, with all their branches on; and which, by their subterraneous situation, had contracted a black colour, nothing inferior to jet, joined with a hardness, which far surpasses that of any living oak. — It is hard to conceive how such trees as these should have come at this depth, unless by a general subversion of the whole terrestrial globe at the flood.

Mr Boyle mentions a huge oak dug out of a salt-mine in Transilvania, so hard as not easily to be wrought on by iron tools; which yet being exposed to the air, out of the mine, became so rotten, that in four days it crumbled between the fingers. *Dissert. de Anim. Hung.* — And Mr Derham observes the same of the trees turned up by the breaches at Dagenham, &c. *Philos. Transf. No 335.* See Supplement, article **BEEWOOD**.

Cutting

Cutting in Wood. }
Measure of Wood. } See the article {
Painting on Wood. }
Sculpture in Wood. }
Stack of Wood. } CUTTING.
MEASURE.
PAINTING.
SCULPTURE.
STACK.

WOOD, *Sylva*, in geography, a multitude of trees, extended over a large continued tract of land, and propagated by nature, or without culture.

Many great woods only consist of trees of one kind. — At Cape Verd in Africa, are woods of orange and lemon trees; in Ceylon, are woods of cinnamon trees; in the Molucca islands, woods of clove trees; in the islands of Nero, Lontour, Lofgain, &c. woods of nutmeg trees; in Brazil, woods of brazil trees, &c. in Numidia, woods of date trees; in Madagascar, woods of tamarind trees, &c.

WOOD and wood, in the sea language, is when two pieces of timber are so let into each other, that the wood of the one joins close to the other.

WOOD-CORN, is a certain quantity of oats, or other grain, antiently given by customary tenants to their lord, for the liberty to pick up dead or broken wood.

WOOD-GELD, WOONGELDUM, in our antient customs, the gathering, or cutting of wood within the forest. — Or it may denote the money paid for the same, to the foresters. Sometimes it also seems to signify an immunity from this payment, by the king's grant. — Crompton says expressly, it signifies to be free from the payment of money for taking of wood in a forest. See GELD.

WOOD-HAY, an antient custom at Exeter; whereby a log out of every beam of wood brought over Ex bridge, is taken towards the reparation of that bridge. *Antiq. of Exeter.*

WOOD-MOTE, the antient name of that forest-court, now called the *court of attachment*.

WOODPLEA-Court, is a court held twice a year in the forest of Clun in Shropshire, for determining all matters relating to wood, and the feeding of cattle there. — Perhaps it was originally the same with wood-mote-court.

WOODWARD *, an officer of the forest, whose function is to look after the woods, and observe any offences either in vert, or venison, committed within his charge; and to prevent the same; and in case any deer are found killed, or hurt, to inform the verderer thereof, and present the delinquents at the next court of the forest.

* Woodwards may not walk with bows, and shafts, but with forest-bills. — *Arum & calamus gestare in foresta non licet, sed (ut respicitur utar verbo) baculum tantummodo.* Term. Hill. An. 13 Ed. III.

WOOF, among manufacturers, the threads which the weavers shoot across, with an instrument called the shuttle, between the threads of the warp, to form the web.

The woef is of different matter, according to the piece to be wrought. — In taffety, both woef and warp are silk.

In mohais, the woef is usually wool, and the warp silk. — In latins, the warp is frequently flax, and the woef silk.

WOOL, lana, the hair, or covering of sheep; which, washed, shorn, dressed, combed, spun, wove, &c. makes divers kinds of stuffs, cloths, &c. for apparel, furniture, &c.

While the wool remains in the state it was first shorn off the sheep's back, and not sorted into its different kinds, it is called fleece.

Each fleece consists of wool of divers qualities, and degrees of fineness, which the dealers therein take care to separate. The French and English usually separate each fleece into three sorts; viz. 1°. Mother-wool, which is that of the back and neck. 2°. The wool of the tails and legs. 3°. That of the breast, and under the belly.

The Spaniards make the like division into three sorts, which they call *prime*, *second*, and *third*; and, for the greater ease, denote each bale or pack with a capital letter, denoting the sort. — If the triage, or separation be well made, in fifteen bales there will be twelve marked R; that is, refine, or prime; two marked F, for fine, or second; and one S, for thirds.

The wools most esteemed are the English, chiefly those about Leominster, Cotswold, and the Isle of Wight; the Spanish, principally those about Segovia; and the French, about Berry: which last are said to have this peculiar property, that they will knot or bind with any other sort; whereas the rest will only knot with their own kind.

Among the antients, the wools of Attica, Megara, Laodicea, Apulia, and especially those of Tarentum, Parma, and Alitino, were the most valued. — Columella sets the two last even above that of Tarentum, Lib. VIII. c. 2. — And Varro assures us, the people there used to clothe their sheep with skins, to secure the wool from being damaged. *De Re Rust. Lib. II. c. 2.*

Tavernier affirms, that the wools in Asia are incomparably finer than those of Europe; and that there is no doubt, but that wool was the golden fleece sought for at Colchis.

The art of preparing and working wool, is attributed, by the antients, to Minerva; who, accordingly, is made the genius and protectress thereof.

English Wool. — The wools of England have always been in the highest repute; and that always more abroad than at home. — Some we have, which manufactured by our own clothiers, Chamberlayne observes, does, both for softness and fineness, vie with the choicest silks. — Spanish wools, we know, bear a great price among us; but it is certain, much the greatest part of that, which when manufactured, our clothiers, &c. call Spanish cloth, grows in England. — Add, that the French can make no good cloth of their own wool, without, at least, one third of English wool mixed with it. — It is allowed, the goodness of the Spanish wool is owing to a few English sheep sent over into Spain, as a present, by Henry II. of England; or, as others will have it, though we think mistakenly, by Edward IV. in 1465.

The fineness and plenty of our wools is owing, in great measure, to the sweet, short grafs in many of our pastures and downs; though the advantage of our sheeps feeding on this grafs all the year, without being obliged to be shut up in folds during the winter, or to secure them from wolves at other times, contributes not a little thereto.

The Scotch and Irish wools, are commonly sold abroad for English; and upon the same footing. — But foreigners, skilled in those matters, find they come far short of it in fineness; though, in some markets, the Irish is even said to be preferred to the English.

The yearly produce of wool in England is calculated by Dr Davenant, and Mr King, at two millions sterling. See WOOLLEN Manufactory.

Antiently, the principal commerce of the nation consisted in wool unmanufactured; which foreigners, especially the French, Dutch, and Flemish bought of us. — Inomuch, that the customs of English wool exported in Edward the third's reign, amounted, at 50 s. a pack, to 250000 l. per annum. An immense sum in those days! See COMMERCE.

This excessive custom on the export of unmanufactured wool, set our people to the making it into cloth themselves. In which they succeeded so well, that towards the close of the sixteenth century, under the reign of queen Elizabeth, the exportation of any wool at all was absolutely prohibited; and this, upon pain of having the right hand struck off.

From that time, England has been exceedingly jealous of its wool. — To prompt their vigilance, the judges, king's council at law, and masters in chancery, in parliament, are seated on wool packs. — Accordingly, scarce a parliament but has renewed, and reinforced the prohibition; particularly, about the middle of the seventeenth century, the exporting of wool was made a capital crime.

But all these precautions are ineffectual; the English themselves, particularly those about the coast of Sussex, making use of the long winter nights to wait over their wools to France: being sure of carrying them to a good market, they despise the penalty, with an intrepidity, that the rest of Europe are amazed at.

M. Colbert, a person the French manufactures and commerce are infinitely indebted to, had entertained a design of procuring some of our English sheep, and propagating them in France; hoping, that by chusing them, in the provinces of that kingdom, such pastures, and such a sky as they had in their own island, they might there be perpetuated; and France be no longer obliged precariously to depend on the clandestine supplies of wool from the English owlers. — But the count de Cominges, then ambassador of France at the English court, laid the impossibility of having such an export of sheep, and the almost equal impossibility of keeping and making them multiply there, so strongly before him, that he abandoned the design.

Wool is reckoned by the sack, containing two weighs; the weigh, six rod and a half; the rod, two stones; the stone, two cloves; and the clove, seven pounds. — Twelve sacks make a last, or 4368 pounds.

A sack of wool, or 364 pounds, is sufficient for four standard cloths, to render them true breadth, i. e. six quarters and a half; true weight, i. e. sixty pound; and the true length, i. e. twenty four yards.

For the divers preparations of wool, see CARDING, COMBING, SPINNING, WEAVING, FULLING, and CLOTH.

Packet of WOOL. } See the article { POCKET.
Sarpilar of WOOL. } SARPILAR.

WOOL-DRIVERS, are those who buy wool of the sheep-owners in the country, and carry it on horseback to the clothiers, or market-towns, to sell it again.

WOOLLEN Manufactory, includes the several sorts of commodities into which wool is wrought; as broad cloths, long and short kerseys, bays, serges, flannel, perpetuanas, jays, stuffs, frieze, penisons, stockings, caps, rugs, &c. — Each whereof,

whereof, see under its respective article, *CLOTH, &c.*
The *woollen manufactory*, which now makes the principal article both in our foreign and domestic trade, being that which furnishes the cargoes of our vessels, that employs our people, &c. may be said to have had its rise in the fifteenth century.

Till that time, our *wool* was all sold in the fleece, to such of our neighbours as came to fetch it.—Among our customers, however, the principal were the Flemings, and Brabanters; and particularly the merchants of Gant and Louvain, who took off vast quantities to supply two manufactories that had flourished in those two cities from the tenth century; and had furnished the greatest part of Europe, and even England itself, with all sorts of *woollen cloths, &c.*—But the richness of the manufactories of Gant, and the incredible number of hands employed therein, having spirited up the inhabitants to revolt, divers times, against their sovereigns, on account of certain taxes which they refused to pay; the seditions were at length punished, and dispersed, and part of them took refuge in Holland, and the rest in Louvain.

These last, together with their art of manufacturing cloths, carried with them their spirit of sedition.—And it was not long before several of them, to avoid the punishment they had deserved for killing some of the magistrates, removed into England; where they instructed our people how to work their own *wools*.

This establishment is referred to the year 1420; from which time no endeavours have been spared to keep our *wools* to ourselves.

The president Thuanus makes this epocha an hundred years later; and attributes the establishment of the *woollen manufactories* in England to queen Elizabeth, and the troubles about religion, which the severity of the duke of Alva and the Spanish inquisition had occasioned, and kept up so long in the Low Countries.—But what that noble author says, is rather to be understood of their perfection, than their first establishment; and of the several great manufactories then set up at Norwich, Colchester, Sandwich, Hampton, &c.—For in the English and Flemish historians, we find mention made of the manufactories of London, long before any part of the seventeen provinces had attempted to throw off the Spanish yoke.

As this manufacture now stands, Dr Davenant and Mr King compute the produce thereof to be eight millions per annum: three fourths whereof are consumed at home, and the rest exported.

So jealous are we now become of our *woollens*, that, besides the precautions taken to use all our own *wools* ourselves, we have added that of selling them ourselves, and of carrying them to the places where they are required; not admitting strangers to come and buy any in England.

And hence the establishment of those famous magazines in Holland, the Levant, and the North, where our *woollens* are deposited, to be vended by factors, or commissioners.—The magazine in Holland has changed place divers times; and it has been successively at Middleburgh, Delf, Rotterdam, and Dort, where it now remains; and where all the Germans come to furnish themselves.—That for the Levant, is at Smyrna; and for the North, at Archangel.

A pack, or 240 pounds weight of short *wool*, it is computed, employs sixty three persons a week, to manufacture it into cloth; viz. three men to sort, dry, mix, and make it ready for the stock-carder; five to scribble, or stock-card it; thirty five women and girls, to card and spin it; eight men to weave it; four men and boys to spool it, and reed quilts; eight men and boys to scour, burl, mill, or full it; row, shear, pack, and press it.

A pack of large, long, combing *wool*, made into stuffs, serges, sagathies, &c. for the Spanish trade, will employ, for one week, 202 persons, whose wages amount to 43 *l.* 10 *s.*—Thus, 7 combers, 3 *l.* 10 *s.* dyers, 5 *l.* 15 *s.* spinners, 18 *l.* 20 throwers, and doublers, 5 *l.* 25 weavers, and attendants, 12 *l.*

A pack of *wool* made into stockings, will employ, for one week, 184 persons, who will earn 56 *l.*—Thus, 10 combers, 5 *l.* 5 *s.* the dyer, 1 *l.* 6 *s.* 102 spinners, 15 *l.* 12 *s.* doublers and throwers, 4 *l.* 10 *s.* 60 stocking-weavers, 30 *l.*

Bleaching of WOOLLENS. See the article *BLEACHING*.

WOOL-STAPLE, denotes a city or town where *wool* used to be sold. See *STAPLE*.

WOOLSTED. See the article *WOOLSTED*.

WOOL-WINDERS, are persons employed in winding up fleeces of *wool* into bundles, to be packed, and sold by weight.—These are sworn to do it truly between the owner and the merchant.

WORD, in language, is an articulate sound, designed to represent some idea.

WORD, in writing, is an assemblage of several letters, forming one or more syllables, and signifying some thing.

The Port-Royalists define *words* to be distinct articulate sounds, agreed on by mankind, to convey their thoughts and sentiments by.

Grammarians divide *words* into eight classes, called *parts of speech*; which are the *noun, pronoun, verb, participle, adverb, conjunction, preposition, and interjection*; to one or other of which, all the *words* and terms in all languages, which have, or may be invented to express our ideas, are reducible. See each under its proper article.

Words, again, are divided into *primitives and derivatives, simple and compound, synonymous and equivocal*.

With regard to their syllables, *words* are further divided into *monosyllables, and polysyllables*.

The grammatical figures of *words*, which occasion changes in the form, &c. thereof, are *syncope, apocope, apostrophe, diacresis, apharesis, prothesis, epenthesis, parogoge, metathesis, &c.* See each in its proper place, *SYNCOPE, APOCOPE, &c.*

The use of *words*, we have observed, is to serve as sensible signs of our ideas; and the ideas they stand for in the mind of the person that speaks, are their proper significations.

Simple and primitive words have no natural connection with the things they signify; whence there is no rationale to be given of them: it is by a mere arbitrary institution and agreement of men, that they come to signify any thing.—Certain *words* have no natural propriety or aptitude, to express certain thoughts, more than others; were that the case there could have been but one language.

But, in derivative and compound words, the case is somewhat different.—In the forming of these, we see, a regard is to be had to agreement, relation, and analogy: thus, most *words* that have the same ending, have one common and general way of denoting or signifying things; and those compounded with the same prepositions, have a similar manner of expressing and signifying similar ideas in all the learned languages where they occur.

For the perfection of language, it is not enough, Mr Locke observes, that sounds can be made signs of ideas; unless these can be made use of, so as to comprehend several particular things; for the multiplication of *words* would have perplexed their use, had every particular thing needed a distinct name to be signified by.

To remedy this inconvenience, language had a farther improvement in the use of general terms, whereby one *word* was made to mark a multitude of particular existences; which advantageous use of sounds was obtained only by the difference of the ideas they were made signs of; those names becoming general, which are made to stand for general ideas; and those remaining particular, where the ideas they are used for are particular.

It is observable, that the *words* which stand for actions, and notions quite removed from sense, are borrowed from sensible ideas; as, to imagine, apprehend, comprehend, understand, adhere, conceive, infill, disgust, disturbance, tranquility, &c. which are all taken from the operations of things sensible, and applied to modes of thinking.—*Spirit*, in its primary signification, is no more than breath; *angel*, a messenger. By which we may guess what kind of notions these were, and whence derived, which filled the minds of the first beginners of languages; and how nature, even in the naming of things, unawares, suggested to men the originals of all their knowledge: whilst, to give names that might make known to others any operations they felt in themselves, or any other ideas that came not under their senses, they were forced to borrow *words* from the ordinary and known ideas of sensation.

The ends of language in our discourse with others, are chiefly three: first, to make our thoughts or ideas known one to another.—This we fail in, 1^o. When we use names without clear and distinct ideas in our mind. 2^o. When we apply received names to ideas, to which the common use of that language doth not apply them. 3^o. When we apply them unthinkingly, making them stand now for one, and anon for another idea.

Secondly, to make known our thoughts, with as much ease and quickness as is possible.—This men fail in, when they have complex ideas, without having distinct names for them; which may happen either through the defect of a language, which has none; or the fault of the man, who has not yet learned them.

Thirdly, to convey the knowledge of things.—This cannot be done, but when our ideas agree to the reality of things.—He that has names without ideas, wants meaning in his *words*, and speaks only empty sounds.—He that has complex ideas without names for them, wants dispatch in his expression.—He that uses his *words* loosely and unsteadily, will either not be minded, or not understood.—He that applies names to his ideas, different from the common use, wants propriety in his language, and speaks gibberish;

and he that has ideas of substances, disagreeing with the real existence of things, so far wants the materials of true knowledge.

Division of Words. } See the article { *Division.*
General Words. } *GENERAL.*

WORD, Watch-WORD, in an army, or garrison, is some peculiar word, or sentence, by which the soldiers are to know, and distinguish one another in the night, &c. and by which spies, and designing persons are discovered.

It is used also to prevent surprizes. — The word is given out in an army every night by the general, to the lieutenant, or major-general of the day, who gives it to the majors of the brigades, and they to the adjutants; who give it first to the field-officers, and afterwards to a serjeant of each company, who carry it to the subalterns.

In garrisons it is given, after the gate is shut, to the town-major, who gives it to the adjutants, and they to the serjeants.

WORD, in heraldry, &c. See the article **MOTTO**.

WORK-HOUSE, a place where indigent, vagrant, and idle people are set to work, and maintained with cloathing, diet, &c.

Such are the Bridewells, and several other places about the city, or suburbs; such also was the foundation of that in Bishopsgate-Street, for employing the poor children of the city and liberties, who have no settlement; and that for the parish of S. Margaret's Westminster, called the *grey-coat hospital*.

At Amsterdam they have a famous *work-house*, or house of correction, called the *Rapshuis*, which, by a privilege granted in 1602, has alone the right of shaving, and cutting the dyers woods, as brazil, fustic, campeche, sassafras, &c. Each person, tolerably strong, kept in the house, is obliged to furnish 250 pounds of salped wood per day; and the weaker, a certain proportionable quantity of chips.

WORKS, Opera, in fortification, the several lines, trenches, ditches, &c. made round a place, an army, or the like, to fortify, and defend it. — See *Tab. Archit. fig. 21.* see also the articles **LINE**, and **TRENCH**.

The principal *works*, in a fortress, or fortified place, see under the articles **FORTIFIED PLACE**, **FORTIFICATION**, &c.

Carpenters WORK.

Clock-Work.

Crown-Work.

Field-Work.

Fire-Work.

Fret-Work.

Grotesque-Work.

Horn-Work.

Mosaic-Work.

Out-Work.

Regimen of the Work.

Rustic-Work.

Scatch-Work.

Stream-Work.

Vermicular-Work.

Wax-Work.

Working-Furnace.

Working of Glass.

WORLD, Mundus, the assemblage of parts which compose the universe.

The *duration of the world*, is a thing which has been greatly disputed — Plato, after Ocellus Lucanus, held it to be eternal; and to have flowed from God, as rays flow from the sun. Aristotle was much of the same mind: he asserts, that the world was not generated, so as to begin to be a world, which before was none: and, in effect, his whole eighth book of *Phys.* and first book *de Caelo*, are spent in proving the eternity of the world.

He lays down a pre-existing and eternal matter, as a principle; and thence argues the world eternal. — His argument amounts to this, that it is impossible an eternal agent, having an eternal passive subject, should continue long without action.

His opinion was long generally followed; as seemed to be the fittest to end the dispute among so many sects about the first cause.

Epicurus, however, though he makes matter eternal, yet shews the world to be but a new thing, and says it was formed out of a fortuitous concourse of atoms. See *Lucretius*, Lib. V.

Some of the modern philosophers refute the imaginary eternity of the world, by this argument: that, if it be ab eterno, there must have been a generation of individuals, in a continual succession from all eternity; since no cause can be assigned why they should not be generated, viz. one from another. — Therefore, to consider the origin of things, and the series of causes, we must go back in infinitum, &c. there must have been an infinite number of men, and other individuals already generated; which subverts the very notion of

number. — And if the cause which now generates have been produced by an infinite series of causes; how shall an infinite series be finite, to give room for new generations?

Dr Halley suggests a new method of finding the age of the world, from the degree of saltness of the ocean.

It is another popular topic of controversy, whether the world be finite, or infinite? See the arguments on both sides, under the article **UNIVERSE**.

It is likewise disputed, whether the plurality of worlds be possible? See **PLURALITY**.

Some hold the affirmative, from an opinion of the infinite power of the Deity; it being a setting bounds to omnipotency, to say, that he created so many bodies at first, and that he could not create more.

The Cartesians maintain the negative, upon these principles: that it is a contradiction to say, there are several worlds existing at the same time, since this implies several universes of created beings, the world being the *res tota*. That if there were several worlds, they must either be at a distance from one another, or contiguous; but neither can be said: for were they contiguous, they would only constitute one; and were they distant, there must be something between. But what can be between? If it be extended, it is corporeal; and instead of separating the several worlds, it will connect them all into one.

The *Existence of an eternal World* has been much controverted of late. The arguments on either side, see under the article **BODY**, **EXISTENCE**, and **ETERNAL**.

The world is sometimes divided into *upper*, and *lower*.

Lower, or *sublunary* **WORLD**, is the globe of our earth. See

EARTH.

Upper **WORLD**, includes the heavens, and heavenly bodies.

Axis of the WORLD.

Map of the WORLD.

Soul of the WORLD.

System of the WORLD.

See the article { **AXIS.**
MAP.
ANIMA Mundi.
SYSTEM.

WORMS, Lumbrici, or *Vermes*, in medicine, a disease arising from some of those reptiles being generated, and growing in the body: whence, frequently, terrible symptoms proceed.

The ordinary place of the worms, is the intestines: though there is scarce any part of the body but is sometimes infected with them: for besides the *vermes intestinales*, there are *dentales*, *gingivales*, *pulmonarii*, *cardiaci*, *sanguinari*, *cutaneous*, *umbilical*, *hepatic*, *salivari*, &c.

They are all usually supposed to be ingendered from the eggs of some insect, deposited in something that is taken into the body by way of food; or some other way: an hypothesis, however, which will hardly account for certain species of these insects not to be found but in the bodies of animals. — A solution of this difficulty, will, perhaps, be hard to find, without having recourse to the first stamina of animals, and the principles of generation.

There are three species of worms, most frequent in the human body: the *teretes*, or round and thick, mostly found in the duodenum; the *latus*, or flat, called also *tania*; and the round and small, found in the rectum, called *oxyurides*. — Sometimes, indeed, there are anomalous worms expelled; as horned, hairy, four-footed, &c. worms.

The symptoms of this disease are vomiting, head-ach, heartburn, sighing, swooning, feeble pulse, heavy sleep, and sometimes delirium, quinancy, pleurisy, canine hunger, and innumerable others; occasioned by the animals sucking, moving, velleitating, gnawing, consuming the chyle, irritating the nerves, wounding the solids, &c.

As to the *vermis latus*, beside the other common symptoms, those affected with this, have one peculiar to them; which is, that with their stools they frequently discharge several little bodies, like gourd-seeds.

Dr Tyfon, in the *Philosophical Transactions*, N^o 146. gives a curious account of the flat worm, or *lumbricus latus*; called by Hippocrates, *tanais*, and in English, ordinarily, the *tape-worm*, or *joint-worm*. — This is always single: it lies variously convoluted; being sometimes as long as all the guts; and sometimes, it even vastly exceeds that length.

Olaus Borrichius assures us, a patient of his, in a year's time, voided 800 foot in measure of this worm, though he had not yet met with the head: in voiding, the patient always observed it to break off.

Dr Tyfon parallels this case with that of a patient of his, who voided vast quantities of this worm, for several years together; but in various pieces: some two, three, four, six, or more yards long: but all put together, he lays, would much exceed the length of that of Borrichius.

The joints in this worm are very numerous: in one of 24 feet long, Dr Tyfon numbered 507 joints. — Above the middle of the edges of each joint, he observed a protuberant orifice. — Those orifices he takes for so many mouths; the best microscopes discovering no mouth in what usually passes for the head.

The worm is frequent enough in most kinds of animals; as

W O R

dogs, oxen, crabs, herrings, pikes, &c. — Some authors assert, that it is not one, but many *worms* linked together, and included in a spoliom of the intestines; and that this spoliom is not animated, but receives its sense and motion from a sort of vermiculi cucurculini inclosed in it. — This, Gabucinus, de Lumb. Com. says, he has plainly discovered: but Dr Tyson abundantly evinces the contrary.

In Persia, &c. there are also very long slender *worms*, six or seven yards long, bred in the legs, and other parts of men's bodies: when arrived at a certain pitch, they put out their heads, necks, &c. and withdraw them (if displeased or hurt) again, causing intolerable pains, fevers, &c. See Supplement, article DRACUNCULI.

Aristotle observes, that most deer have *worms* under their tongues. — Sheep's noses often abound with them.

In the *Philosoph. Transact.* N^o. 113. we have accounts of divers remarkable operations whereby *worms* were taken out of divers unsuspected parts of the body; the operators being chiefly women. — Mrs Mary Hatlings is there recorded, as famous for the discovering of *worms* hid in the face, gums, tongue, &c. which she managed with such address, that she took them out of any part affected, with a goose-quill. — Mr Dent relates, that he himself was cured of certain odd tumors on his tongue, by one of those worm-doctresses, Mrs French, who, piercing the parts affected with a lancet, drew out five or six *worms* at a time. — In less than eight days, he assures us, she took out of his tongue above a hundred *worms*, and thirty out of his gums.

Sir Theodore Mayerne assures us, in the *Philosoph. Transact.* N^o. 211. that the famous fugat, or remedy given by Pontanus, (a celebrated chymical empiric) for the *worms* in children, is fifteen grains of mercurius dulcis, with five grains of scammony, and two or three times as much sugar, made up in lozenges. — Heads, that this dose of the scammony, which in France purges grown persons, is ineffectual in England, to persons of above fifteen years old, and ought to be augmented. See Supplement, article WORMS.

Cochineal WORM.

Silk WORM.

Solitary WORM.

Spermatic WORM.

COCHINEAL.

SILK.

SOLITARY.

SPERMATIC.

See the article

WORM, in chymistry, denotes a long, winding pewter-pipe, which distillers and apothecaries place in a tub of water, to cool and condense the vapours in the distillation of spirits. This the chymists also call a *serpentine*. — Formerly, this *worm*, or something like it, was placed above the head of the still, with a refrigeratory at the upper end of it, which is useful enough in the distilling of spirit of wine.

To WORM a cable, or *hawser*, in the sea-phrases, signifies to strengthen it, by winding a small line, or rope, all along between the strands.

WORM-SEED, *Semen contra, semen sanctum, or semen fontanicum*, is a hot, bitter, drying kind of seed, proper to destroy *worms* generated in a human body, and particularly in children.

This seed is small, of a brownish colour, an oblong figure, a bitter taste, and a strong smell. — It must be chosen new, greenish, of a sharp, bitter, aromatic taste, not a little disagreeable.

The place where it is produced, is Persia, about the frontiers of Muscovy. It is brought to us from Aleppo, &c. — Naturalists have not been agreed about the plant that produces it.

J. Bauhine has a large dissertation on the subject. — Some will have it the species of absinthium, or wormwood, called *fontanicum*, or *marinum absinthium*; others will have it the *tanacetum*, others the *abrotanum*; but it is really the seed of a genuine species of wormwood.

M. Tournefort gives us the following account of this notable drug, in the second volume of his travels. The *sementine*, or *worm-powder*, is not gathered like our feeds. — The plant grows in the meadows, and must be let ripen; and the mischief is, that as it grows near to maturity, the wind scatters a good part of it among the grass, where it is lost; and this it is that makes it so dear.

As they dare not touch it with the hand, for fear of making it spoil the sooner; when they would gather what is left in the ear, they have recourse to this expedient. — They take two hand baskets, and, walking along the meadows, sweep the baskets, the one from right to left, the other from left to right, as if they were mowing; by this means the seed is shook out into the baskets.

WORMWOOD, a medicinal herb, among physicians, &c. called *absinthium*. See ABSINTHIUM.

WORMWOOD-WINE, *Vinum absinthites*. See VINUM.

WORSHIP of God, *Cultus Dei*, amounts to the same with what we otherwise call *religion*. See RELIGION.

This *worship* consists in paying a due respect, veneration, and homage to the Deity, under a certain expectation of reward.

W O U

And this internal respect, &c. is to be shewn and testified by external acts; as prayers, sacrifices, thanksgivings, &c. The Quietists, and some other mystic divines, set aside not only all use of external *worship*; but even the consideration of rewards and punishments.

Yet, even the heathens had a notion, that God did not require us to serve him for nought: — *Dii quamobrem colendi sunt*, says Cicero, *non intelligo, nullo nec accepto ab illis nec sperato bono*.

The school-divines divide *worship* into divers kinds, *viz. latría*, that rendered to God; and *idolatria*, that rendered to idols, or images. — To which the Romanists add, *dulia*, that rendered to saints; and *hyperdulia*, that to the virgin.

WORSTED, or WOOLSTEN, in matters of commerce and manufacture, is a kind of woollen-thread.

Worsted is, properly, a thread spun of wool that has been combed; and which, in the spinning, is twisted harder than ordinary.

It is chiefly used either to be knit, or wove into stockings, caps, gloves, or the like.

The name *worsted*, is supposed to be borrowed from a town thus called, in Norfolk, noted for fine spinning. — They who write it *woolsted*, do it on supposition of the word's being formed from *wool*, the matter of this thread.

WOVEN Stockings. See the article STOCKING.

WOULD, or WEILD, among dyers. See WEILD.

WOULDING, a sea-term, for the winding of ropes fast round about a yard, or mast of a ship, after it has been strengthened by some piece of timber nailed thereto.

WOUND, *Vulnus*, in medicine and chirurgery, a recent separation, made in the soft or fleshy parts of the body, from an external cause; and particularly from the action of some hard and sharp instrument.

Or, it is a solution of the continuity of a fleshy part, made by some penetrating body; while it yet remains fresh, bloody, and without putrefaction: by which circumstances a wound is distinguished from an ulcer.

A like separation happening in a bony part, is called a *fracture*.

All wounds proceed either from puncture, incision, or contusion, according to the nature and make of the instrument they were caused by.

Wounds are usually divided, with respect to their cause, circumstances, cure, &c. into *simple*, and *compound*. — *Simple wounds* are those made by puncture, incision, or contusion, separately; those of the outer skin, without any considerable loss of substance, or hurting any remarkable vessel; and those not complicated with any dangerous symptoms.

Compound wounds, are those made both by puncture and incision at the same time, to which is sometimes also added contusion; those attended with great loss of flesh, or the hurt of some considerable vessel; add, those made by envenomed instruments, or attended with violent symptoms.

The history of a wound is thus delivered by Boerhaave. — Immediately upon the solution, the wounded parts recede further and further from each other. — The blood gushes out, at first, with some violence; but stops of itself: then a bloody scab is formed in the cavity of the wound, and a thin ruddy humour oozes out; the lips of the wound begin to reddens, ache, swell, and turn black; and in (great wounds) a fever and thirstiness succeed. — On the third or fourth day, there is found a white, viscid pus; upon which, the heat, redness, tumor, &c. abate, and the cavity gradually fills up from the bottom upwards, and from the circumference to the centre with growing flesh. — Lastly, the wound dries, and cicatrises. But note, these symptoms vary according to the nature and cause of the wound. — Thus, if it be by incision, and a large blood-vessel be cut, the hæmorrhage is more violent; especially if it be an artery; in which case florid blood flies out impetuously, and by starts: if only a vein be cut, the flux is more moderate and equable, and the blood is of a darker colour. — If the wound be attended with contusion, the hæmorrhage is small.

In wounds, where any large artery is quite cut in two, the flux usually proves mortal. — A lesser artery, cut transversely, flies back amongst the solid parts, and will have its mouth stopped: if an artery be not quite cut off, there arises a perpetual flux; or, if that be stopped, an aneurysma. — A nerve being cut off, flies back, produces a pain, and obstruction about the wound; and below it, a numbness, and wasting with immobility: the case is much the same in wounded tendons, and membranes. — Wounds of the temporal muscle are rarely cured; but generally bring on horrible convulsions.

The following wounds are commonly reputed mortal; *viz.* those of the cerebellum, and of the cerebrum, if they be deep enough to hurt the medulla oblongata; deep wounds in the spinal marrow, especially the upper part thereof; those of the heart, lungs, liver, spleen, kidneys, pancreas, mesentery, stomach, intestines, &c. those of the cava, aorta, ca-

rotides,

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rotides, pulmonary, and other large veins and arteries; those of the bronchia, thorax, and diaphragm; large wounds of the oesophagus, trachea, and the bladder; and all inveterate wounds.

In young children, and aged persons, wounds frequently prove mortal, which seemed but slight.—Those wounds generally prove troublesome which happen in an ill state of body, and especially with a low, or spare diet.—All wounds are reputed more dangerous and difficult of cure in winter, than summer; in autumn, than in spring.

The cure of wounds consists in uniting the divided parts; which is the work of nature alone, and which the surgeon can only contribute to by removing external impediments, and applying medicines familiar to the part, called *vulneraries*, and *balsamics*.

The first step, then, to be taken in a simple wound, is to cleanse it, and extract any heterogeneous body that may chance to be lodged therein.—Next, the cavity to be gently wiped with doffils dipt in warm red wine.—The lips are now, to be brought together by bandages or sutures; and the wound to be covered with a pledget dipt in balsam of Peru, or oil of sweet almonds.—The pain thus eased, and the symptoms removed, the wound is to be suppurated, deteged, incarnated, and cicatrized, after the manner of tumors, and ulcers.

If the wound be dangerous, the symptoms violent, and the body cacochymic, more powerful means are had recourse to; as, first, phlebotomy, then gentle cathartics, or clysters; then vulnerary drinks, apozems, and pifans; with cardiacs and paregorics interposed.—In internal wounds, vulneraries and alkalies do well, particularly album græcum, river lobsters, mercurials, &c.

Fresh wounds are cured, ordinarily, in three or four days, without any other means, than applying a few drops of balsam of Peru.—Sometimes, however, digestives are required. Gun-shot wounds are usually the worst of all, by reason of the violent contusion and separation of the parts; which prevent their coming to digestion for the space of three or four days.

In the cure of large wounds, bandages and sutures are required, to fit and dispose them for healing. See *SUTURE*.

WRACK. See the article *WRECK*.

WREATH, in heraldry, a roll of fine linnen, or silk, (like that of a Turkish turban) consisting of the colours born in the escutcheon; placed, in an achievement, between the helmet and the crest, and immediately supporting the crest.

WRECK, **WRACK**, or *Sea-Wreck*, in natural history, a kind of herb growing in the sea, upon rocks and stones, and which the waves tearing off, cast upon shore.

In some places it is used to manure the ground.—In Normandy, and other parts, they burn it; and of the ashes make a kind of soda, or pot-ash, which they use in the making of common green glass, to promote the fusion or vitrification of the other materials.

WRECK, **WRECCUM**, called also *Ship-Wreck*, or *Ship-Wrack*, in law, &c. is when a ship perishes in the sea, and no man escapes alive out of it.

The civilians term it *navisfragium*.—The goods in the ship, which are brought to land by the waves, belong to the king, or him to whom he assigns the right thereof.*

* Thus, in the Stat. Prærog. Reg. c. 11.—*Res habebit wreckum maris per totum regnum, balenas & sturgesones captas in mari, vel alibi intra regnum, exceptis quibuslibet privilegiatis locis, &c.*

If a man, a dog, or even a cat escape alive, the party to whom the goods belong coming within a year and a day, and proving the goods to be his, shall have them again. In divers charters, and old writings, it appears, that *wreck*, antiently, not only comprehended goods which came from a perishing ship, but whatever else the sea cast upon land; whether it were precious stones, fishes*, sea-weed, or the like.

* This *wreck*, in the Grand Customary of Normandy, c. 17. is called *warech*, and latinized *verisicum*; and in some of our antient charters, *wereche*, *werec*, *werech*, and *seapuerp*; q. d. *sea-upwerp*, of sea, and *up-werpen*, to cast up.

WRESTLING, a kind of combat, or engagement between two persons unarmed, body to body, to prove their strength and dexterity; and try which can throw his opponent to the ground.

Wrestling, *palestra*, is an exercise of very great antiquity and fame.—It was in use in the heroic age; witness Hercules, who wrestled with Antæus.

It continued a long time in the highest repute; and had very considerable rewards and honours assigned it at the Olympic games.—It was the custom of the athletes, or wrestlers, to anoint their bodies with oil, to give the less hold to their antagonist.

Abiancourt observes, that Lycurgus ordained the Spartan maids to *wrestle* in public, quite naked, to break them of

W R I

their too much delicacy and niceness; to make them appear more robust, and to familiarize the people, &c. to such nudities.

WRIST. See the article *CARPUS*.

WRIT*, *Breve*, in law, a precept of the king in writing, under seal, whereby any thing is commanded to be done, touching a suit, action, or process for justice.—As, the summoning a defendant, taking a distress, redressing a distress, or the like.

* The word is formed from the Saxon, *writan*, to write.

Writs are variously divided, and in various respects.—Some with regard to their order, or manner of granting, are termed *original*, and others *judicial*.

Original Writs, are those sent out of the high court of chancery, to summon the defendant in a personal, or tenant in a real action; either before the suit begins, or to begin the suit thereby.

Judicial Writs are those sent by order of the court where the cause depends, upon emergent occasions, after the suit begins.

Judicial Writs are distinguished from *original*, in that their teste bears the name of the chief justice of that court whence they come; whereas the *original* say, *teste me-ipsis*, in the name, or relating to the king.

Writs are also distinguished, according to the nature of the action, into *real* and *personal*—*Real*, are either touching the possession, called *writs of entry*; or the property, called *writs of right*.

Personal writs, are those relating to goods, chattels, or personal injuries.

To which may be added, *mixt writs*, for the recovery both of the thing and damages.

Some *writs*, again, are at the suit of the party; some, of office; some, ordinary; some, of privilege.—A *writ of privilege*, is that which a privileged person brings to the court for his exemption, by reason of some privilege which he enjoys.

WRIT of Nisby. See the article *NEIF*.

WRIT of Rebellion. See the article *COMMISSION of Rebellion*.

WRITs Vicountial, are such as are triable in the sheriff's, or county court. See *VICOUNTIEL*.

WRIT of Assistance, that issuing out of the exchequer, to authorize some person to take a constable, or other public officer, to seize goods or merchandise prohibited, and uncustomed, &c. Stat. 14. 2 Car. II. c. 1.

There is also a *writ* of this name issuing out of chancery, to give possession of lands.

<i>Action of a WRIT.</i>	} See {	ACTION.
<i>Appeal by WRIT.</i>		APPEAL.
<i>Attachment by WRIT.</i>		ATTACHMENT.
<i>Continuance of a WRIT.</i>		CONTINUANCE.

WRITER of the Tallies, an officer of the exchequer, being clerk to the auditor of the receipt; who writes upon the tallies the whole letters of the tellers bills. See *TALLY*, and *EXCHEQUER*.

WRITING, *Scriptura*, the art or act of signifying and conveying our ideas to others, by letters, or characters visible to the eye.

Writing is now chiefly practised among us by means of pen, ink, and paper.—The antients had other methods. See *BOOK*, *BARK*, and *STYLE*.

The invention of the art of *writing* is referred to Cadmus. See *LETTER*, and *GREEK*.

In law, we say, deeds, conveyances, &c. are to be in *writing*.—A will may either be in *writing*, or by word of mouth.

We also say, *written law*, *lex scripta*, in opposition to common law, which is called *lex non scripta*.—We have also *written* and *unwritten* traditions, &c.

Authentic *writings* of any contract, sealed, and delivered, make the evidences thereof.

J. Ravenau has a treatise entitled *Des Inscriptions en Faux*, wherein he shews how to revive, and restore old *writings* almost effaced, by means of galls ground in white wine, and distilled; and thus rubbed over the *writing*.

La Vayer has a curious dissertation on the proof of facts by comparison of hand *writings*, wherein he endeavours to shew this method of proof to be very suspicious and fallacious.

It is a point controverted among the school-philosophers, what it is that *writing* properly signifies, or represents? whether ideas, or things, or words? i. e. whether it expresses things themselves, or our ideas of things, or the articulate sounds by which, on other occasions, we express those ideas?

The common opinion is, that *writing* only represents words, that its proper object is the voice, and that it only signifies ideas mediately, or secondarily; and by means of those things themselves.

Others,

W R O

Others, on the contrary, will have ideas, speech, and *writing*, all equally, and immediately representatives of things. But the controversy is impertinent enough!—No doubt, our ideas of things, are the things themselves; there being no foundation for any distinction between them.

And as to *writing*, some may be said to be *real*, or *significative* of things and ideas.—As, the Egyptian hieroglyphics; the characters of chymists, astronomers, &c. which are a kind of images, or bear some natural or pretended resemblance, as analogy with the things they are intended to express.

But the common *writing* only represents sounds, which is the first and most natural language; and accordingly, our orthography is apparently formed on, or adapted to the pronunciation.

Hence, the end of *writing* is to excite, as it were, certain sounds which have been made the arbitrary signs of certain ideas.—This it does by virtue of a combination, or association between such and such figures made with the pen, and such and such inflexions of the voice.

In effect, we have a great many *written* words which have no ideas belonging to them; as, *scindapsus*, *bladri*, &c. which tend no further than to produce sounds.—Add, that people, when they begin to learn to read *writing*, take it from sounds which they hear produced by the person who teaches them: an abundant argument, that *writing* does not immediately signify ideas and things; but first sounds, and then things.

Gothic Writing. See the article *GOthic*.

Secret Writing. See *CRYPTOGRAPHY*, *STEGANOGRAPHY*, *SCYTALA*, *CIPHER*, *DECIPHERING*, &c.

Short Writing. See the article *BRACHYGRAPHY*.

Written Tradition. See the article *TRADITION*.

WRONG, in a logical sense. See *ERROR*, *FALSHOOD*, and *TRUTH*.

W Y T

WRONG, in a legal sense, *injury*, *tort*. See *INJURY*.

WULVESHEVED, or *WULWESHEAD*. See *WOLFESHEAD*.

WYCH-House, a house in which salt is boiled. See *SALT*.

WYDRAUGHT, a water-course, or water-passage, to carry off the filth and sullage of a house; properly a sink, or common-thore.

WYKE, antiently denoted a farm, hamlet, or little village.

*WYTE**, *WYTA*, or *WITE*, *WITA*, in our antient customs, a pecuniary penalty, or mulct.

* — *Jurat secundum vitam quod nec fuerat furti conscius nec coadjutor in eo.* Leg. Inz.

The Saxons had two kinds of punishments, *were*, and *wyte*; the first for the more grievous offences. See *WERE*.

The *wyte* was for the less heinous ones.—It was not fixed to any certain sum; but left at liberty, to be varied according to the case.

Hence, also, *wyte*, or *wittree*, one of the terms of privilege, granted our portmen; signifying a freedom or immunity from fines, or amerciaments: or, as it is vulgarly conceived, from being liable to be begged for fools, for lack of *wit*.

WYTA, or *WITA Plena*, signified a forfeiture of an hundred and twenty shillings.—*Si pindbreche fiat in curia-regis plena wita sit; alibi quinque marca.*

To swear according to the *wyte*, *secundum vitam jurare*, was to purge one's self by the oaths of so many witnesses, as the nature of the crime, and the punishment, or *wyte*, did require.

Hence, also, *bloodwite*, *legerwite*, *ferdwite*, *childwite*, *wardwite*, &c. See *FERDWITE*, *LEGERWITE*, *CHILDWITE*, &c.

WYTHE, in law, the same as *waif*. See *WAIF*.



X, A double consonant, and the twenty second letter in the English alphabet.

The *x* of the Latins, and *ξ* of the Greeks, are compounded of *c* *s*, and *κ* *σ*; whence to this day, the letter *x*, in the English and French, has the same sound with *c* *s*, or *k* *s*. — Thus we pronounce *Alexander*, exactly as if wrote *Alesander*, or *Aleksander*.

The Italians have no *x* at all in their language; but, both speak and write *Alessandro*. — The Spaniards pronounce the *x*, like our *c* before *a*; viz. *Alexandro*, as if it were *Alecandro*. — The Portuguese pronounce it like *sh*.

In foreign words, used in English, we sometimes soften the *x* into a double *s*; as *Brussels*, for *Bruxelles*, &c.

The letter is not known in the Hebrew, or other oriental languages; but, in lieu of it, they write the two simple letters whereof it is compounded. — And the like do the modern Germans.

X is also a numeral letter, and signifies ten; as representing two *V*s placed one at top of the other. See *V*.

X Supra deus numero tibi dat retinendus.

When laid flat, thus *X* it signifies a thousand; and when a dash is added over it, *X̄*, it signifies ten thousand.

XENIA, in some ancient customs, were gifts, or presents made to the governors of provinces, by the inhabitants thereof.

The word occurs pretty frequently in charters of privileges; where, *quietas esse à xenis*, denotes an exemption from making such presents to kings and queens, upon their travelling through such precincts.

XENODOCHUS, an ecclesiastical officer of the Greek church; the same with the *hospitaler*; or a person who takes care of the reception and entertainment of strangers. See *HOSPITALER*.

S. Isidore, a priest and solitary, surnamed *Xenodochus*, lived in the fourth century. — He was thus called, because entrusted with that office in the church of Alexandria.

XEROPHAGIA*, *XEROPHAGY*, in church-history, the feeding on dried foods.

* The word is formed from *ξηρ*, *siccus*, dry, and *φαγω*, I eat.

In the first ages, some, not contented with simple fasting, added the *xerophagy* thereto; abstaining not only from flesh and wine, but also from all flesh, succulent, and vinous fruits. — And some even brought themselves to bare bread and water.

Tertullian, in his book *de Abstinencia*, c. 9. speaks of the *xerophagia*, as a thing commendable in time of persecution.

XEROPHTHALMIA*, *ΞΗΡΟΦΘΑΛΜΙΑ*, a kind of ophthalmia, wherein the eyes itch, and are red, but without swelling, or watering. See *OPHTHALMIA*.

* The word is compounded of *ξηρ* dry, and *φθαλμος*, eye.

XESTA, *ΞΕΣΤΗΣ*, an Attic measure of capacity; answering to the Roman *sextary*. See *SEXTARY*.

XIPHIAS, *ΞΙΦΙΑΣ*, the name of the SWORD-FISH. It is also used to express a fiery meteor, in form of a sword. See *METEOR*.

This differs from the *aconias*, in that this latter is longer, and more like a dart; and the former shorter, and broader in the middle.

XIPHOIDES, *ΞΙΦΟΕΙΔΗΣ*, in anatomy, a cartilage placed at the bottom of the sternum, called also *ensiformis*. It is about an inch long, and shaped like the point of a sword. — Whence its appellation, from *ξίφος*, sword, and *ειδ*, figure.

XV.VIR, *Quindecimvir*. See the article *QUINDECIMVIR*. Authors, and especially antiquaries, make use of such abbreviations, which they borrow from medals, and other monuments of antiquity, where those names are so expressed.

XŸLO-ALOE*, in medicine, the lignum aloes: called also *agallochum*.

* The word is compounded of *ξύλον*, *lignum*, wood, and *αλόν*, aloes.

XYLO-BALSAMUM*, *ΞΥΛΟΒΑΛΣΑΜΟΝ*, a name which naturalists, &c. give to the wood of the tree, which yields that precious gum, known to the Latins by the name of *opa-balsamum*, and among us, by the name of *balm of Gilead*.

* The word is compounded of *ξύλον*, wood, and *βάλσαμον*, balsam, balm.

We have branches of this tree brought us from Cairo. They are very straight, brittle, unequal, and full of knots; their bark is reddish without, and greenish within. — The wood is whitish, and full of pith; and, when broke, yields an agreeable smell, resembling that of the balsam.

The *xylo-balsamum* is reputed good to strengthen the brain, and stomach, and to expel poison.

XYNOECIA*, a feast among the ancient Athenians, instituted on occasion of Theseus's uniting all the petty communities of Attica into one commonwealth; the assemblies whereof were to be held at Athens, in the Prytaneum.

* The word is formed of the Greek, *ξύς*, or *σύν*, with, and *οικισ*, I inhabit.

XYSTARCHA, in antiquity, the master or director of the *xyllus*.

In the Greek gymnasium, the *xystarcha* was the second officer: the first was the gymnasiarch. — The *xystarcha* was his lieutenant, and presided over the two *xythi*, and all exercises of the athlete therein.

XYSTUS*, in the ancient architecture — A *xyllus*, among the Greeks, was a long spacious portico, either open, or covered over; wherein the athlete, and others, practised wrestling, and running.

* The word is Greek, *ξύς*, formed of *ξύειν*, to polish, shave, rub.

The *xyllus* made a necessary part of a gymnasium. — The athlete, who practised therein, were thence called *xylici*.

XYSTUS, among the Romans, was an alley, or double row of trees, meeting arbor-wise at top, and forming a shade to walk under.



Y.

Y A R

Y, The twenty third letter in the English alphabet, borrowed, originally, from the Greek υ .

It is occasionally both vowel, and consonant.

—As a vowel, some authors have judged it unnecessary in our language, in regard its sound is precisely the same with that of the *i*.—Accordingly, it is but little used, except in words borrowed from the Greek, to denote their origin, by representing the Greek υ .

The vowel *y*, however, has a place even in some words purely English; and that both in the middle thereof, as in *ying*, *frying*, &c. and at the end, as in *lay*, &c.

Some ascribe the use of the *y*, in pure English and French words, and those that have no *y* in Latin or Greek, to this, that antiently each of those words were written with a double *ii*; which having something awkward in it, the *y* was substituted in lieu thereof.

Others say, that those words being antiently wrote, as well as pronounced with a double *ii*, which they still are in the Walloon, as *paissen*, *paissen*, &c. to avoid their being mistaken for an *u* with two dots over it, they made the second *i* longer than the first, and so formed the *y* without designing it.—Some give a particular reason, why words ending in *i*, came to be wrote with *y*; *viz.* that the copists found the tail of the *y* very commodious, to adorn the margins, and bottoms of pages withal.

When the *y* follows a consonant, it is a vowel; and when it precedes a vowel, it is a consonant, and should be called *ye*, and not *wy*.

The Romans used the *y* for the vowel *u*, which they had no character for, distinct from the *v* consonant: their way being to pronounce the common *u*, as we do the diphthong *ou*; and the Greek υ , as the English and French *u*.

In our own, and some other modern tongues, authors begin to dispense more and more, with the precise orthography, which requires all words that have an *u*psilon, in the Greek, to be wrote with a *y*. And with reason; since our Greek *y* has lost the sound it had, in the language whence we borrow it.—But it is certainly ridiculous to use it, as many do, in words which indeed have a Greek origin, but have no *u* in the Greek; as in *eclipse*: yet some affect to do this.

Y is also a numeral letter, signifying 150, or, according to Baronius, 159; as in the verse.

Y dat centenos & quinquaginta novenos.

When a dash was added at top, \bar{Y} , it signified 150 thousand.—Pythagoras used the *Y* as a symbol of human life; the foot representing infancy, and the forked top the two paths of vice and virtue, one or the other of which, people are to enter upon, after attaining to the age of discretion.

YACHT, or **YACCH**, a kind of vessel used by the English, furnished with masts, and sails; fit to go to sea; and commodiously contrived and adorned, within and without, to suit it for state-passengers, &c.

* The word seems derived from the Dutch *iacht*, hunting, by reason of the lightness of these vessels.

Yachts are vessels with one deck, carrying from 4 to 12 guns, with from 20 to 40 men; being of burden from 30 to 60 ton.—They draw little water, and are used for running, and making short trips, &c.—Their make and form is various.

The Dutch have also *yachts*, but theirs are not so well prepared to live at sea.—They are seldom used, but to sail on rivers and canals.

YARD, *Virga*, a long measure, used in England, and Spain; chiefly to measure cloth, stuffs, &c.

The English *yard* contains three feet.—It was first settled by Henry I. from the length of his own arm.

The English *yard* is just seven ninths of the Paris ell; so that nine *yards* make seven ells.—To reduce ells, therefore, into *yards*, say, if seven ells give nine *yards*, how many *yards* will the given number of ells give?

Yards are converted into ells Flemish, by adding a third part; into ells English, by subtracting a fifth part; or multiplying by 8, and casting off the right-hand figure.—Ells English are converted into *yards*, by adding a fourth.—To turn ells Flemish into *yards*, subtract one quarter.

The Spanish *vara*, or *yard*, chiefly used at Sevil, is, in some places, called *barra*.—It contains $\frac{17}{12}$ of the Paris ell; so that 17 ells make 24 Spanish *yards*.

Y A W

YARD, in anatomy, the penis, or virile member; serving for the evacuating of the urine, and seed. See **PENIS**.

YARD-LAND*, *Virgata terra*, or *virga terra*, is a certain quantity of land, but that various according to the place.—At Wimbleton in Surrey, it is only 15 acres; but in most other counties it contains 20, in some 24, in some 30, and in others 40, or 45 acres.

* *Virgata terra continet 24 acras; & 4 virgatae constituent unam bidam, & quinque bidae constituent sedam militare.* MS. Abbat. Malmes. See **HIDE**, **KNIGHT'S Fee**, and **Plow-Land**.

YARDS, or **Sail-YARDS**, of a ship, are long pieces of timber, tapering at each end, fitted across the several masts, to carry the sails.

The sails are fastened to the *yards* at the heads; so as to be hoisted up, and let down together with them, by ropes called *balliards*.

The main *yard*, is that of the main-mast.—The *mizzen yard*, the *bolt-sprit yard*, &c. are those of the *mizzen*, &c.—See *Tab. Ship*, fig. 1. m. 2. 29. 37. 44. 67. 86. 93. 109. 126. 138.

They have several phrases, and words of command, relating to the management of the *yards*; as—*Brace the yard*, which signifies to traverse aft the *yard-arm*, whole brace is haled; so that to *traverse the yard*, is the same as to *say*, brace it aft.—*Square the yard*, is as much as to *say*, see that it hang right across the ship, and one *yard-arm* not traversed more than the other.—*Top the yards*, that is, make them hang even.

YARD-Arm, is that half of the *yard* which is on either side the mast, when it lies athwart the ship.

YARDS also denote places belonging to the navy, where the ships of war, &c. are laid up in harbour.

The king's *yards*, are Chatham, Deptford, Woolwich, Portsmouth, Sherborne, Plymouth, and Harwich; each of which is provided with several docks, wharfs, launches, and graving places for the building, repairing, and cleaning his majesty's ships.

In these *yards* are also lodged great quantities of timber masts, planks, anchors, &c. There are also store-houses belonging to each *yard*, wherein are reserved vast quantities of cables, rigging, sails, blocks, &c.

In the several *yards* there are also great rope-yards, wherein cables, and all sorts of cordage are made.

YARE, among sailors, implies as much as, nimble, ready, quick, expeditious.—Hence, to *be yare at the helm*, as some say, signifies to set a fresh man at the helm.

YARN, denotes spun wool. See **WOOL**.

Rope-YARN. See the article **ROPE**.

YARRINGLES, or **YARRINGLE Blades**, a kind of reel, or instrument, with which hanks of yarn are wound on to clues, or balls.

YATCHES. See the article **YACHT**.

YAWS, or **YAWES**, the name of an Indian disease, called also the pox in the sea language.—A ship is said to make *yaws*, when, through the fault of him at the helm, she is not kept steady in her course; but makes angles in and out.

To prevent this, the conner cries to him at the helm, *Steady, Steady*.

YAWNING, *Oscitatio*, an involuntary opening of the mouth, occasioned by a vapour, or ventosity, endeavouring to escape; and generally witnessing a troublesome weariness, or an inclination to sleep.

The remedy Hippocrates prescribes against continual *yawnings*, is to make long breathings, or respirations.—The same he also recommends against the hiccough.

The nervous membrane of the oesophagus, has been held the seat of *yawning*, which, according to the usual system, is produced, whenever any irritation determines the spirits to flow thither in too great abundance.—The cause of the irritation is supposed to be some troublesome humour, wetting the inner membrane of the oesophagus; which humour may proceed either from the glands spread throughout the membrane, or from acid vapours arising from the stomach, and condensing on the sides of the oesophagus.—By such means, the nervous fibres of the membrane of the gullet being irritated, dilate the gullet; and the mouth is constrained to follow the same motion, as being lined with the same membrane.—But this system of *ositation* has, of late, given way to a better, and more mechanical one.

Yawning

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Yawning is, in reality, performed by expanding almost all the muscles of voluntary motion at the same time; but most considerably those of the lungs; by springing a great quantity of air, very slowly, and after retaining it some time, and rarefying it, by expelling it again, slowly, and restoring the muscles to their natural state.

Hence, its effects are to move, accelerate, and distribute all the humours of the body, equally through all the vessels; thereby disposing the organs of sensation, and all the muscles of the body, for the performance of their respective functions. *Vid. Boerh. Inst. Med. § 638.*

YCONOMUS. See the article **OECONOMUS.**

YDRARGYROS, HYDRARGYROS, or Quicksilver. See **MERCURY.**

YEAR, Annus, in the full extent of the word, is a system, or cycle of several months; usually twelve.

Others define *year*, in the general, a period, or space of time, measured by the revolution of some celestial body in its orbit.

Thus, the time wherein the fixed stars make a revolution, is called the *great year*. And the times wherein Jupiter, Saturn, the Sun, Moon, &c. finish their revolutions, and return to the same point of the zodiac, are respectively called the *years of Jupiter, and Saturn*; and the *Solar*, and the *Lunar years*.

Year, properly, and by way of eminence so called, is the *solar year*; or the space of time wherein the sun moves through the twelve signs of the ecliptic.

This, by the observations of Cassini, Bianchini, and de la Hire, contains 365 days, 5 hours, and 49 minutes; which is the quantity of the *year* assumed by the authors of the Gregorian calendar.

But, in the civil, or popular account, this *year* only contains 365 days; except every fourth, which contains 366.

The vicissitude of seasons seem to have given occasion to the first institution of the *year*.—Man, naturally curious to know the cause of that diversity, soon found it was the proximity and distance of the sun; and upon this, gave the name *year* to the space of time wherein that luminary, performing his whole course, returned to the same point of his orbit.

And hence as it was on account of the seasons, in a great measure, that the *year* was instituted, their chief regard and attention was, that the same parts of the year should always correspond to the same seasons; i. e. that the beginning of the *year* should always be when the sun was in the same point of his orbit; and that they should keep pace, come round, and end together.

This, different nations aimed to attain by different ways; making the *year* to commence from different points of the zodiac; and even making the time of his progress different. So that some of their *years* were much more perfect than others, but none of them quite just; i. e. none of them but whose parts shifted, with regard to the parts of the sun's course.

It was the Egyptians, if we may credit Herodotus, that first formed the *year*, making it to contain 360 days; which they subdivided into 12 months.

Mercury Trismegistus added five days more to the account.

—And, on this footing, Thales is said to have instituted the *year* among the Greeks. Though that form of the *year* did not hold throughout all Greece.—Add, that the Jewish, Syrian, Roman, Persian, Ethiopic, Arabic, &c. *years*, were all different.

In effect, considering the poor state of astronomy in those ages, it is no wonder different people should disagree in the calculus of the sun's course.—We are even assured by Diod. Siculus, Lib. I. Plutarch, in *Numa*, and Pliny, Lib. VII. c. 48. that the Egyptian *year* itself was at first very different from that now represented.

Solar YEAR, is the interval of time wherein the sun finishes his course through the zodiac; or wherein he returns to the same point thereof from whence he had departed.

This, according to our account, is 365 days, 5 hours, 49 minutes; though some astronomers make it a few seconds, and some a whole minute less; as Kepler, for instance, who makes it 365 days, 5 hours, 48 minutes, 57 seconds, 39 thirds.—Ricciolus, 365 days, 5 hours, 48 minutes; and Tycho Brahe, 365 days, 5 hours, 48 minutes.

The *solar year* is either *astronomical*, or *civil*.

Solar astronomical YEAR, is that determined precisely by the observations of astronomy; and is of two kinds, *tropical*, and *sidereal* or *astral*.

Tropical, or Natural YEAR, is the time which the sun employs in passing through the zodiac; which, as before observed, is 365 days, 5 hours, 49 minutes.

Sidereal, or Astral YEAR, is the space of time wherein the sun, going from any fixed star, returns to the same.—This consists of 365 days, 6 hours, 10 minutes.

Civil YEAR, is that form of *year* which each nation has con-

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trived to compute time by: or the *civil* is the tropical *year*, considered as only consisting of a certain number of whole days; the odd hours and minutes being set aside, to render the computation of time, in the common occasions of life, more easy.

Hence, as the *tropical year* is 365 days, 5 hours, 49 minutes, the *civil year* is 365 days.—And hence, also, as it is necessary to keep pace with the heavens, it is required that every fourth *year* consists of 366 days.

Hence, lastly, the *civil year* is either *common*, or *bissexile*.

The *common civil YEAR*, is that consisting of 365 days.—This, therefore, has seven months of 30 days each, and five of 31 days.

Bissexile, or Leap YEAR, is that consisting of 366 days; or has one day extraordinary; which day is called the *intercalary*, or *bissexile day*.

This intercalary, or additional day to every fourth *year*, was first appointed by Julius Caesar; who, to make the *civil year* keep pace with the tropical ones, contrived that the six hours which the former came short of the latter, should, in four *years*, make a whole day, and be added after the twenty-fourth of February, which was their sixth of the calends of March.

Hence, as, in that *year*, they reckon this day twice over, or had *bis sexto calendas*, the *year* itself came to be called *bis sextus*, and *bissexile*.

The intercalary day, however, among us, is not got in by telling the twenty fourth of February twice over; but by adding a day after the twenty eighth of February; which month, in that *year*, comes to contain twenty nine days.

A further reformation, in this *year*, was made by pope Gregory. See **Gregorian YEAR.**

Lunar YEAR, is a system of twelve lunar months. See **LUNAR.**

Hence, from the two kinds of synodical lunar months, there arise two kinds of *lunar years*; the one *astronomical*, the other *civil*.

Lunar astronomical YEAR, consists of twelve lunar synodical months; and therefore contains 354 days, 8 hours, 48 minutes, 38 seconds, 12 thirds.

Lunar civil YEAR, is either *common*, or *embolismic*.

The *common Lunar YEAR*, consists of twelve lunar civil months; and therefore contains 354 days.

The *embolismic*, or *intercalary YEAR*, consists of thirteen lunar civil months; and therefore contains 384 days. See **EMBOLISMIC.**

Note, as the difference between the common lunar civil *year* and the tropical *year* is 11 days, 5 hours, and 40 minutes; to have the former keep pace with the latter, there are 34 months of 30 days, and 4 months of 31 days each, to be inserted in every 100 lunar *years*; which still leave behind them an appendix of 4 hours, 21 minutes, which in six centuries make nearly a day more.

Thus far we have considered *years* and months, with a view to the principles of astronomy, wherein the division is founded.—By this, the various forms of civil *years* that have antiently obtained, or still do obtain, in divers nations, are to be examined.

Antient Roman YEAR, was the *lunar year*, which, as first settled by Romulus, only consisted of ten months; viz. 1^o. March, containing 31 days. 2^o. April, 30. 3^o. May 31. 4^o. June, 30. 5^o. Quintilis, 31. 6^o. Sextilis, 30. 7^o. September, 30. 8^o. October, 31. 9^o. November, 30. 10^o. December, 30; in all 304 days; which came short of the true lunar *year* by 50 days; and of the solar, by 61 days.

Hence, the beginning of Romulus's *year* was vague, and unfixed to any precise season; to remove which inconvenience, that prince ordered so many days to be added yearly as would make the state of the heavens correspond to the first month, without incorporating these additional days, or calling them by the name of any month.

Numa Pompilius corrected this irregular constitution of the *year*, and composed two new months, January and February, of the days that were used to be added to the former *year*.—Thus, Numa's *year* consisted of twelve months; viz. 1^o. January, containing 29 days. 2^o. February, 28. 3^o. March, 31. 4^o. April, 29. 5^o. May, 31. 6^o. June, 29. 7^o. Quintilis, 31. 8^o. Sextilis, 29. 9^o. September, 29. 10^o. October, 31. 11^o. November, 29. 12^o. December, 29; in all 355 days; which exceeds the quantity of a lunar civil *year* by one day; and that of a lunar astronomical *year*, by 15 hours, 11 minutes, 24 seconds; but comes short of the common solar *year* by ten days; so that its beginning also was vague, and unfixed.

Numa, however, desiring to have it fixed to the winter-solstice, ordered 22 days to be intercalated in February every second *year*, 23 every fourth, 22 every sixth, and 23 every eighth *year*.

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But this rule failing to keep matters even, recourse was had to a new way of intercalating; and instead of twenty three days every eighth year, only fifteen were added; and the care of the whole was committed to the pontifex maximus; who, neglecting the trust, let things run to the utmost confusion. — And thus the Roman year stood till Julius Cæsar made a Reformation.

For the manner of reckoning the days of the Roman months, see CALENDs, NONES, and IDEs.

Julian YEAR, is a solar year, containing, commonly, 365 days; though every fourth year, called *bissextile*, it contains 366. See *BISSEXTILE*.

The months, &c. of the Julian year stand thus: 1^o. January, 31 days. 2^o. February, 28. 3^o. March, 31. 4^o. April, 30. 5^o. May, 31. 6^o. June, 30. 7^o. July, 31. 8^o. August, 31. 9^o. September, 30. 10^o. October, 31. 11^o. November, 30. 12^o. December, 31. — But, every *bissextile* year, a day is added after the 28th of February; which month, then, contains 29 days.

The astronomical quantity, therefore, of the Julian year is 365 days, six hours, which exceeds the true solar year by eleven minutes; which excess, in 131 years, amounts to a whole day. — And thus the Roman year stood, till the reformation made therein by pope Gregory.

For this form of the year, we are indebted to Julius Cæsar; who, in the contrivance thereof, was assisted by Sosigenes, a famous mathematician, called over from Egypt for this very purpose; who, to supply the defect of sixty seven days, which had been lost through the fault of the pontifices, and to fix the beginning of the year to the winter solstice, made that year to consist of fifteen months, or 445 days; which, for that reason, is used to be called, *annus confusionis*, the year of confusion.

This form of the year was used in all Christian nations, till the middle of the sixteenth century; and still continues to be so, not only by several nations (among the rest, by the English, Swedes, Danes, &c.) but also by the modern astronomers, and chronologers. — For, since the error is known, there is no danger from it.

Gregorian YEAR, is the Julian year corrected by this rule; that, whereas on the common footing, every secular or hundredth year, is *bissextile*; on the new footing, three of them are common years, and only the fourth is *bissextile*.

The error of eleven minutes in the Julian year, little as it was, yet, by being repeated over and over, at length became considerable; and from the time when Cæsar made his correction, was grown into thirteen days, by which means the equinoxes were greatly disturbed. — To remedy this irregularity, which was still increasing, pope Gregory XIII. called together the chief astronomers of his time, and concerted this correction; and, to restore the equinoxes to their place, threw out the ten days that had been got from the time of the council of Nice, and which had shifted the fifth of October to the fifteenth.

In the year 1700, the error of ten days was grown to eleven; upon which the Protestant states of Germany, to prevent further confusion, accepted the Gregorian correction.

Yet is even the Gregorian year far from being perfect; for we have shewn, that in four centuries, the Julian year gains three days, one hour, twenty minutes: but it is only the three days that are kept out in the Gregorian year; so that here is still an excess of one hour, twenty minutes, in four centuries; which, in seventy two centuries, amounts to a whole day.

Egyptian YEAR, called also the year of Nabonassar, is the solar year of 365 days, divided into twelve months, of thirty days each, besides five intercalary days, added at the end.

The names, &c. of the months are as follow: 1^o. Thoth. 2^o. Paophi. 3^o. Athyr. 4^o. Chojac. 5^o. Tybi. 6^o. Mecheir. 7^o. Phamenoth. 8^o. Pharmuthi. 9^o. Pachon. 10^o. Panni. 11^o. Epiphi. 12^o. Mesori; beside the *ἡμέραι παραγρηταίαι*.

Hence, as the Egyptian year, in every four years, loses a whole day of the Julian year, its beginning, in the space of 460 years, runs through every part of the Julian year; which space elapsed, they meet again.

This year is used by Ptolemy in his *Almagest*, so that the knowledge thereof is of great use in astronomy, for comparing the ancient observations with the modern.

The ancient Egyptians, we are told by Diodorus Siculus, Lib. I. Plutarch, in the life of Numa, and Pliny, Lib. VII. c. 48. measured their years by the course of the moon. — At first, they were only one month; then three; then four, like that of the Arcadians; and then six, like that of the people of Acarnania. — Those authors add, that it is on this account, they reckon such a vast number of years from the beginning of the world; and that in the history of their kings, we meet with some who lived 1000, or 1200 years.

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But Herodotus is silent on this point: he only says, that the Egyptian year consisted of 12 months, as we have above represented it. — Besides, we learn from scripture, that from the times of the flood, the year was composed of 12 months: Cham, consequently, and his son Mizraim, the founder of the Egyptian monarchy, must have had that custom; and it is no way probable, his descendants should alter it. — Add, that Plutarch speaks of it with a deal of uncertainty; and as no more than a report: and Diod. Siculus, as only a conjecture of I know not what authors, whom he does not name; and who, in all probability, might have framed this hypothesis, to reconcile the Egyptian chronology with that of some other nations.

F. Kircher, however, maintains, that besides the solar year, there were some of the names, or cantons of Egypt, who used a lunar one; and that, in the remotest ages, there were some who took a revolution of the moon, that is, a month, for a year; and others, who finding the year too short, made it two months, others three, and others four, &c. *Oedip. Egypt.* Tom. II. p. 252.

A late author observes, that Varro has affirmed of all nations, what we have here quoted of the Egyptians; and adds, that Lactantius takes him to task on that subject. — We do not know in what places of Varro, or Lactantius he has seen this: all we can say, is, that Lactantius, *Divin. Inst.* Lib. II. c. 15. where he gives Varro's opinion, only represents him as speaking of the Egyptians. — However, S. Augustin, *de Civit. Dei*, l. 15. c. 14. shews, that the years of the patriarchs mentioned in scripture, are like ours, and not one of ours equal to ten of theirs, as, it appears, had been the opinion of some people.

Upon the Egyptians being subdued by the Romans, they received the Julian year, though with some alteration; for they still retained their antient months, with the five *ἡμέραι παραγρηταίαι*, and, every fourth year, intercalated another day between the 28th and 29th of August. — Add, that the beginning of their year answered to the 29th of August of the Julian year.

This year, thus reformed, was called the *annus Atticus*, as being instituted soon after the battle of Actium.

Antient Greek YEAR, was lunar; consisting of 12 months, which at first had 30 days a piece, then alternately 30, and 29 days, computed from the first appearance of the new moon; with the addition of an embolismic month of 30 days, every 3d, 5th, 8th, eleventh, 14th, 16th, and 19th years of a cycle of 19 years; in order to keep the new and full moons, to the same terms or seasons of the year.

Their year commenced at the full moon next after the summer solstice. — The order, &c. of their months was thus: 1^o. Ἑκατομβαιων, containing 29 days. 2^o. Μεταγηνιων, 30. 3^o. Βορεορηνιων, 29. 4^o. Μαμακαληνιων, 30. 5^o. Πανδηλιων, 30. 6^o. Ποσειδιων, 30. 7^o. Γαμμηλιων, 29. 8^o. Αδερηνιων, 30. 9^o. Ελαφβολιων, 30. 10^o. Μενεμηνιων, 30. 11^o. Θερσηλιων, 29. 12^o. Εκρεμφοριων, 30.

The Macedonians had other names for their months: so had the Syro-Macedonians, Smyrναῖοι, Τυριανοί; so also the Cypriots, Παφιαῖοι; and so the Bithynians, &c.

Antient Macedonian YEAR, is a lunar year, only differing from the Attic, in the names and order of the months; the first Macedonian month, agreeing with the Attic *μαεμαδαιων*. — The months stand thus: 1^o. Δις, 30 days. 2^o. Απλλαδαι, 29. 3^o. Αυδοιαι, 30. 4^o. Περσιαι, 29. 5^o. Διγρηαι, 30. 6^o. Ζαυθαι, 29. 7^o. Αβιμειαι, 30. 8^o. Δαισιαι, 29. 9^o. Παιμειαι, 30. 10^o. Λυβαι, 29. 11^o. Γερσηναι, 30. 12^o. Υπερβηραι, 29.

Modern Macedonian YEAR, is a solar year, whose beginning is fixed to the first of January of the Julian year, with which it perfectly agrees.

This year was particularly called the *Attic year*; and the intercalary month, after posideon, was called *πρωσπειδων*, or latter *posideon*.

Antient Jewish YEAR, is a lunar year, consisting commonly, of eleven months, which alternately contain 30 and 29 days.

It was made to agree with the solar year, either by the adding of 11, and sometimes 12 days, at the end of the year, or by an embolismic month.

The names and quantities of the months stand thus: 1^o. Nisan, or Abib, 30 days. 2^o. Ijar, or Zius, 29. 3^o. Siban, or Siwan, 30. 4^o. Thamuz, or Tamuz, 29. 5^o. Ab, 30. 6^o. Elul, 29. 7^o. Tisri, or Ethanim, 30. 8^o. Marchesvan, or Bul, 29. 9^o. Cisleu, 30. 10^o. Tebeth, 20. 11^o. Sabat, or schebeth, 30. 12^o. Adar, in the embolismic year, 30. Adar, in the common year, was but 29.

Note, in the defective year, Cisleu was only 29 days; and in the redundant year, Marchesvan was 30.

Modern Jewish YEAR, is likewise lunar, consisting, in common years, of 12 months, but of 13 in embolismic years; which, in a cycle of 19 years, are the 3d, 6th, 8th, 11th, 14th,

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14th, 17th, and 19th. — Its beginning is fixed to the new moon next after the autumnal equinox.

The names, &c. of the months are, 1°. Tifri, containing 30 days. 2°. Marcheshvan, 29. 3°. Cisleu, 30. 4°. Teth, 29. 5°. Schebeth, 30. 6°. Adar, 29. 7°. Vedar, in the embolismic year, 30. 8°. Nisan, 30. 9°. Ijar, 29. 10°. Sivan, 30. 11°. Thamuz, 29. 12°. Ab, 30. 13°. Elul, 29.

Syrian YEAR, is a solar year, having its beginning fixed to the beginning of October in the Julian year; from which it only differs in the names of the months, the quantities being the same; as follows:

1°. Tifhrin, answering to our October, and containing 31 days. 2°. Latter Tifhrin, containing, like our November, 30. 3°. Canun, 31. 4°. Latter Canun, 31. 5°. Shabat, 28. 6°. Adar, 31. 7°. Nisan, 30. 8°. Aiyas, 31. 9°. Haziram, 30. 10°. Tamuz, 31. 11°. Ab, 31. 12°. Elul, 30.

Persian YEAR, is a solar year, of 365 days, consisting of 12 months of 30 days each, with 5 intercalary days added at the end.

The months are as follow: 1°. Afrudja meh. 2°. Ardihacit meh. 3°. Card meh. 4°. Thir meh. 5°. Merded meh. 6°. Schabarir meh. 7°. Mehar meh. 8°. Aben meh. 9°. Adar meh. 10°. Di meh. 11°. Behen meh. 12°. Affir meh.

This year is called the *yezdegerdic year*, to distinguish it from the fixed solar year, called the *gelalean year*, which the Persians began to use in the year 1079; and which was formed by an intercalation made fix or seven times in four years, and then once every fifth year.

The *yezdegerdic year*, it may be observed, is the same with Nabonassar's year. — As to the *gelalean year*, it is absolutely the best and justest of all the civil years yet invented, as being found, by calculation, to keep the solstices and equinoxes precisely to the same days, and answering very accurately to the solar motions; which no other civil year does, not even the Gregorian, for want of so commodious an intercalation.

Arabic, and Turkish YEAR, is a lunar year, consisting of 12 months, which contain, alternately, 30, and 29 days. Though, sometimes it contains 13 months; the names, &c. whereof are as follow: 1°. Muharram, containing 30 days. 2°. Saphar, 29. 3°. Rabia, 30. 4°. Latter Rabia, 29. 5°. Jomada, 30. 6°. Latter Jomada, 29. 7°. Rajab, 30. 8°. Shaaban, 29. 9°. Samadan, 30. 10°. Shawal, 29. 11°. Dulkaadsh, 30. 12°. Dulheggia, 29, and in the embolismic year, 30. — An intercalary day is added every 2d, 5th, 7th, 10th, 13th, 15th, 18th, 21st, 24th, 26th, 29th, in a cycle of 29 years.

Ethiopic YEAR, is a solar year perfectly agreeing with the Aetic, except in this, that the names of the months are different. — It commences with the Egyptian year, on the 29th of August of the Julian year.

Its months are, 1°. Mafecaram. 2°. Tykympt. 3°. Hydar. 4°. Tythas. 5°. Tyr. 6°. Jacatit. 7°. Magabit. 8°. Mijazia. 9°. Gmbar. 10°. Sync. 11°. Hamel. 12°. Hahaf. Intercalary days 5.

Metonic YEAR.

Attic YEAR.

Yezdegerdic YEAR.

Gelalean YEAR.

Nabonassar's YEAR. See EGYPTIAN Year, and NABONASSAR.

Sabbatic YEAR, Annus sabbaticus, among the antients, was every seventh year; during which, the Jews let their lands lie at rest.

Every seventh *sabbatic year*, i. e. every 49th year, was called the *year of jubilee*; and held with solemnity extraordinary.

Anomalistical YEAR.

Climacteric YEAR.

Emergent YEAR.

Enneatocal YEAR.

Holy YEAR.

Platonic, or great YEAR.

YEAR of the Hegira.

NEW YEAR's day, or the day wherein the year commences, has always been very different, in different nations, and yet in all has been held in great veneration.

Among the Romans, the first and last day of the year were consecrated to Janus; on which account it was, that they represented him with two faces.

To them we owe the ceremony of wishing a *happy new year*; which appears to be very antient. — Before the first day was spent, they not only visited and complimented each other, but also presented fire, and offered vows to the gods for the preservation of each other. — Lucian represents it as a practice of a very antient standing, even in his time; and refers it to Numa.

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Ovid intimates the same ceremony, in the beginning of his *Fæst.*

Postera lux oritur, linguisque animisque favete:

Nunc dicenda bona, sunt bona verba die.

And Pliny, more expressly, Lib. XXVIII. cap. 1. *Primum anni incipientis diem lætis precationibus invicem sausum amantur.*

The civil, or legal YEAR, in England, commences on the day of the annunciation, i. e. on the 25th day of March; though the historical year begins on the day of the circumcision, i. e. the first of January, on which day the German and Italian year also begins. — Stow observes, that William the conqueror, having been crowned on the first of January, that thenceforth became the first of the year for historians, &c. Though, in all civil affairs, they retained the antient manner of accounting, which began with the 25th of March.

The part of the year between those two terms is usually expressed both ways, as 1748-9, or 1749. — Since the conqueror, the king's patents, charters, proclamations, &c. are usually dated by the year of the king's reign.

The church, as to her solemn service, begins the year on the first Sunday in advent, which is always that next S. Andrew's day, or the 30th of November.

The Jews, as most other nations of the east, had a civil year, which commenced with the new moon in September; and an ecclesiastical year, which commenced from the new moon in March.

The French year, during the reigns of the Merovingian race, began on the day wherein the troops were reviewed; which was the first day of March. — Under the Carolingians it began on Christmas-day; and, under the Capetians, on Easter-day; which, therefore, varied between the 22d of March, and the 25th of April.

And this is still the beginning of the French ecclesiastical year.

— But for the civil, Charles IX. appointed in 1564, that for the future it should commence on the first of January.

The Mahometans begin their year the minute the sun enters Aries. — The Persians, in the month answering to our June. — The Chinese, and most of the Indians, begin it with the first moon in March. — The Brachmans begin it with the new moon in April; on which day they hold a feast called *sanuat faradi paudaya*, q. d. feast of New-year's day. — The Mexicans, according to d'Acosta, begin the year on our 23d of February, when the leaves begin to grow green. — Their year consists of 18 months, having 20 days each: which making 360 days, the remaining five days are spent in mirth; and no business is suffered to be done, nor even any service at the temples. — Alvarez relates much the same of the Abyssinians; who begin their year on the 26th of August, and have five idle days at the end, which they call *pagomen*. — At Rome there are two ways of computing the year; the one beginning at the nativity of our Lord: this the notaries use, dating a nativitate. The other in March, on occasion of the incarnation; and it is by this the bulls are dated, anno incarnationis. — The Greeks begin their year of the world from the first of September.

Years are also distinguished with regard to the epocha's whence they are numbered: thus, years of our Lord, are those reckoned from the birth of Jesus Christ, which are now 1749. — Years of the world, are those elapsed since the creation, which Scaliger makes to be 5698. — Years of Rome, of the Hegira, of Nabonassar, &c. See the difference between these years, under the article EPOCHA.

YEAR and Day, in law, &c. is a time that determines a right in many cases, and is in some an usufruct, and in others a prescription.

Thus, in the case of an efray, if the owner, proclamation being made, challenge it not within a year and day, it is forfeit.

In like manner is the year and day given in cases of appeal, of descent, of entry or claim, of non-claim upon a fine, or writ of right, of the death of a man fore bruised, or wounded; of protections, essoins in respect of the king's service; of a wreck, and on many other occasions.

YEAR Day and Waste, *annus dies et vastum*, is a part of the king's prerogative, whereby he challenges the profits of the lands and tenements of persons attainted for petit-treason, or felony, for the space of a year and a day; whosoever is lord of the manor to which they belong.

Not only this, but at the end thereof he may waste the tenements, destroy the houses, root up the woods, gardens, pasture, and plow up the meadows, unless the lord of the fee agree with him for the redemption of such waste. — After the year day and waste, they are to be restored to the lord of the fee.

YEARN, in hunting, signifies to bark, as beagles properly do, at their prey.

YELK. See the article YOLK.

YELLOW*, a bright colour, reflecting the most light of any after white.

* The word is formed from the Italian *giallo*, or the German *gelb*, which signifies the same; or from the Latin *galbanus*, bright, gay.

There are divers yellow substances that become white upon wetting and drying them again several times at the sun: wax, linen-cloth, &c. See BLEACHING.

And the same bodies, if they be already white, and continue a long time in the air without being wetted, turn yellow. Paper and ivory, applied near the fire, become successively yellow, red, and black.—Silk, when turned yellow, is whitened again with the fumes of sulphur.

YELLOW, in dyeing, is one of the five simple and mother colours.

For the finest yellows, they first boil the cloth, or stuff, in allum and pot-ashes; and then give the colour with the weld, or woad.

Turmeric likewise gives a good yellow, though not the best. There is also an Indian wood that gives a yellow colour bordering on gold.

Greens are usually made of yellow and blue mixed.—With yellow, madder red, and goat's-hair prepared with madder, are made the golden yellow, aurora, panly, nacarate, isabella, and chamois-colour; which are all calfs, or shades of yellow. Painters and enamellers make their yellow of mafficot, or as some write it mafficot, which is cerufs raised to a yellow colour by the fire; or with yellow oker.—Limners and illuminers make it with saffron, and French berries, orcanette, &c.

Brantom observes, it was antiently the custom to paint a man's door yellow, and shew his house with salt; to declare him a traitor to his king.

YELLOW, or French berries. See the article AVIGNON.

YELLOW jaundice. See the article JAUNDICE.

YELLOW, a disease in a horse, much the same with that called jaundice in man.

There are two kinds of it, the yellow, and the black.

The yellow is a very frequent disorder, say the farriers, arising from obstructions in the gall pipe, or the little ducts opening into the same, occasioned by viscid or gritty matters lodged therein, or a fullness and compression of the neighbouring blood-vessels; by means whereof, the matter that should be turned into gall, is taken up by the vein, and carried into the mass of blood; which it tinctures yellow: so that the eyes, inside of the lips, and other parts of the mouth capable of shewing the colour, appear yellow.

The effect whereof is, that a horse will be dull, heavy, and low-spirited; easily jaded by the least labour or exercise, &c.

YEOMAN, the first or highest degree among the plebeians of England; next in order to the gentry.

The yeomen are properly the freeholders, who have land of their own; so called from the Saxon *geman*, or *geman*, common.—The word *yeoman*, is used for yeoman in the statute 33 Hen. VIII. and in old deeds; it is sometimes also written *jeman*, which, in the German, signifies any body. According to Sir Thomas Smith, a yeoman is a free-born Englishman, who can lay out of his own free-land in yearly revenue, to the sum of forty shillings sterling.

The yeomanry of England are capable of holding lands of their own to a good value; are adjudged capable of certain offices, as constables, church-wardens, jury-men, and are also to vote in elections to parliament, and to serve in the army.

The yeomen were famous, in antient times, for military valour, being particularly expert at the management of the bow; whence the infantry was composed chiefly of them.

In many cases, the law conceives a better opinion of the yeomanry, that occupy lands, than of tradesmen, artificers, &c. By a statute, 2 Henry IV. it is enacted, That no yeoman shall take or wear a livery of any lord, upon pain of imprisonment, and a fine at the king's pleasure.

YEOMAN, is also a title of office in the king's household, of a middle place, or rank between an usher and a groom. Such are the—Yeoman of the pantry; yeoman of the scullery; yeoman of the storeroom, &c. See HOUSEHOLD.

YEOMEN Warders. See WARDERS of the Tower.

YEOMEN of the Guard, properly called yeomen of the Guard of the king's body, were antiently 250 men, of the best rank under gentry, and of larger stature than ordinary; every one being required to be six feet high.

At present there are but one hundred yeomen in constant duty; and seventy more not in duty; and as any of the hundred die, his place is supplied out of the seventy.

They go clad after the manner of King Henry the eighth's times.—They formerly had diet as well as wages, when in waiting, but this was taken off in the reign of queen Anne. Their attendance is on the sovereign's person, both at home, and abroad; and they have a room allotted for them only, called the guard-chamber.

The officers and yeomen are at the disposal of the captain, but the captain is at the appointment of the king.

YERKING, in the manage, is when a horse strikes with his hind legs, or flings and kicks back with the whole hind quarters; stretching out the two legs nearly together, and even to their full extent.

YEST, or *Barm*, a head or scum arising upon beer or ale; while working or fermenting in the vat.

It is used for a leaven or ferment in the making of bread; as serving to swell or puff it up very considerably in a little time, and to make it much lighter, softer, and more delicate.—But when there is too much of it, it renders the bread bitter.

The use of yeast in bread, is but of late standing among us: it is not above eighty years since the avarice of the bakers first introduced it; and then it was only done by stealth.—Though Pliny witnesses it to have been used by the antient Gauls.

The faculty of medicine of Paris, by a decree of the 24th of march, 1688, solemnly maintained it noxious to the health of the people; yet even that censure could not prevent its progress.

YEZDEGERDIC Year. See PERSIAN YEAR.

YGROMETER. See the article HYGROMETER.

YIELDING and paying, a law phrase, formed by corruption from the Saxon *geldan*, or *gidan*, to pay.—Hence, in Domelday, *gidare* is frequently used for *skore*, reddere; the faxon g being easily converted into a y. See GELD, and GILD.

YNCA, *YNCAN*, or *INCA*, an appellation antiently given to the kings of Peru, and the Princes of their blood; the word signifying literally, lord, king, emperor, and royal blood.

The king himself was particularly called *capac ynca*, i. e. great lord.—His wife, *pallas*, and the princes simply *yncas*. These *yncas*, before the arrival of the Spaniards, were exceeding powerful.—Their people revered them to excess, as believing them to be sons of the sun, and never to have committed any fault.—If any person offended the royal majesty in the smallest matter, the city he belonged to was totally demolished.

When they travelled, whatever chamber they lay in on the road, was walled up as soon as they departed, that no body might ever enter in after them.—The like was done to the room wherein the king died; in which, likewise, all the gold, silver, and precious furniture, were always immured, and a new apartment was built for his successor.

His beloved wives, domestics, &c. likewise sacrificed themselves, and were buried alive in the same tomb along with him. See the *History of the Yncas*, by Garcilasso de la Vesta.

YOAK, or *Yoke*, in agriculture, a frame of wood, fitted over the necks of oxen; whereby they are coupled together, and harnessed to the plough, &c. See PLOUGH. It consists of several parts, as the *yoke*, properly so called, which is a thick piece of wood, lying over the neck; the *bow*, which compasses the neck about; the *stitchings* and *wreathings*, which hold the bow fast in the yoke; and the *yoke-ring* and *ax-chain*.

The Romans made the enemies they subdued pass under the yoke, which they called *sub jugum mittere*; that is, they made them pass under a sort of furca patibularis, or gallows, consisting of a pike, or other weapon, laid across two others planted upright in the ground.—This done, they treated them with humanity enough, and sent them home again.

The same measure was sometimes dealt them by their enemies upon the same occasion.—Thus Cæsar, Lib. II. observes, that the consul L. Cassius had been killed by the Swiss, and his army defeated, and made to pass under the yoke.

YOAK of Land, *jugata terre*, in our antient customs, was the space which a yoke of oxen, that is, two oxen, may plough in one day. See HIDE, YARD-LAND, &c.

Sea-YOAK. See the article SEA.

YOIDES*, or *HYOIDES*, in anatomy, a bone situate at the root of the tongue, and composed of divers little bones, united by cartilages which sometimes ossify.

* It has its name *yoides*, and sometimes *ψιλαιδης*, *psiloides*, from its resembling a Greek *υ*, or upilon.—Some also call it *lamboides*, as resembling a lambda inverted.

It is not contiguous to the extremity of any other bones, nor has any articulation with them: on which account, it is not shewn in the skeletons.

Its use is to fortify the base or root of the tongue, and facilitate the passage of the air into the trachea, and the food into the gullet.—It has five pair of muscles, which move it together with the tongue.

Y O U

YOLK, or **YELK**, in natural history, the yellow part in the middle of an egg.

The chicken is formed out of, and nourished by the white alone, till it be grown to some bulk: after which, the *yolk* serves it for nourishment; which it likewise does, in part, after it is hatched. — For a good part of the *yolk* remains after exclusion; being received into the chicken's belly: and being there reserved, as in a store-house, is by the ductus intestinalis, as by a funnel, conveyed into the guts, and serves instead of milk. *Willughb. Ornithol. Lib. I. c. 3.* — This was even known to Pliny: *Ipsam animal ex albo liquore ovi corporetur: cibus ejus in luteo est. Lib. X. c. 53.*

YOUNG. See **GENERATION**, **CONCEPTION**, **GESTATION**, **EMBRIO**, **FOETUS**, **DELIVERY**, **CHILD**, &c. In the army, that regiment or officer, is said to be the *younger*, *junior*, which was last raised, or whose commission is of latest date, whatever be the age of the man, or however long he may have served in other capacities.

YOUNKERS, among sailors, are the *younger* sailors, otherwise called *foremast-men*; whose business is to take in the top-sails, furl the sails, sling the yards, &c.

Y Q U

YOUTH, *Adolescence*. See **AGE**, and **ADOLESCENCE**. **YPSILOIDES**, $\Psi\text{Y}\text{I}\text{O}\text{E}\text{I}\text{A}\text{H}\text{E}$, in anatomy, the third genuine suture of the cranium; thus called from its resembling a Greek ψ , or upilon.

Some also call it $\lambda\alpha\mu\beta\delta\omicron\iota\delta\omicron\varsigma$, *lambdoides*. See **LAMBDOIDES**.

There is also a bone at the root of the tongue, called *ypsiloïdes*, and *yoides*. See **YOIDES**.

YQUETAYA, in natural history, a plant growing in Brazil, long used as a medicine in that country; and lately discovered to the Europeans by a French surgeon.

It has been since found in France; where, being cultivated and examined by M. Marchant, it appears to be no other than the common water betony, or *serophularia aquatica*.

It has this remarkable property, that it takes away from fenna all its ill taste and smell; which property of correcting the infusion of fenna, was before wholly unknown.

To use this plant, it must be dried ten or twelve days in the shade, and afterwards exposed to the sun, till quite dry.



Z.

ZEN

ZIN

Z, The last letter in the alphabet, and one of the double consonants, both among the Latins and Greeks.

Its pronunciation is much more soft and obtuse than that of the *x*, which makes Quintilian call it *jucundissima*, and *dulcissima*.—Nevertheless, the sound was not always the same as it is now; which is but, as it were, half that of an *s*.

It had something originally in it of the *d*; but only what sounded very smoothly: Thus, *Mezentius* was pronounced, as if it had been *Medesentius*, &c.

The *Z* had also an affinity with the *g*: Thus *Capella*; *z à Græcis venit, licet etiam ipsi primo g Græcâ utebantur*.

Z was also a numeral letter, signifying 2000; according to the verse:

Ultima Z tenens, finem bis mille tenebit.

When a dash was added at the top *Z*, it signified two thousand times two thousand.

ZAİM, a portion of land, allotted for the subsistence of a horse-man in the Turkish militia; called also *timar*. See **TIMARIOT**.

ZAIRAGIA, or **ZAIRAGIAH**, a kind of divination in use among the Arabs; performed by means of divers wheels or circles, placed concentric to one another, and noted with several letters which are brought to answer to each other, by moving the circles according to certain rules.

This is also called *zavaiah*, by reason the circles of this machine, which are called *mutaxariat*, *laphak*, &c. are intended to correspond to the orbs of the planets, and the atmospheres of the several elements.

ZAPATA *, or *Sapata*, a kind of feast, or ceremony held in Italy, in the courts of certain princes, on S. Nicholas's day, wherein people hide presents in the shoes or slippers of those they would do honour to, in such manner, as they surprize them on the morrow when they come to dress.

* The word is originally Spanish, *capato*, and signifies a shoe, or slipper.

It is done in imitation of the practice of S. Nicholas, who used, in the night time, to throw purses of money in at the windows, to marry poor maids withal.

F. Menestrier has described these *zapatas*, their origin, and different usages, in his treatise *des ballets anciens, & modernes*.

ZEAL, **ZEUS**, *ζῆλος*, the exercise of a warm animated affection, or passion for any thing.

Some will have jealous *zeal* to be properly a mixt, or compound sensation, where one affection is raised or inflamed by another.—On these principles, jealousy may be defined an affection arising from love and indignation, which cannot bear a thing to be given to another, that a person desires for himself, or one whom he loves and favours.—Others make it consist in an eager study, or desire to keep any thing inviolate; or a fervour of mind, arising from an indignation against those who abuse or do evil to a person beloved.

The Greek philosophers make three species of *zeal*.—The first, of *envy*: the second, of *emulation*, or imitation: the third of *piety*, or devotion; which last makes what the divines call *religious zeal*.

Josephus speaks much of a party or faction, called the *Zealous*, or *Zealots*, which arose among the Jews during the war with Vespasian and Titus. Lib. XIV. c. 6. *Antiq.* and Lib. IV. c. 12. *de Bello Judaico*.

ZECHIN, or **ZECCHINO**. See the article **SEQUIN**.

ZEDOARY, **ZEDOARIA**, a medicinal root, belonging to a plant growing in the East-Indies, whose leaves are like those of ginger, only longer and broader. See **ROOT**.

Zedoary root is of an ash-colour, it has an aromatic, bitterish taste; and is ranked in the class of cephalics: but it is also reckoned, by many, amongst the alexipharmics, whereupon it comes to have a place in the capitals; and is even said to prevent infection, by holding it only in the mouth. On account of its agreeable bitter, it is also prescribed among stomachics; and for its spicy warmth, is commended in colics, and hysterical affections, for promoting the menfes, &c.

ZENITH, in astronomy, the vertical point; or a point in the heavens directly over our head.

Or, the *zenith* is a point, as *Z* (*Tab. Astronomy, fig. 52.*) in the surface of the sphere, from which a right line drawn through the spectator's head, passes through the centre of earth.

Hence, there are as many *zeniths* as there are different places.

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ces on the earth, where the heavens may be seen; and upon the changing our place, we also necessarily change our *zenith*.

The *zenith* is also called the *pole of the horizon*, because 90 degrees distant from each point thereof.

It is also the pole of all the almucantars, or parallels of the horizon, whereby the altitude of the stars is estimated.

Through the *zenith* pass the vertical-circles, or azimuths.

The point diametrically opposite to the *zenith*, is called the *nadir*; which is the point directly under our feet.

The *nadir* is the *zenith* to our antipodes; as our *zenith* is the *nadir* to them.

ZENITH-Distance, is the complement of the sun's, or a star's meridional altitude; or, it is, what the meridian altitude wants of 90 degrees.

ZENSUS, in arithmetic, a name which some authors give to a square number; or the second power.

The higher powers they call *zenizenus*, *zenficubus*, *zenfizenus*, *zenfurdolidus*, &c. See **POWER**.

ZEPHYRUS *, or **ZEPHYR**, the west-wind; a wind blowing from that cardinal point of the horizon opposite to the east.

* The word is Greek, *ζephyρος*.—The poets personify it. It is also called *favonius*, and *occidentis*; and by many has been confounded with the *africus*.

ZEST, the woody, thick skin, quartering the kernel of a walnut.—Some physicians prescribe this *zest*, dried and taken with white-wine, as a remedy against the gravel.

The word is also used for a chip of orange or lemon-peel; such as is usually squeezed into ale, wine, &c. to give it a flavour, or for the fine thin oil that spurts out of that peel on squeezing it.

Hence, to *zest* an orange or lemon, among confectioners, is to cut the peel from top to bottom into small slips, as thin as possible; or, to *zest*, is to squeeze the peel over the surface of any thing.

ZETA *, or **ZETECULA**, a little closet, or withdrawing-chamber, with pipes running along the walls, to receive, from below, either the cool air, or the steam of warm water.

* The word is formed either from *ζῆν*, to be warm; or of *ζῆν*, *vivere*, to live, on account of the use made hereof for love and enjoyment.

ZETETICE *, **ZETETIC-Method**, in mathematics, the method made use of to investigate, or find the solution of a problem.

* The word is Greek *ζητητικη*, formed from *ζητω*, I seek.

The ancient Pyrrhonians were sometimes called *zetetici*, *g. d.* seekers.

ZEUGMA *, a figure in grammar, whereby an adjective, or verb, which agrees with a nearer word, is also, by way of supplement, referred to another more remote.

* The word is Greek, *ζευγμα*, which literally denotes a joining together: from *ζυνω*, I join.

Thus Terence, *Uinam aut hic furdus, aut hæc muta facta sit*.—So Virgil, *Hic illius arma hic curvus fuit*.—In which cases, the words *facta sit*, agreeing primarily with *hæc muta*, are also made to agree or extend to *hic furdus*: and the verb *fuit*, is not only referred to *hic curvus*, which it properly respects, but further, to *hic illius arma*.

The Latins, it may be here observed, take a liberty in constructions, which some of the nicer critics among the moderns, particularly the French, will not allow in the modern tongues.

ZIBETHUM, or **ZIBETTA**, in natural history, *civet*; a perfume, contained in a kernelly bladder, in the groin of a civet cat. See **CIVET**.

ZICZAC. See the article **ALLEY** in *Ziczac*.

ZINDIKITES, a sect among the Mahometans, so denominated from their leader Zindik, whom Grotius makes to be one of the magi, and a follower of Zoroaster.

The *Zindikites* believe no providence nor resurrection.—They allow no other God but the four elements; and in this sense they assert, that man, being a mixture of those simple bodies, returns to God when he dies.

ZINK, a kind of metalline substance, very hard, white, and sparkling; and which, though not ductile enough to denominate it a metal, yet stretches a little under the hammer.

Zink is the same with what is otherwise called *spelter*, it is of late produced in great quantities from the lapis calaminaris. Founders, toy-men, &c. use it to tinge copper, &c. It gives a fine gold colour to that metal, and thus makes what is called *princes metal*, from prince Rupert the inventor of it.

M. Homberg

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ZON

M. Homberg has a conjecture, that *zink* is no other than a natural mixture of two real metals, *viz.* tin, and iron.—What led him to the opinion was, that *zink* yields precisely the same fumes by the burning-glass, as such a mixture does.—Accordingly, he assures us, he often substituted in these trials, the one for the other; and this always with the very same effect: but this is not proof enough.

ZINZIBER, or **ZINGIBER**. See the article **GINGER**.

ZIZYPHA, or **ZIZYPHUS**, a name sometimes given to a kind of fruit, more usually called *jujube*. See **JUJUBE**.

ZOCCO, **ZOCCOLO**, **ZOCLE**, or **SOCLE**, in architecture, a kind of stand or pedestal; being a low, square piece, or member, serving to support a busto, statue, pedestal, or the like thing, that needs to be raised.—See *Tab. Archit. fig. 24. lit. z.*

ZODIAC*, **ZODIACUS**, in astronomy, a fascia, or broad circle, whose middle is the ecliptic, and its extremes two circles parallel thereto, at such distance from it as to bound, or comprehend the excursions of the sun and planets.

* The word is formed from the Greek *ζώνη*, animal; by reason of the constellations therein, which have the forms of animals given them: others derive it from *ζώνη*, life; from an opinion, that the planets have a great influence on animal life.

The sun never deviates from the middle of the *zodiac*; *i. e.* from the ecliptic; the planets all do, more or less.

Their greatest deviations, called *latitudes*, are the measure of the breadth of the *zodiac*: which is broader, or narrower, as the greatest latitude of the planets is made more or less.—Accordingly, some make it 16, some 18, and some 20 degrees broad.

The *zodiac* cutting the equator obliquely, makes an angle therewith of 23 degrees and an half; or more precisely of 23° 29', which is what we call the *obliquity of the zodiac*, and is the sun's greatest declination.

The *zodiac* is divided into twelve portions, called *signs*; and those divisions or signs are denominated from the constellations which antiently possessed each part.—But the *zodiac* being immovable, and the stars having a motion from west to east, those constellations now no longer correspond to their proper signs; whence arises what we call the *precession of the equinoxes*.

When a star, therefore, is said to be in such a *sign of the zodiac*, it is not to be understood of that sign, or constellation of the firmament; but only of that twelfth part of the *zodiac*, or dodecatemery thereof.

Cassini has also observed a tract in the heavens, within whose bounds most of the comets, though not all of them, are observed to keep; which, for this reason, he calls the *zodiac of the comets*.

This he makes as broad as the other *zodiac*, and marks it with signs or constellations like that; as Antinous, Pegasus, Andromeda, Taurus, Orion, the lesser Dog, Hydra, the Centaur, Scorpion, and Sagittary.

ZONE*, **ZONA**, in geography and astronomy, a division of the terraqueous globe, with respect to the different degree of heat found in the different parts thereof.

* The word is Greek *ζώνη*, *q. d.* belt, girdle.

A *zone* is the fifth part of the surface of the earth, contained between two parallels. See **PARALLEL**.

The *zones* are denominated *torrid*, *frigid*, and *temperate*.

Torrid ZONE, is a fascia, or band surrounding the terraqueous globe, and terminated by the two tropics.

Its breadth, therefore, is 46° 58'. The equator running through the middle of it, divides it into two equal parts, each containing 23° 29'.

The antients imagined the *torrid zone* uninhabitable.

Temperate ZONES, are two fasciæ, or bands environing the globe, and contained between the tropics, and the polar circle.—The breadth of each is 43° 2'.

Frigid ZONES, are segments of the surface of the earth terminated, the one by the antarctic, and the other by the arctic circle.—The breadth of each is 46° 58'.

The difference of *zonar* is attended with a great diversity of phenomena.—1°. In the *torrid zone*, the sun passes through the zenith twice a year; and his recess from the equator towards the pole which is above the horizon, is twice a year equal to the height of the pole.

2°. In the temperate and frigid *zones*, the least height of the pole exceeds the greatest distance of the sun, from the equator; and therefore, to the inhabitants thereof, the sun never passes through the zenith; yet if on the same day the sun rises at the same time to a greater height, the height of the pole is the less, in regard the inclination of the circles of diurnal revolution to the horizon is less.

3°. In the temperate and torrid *zones*, the sun rises and sets every natural day, by reason the distance of the sun from the pole always exceeds the height of the pole; yet every where but under the equator, the artificial days are un-

ZOP

equal, and the inequality is the greater as the place is less distant from the frigid *zone*.

4°. Where the temperate *zones* terminate on the frigid, the height of the pole is equal to the sun's distance from the pole, when in the neighbouring tropic; and, consequently, once a year, the sun, in its diurnal motion, performs an entire revolution, without going down under the horizon.

5°. Every where in a frigid *zone*, the height of the pole is greater than the least distance of the sun from the pole; and therefore during some revolutions of the earth, the sun is at a distance from the pole less than the pole's height; and during all that time, does not set, nor so much as touch the horizon.—Where the distance from the pole, as the sun recedes from it, exceeds the height of the pole, or latitude of the place, the sun rises or sets every natural day.

ZONNAR*, a kind of belt, or girdle of black leather, which the Christians and Jews of the Levant, particularly those in Asia, and the territories of the grand seignior, are obliged to wear; to distinguish themselves from the Mahometans.

* The word is corrupted from the vulgar Greek, a contraction of *ζώνιον*, of *ζώνη*, girdle.

It was Motavakkel X. kaliph, of the family of the Abassides, that first enjoined the Christians, &c. to wear the *zonnar*.

The ordinance to this effect was published in the year of the Hegira 235.

Hence, as most of the Christians of Syria, Mesopotamia, &c. are either Nestorians, or Jacobites; those sectaries are often called *Christians of the girdle*.

ZOOLOGIA*, **ZOOLOGY**, a discourse, or treatise upon animals, or living creatures.

Zoology makes a considerable article in natural history; comprehending what relates to the form, structure, method of living, feeding, propagating, &c. of the divers species of brute creatures, and the descriptions of every kind.

* The word is Greek *ζωολογία*, compounded of *ζώνη*, life, and *λογος*, speech, discourse.

ZOOPHORIC Column, is a statuary column; or a column that bears or supports the figure of an animal.

ZOOPHORUS, or **ZOPHORUS**, in the antient architecture, the same thing with the *frieze* in the modern.

It was thus called in Greek, because antiently adorned with the figures of animals; from *ζώνη*, animal, and *φορος*, I bear.

The Greeks sometimes also call the *zodiac*, *zoophorus*, because of the signs and constellations therein.

ZOOPHYTON*, **ZOOPHYTE**, in natural history, a kind of intermediate body, supposed to partake both of the nature of an animal and a vegetable.

* The word is Greek *ζωοφυτον*, compounded of *ζώνη*, animal, and *φυτον*, plant, *q. d.* plant-animal.

Such is the *planta pudica*, or sensitive plant, commonly supposed to be; though with little foundation.—The antients also reputed sponges to be *zooephytes*.

The foetus, while in the womb, appears to many to be a real *zooephyte*; growing to the mother by the funiculus umbilicalis, as plants do to the earth by their stem.

Olearius mentions a very extraordinary sort of *zooephyte*, called *agnus Scythicus*, or *borametz*, growing near Samara on the Volga.—He tells us, that it is a kind of melon shaped like a lamb, all the parts whereof it has, and that it grows to the earth by a stem, which serves it for a navel-string.—As it grows, he says, it changes place as much as its stem will allow of; and it consumes and dries up all the grass where it grows.—When ripe, the stem withers, and the body, or fruit, becomes covered with a downy skin, which may be dressed, and used as fur.

Olearius was shewn some of this skin, taken off the covering of a bed; which the people swore came from the fruit; but he could hardly believe them: it was covered with a soft curled wool, like that of a young lamb.—Scaliger adds, that this fruit lives, and grows, till such time as it wants grass.—But what credit is to be given to most of the marvellous in these accounts, may be seen in *Philosoph. Trans.* n. 247. p. 461. and n. 290. p. 353. The skin shewn to Olearius was, in all probability, that of a real lamb. See *Supplement*, article **BORAMETZ**.

ZOOTOMY*, **ZOOTOMY**, the art or act of dissecting animals, or living creatures.

* The word is compounded of *ζώνη*, animal, and *τομή*, *sect*, I cut.

Zootomy amounts to the same with *anatomy*, or rather comparative anatomy.

ZOPHORIC. See the article **ZOOPHORIC**.

ZOPHORUS. See the article **ZOOPHORUS**.

ZOPISSA,

Z U I

ZOPISSA*, **ΖΟΠΙΣΣΑ**, *Naval-pitch*; a kind of mixture of pitch and tar, scraped off from ships that have been a long time at sea.

* The word seems formed from *ζωω*, *bullis*, I boil, and *πισσα*, pitch; *q. d.* concocted pitch.

This matter, by being gradually penetrated by the salt of the sea, becomes impregnated with its qualities; and being applied to the body, externally, is found resolute and defecative.

ZUINGLIANS, a branch of ancient Reformers or Protestants; denominated from their author Uldric, or Huldric Zuinglius.

This eminent divine was born at Wildchaufen, in the county of Toggenbourg in Switzerland, in 1487.—After having finished his studies in theology, and received the doctor's cap at Basil, in 1505, he applied himself to preaching; and that with good success.

Soon after Luther had taken up arms against Rome, Zuinglius, being then minister of the chief church in Zurich, fell in with him; he preached openly against indulgences, then against the intercession of the saints, then against the mass, the hierarchy, the vows and celibate of the clergy, abstinence from flesh, &c.

As to the eucharist, interpreting *hoc est corpus meum* by *hoc significat corpus meum*, he maintained, that the bread and wine were only bare significations, or representations of the body and blood of Jesus Christ; but in this he differed from Luther, who held a consubstantiation.

In a conference held with the deputies of the bishop of Constance, in 1523, he procured most of the external ceremonies of religion to be abolished.—As to matters of grace, Zuinglius seemed inclined to Pelagianism; giving all to

Z Y T

free-will, considered as acting by the meer strength of nature; in which he differed from Calvin.

ZYGOMA*, **ΖΥΓΜΑ**, in anatomy, a bone of the head, otherwise called *os jugale*. See **BONE**.

* The word is formed from *ζυγωμαι*, I join; so that *zygoma*, properly speaking, is the juncture of two bones.

The *zygoma* is no single bone, but an union or assemblage of two processes, or eminences of bones; the one from the *os temporis*, the other from the *os max.*—See *Tab. Anat. (Osteol.) fig. 2. lit. c.*

These two eminences, or apophyses, are joined together by a suture, thence called *zygomatikus*.

ZYGOMATICUS, a muscle of the head, which has its origin in the processus jugalis, or *zygoma*; and passing obliquely, is inserted near the angle of the lips.—It helps to draw the lips obliquely upwards.—See *Tab. Anat. (Myol.) fig. 1. n. 9. fig. 6. n. 4. fig. 7. n. 2.*

ZYGOMATICUS, is also an epithet given to the suture that binds the two processes of the *zygoma* together.

ZYMOSIMETER*, an instrument proposed by Swammerdam, in his book *de Respiratione*, wherewith to measure the degree of fermentation occasioned by the mixture of different matters; and the degree of heat which those matters acquire in fermenting; as also the heat or temperament of the blood of animals.

* The word is formed from *ζυμωσις*, fermentation, and *μετρον*, measure.

ZYTHUM, or **ΖΥΤΗΟΣ**, a sort of malt liquor, in use among the ancient Germans.

Matthiolus represents the ancient *zythum*, and *curmi*, as the same with our beer and ale.

F I N I S.



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An INDEX of Words and Articles which are explained under others,
and not mentioned in their alphabetical places.

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DEMY.
DENTES *Oculares*.
DENTES *Sapientie*.
DEPART, *Water of*.
DEPONERE, *Arma*.
DERIVATIVE *Affections*.
DERIVATIVE *Words*.
DESCENDENS *obliquus*.
DESCENDENTES *Cervicales*.
DESCENSION, *oblique*.
DESCENSUM, *par*.
DESCENT, *Distillation by*.
DESCENT, *Riens par*.
DESCRIPTION of the *Globes*.
DESCRIPTION, *organical*.
DESIGN, *Reduction of*.
DESIRE, *antecedent*.
DESIRE, *comme est*.
DETAINING, *forcible*.
DETERMINATE *Number*.

LUSTRAL.
MIDSUMMER.
QUARTER.
SABBATH.
TWELFTH.
YEAR.
GRACE.
SIGNAL.
TELESCOPE.
SUBDEACON.
WATER.
MESSE.
SUBDEAN.
CIVIL.
ARTICLE.
MASS.
ACCIDENTAL.
BOOK.
TALLY.
ARITHMETIC.
TITHING.
NONE & *decims*.
ADVOCATIONE.
MODUS.
NAIL.
QUARTER.
NEEDLE.
PARALLEL.
RECLINER.
ANTECEDENT.
DECREMENT.
SPECIES.
TITHING.
DECIPHERING.
COUNTERDEED.
ASSIGNEE.
CONDITION.
FORGER.
SURRENDER.
HUNTING.
NUMBER.
INDEFEISIBLE.
COMPLEMENT.
SE *defendendo*.
CHARTA.
PROPOSITION.
TORTURE.
ADDITION.
COMPARATIVE.
CONJOINT.
PARODICAL.
POSITIVE.
SUPERLATIVE.
AGNUS *Dei*.
ARGENTUM.
DENARIUS.
JUDICIUM.
PROBLEM.
EXCOMMUNICATO.
HÆREDE.
INDELIBLE.
CLERK.
JUSTICE.
LINE.
MISDEMEANOUR.
DEMAIN.
PAUSE.
RELIEVO.
VOLT.
APAGOGICAL.
OSTENSIVE.
DEMI.
OCULARES.
SAPIENTIE.
WATER.
ARMA.
AFFECTION.
WORD.
OBLIQUUS.
CERVICALES.
OBLIQUE.
PER *Disensam*.
DISTILLATION.
RIENS.
GLOBE.
{ CURVE, and
{ ORGANICAL.
REDUCTION.
ANTECEDENT.
SOIT *fait*.
FOP-*IBLE*.
NUMBER.

DEUM,

DEUM, *Te.*
 DEVOTION, *Homage of.*
 DEW, *mil.*
 DEW, *Honey.*
 DEXTER, *Bend.*
 DEXTER, *Bend, party per.*
 DIABOLI *morfus.*
 DIABOLICUM *Parliamentum.*
 DIACONATE.
 DIAEX, *Diapason.*
 DIAGONAL *Barometer.*
 DIAL, *azimuth.*
 DIAL, *catoptrical.*
 DIAL, *declining.*
 DIAL, *declining.*
 DIAL, *elliptical.*
 DIAL, *horizontal.*
 DIALS, *polar.*
 DIALS, *refracted.*
 DIAL, *universal.*
 DIAL, *Cock of.*
 DIAL, *Plane of.*
 DIAMETER, *apparent.*
 DIAMETER, *Figure of.*
 DIAMOND, *false.*

DIAPASON.

DIAPENTE.

DIAPHORETIC of Tin.
 DIAPHRAGMATIC Nerves.

DIATESSARON, *Diapason.*

DIAZEUCTIC *Syllogism.*
 DIAZUGMENON *Nete.*
 DICTATOR, *Pro.*
 DICTION, *obscurity of.*
 DIE, *sine.*
 DIEM, *post.*
 DIEN, *Ich.*
 DIES, *festi.*
 DIET, *imperial.*
 DIFFERENCE, *descensional.*
 DIFFERENCE, *numerical.*
 DIFFERENT, *equi.*
 DIFFERENTIAL *Calculus.*
 DIFFORM *Temperament.*
 DIGESTING *Fire.*
 DIGNITIES, *accidental.*
 DII *Manes.*
 DII *noventisler.*
 DIMINISHED *Angle.*
 DIMINUTION, *Diameter of.*
 DINOTRATES' *Quadratrix.*
 DIOCESAN *Synod.*
 DIOCESE, *Chancellor of.*
 DIOCESE, *Exarch of.*
 DIPT *Candles.*
 DIPT *Medals.*
 DIPTERE, *pseudo.*
 DIRE *Voir.*
 DIRECT *Confirmation.*
 DIRECT *Method of Fluxions.*
 DIRECT *Mood.*
 DIRECT *Percussion.*
 DIRECT *Proposition.*
 DIRECT *Line, succession in.*
 DIRECTION, *arch of.*
 DIRECTION, *converse.*
 DIRECTUM *Dominium.*
 DISCLAIMER, *recto sur.*
 DISCOIDAL.
 DISCOUS.
 DISEASE, *endemic.*
 DISEASE, *exotic.*
 DISEASE, *organical.*
 DISEASE, *periodic.*
 DISEASE, *popular.*
 DISEASE, *proleptic.*
 DISEASE, *similar.*
 DISEASE, *spurious.*
 DISEASE, *venercal.*
 DISCUST.
 DISJUNCT *Affection.*
 DISJUNCTIVE *Syllogism.*
 DISPERSION, *Point of.*
 DISSOLVING *Appropriation.*

TE *Deum.*
 HOMAGE.
 MILDEW.
 HONEY.
 BEND.
 PARTY.
 MORSUS.
 PARLIAMENTUM.
 DEACONRY.
 DIAPASON *Diaex.*
 BAROMETER.
 AZIMUTH.
 CATOPTRICAL.
 DECLINING.
 DEINCLINING.
 ELLIPTICAL.
 HORIZONTAL.
 POLAR.
 REFRACTED.
 UNIVERSAL.
 COCK.
 PLANE.
 APPARENT.
 FIGURE.
 FALSE.

DIS-DIAPASON,
 SEMI-DIAPASON, and
 TETRA-DIAPASON.
 SEMI-DIAPENTE,
 DIAPASON - DIAPENTE,
 and
 DISDIAPASON - DIA-
 TINE. [PENTE.
 NERVE. [SARON,
 DIAPASON - DIATES-
 DISDIAPASON - DIA-
 TESSARON, and
 SEMI-DIATESSARON.

SYLLOGISM.
 NETE.
 PRO-DICTATOR.
 OBSCURITY.
 SINE *Die.*
 POST *Diem.*
 ICH *Dien.*
 FESTI.
 IMPERIAL.
 DESCENSIONAL.
 NUMERICAL.
 EQUIDIFFERENT.
 CALCULUS.
 TEMPERAMENT.
 FIRE.
 ACCIDENTAL.
 MANES.
 NOVEMILES.
 ANGLE.
 DIAMETER.
 QUADRATRIX.
 SYNOD.
 CHANCELLOR.
 EXARCH.
 CANDLE.
 MEDAL.
 PSEUDO-DIPTERE.
 VOIR.
 CONFIRMATION.
 FLUXIONS.
 MOOD.
 PERCUSSION.
 PROPOSITION.
 SUCCESSION.
 ARCH.
 CONVERSE.
 DOMINIUM.
 RECTO.
 FLOWERS.
 ENDEMIC.
 EXOTIC.
 ORGANICAL.
 PERIODIC.
 POPULAR.
 PROLEPTIC.
 SIMILAR.
 SPURIOUS.
 VENEREAL.
 DISTASTE.
 AFFECTION.
 SYLLOGISM.
 POINT.
 APPROPRIATION.

DISTANCE, *accessible.*
 DISTANCE, *inaccessible.*
 DISTANCE, *meridional.*
 DISTANCE, *Sun's.*
 DISTANCE, *zenith.*
 DISTANCES and *Rhumbs.*
 DISTANT, *equi.*
 DISTILLATION of *Brandy.*
 DISTILLATUM *Acetum.*
 DISTINCT *Small-pox.*
 DITCH, *Tenaille of.*

DITONE.

DIVINA *virgula.*

DIVINATORIUS *Baculus.*

DIVINE *Faith.*

DIVINE *Fate.*

DIVINE *Law.*

DIVINE *Prebend.*

DIVINITY, *scholastic.*

DIVISE.

DIVISOR, *common.*

DIVORTIUM, *Cui ante.*

DIURNAL *Arch.*

DOCTRINE of *Sphere.*

DOG-Nails.

DOGS, *lawing of.*

DOGS, *worming of.*

DOGE, *vise.*

DOG-legged *Stairs.*

DOLLAR, *Rix.*

EXCICCATION.

FABLE, *Moral of.*

FACERE *Regalia.*

FACIA.

FACIAS, *fieri.*

FACIAS, *habere seismam.*

FACIAS, *levari.*

FACIAS, *recordari.*

FACIAS, *scire.*

FACIAS, *venire.*

FACIENDA *Allocatione.*

FACIENDA *Contributione.*

FACIENDA *Conversione.*

FACIENDA *Executione.*

FACIENDA *Perambulatione.*

FACIENDA *Reparatione.*

FACIENDO *alternate.*

FACT, *Covenant in.*

FACT, *Release in.*

FACTITIOUS *Allum.*

FACTITIOUS *Diamonds.*

FACTITIOUS *Salt-petre.*

FACTITIOUS *Vermillion.*

FACTIVE *Art.*

FACTO, *de.*

FACTUM, *non est.*

FACULTY of *Advocates.*

FACULTIES, *Master of.*

FECULENT.

FAILING.

FAIT, *soit comme il est desire.*

FAIT, *riens passe par.*

FAITH, *Article.*

FAITH, *Confession of.*

FALL, *land.*

FALL, *wind.*

FALLEN, *Crest.*

FALLIBLE.

FALLOWING, *twi.*

FALLOW, *ploughing of.*

FALSE *Judgment.*

FALSE *Medals.*

FALSE *Proposition.*

FALSE *Root.*

FALSE *Species.*

FALSE *Suture.*

FALSE *Deeds, Forger of.*

FALSITY.

FAMOUS.

FAN, *mounting of.*

FANCY.

FARM, *Fee.*

FARTHING, *smoak.*

FASCIA.

FASHIONS.

FAST, *hold.*

ACCESSIBLE.
 INACCESSIBLE.
 MERIDIONAL.
 SUN.
 ZENITH.
 CHART.
 EQUIDISTANT.
 BRANDY.
 ACETUM.
 FOX.
 TENAILLE.
 DIAPASON-DITONE,
 DISDIAPASON-DITONE,
 SESQUI-DITONE.
 VIRGULA.
 BACULUS, and
 VIRGULA.
 FAITH.
 FATE.
 LAW.
 PREBEND.
 SCHOLASTIC.
 DEVISE.
 COMMON.
 CUI ante.
 ARCH.
 SPHERICE.
 NAIL.
 LAWING.
 WORM.
 VICE-Doge.
 STAIRS.
 RIXDOLLAR.

EXSICCATION.

MORAL.

REGALIA.

FACE.

FIERI.

SEISINAM.

LEVARI.

RECORDARI.

SCIRE.

VENIRE.

ALLOCATIONE.

CONTRIBUTIONE.

CONVERSIONE.

EXECUTIONE.

PERAMBULATIONE.

REPARATIONE.

ATTURNATO.

COVENANT.

RELEASE.

ALLUM.

DIAMOND.

SALTPETRE.

VERMILLION.

ART.

POSSESSION.

NON est *factum.*

ADVOCATE.

MASTER.

FECULENT.

FAILURE.

JOIT.

RIENS.

ARTICLE.

CONFESSION.

LAND-FALL.

WIND-FALL.

CREST-FALLEN.

INFALLIBLE.

TWIFOLLOWING.

PLOUGHING.

JUDGMENT.

MEDAL.

PROPOSITION.

ROOT.

SPECIES.

SUTURE.

FORGER.

FALSHOOD.

INFAMOUS.

MOUNTING.

PHANTASY.

FEE-farm.

SMOAK.

FACE.

FARCIN.

HOLD-FAST.

FAT.
 FAT Waters.
 FATHIMITES.
 FATHERS of S. Lazarus.
 FATUS, *Lynx*.
 FAUCON.
 FAUCONRY.
 FAVOUR, *Resignation in*.
 FEAR, *panic*.
 FEAST of Purification.
 FEASTS, *marcable*.
 FEATHER, *Cut*.
 FEE, *alienating in*.
 FEE, *arriere*.
 FEE, *bar*.
 FEE, *base*.
 FEE, *frank*.
 FEE, *guaranty*.
 FEE, *hors de son*.
 FEE, *Knights*.
 FEE, *retaining*.
 FEEDING Fish.
 FEET, *Crovis*.
 FEET, *foudering in*.
 FEIGNED Recovery.
 FELONY, *Misprison of*.
 FEME, *Baron and*.
 FEMORIS *Quadratus*.
 FEMORIS *Rectus*.
 FENCE, *Frampole*.
 FENNEL-Seed.
 FENNEL-Water.
 FEODAL.
 FEODATARY.
 FEOFFAMENT *forma*.
 FERIE *sementina*.
 FERM, *frank*.
 FERREA *uba*.
 FESSE, *party per*.
 FEUD, *deadly*.
 FEUDARY.
 FEUDATARY.
 FIUDUM.
 FEUDI *apertura*.
 FEVER, *continend*.
 FEVER, *continued*.
 FEVER, *military*.
 FEVER, *military*.
 FEVER, *pestilential*.
 FEVER, *purple*.
 FEVER, *putrid*.
 FEVER, *secondary*.
 FIAL, or FIOL.
 FICHANT Flank.
 FICHANT Line of defence.
 FIDUCIAL Line.
 FIELD Officers.
 FIFTH Pair of Nerves.
 FIFTH Rate.
 FIGHTS, *close*.
 FIGHT, *Signals for*.
 FIGURATE Descant.
 FIGURATE History.
 FIGURE, *Academy*.
 FIGURES, *Arabic*.
 FIGURES, *curvilinear*.
 FIGURES, *equal*.
 FIGURE, *generating*.
 FIGURES, *hyperbol form*.
 FIGURES, *isoperimetric*.
 FIGURES, *like*.
 FIGURE, *mixt*.
 FIGURE, *plain*.
 FIGURE, *prime*.
 FIGURES, *reciprocal*.
 FIGURE, *residual*.
 FIGURE, *Ambit of*.
 FIGURE, *Measure of*.
 FIGURE, *Reduction of*.
 FILE, *half Rear*.
 FILIUS, *Terra*.
 FILLING, *Beam*.
 FILLINGS up of Vault.
 FILTRE.
 FINAL Execution.
 FINE, *super*.
 FINE, *common*.
 FINE, *post*.
 FINE, *Coinographer of*.
 FINES and Recoveries, *Clerk of*.
 FINE, *Note of*.
 FINES, *Tawing of*.
 VOL. II.

VAT.
 WATER.
 FATHIMITES.
 LAZARUS.
 IGNIS.
 FALCON.
 FALCONRY.
 RESIGNATION.
 PANIC Fear.
 PURIFICATION.
 MOVEABLE.
 CUT.
 ALIENATE.
 ARRIERE.
 BAR Fee.
 BASE Fee.
 FRANK.
 GUARANTY.
 HORS.
 KNIGHT.
 RETAINING.
 FISH.
 CROWS Feet.
 FOUNDERING.
 RECOVERY.
 MISPRISION.
 BARON.
 QUADRATUS.
 RECTUS.
 FRAMPOLE Fence.
 SEED.
 WATER.
 FEUDAL.
 FEUDATARY.
 CONTRA *formam*.
 SEMENTINÆ.
 FRANK FERM.
 ULNA.
 PARTY *per seffe*.
 DEADLY Feud.
 FEODARY.
 FEE.
 APERTURA.
 CONTINENT.
 CONTINUED.
 MILIARY.
 MILITARY.
 PESTILENTIAL.
 PURPLE.
 PUTRID.
 SECONDARY.
 PHIAL.
 FLANK.
 LINE.
 OFFICER.
 NERVE.
 RATE.
 CLOSE Fights.
 SIGNAL.
 DESCANT.
 HISTORY.
 ACADEMY.
 ARABIC.
 CURVILINEAR.
 EQUAL.
 GENERATING.
 HYPERBOLIFORM.
 ISOPERIMETRICAL.
 LIKE.
 MIXT.
 PLAIN.
 PRIME.
 RECIPROCAL.
 RESIDUAL.
 AMBIT.
 MEASURE.
 REDUCTION.
 REAR half File.
 TERRÆ Filius.
 BEAM filling.
 VAULT.
 FILTER.
 EXECUTION.
 SUPER-fine.
 COMMON.
 POST-fine.
 CHIROGRAPHER.
 CLERK.
 NOTE.
 TABLING.

FINE, *Camas pro*.
 FINITE Distress.
 FINITE Proposition.
 FIRDWITE.
 FIRE-Works, *artificial*.
 FIRE *chemie*.
 FIRE, *culinary*.
 FIRE, *naked*.
 FIRE, *olympic*.
 FIRE, *port*.
 FIRE, *Wheel*.
 FIRE, *gilding by*.
 FIRE, *Interdiction of*.
 FIRING, *Measure of*.
 FIRMA *alba*.
 FIRMA Terra.
 FIRME *Ejectione*.
 FIRST efficient Cause.
 FIRST formal Notion.
 FIRST objective Notion.
 FIRST Rate.
 FIRST Tithe.
 FIRST Year, Tree, *pruning*.
 FIRST Fruits, *Remembrancer*.
 FISH-Glue.
 FISHES, *crustaceous*.
 FISH, *stock*.
 FISHERY, *coral*.
 FISHING Line, *Float of*.
 FISSURE, *contra*.
 FISTULA *Lachrymalis*.
 FISTULOUS Ulcers.
 FITCHANT Flank.
 FITCHE, *double*.
 FIVE, *Ombre by*.
 FIVE, *Rule of*.
 FIXEDNESS.
 FIXT Alkali.
 FLAGON, *Shot*.
 FLAJOLET.
 FLANC.
 FLANDERS Blue.
 FLANDERS *Measure*.
 FLANK, *Angle, forming*.
 FLANK, *open*.
 FLANK, *Attack in*.
 FLANKED Column.
 FLANKING *a gle*.
 FLANNEL.
 FLAT *Bastion*.
 PURPLE.
 FLAT bottomed Moot.
 FLAT Roof.
 FLAT Wine.
 FLATULENCY.
 FLAX, *Hurds of*.
 FLEMISH Coin.
 FLEMISH Measures.
 FLEMISH Monies.
 FLEMISH Tyles.
 FLEXION of Knee.
 FLEXURE, *contrary, Point of*.
 FLIGHTWITE.
 FLINT-Walls.
 FLOATSAM.
 FLORA, *Field of*.
 FLORENCE.
 FLORENCE, *Barrel of*.
 FLORENTINE Thermometer.
 FLORETTE.
 FLORIANI.
 FLORID Attire.
 FLORID Descant.
 FLORUM omnium, *aqua*.
 FLOTTA.
 FLOURISHED Freezes.
 FLOWER of Antimony.
 FLOWER of Tin.
 FLOWERS, *Trust of*.
 FLOWERS, *Wharls of*.
 FLOWERS, *compound*.
 FLOWERS, *cucullate*.
 FLOWER, *discus*.
 FLOWERS, *erect*.
 FLOWER, *false*.
 FLOWERS, *filular*.
 FLOWERS, *imperfect*.
 FLOWERS, *ingeminated*.
 FLOWERS, *paled*.
 FLOWERS, *perfect*.
 FLOWERS, *radicated*.
 FLOWERS, *stamineous*.
 FLOWERS, *uniform*.

CAPIAS.
 DISTRESS.
 PROPOSITION.
 FERDWITE.
 ARTIFICIAL.
 CHEMISE.
 CULINARY.
 NAKED.
 OLYMPIC.
 PORT.
 WHEEL.
 GILDING.
 INTERDICTION.
 MEASURE.
 ALBA.
 TERRA.
 EJECTIONE.
 EFFICIENT.
 NOTION.
 RATE.
 TITHE.
 PRUNING.
 REMEMBRANCER.
 GLUE.
 CRUSTACEOUS.
 STOCK.
 CORAL Fishery.
 FLOAT.
 CONTRA-FISSURE.
 LACHRYMALIS.
 ULCER.
 FLANK.
 DOUBLE Fitchi.
 OMBRE.
 RULE.
 FIXITY.
 ALKALY.
 SHOT-flagon.
 FLAGFOLET.
 FLANK.
 BLUE.
 MEASURE.
 ANGLE.
 OPEN.
 ATTACK.
 COLUMN.
 ANGLE.
 FLANEL.
 BASTION.
 MOAT.
 ROOF.
 WINE.
 FLATUS.
 HURDS.
 COIN.
 MEASURE.
 MONEY.
 TYLE.
 GENUFLEXION.
 POINT.
 FLEDWITE.
 WALL.
 FLOTSON.
 FIELD.
 FLORIN.
 BARREL.
 THERMOMETER.
 FLORY.
 FLORINIANI.
 ATTIRE.
 DESCANT.
 AQUA.
 FLOTA.
 FREEZE.
 ANTIMONY.
 TIN.
 TRUS.
 WHARLS.
 COMPOUND.
 CUCULLATE.
 DISCUS.
 ERECT.
 FALSE.
 FITULAR.
 IMPERFECT.
 INGEMINATED.
 PALED.
 PERFECT.
 RADICATED.
 STAMINEOUS.
 UNIFORM.

FLOWERED Crowns.
 FLOWING, over.
 FLOWRY.
 FLUID, Elasticity of.
 FLUTED Column.
 FLUTES, cabled.
 FLUTINGS, Plutbands of.
 FLUX Small-pox.
 FLY of a Compass.
 FLY, fishing.
 FOCIALES.
 FORCUNDANS farina.
 FOG, Signals in.
 FOIL, counter.
 FOLD, frank.
 FOLIA pennata.
 FOLIA pinnata.
 FOLIATED Tartar.
 FOLLOWING Sections.
 FONT.

HABENDO returno.
 HABHDALAH.
 HABITUAL Assent.
 HEREDIS reptia.
 HEREDIS & Terra custodia.
 HAGA, Emir.
 HAGBUT.
 HAIR-Compass.
 HAIR, Tour of.
 HALF Duration.
 HALF Files, Rear.
 HALF-penny Board.
 HALF-jugated Confetti.
 HALSER.
 HALT, String.
 HALYARDS.
 HAMAC.
 HAMECH Confection.
 HAMPER.
 HAMPER, Clerk of the.
 HAMSTRINGING.
 HAMUS.
 HANCH.
 HAND.
 HAND-saw.
 HAND-vice.
 HAND, bloody.
 HAND, ambling in.
 HANDS, Imposition of.
 HAND, just Appui of.
 HANG out the white Flag.
 HANGINGS, Arras.
 HARBOROUGH Company.
 HARD Pulse.
 HARD Roe.
 HARD Soap.
 HARDENING, Case.
 HARE's Eye.
 HARE, Trace of.
 HARMONICA Trias.

HARMONICAL.

HARMONICAL Hand.
 HARMONICAL Trumpet.
 HARMONY, natural.
 HARPOCRATES.
 HARPONER.
 HARPOON.
 HATTERS Form.
 HATTERS Furnace.
 HAVING, Modes of.
 HAUBERGEON.
 HAUTGOUT.
 HAWARD.
 HAWK, ragged.
 HAWK, ramage.
 HAWK, weathering of.
 HAWSER, raising of.
 HAY, Truss of.
 HAY, Wood.
 HAYE.
 HEAD-borough.
 HEAD, Beak.
 HEAD, Bolt.
 HEADS, Bolt.
 HEADS, forked.
 HEAD, Hogs.
 HEAD, Moors.
 HEADFANG.
 HEARING Trumpet.

CROWN.
 OVERFLOWING.
 FLORY.
 ELASTICITY.
 COLUMN.
 CABLED Flutes.
 PLATBANDS of Flutings.
 POK.
 FLIE.
 FISHING.
 FECTALES.
 FARINA.
 SIGNALS.
 COUNTERFOIL.
 FRANK-fold.
 PENNATA.
 PINNATA.
 TARTAR.
 SECTION.
 FOUNT.

RETURNO.
 HABDALAH.
 ASSENT.
 RAPTU.
 RECTO.
 EMIR бага.
 HARQUEBUSE.
 COMPASSES.
 TOUR.
 SCRUFFLE.
 REAR half Files.
 BORD half penny.
 CONFECTS.
 HAWSER.
 STRING-HALT.
 HALLIARDS.
 HAMMOCK.
 CONFECTION.
 HANAPER.
 CLERK.
 HAMELING.
 UNGULA.
 HAUNCH.
 MILL.
 SAW.
 VICE.

See

BLOODY.
 AMELE.
 IMPOSITION.
 APPUI.
 FLAG.
 ARRAS Hangings.
 COMPANY.
 PULSE.
 ROE.
 SOAP.
 CASE-hardening.
 EYE.
 TRACE.
 TRIAS.
 CONTRAHARMONICAL, and
 ENHARMONICAL.
 HAND.
 TRUMPET.
 NATURAL.
 HERMHPROCRATES.
 HARPINEER.
 HARPING-Iron.
 FORM.
 FURNACE.
 MODES.
 HABERGION.
 HOGGE.
 HAYWARD.
 RAGGED Flawk.
 RAMAGE.
 WEATHERING.
 ROUSE.
 TRUSS of hay.
 WOOD-hay.
 HAY.
 BOROUGH.
 BEAK.
 BOLT.
 BULK.
 FORKED.
 HOGSHEAD.
 MOOR.
 HEADFANG.
 TRUMPET.

HEAT, actual.
 HEAT, Sand.
 HEAT, welding.
 HEAVEN.
 HEDGEBOOTE.
 HEDGE stalking.
 HEICETÆ.
 HEIGHT, accessible.
 HEIGHT, inaccessible.
 HEIGHT of Atmosphere.
 HEIR, Co.
 HELPING Verbs.
 HEMP, Hards of.
 HENRICUS, Piger.
 HEPATIC Waters.
 HEPATIS, Anima.
 HERBS, cauliferous.
 HERBS, gramineous.
 HERBS, polyspermous.
 HERETIC, negative.
 HERMETIC Column.
 HERMETIS trutina.
 HEROPHILI torcular.
 HETEROGENEAL.
 HETEROGENEAL Number.
 HETEROGENEOUS Air.
 HETEROGENEOUS Continuity.
 HHABAKKUK.
 HEICETÆ.
 HIDE, green.
 HIGH Admiral.
 HIGH Airs.
 HIGH Apparatus.
 HIGH Mafs.
 HIGH Treafon.
 HIGHER Geometry.
 HIGHER Kinds, Circles of.
 HIGHER Kinds, Cones of.
 HIGHER Kinds, Parabola's of.
 HIPPARCHUS's Period.
 HIPPOCRATICUM Vinum.
 HIRCINUS Sanguis.
 HISTORICAL Breezes.
 HISTORICAL Types.
 HISTORY, natural.
 HITH.
 HOBOY.
 HOG-LICE Wine.
 HOLD Land in Peirage.
 HOLD, Copy.
 HOLD, free.
 HOLDER, Copy.
 HOLDING, forcible.
 HOLES, Loop.
 HOLES, Port.
 HOLE, Scoper.
 HOLE, Well.
 HOLLAND Measure.
 HOLLAND, Sleazy.
 HOLLAND, States of.
 HOLLOW Bastions.
 HOLLOW Column.
 HOLY-Day Mafs.
 HOLY War.
 HOLY Water.
 HOLY Week.
 HOLY Virgin, Charity of.
 HOLY Ghost, Mafs of.
 HOMAGE, Receipt of.
 HOMAGE, Respite of.
 HOMINES bindeni.
 HOMINES quatuor prepositi.
 HOMMES prodes.
 HOMO legalis.
 HOMO ecce.
 HOMOGENEAL Continuity.
 HOMOLOGOUS Angle.
 HONOURARY Canons.
 HONOURARY Games.
 HONOREM, appropriari ad.
 HOOD, Rafter.
 HOODINGS.
 HOOK, Ward.
 HORARY, Circles.
 HORARY Line.
 HORIZON, apparent.
 HORIZONTAL Barometer.
 HORIZONTAL Line.
 HORIZONTAL Needle.
 HORNED Angle.
 HORSE-Guards.
 HORSE-radish-Water.

See

ACTUAL Heat.
 SAND.
 WELDING.
 MIDHEAVEN.
 HAYBOOTE.
 STALKING.
 HEICETÆ.
 ACCESSIBLE.
 INACCESSIBLE.
 ATMOSPHERE.
 COHEIR.
 VERB.
 HARDS.
 PIGER.
 WATER.
 ANIMA.
 CAULIFEROUS Herbs.
 GRAMINEOUS.
 POLYSPERMIOUS.
 NEGATIVE Heretic.
 COLUMN.
 TRUTINA.
 TORCULAR.
 HETEROGENEOUS.
 NUMBER.
 AIR.
 CONTINUITY.
 HABAKKUK.
 HEICETÆ.
 GREEN Hide.
 ADMIRAL.
 AIRS.
 APPARATUS.
 MASS.
 TREASON.
 GEOMETRY.
 CIRCLE.
 CONE.
 PARABOLA.
 PERIOD.
 VINUM.
 SANGUIS.
 FREEZE.
 TYPE.
 NATURAL.
 HITH.
 HAUBOY.
 WINE.
 PEERAGE.
 COPY-hold.
 FREE.
 COPY-holder.
 FORCIBLE Holding.
 LOOP Holes.
 PORT.
 SCOPER.
 WELL.
 MEASURE.
 SLEAZY.
 STATES.
 BASTION.
 COLUMN.
 MASS.
 WAR.
 WATER.
 WEEK.
 CHARITY.
 MASS.
 RECEIT of Homage.
 RESPITE.
 HUNDENI.
 PREPOSITI.
 PRODES.
 LEGALIS.
 ECCE.
 CONTINUITY.
 ANGLE.
 CANON.
 GAME.
 APPROPRIARE.
 RUFTER-head.
 WHOODINGS.
 WARD-HOOK.
 CIRCLE.
 LINE.
 APPARENT Horizon.
 BAROMETER.
 LINE.
 NEEDLE.
 ANGLE.
 GUARDS.
 WATER.

HORSE's Tail.
 HORSE, *light*.
 HORSE, *pouch*.
 HORSE, *stalking*.
 HORSE, *juniper*.
 HORSE, *heel of*.
 HORSE, *Major of*.
 HORSE, *Measure for*.
 HORSE, *rounding of*.
 HORSE, *rounding of*.
 HORSE, *Withers of*.
 HORSE, *Wolves Teeth of*.
 HORSEMAN, *Heel of*.
 HOT Baths.
 HOT Diamargariton.
 HOT Diatrthagacanth.
 HOT Waters.
 HOTEL.
 HOUR-Climate.
 HOURS, medicinal.
 HOURS, forty, *Prayers of*.
 HOUSE of Health.
 HOUSE, *Alms*.
 HOUSE, *Computing*.
 HOUSE, *Cydon*.
 HOUSE, *Glass, fire*.
 HOUSE, *Glass, furnace*.
 HOUSE, *green*.
 HOUSE, *monument*.
 HOUSE, *Pyg*.
 HOUSE, *Printing*.
 HOUSE, *round*.
 HOUSE, *Trinity*.
 HOUSE, *Wych*.
 HOUSE, *framing of*.
 HOUSE, *Honours of*.
 HOUSES, *Insurance, Policy of*.
 HOUSE of Commons.
 HOUSES, *Table of*.
 HOUSEHOLD Officers.
 HUMAN Lovers.
 HUMAN Music.
 HUMAN Ufnea.
 HUNGARY Green.
 HUNT, common.
 HURT, *Hoof*.
 HUYGEN's Level.
 HYDRAE cor.
 HYDRAULIC Column.
 HYDRAULIC Machine.
 HYDRAULIC Organ.
 HYDRAULIC Statue.
 HYDROSTATICAL Ballance.
 HYEMAL Solstice.
 HYOIDES.
 HYPERBOLA, *ambigenal*.
 HYPERBOLA, *diverging*.
 HYPERBOLA's, *equal*.
 HYPERBOLA, *equilateral*.
 HYPERBOLA, *nodated*.
 HYPERBOLA, *punctated*.
 HYPERBOLA, *redundant*.
 HYPERBOLION, *nete*.
 HYPERCHEMATIC Style.
 HYPOTHECARY Debt.
 HYPOTHETICAL Syllogism.
 HYSTERIC Waters.

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JACENT Succession.
 JAMBIC, *Galli*.
 JAMBUS, *Chimney*.
 JAMBUS, *Galli*.
 JAPAN Chins.
 JAPAN Silks.
 JAPAN Monies.
 JEANATORUM Domesticus.
 ICED Waters.
 ICY Ocean.
 IDIOMS, *Communication of*.
 JEWISH Year.
 IMPERIAL Water.
 IMPRESSA di.
 INARTIFICIAL Argument.
 INUNDATION.

MACEDONIAN Year.
 MACKAREL *spilling*.
 MACLE.
 MADRIGALESICO Style.
 MAGDEBURG Centuries.
 MAGISTERY of Antimony.

TAIL.
 LIGHT-Horse.
 PUNCH.
 STALKING.
 SUMPTER.
 HEEL.
 MAJOR.
 MEASURE.
 ROUND.
 ROWELLING.
 WITHERS.
 WOLVES.
 HEEL.
 BATH.
 DIAMARGARITON.
 DIATRTHAGACANTH.
 WATER.
 HOSTEL.
 CLIMATE.
 MEDICINAL.
 PRAYER.
 HEALTH.
 ALMS.
 COMPUTING.
 CUSTOM.
 FIRE.
 FURNACE.
 GREEN-HOUSE.
 MUNIMENT.
 PEST.
 PRINTING.
 ROUND.
 TRINITY.
 WYCH-House.
 FRAMING.
 HONOUR.
 POLICY.
 SPEAKER.
 TABLE.
 OFFICERS.
 LAW.
 MUSIC.
 USNEA.
 GREEN.
 COMMON.
 HOOF Hurt.
 LEVEL.
 COR.
 COLUMN.
 MACHINE.
 ORGAN.
 STATUE.
 BALLANCE.
 SOLSTICE.
 YOIDES.
 AMBIGENAL Hyperbola.
 DIVERGING.
 EQUAL.
 EQUILATERAL.
 NODATED.
 PUNCTATED.
 REDUNDANT.
 NETE.
 STYLE.
 DEBT.
 SYLLOGISM.
 WATER.

SUCCESSION.
 GALLIAMBIC.
 CHIMNEY.
 GALLIAMBUS.
 COIN.
 SILK.
 MONEY.
 DOMESTICUS.
 WATER.
 OCEAN.
 COMMUNICATION.
 YEAR.
 WATER.
 VIO.
 ARGUMENT.
 RIVER, and OVER-
 FLOWING.

YEAR.
 FISHING.
 MASCLE.
 STYLE.
 CENTURY.
 ANTIMONY.

MAGISTERY of Sulphur.
 MAGISTRATE, *curule*.
 MAGNA Pessa.
 MAGNATUM, *Scandalum*.
 MAGNET, *arsenical*.
 MAGNET, *Axis of*.
 MAGNETICAL Azimuth.
 MAGNETICAL Direction.
 MAGNETICAL Meridian.
 MAGNETICAL Needle.
 MAGNITUDE of the Earth.
 MAGNITUDE of the Stars.
 MAGNITUDE, *apparent*.
 MAGNUM Cape.
 MAGNUS Psaas.
 MAGNI Rotuli Ingressator.
 MAHOMETAN Epocœa.
 MAID, *marine*.
 MAIDS of Honour.
 MAIHEM.
 MAIL Campus.
 MAIN Guard.
 MAIN, *oyster le*.
 MAIOR.
 MAJOR, *Canis*.
 MAJOR, *Gastricus*.
 MAJOR, *Glutæus*.
 MAJOR, *obliquus capitis*.
 MAJOR, *obliquus oculi*.
 MAJOR Orders.
 MAJOR, *rectus internus capitis*.
 MAJOR, *rectus externus capitis*.
 MAJOR, *foratus anticus*.
 MAJOR, *Teres*.
 MAJOR, *Urfa*.
 MAJORES, *Barones*.
 MAJORES, *Ediles*.
 MAKERS, *Parcel*.
 MALE Plants.
 MALTESE Monies.
 MAMMILLARIS Areola.
 MAMMILLARES Caruncula.

MAN.

MAN, *Generation of*.
 MANERIO, *status de*.
 MANIFEST Acids.
 MANIFEST Qualities.
 MANIFOLD Proposition.
 MANNOR.
 MANOSCOPE.
 MANOUR.
 MANSARD Roof.
 MANUAL, *Sign*.
 MANUBIARY Column.
 MANUFACTORY, *woollen*.
 MANUFACTURE of Cloth.
 MANUFACTURE of Needles.
 MANUFACTURE of Paper.
 MANUFACTURE of Parchment.
 MANUFACTURE of Porcelain.
 MANUS, *dorsum*.
 MANUS, *interossei*.
 MANUS, *perforans*.
 MANUS, *perforatus*.
 MARBLE, *Mosaic work of*.
 MARBLE, *Sculpture in*.
 MARC.
 MARCH, *counter*.
 MARCH, *Order of*.
 MARE, *night*.
 MARIA, *Ave*.
 MARIE Balneum.
 MARINA Aqua.
 MARINE.

MARINE Barometer.
 MARINE Fountain.
 MARINE Freezes.
 MARINE Rainbow.
 MARINE Trumpet.
 MARINE Provelt.

SULPHUR.
 CURULE Magistrate.
 FOSSA.
 SCANDALUM.
 ARSENICAL Magnet.
 AXIS.
 AZIMUTH.
 DIRECTION.
 MERIDIAN.
 NEEDLE.
 EARTH.
 STAR.
 APPARENT.
 CAPE.
 PSAAS.
 INGRESSATOR.
 EPOCHA.
 MERMAID.
 HONOUR.
 MAHIM.
 CAMPUS.
 GUARD.
 OUSTER.
 MAYOR.
 CANIS.
 GASTRICUS.
 GLUTÆUS.
 OBLIQUUS.
 ORDER.
 RECTUS.
 SERRATUS.
 TERES.
 URSA.
 BARON.
 EDILES.
 PARCEL Makers.
 PLANT.
 MONEY.
 AREOLA.
 CARUNCULÆ.
 ALDERMAN.
 CHAIRMAN.
 EALDERM.
 FRIENDLEMAN.
 GAVELMAN.
 GENTLEMAN.
 HEBBERMAN.
 HODMAN.
 JOURNEYMAN.
 LAYMAN.
 MUSSULMAN, and
 YEOMAN.

Sec

GENERATION.
 STATUS de manerio.
 ACID.
 QUALITY.
 PROPOSITION.
 MANOR.
 MANOMETER.
 MAINOUR.
 ROOF.
 SIGN.
 COLUMN.
 WOOLLEN.
 CLOTH.
 NEEDLE.
 PAPER.
 PARCHMENT.
 PORCELAIN.
 DORSUM.
 INTEROSSEL.
 PERFORANS.
 PERFORATUS.
 MOSAIC.
 SCULPTURE.
 MARK.
 COUNTER-March.
 ORDER.
 NIGHT-Mare.
 AVE-MARIA.
 BALNEUM.
 AQUA.
 TRANSMARINE, and
 ULTRAMARINE.
 BAROMETER.
 FOUNTAIN.
 FREEZE.
 RAINBOW.
 TRUMPET.
 PROVOST.

MARINUM

MARINUM Finum.
MARINUS Pulmo.
MARITAGII Valere.
MARK.

MARKET, Clerk of.
MARRIAGE, frank.
MARRIAGE, solemn.
MARRIAGE, Bans of.
MARRIAGE, Forfeiture of.
MARRIAGE, frank, tenant in.

NABONASSAR, Epocha of.
NÆNIA.

NAIDS.
NAILS, clamp.
NAILS, port.
NAIPER'S Bones.
NAKED Stalk.
NAPIER'S Bones.
NARIUM, sector.
NASI, Columna.
NASI, Constrictores.
NASI, Dilatatores.
NASI, Dorsum.
NASI, Elevator.
NASI, Globulus.
NATA.
NATANT.
NATI, Post.
NATIONS quatre.
NATIVE Allum.
NATIVE Arsenic.
NATIVE Chinabar.
NATIVE Fossils.
NATIVE Sulphur.
NATURÆ Curiosi.
NATURÆ, Minima.
NATURAL Agents.
NATURAL Arbors.
NATURAL Astrology.
NATURAL Canon.
NATURAL Colcothor.
NATURAL Consumption.
NATURAL Delivery.
NATURAL Divination.
NATURAL Evil.
NATURAL Father.
NATURAL Flying.
NATURAL Forms.
NATURAL Foundation.
NATURAL Fruits.
NATURAL Glands.
NATURAL Good.
NATURAL Grace.
NATURAL Hawger.
NATURAL Lacea.
NATURAL Litharge.
NATURAL Month.
NATURAL Obligations.
NATURAL Perfection.
NATURAL Phosphori.
NATURAL Ports.
NATURAL Postures.
NATURAL Quantity.
NATURAL Religion.
NATURAL Road.
NATURAL Salt-petre.
NATURAL Theology.
NATURAL Vermilion.
NATURAL Wine.
NATURALIA Prima.
NATURALS, non.
NATURE of Air.
NATURE of Comets.
NAVAL Architecture.
NAVAL Army.
NAVAL Fountain.
NAVAL Pitch.
NAVICULARIS Fessia.
NAVY, Surveyor of.
NAVY, Treasurer of.
NAUTICA Pyxis.
NAZAREANS.
NEALING of Porcelain.
NECESSARY Novation.
NECESSITAS Trinoda.
NEGATIONIS Medium.
NEGATIVE Demonstration.
NEGATIVE Proposition.
NEGATIVE Theorem.

VINUM.
PULMO.
VALORF.
COUNTER-Mark, and
Half-Mark.
CLERK.
FRANK Marriage.
SOLERN.
BANNS.
FORFEITURE.
TENANT.

EPOCHA of Nabonassar.

NENIA.
NENADS.
CLAMP.
PORT.
NEPERS.
STALK.
NEPERS.
FORTOR.
COLUMNA.
CONSTRICTORES.
DILATATORES.
DORSUM.
ELEVATOR.
GLOBULUS.
NATTA.
NATANT.
POST-NATI.
QUATRE Nations.
ALLUM.
ARSENIC.
CINNABAR.
FOSSIL.
SULPHUR.
ACADEMY.
MINIMA.
AGENT.
ARBOR.
ASTROLOGY.
CANON.
COLCOTHAR.
CONSUMPTION.
DELIVERY.
DIVINATION.

See

EVIL.
FATHER.
FLYING.
FORM.
FOUNDATION.
FRUIT.
GLAND.
GOOD.
GRACE.
HUNGER.
LACCA.
LITHARGE.
MONTH.
OBLIGATION.
PERFECTION.
PHOSPHORI.
PORT.
POSTURE.
QUANTITY.
RELIGION.
ROAD.
SALT-PETRE.
THEOLOGY.
VERMILION.
WINE.
PRIMA.
NON-NATURALS.
AIR.
COMET.
ARCHITECTURE.
ARMY.
FOUNTAIN.
PITCH.
FOSSA.
SURVEYOR of the Navy.
TREASURER.
PYXIS.
NAZARITES.
PORCELAIN.
NOVATION.
TRINODA.
MEDIUM.
DEMONSTRATION.
PROPOSITION.
THOREM.

NEGLIGENT Escape.
NEPHRITIC Waters.

PACE, in.
PACIS Ofculum.
PACIS securitate.
PAD-Saddle.
PAGAN'S Fortification.
PAGNOTE, Mount.
PAILLIER.
PAINS, after.
PAINS, nocturnal.
PAINTERS Glazs Furnace.
PAINTING of Porcelain.
PAL, Fendue en.
PALATI sacri quæstor.
PALEING.
PALED, counter.
PALL.
PALM, Oil of.
PAN-Tiler.
PLANT, annual.
PLANT, capillary.
PLANT, capsulate.
PLANT, cormiculate.
PLANT, corymbiferous.
PLANT, cucurbitaceous.
PLANT, dorsiferous.
PLANT, exotic.
PLANT, frumentaceous.
PLANT, imperfect.
PLANT, pentapetalous.
PLANT, sensitive.
PLANT, tergisofatous.
PLANT, umbelliferous.
PLANTS, Diseases of.
PLANTS, Parenchyma of.
PLANTÆ capitata.
PLANTÆ capresolata.
PLANTÆ fundus.

PLANTATION.

PLANTING.
PLATE-Glafs.
PLATFOND.
PLATIC Aspects.
PLEA, counter.
PLEA-Wood, Court.
PLEAS, Clerk of.
PLEAS, common, Prothonotary of.
PLEA, double.
PLEAD.
PLEAD in Arrest.
PLEBII Ediles.
PLEDGE, safe.
PLEGGERY.
PLEGIIS acquietandis.
PLEVIN, non.
PLEXUS mesentericus.
PLINTHS, Course of.
PLOT, counter.
PLOTTOON.
PLOUGH, Peace of.
PLOUGH, trenching.
PLUMBERS Furnace.
PLUMB Level.
PLUMB-LINE.
PLUMB-RULE.
PLUME Allum.
PLURA, Quæ.

PNEUMATICAL, Hydraul.

POEM, Action of.
POENA, Sub.
POENA talionis.
POEON.
POETICAL Elegancies.
POETICAL Licence.
POETICAL Numbers.
POETICAL Pleiades.
POETRY, dithyrambic.

QUADRABILIS Testudo.
QUADRANT, Gunter's.
QUADRANT, sinical.
QUADRANT, triangular.
QUADRATA, Cmo Musculosa.
QUADRATES, sequi.
QUADRATIC Parabola.
QUADRATURE of Curves.

ESCAPE.
WATER.

IN Pace.
OSCULUM.
SECURITATE.
SADDLE.
FORTIFICATION.
MONT Pagnat.
PAILLER.
AFTER-Pains.
NOCTURNAL.
FURNACE.
PORCELAIN.
FENDUE en Pal.
QUASIOR.
PALING.
COUNTER-paled.
PALLIUM.
OIL of Palm.
TYLE.
ANNUAL Plant.
CAPILLARY.
CAPSULATE.
CORNICULATE.
CORYMBIFEROUS.
CUCURBITACEOUS.
DORSIFEROUS.
EXOTIC.
FRUMENTACEOUS.
IMPERFECT.
PENTAPETALOUS.
SENSITIVE.
TERGISOFATOUS.
UMBELLIFEROUS.
DISEASE.
PARENCHYMA.
CAPITATÆ.
CAPREOLATÆ.
FUNDUS.

IMPLANTATION, and
TRANSPLANTATION.

REPLANTING.
GLASS.
PLAFOND.
ASPECT.
COUNTER-PLEA.
WOOD-Plea Court.
CLERK.
PROTHONOTARY.
DOUBLE.
IMPLEAD.
ARREST.
ÆDILES.
SAFE-Pledge.
PLEGGERY.
ACQUIETANDIS.
NON-PLEVIN.
MESENTERIC.
COURSE of Plinths.
COUNTER-PLOT.
PLATTOON.
PEACE.
TRENCHING.
FURNACE.
LEVEL.

PLUMMET.
ALLUM.
QUÆ plura.
HYDRAULO-PNEU-
MATICAL.
ACTION.
SUBPOENA.
TALIO.
PÆAN.
ELEGANCY.
LICENCE.
NUMBER.
PLEIADES.
DITHYRAMPIC.

TESTUDO.
GUNTER'S Quadrant.
SINICAL.
TRIANGULAR.
CARO.
SESQUIQUADRATE.
PARABOLA.
CURVE.

QUADRATI

S A I

QU. *cus* *promator* *radii*.
QU. *uple* *winding* *tairs*.
QU. *resor*, *Pro*.

SABATIC Year.
SACCHARINE Allun.
SACRODOTAL Crown.
SACRODOTAL Title.
SACRAMENTALIS Le.
SACRED Buildings.
SACRED Criticism.
SACRED Diptychs.
SACRED Games.
SACRED History.
SACRI Palatii *quæst.*
SACRIFICES, King of.
SACRORUM, Duumviri.
SACRUM Oils, Nervous.
SACRIS absolutio a.
SAIL, yards.
SAIL, Bunt of.
SAIL, cut.
SAIL, drift.
SAIL, fore.
SAIL, prest.
SAILS, short.
SAILING, middle Latitude.
SAILING, oblique.
SAILING, parallel.
SAILING, plain.
SAILING, right.
SAILLANT.
SAINTS, Mass of.

See

PROMATOR.
STAIR.
PROQUESTOR.

YEAR.
ALLUM.
CROWN.
TITLE.
LEX.
BUILDING.
CRITICISM.
DYPTYCHS.
GAME.
HISTORY.
QUESTOR.
KING.
DUUMVIRI.
NERVES.
ABSOLUTION.
YARD.
BUNT.
CUT.
DRAFT.
FORE.
PREST.
SHORT.
MIDDLE Latitude.
OBLIQUE.
PARALLEL.
PLAIN.
RIGHT.
SAILANT.
MASS.

S A N

SAINTS, Suffrages of.

SAIQUE.
SAK.
SAL Emixum.
SALADE.
SALE by Inch of Cavalie.
SALE, Bill of.
SALE, Port.
SALIENS, punctum.
SALIENT, counter.
SALINE Waters.
SALIQUE.
SALLAD.
SALLET.
SALMON Fishery.
SALPENSÆUS, Palato.
SALT Fish.
SALT of Lead.
SALT of Tartar.
SALT of Tin.
SALTPETRE.
SALT, Spirit of.
SALT, Attic.
SALTS, esurine.
SALTS, neutral.
SALT, white.
SALTANS, Capra.
SALTED Hide.
SALVAGE.
SALVE, Weapon.
SAMBUCINUM, Acetum.
SANCTIFYING Grace.
SAND, casting in.

See

SUFFRAGE.
SAICK.
SAC.
ENIXUM.
SALET.
CANDLE.
BILL.
PORTALE.
PUNCTUM.
COUNTERSALIENT.
WATER.
SALIC.
SALET.
FISHERY.
PALATOSALPENSÆUS.
FISH.
LEAF.
TARTAR.
TIN.
REFINING.
SPIRIT.
ATTIC.
ESURINE.
NEUTRAL.
WHITE.
CAPRA.
HIDE.
SAVAGE.
WEAPON-salve.
ACETUM.
GRACE.
CASTING.

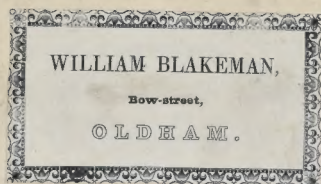
T H E E N D.





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WILLIAM BLAKEMAN,

Bow-street,

OLDEHAM.

